

ON THE RISE OF OLD ENGLISH SECONDARY NON-FRONT SHORT VOWEL PHONEMES

ALFRED RESZKIEWICZ

University of Warsaw

The purpose of this paper is to outline, in phonemic-allophonic terms, the prehistoric development of Old English secondary non-front short vowels. As the title itself implies the author is convinced that the digraphs *ie, io, eo, ea* in words such as *ierming, iorre, weorc, hearm* represented, first, simple nuclei (vowels), not diphthongs¹; secondly, that they were distinct phonemes, different from, and not allophones of, the corresponding front phonemes /i e æ/². They are termed 'secondary' to differentiate them from the primary back vowels /u o a/, before which palatalization did not take place. Cf. OE *gūma, gōs, gāt* vs. *giernan (giornan) /jǣrnan/, georn /jǣrn/, geard /jǣrd/³. They are termed by the cover term 'non-front' so as to include the possibility to treat them both as back and central (details below)⁴.*

¹ This was voiced by the author as early as 1953. Full references on the problem are found in Kuhn 1961: 522, to which one might add Jassem 1953 (of. n. 19, p. 173) and Ney 1968.

² So especially Hockett 1959, Antonsen 1961 and 1965. A different but untenable position is held by Stockwell 1958 and Stockwell and Barritt 1951. It is untenable because if one agrees that [i e a] were only allophones of /i e æ/, one must accept that [r] and [ʀ], as well as [l] and [ʎ], were all different phonemes, /r ʀ l ʎ/. Tertium non datur. Cf. Reszkiewicz 1953 and 1961: 89-90 and Fisiak 1967.

³ The phonetical values of the vocalic symbols used in this paper are shown in the following table:

	Front		Central	Back	
	Spread	Rounded	Spread	Spread	Rounded
High	i	y	ɨ	ɯ	u
Mid	e	ø	e	ɛ̃	o
Low	æ	ɑ̃	ɑ̃	ɑ̃	ɑ̃

The symbols used by E. Antonsen, and in the discussion of his approach, are shown in the table p. 28 centre.

⁴ Cf. Hockett's terms 'a high unrounded central-to-back vowel /i/' or 'a mid unrounded central-to-back vowel /e/' (1959: 595).

The immediate cause of writing this paper is Elmer H. Antonsen's very interesting and suggestive article on Germanic umlaut published in *Language* 1961 (in which the rise of Old English secondary back vowels is also discussed) which, ingenious as it is, cannot fully satisfy the student of English philology and cannot be fully accepted as it stands. If however certain important corrections are made, we shall be, I believe, in possession of a theory that will explain realistically the Old English system of short vowels not only from the synchronic point of view, which in the main (for Old Anglian) has been done by Hockett (1959), but also from the diachronic point of view, with the inclusion of West-Saxon.

Some of the points that one has to disagree with in Antonsen's theory and that must be revised are the following (in order of the discussion that follows):

- 1) his contention that *æ* in OE *æþeling* cannot represent the *i*-mutation of *a*;
- 2) his belief that the stressed vowels in */fat/ and */æþuling-/ were central before the Anglo-Frisian fronting;
- 3) his claim that *ea* cannot be the result of a back mutation of *æ*;
- 4) his belief that allophones could have developed as early as Proto- and North-West-Germanic and had waited until Old English times to be phonemized;
- 5) his relative chronology of sound changes, especially that *i*-umlaut occurred before the Anglo-Frisian shift of /a/.

Antonsen argues that *æ* in *æþeling* cannot represent the *i*-mutation of *a*, because 'the latter could not have been rounded [=round]...' (225), hence he postulates a low-mid central allophone/phoneme "ə" (219, 220). Here he overlooks the fact that when WG */ā/ > AF */æ/ (as reflected in WS *ǣl* 'eel') and when WG */aj/ > AF */ā/, this new *ā* was structurally round (as /ō ū/ in the back series were). Consequently, when WG */a/ split into AF */æ/ and */a/, the latter, on analogy to /ā/, was also structurally round. Now if we agree that the Anglo-Frisian fronting took place before mutation and that the Anglo-Frisian vocalic system before mutation was as follows:

	Front Spread	Back Rounded
High	ī	ū
Mid	ē	ō
Low	ǣ	ā

then it becomes evident that just as /ū/ were mutated to /y/, and /ō/ to /ō̄/, so also /ā/ (back round) could have been mutated to /ā̄/ (front round), which immediately shifted (hence Hockett's 'hole in the pattern', 1959: 576) to /ǣ/, just as later on /ō/ > /ē/, and still later /y/ > /ī/.

That there was a difference between OE /æ/ derived from Gmc. /a/ by the Anglo-Frisian fronting and OE /æ/ derived from Gmc. /a/ by *i*-umlaut ('sec-

ondary') is not seen in Antonsen's examples *æþeling* (<PG */apuling-/) and *fæt* (<PG */fata-/) but it can be seen if another parallel pair is taken, e. g. *gædeling* (<PG */gaduling-/), which shows no palatalization, and *gæf*, *geaf* (<PG */gaf/), which does.

In other words the development of *gæf*, *geaf*, with palatal /j/, and that of *gædeling*, *geaduling*, with velar /g/, are to be reconstructed as follows:

WG	AF ₁	AF ₂	OE ₁	OE ₂	
*/gaf/	*/gæf/	*/gæf/	*/jæf/	*/jæf/	<i>gæf</i> , <i>geaf</i>
*/gaduling/	*/gad-/	*/gad-/	*/gād-/	*/gæd-/	<i>gæduling</i>

and there seems to be no reason to posit a lower-mid central phoneme */ə/; rather one has to posit, as an intermediate link, a low front round phoneme /ā̄/ as suggested above.

Antonsen contends that the stressed vowel in */fat/ and /ǣþuling/ were both central before the "shift forward" (=Anglo-Frisian fronting) and both front (/ǣ/) after the shifting, i.e. that '[ǣþuling-] > [ǣ̄þuling-]' and '[fat] > [fæt]' (225). Now if this were true the problem arises how to explain the palatal /j/ in *geat* (= /jæt/) and the velar /g/ in *gædeling*, in forms which are exact parallels to *fæt* and *æþeling*. The only reasonable answer seems to be that the two forms had different vowels (as to the front-back opposition), after the fronting (and before the palatalization).

Here the traditional explanation is to be preferred. After the Anglo-Frisian fronting the vowel in the antecedents of OE *fæt*, *gæt* (*geat*), *gæf* (*geaf*) must have been a front one, but in the antecedents of *æþeling*, *gædeling* it was not, not even central, as shown in the preceding paragraph, but rather a back variety i.e. /a/ (*/apuling/, */gaduling/). Consequently any positing of a central allophone or phoneme ə for that stage of the history of the English vocalic system is unnecessary, and unwarranted.

Antonsen claims (226) that *ea* cannot be the result of a back mutation of *æ* because it is impossible 'to reconcile *ea* as the back mutation of *æ*, and *æ* as the front mutation of *a*' ... 'since the contrast spread-rounded cannot be present' and consequently he claims both should result in a central phoneme. Now if we accept, as we should, that by 'breaking' and 'velar-umlaut' /i/ > /u/ and /e/ > /ʌ/ (= /ē/), so also we have to accept that /æ/ (front unrounded) could 'change, by breaking, etc., into /ā/ (back unrounded), which was in contrast with /a/ (back rounded, as shown above), just as /u/ was in contrast with /u/ and /ʌ/ (= /ē/) with /o/. In other words the structural contrast spread-rounded could have existed in Old English at a very early period in the low series too, and consequently *ea* could have resulted from *æ* by back mutation.

It was only at a later date when /ā̄/ > /ǣ/ that /ā̄/ became phonetically central, still structurally back (cf. Hockett 1959: 576). Besides, the fact that

ea must go back to older /æ/ is demonstrated for instance by OE *geard* /jard/ <Proto-Gmc */gard/, which first had to be fronted to */gærd/ in order to produce palatalization of [g] > [ǰ] (unfronted /a/, as in **gaduling*, would produce no palatalization, cf. OE *gædeling*) and only then retracted to the Old English form with palatal /j/ and back unrounded /a/.

Antonsen claims that many allophones that were phonemicized in pre-historic Old English had developed as early as Proto-Germanic and North-West Germanic times. So we are told (219-20) that a back allophone of /e/, [ʌ], an unrounded vowel with the tongue position of [o], developed when /e/ came to stand before /-u/. If this were true we could not account for the palatal value of the initial consonant, say in OE *geolu* 'yellow'. Gmc. */gelw(a)-/ could have developed into OE /jelu, jɛlw-/ only if Gmc. /g/ was followed by a front vowel, e.g. [e], not by a back vowel, rounded or spread. In fact the back variant [ʌ] which later on gave OE /ə/ as in *jeolu*, *georn*, etc., must have developed only after Gmc. /g ~ ǰ, k/ were palatalized (i.e. after *g > ǰ, ǰ > j, k > ǰ*).

Finally Antonsen operates with the assumption as if *i*-umlaut, *u*-umlaut and breaking occurred before the Anglo-Frisian fronting of WG */a/ (as in */sat/ > */sæt/). He writes:

'Before the shift of the /a/ phoneme in Anglo-Frisian... the /a/ phoneme was realized in four allophones: front raised [æ] before /-i/, e.g. n.a.pl. [gæsti-]; central raised [ɛ] before /-u- + /-i/, e.g. [ɛpuling-]; back raised [ɑ] before /-u/, e.g. n.a.pl. [fatu]; and central low [a] before /-a/, /-e/, and /-/ (as well as nasals), e.g. g.pl. [fata], d.sg. [fate], n.sg. [fat]. At this point, however, the /a/ phoneme, including its various allophones, shifted forward... while [a] underwent a split...' (225).

This assumption (that the Anglo-Frisian fronting followed the umlauts) is not confirmed by internal reconstruction.

First, items such as *gæten* (<*/gaitǫn-/), *cæġ*, *cæġa* 'key' demonstrate that the palatalization of velars must have taken place before *i*-umlaut, i.e. before (low) back vowels were fronted, otherwise it would be difficult to account for the fact that in *gæten*, *cæġ*, etc., no palatalization took place⁵.

⁵ To avoid misunderstanding this point requires explanation. In his more recent article (1965: 33-35) Antonsen explicitly claims that Gmc. /ai/ had two variants, [æi], 'normally', and [ææ], before /-a/, which in North-West-Germanic were phonemicized, i.e. became respectively /ai/ (= [æi]) in most environments, but [œu] before /-u/ and /æ/ (= [ææ]) to account for the Old English development of /ai/ > /ē/ (1965: 33n. 50) and as evidence for positing /æ/ along with /ai/ for North-West-Germanic he quotes Old English *dāl* 'dole' and *dæl* 'deal', the former being the reflex of Proto-Gmc. /ai/ before /-a/ (PG */daila-/, NWG */dæl-), the latter that of PG /ai/ before /-i/ (PG */daili-/, NWG */dæil-.) (34 n. 56).

So far as this pair, taken in isolation, is concerned, everything seems correct. If however a pair of examples with an initial /g-/ is considered as for instance OE *gāt* 'goat' and *gæten* 'of a goat', the former being the reflex of Proto-Gmc. */gait-/ (cf. Goth. *gaita*),

Second, items such as OE *geat* : *gata* (phonologically /jæt/ : /gata/, both from WG */gat, gata/), show that the Anglo-Frisian fronting of WG /a/ must have occurred before the palatalization, otherwise it would be hard to explain the fact that in the first item of the pair we have /j/ and in the second /g/.

Third, items such as OE *geard* /jard/ 'yard', *ǰearn* /jarn/ 'yarn' (<WG */gard/, */garn/) show that fronting of WG */a/ must have occurred before the palatalization and before *u*-umlaut (breaking), otherwise it would be hard to account for the shift /g/ > /j/ before a nonfront vowel.

From the above three premises it follows that fronting must have preceded both palatalization and the umlauts, and the relative chronology was: 1) fronting, 2) palatalization, 3) umlauts⁶.

One of the most useful suggestions proposed by Antonsen, for which he deserves especially high credit, is his theory of simultaneous or 'combined umlaut', in which 'the retracting influence of /r/+consonant and the fronting influence of /-i/ counteracted each other to produce the 'high central spread allophone [ɛ̄]...' as well as the 'high-mid central (spread) allophone [ɛ̄]' (1961 : 227).

In this way the rise of WS *ie* /i/ as in *giernan*, *ierming* is elegantly and convincingly explained. (Ibid.)

Two comments however are here in order.

First, this combined influence of fronting and retracting forces upon the umlauted vowel need not have operated as early as Proto-Germanic (227). As far as the prehistory of English is concerned, it should be placed not earlier than the period after the palatalization of velars before front vowels. Thus

the latter being the reflex of Proto-Gmc. */gaitǫn-/ (cf. Goth. *gaita*), one is entitled to ask, and to receive a reliable answer, why in *gæten*, developed allegedly from NWG */gaitǫn-/, the initial /g/ was not palatalized in Old English though it stood before a front vowel ([æ]). Besides it must be added that this is not the only example; witness for instance *gæst* 'breath' <*/gaistiz/ (Campbell 1959 : §636) and *gæstan* 'frighten' <*/gaistjan-/ beside *gāst* <*/gaistaz/; *gæling* 'delay' (cf. OIcel. *geila* 'separate') beside *gāl* 'gay' (OHG *geil*); *gæred* 'wedge-shaped' beside *twigærele* 'cloven' (Hall 1962) beside *gār* 'spear' <PG */gaizaz/ (cf. OIcel. *geirr*). Besides if the evidence for NWG /æ/ (≠ /ai/) presented by OE *dāl*/*dæil* (n. 56) is correct then the statement that the contrast /ai/ and /æ/ was levelled in pre-English in favour of /æ/ (n. 58) must be incorrect. And if the statement of note 58 is correct, then the "evidence" of note 54 is gone and there is no need to posit NWG /ai/ and /æ/ as two different clusters.

⁶ This relative chronology differs to a certain degree from that given by Campbell (1959 : 109) for two reasons: a) Campbell dissociates breaking from back mutation, b) he treats certain orthographic phenomena as phonological processes (hence stems his 'palatal diphthongization of front vowels' and his conclusion that 'breaking must be regarded as the earlier change [than *i*-umlaut]' (108). In our opinion the rise of a form such as *georn* was as follows: /gern/ > /ǰern/ > /ǰern/ spelled *georn*, where <eo> indicates both the palatal value of <g> and the retracted central phoneme /ə/ (cf. Reszkiewicz 1953 : 196; 1961 : 51 - 52, §161).

in */girnian/, first [g] was fronted to [g̊] (later on /j/) and only then [i] was retracted to [ɛ] and not the other way round, which would be contrary to known phonetic facts.

Second, cases such as Proto-Gmc. */apuling-/ and Proto-Gmc. */girnian/ should be kept apart. That these represent not quite identical phenomena seems to follow from the fact that the former (let's call it discontinuous combined umlaut since the umlauting forces are placed in two successive syllables different from that of the umlauted vowel, as in *a-*p̄u*-ling- or *a-*p̄*-ul-ing) is not indispensable for the prehistory of Old English vocalism, but the latter (when the umlauting forces are more contiguous as in *gir-ni-an) is, and consequently should be included in Old English diachronic phonology.

A revised version of the prehistoric phonemic-allophonic development of the simple vocalic nuclei from North-West Germanic to Early Old English, as I see it, can now be outlined.

Stage 1 (North-West Germanic).

The system consisted of five phonemes /ieaou/, with rather no allophones to be postulated at that stage, that would be common to both pre-West- and pre-North-Germanic.

This starting point differs markedly from Antonsen's (1961 : 220, 1965: 28), where he postulates at that stage the following phonemic-allophonic system:

	Spread		Rounded
High	/i/ [ɪ]		[y] /u/
Mid	/e/ [ʌ]		[ø] /o/
Low		[æ] [ɐ] [a]	
		/a/	

In the present version the system at that stage is believed to be simply as follows⁷:

	Front (Spread)		Back (Rounded)
High	/i/		/u/
Mid	/e/		/o/
Low		/a/	

Stage 2 (Pre-Anglo-Frisian or Early Anglo-Frisian).

In the Ingveonic area, the centre of Germanic and Germanic innovations,

⁷ At this moment it might be possible, though not necessary (see note 9 below), to posit, with Twaddell (1948 : 296), the following allophonic system:

	Spread		Rounded
High	[i]		[y, u]
Mid	[e]		[ø, o]
Low		[æ, a]	

a tendency set in to develop a front and a back allophone of the low central phoneme /a/ and in this way to fill in the two empty holes in the pattern, one for a low front spread phoneme and one for a low back rounded phoneme. With this development a perfect symmetry was achieved (3×2 pattern, with the oppositions high, mid, low on the one hand, and front spread vs. back rounded on the other) except that at that stage [æ] and [a] were not yet phonemicized.

	Front Spread		Back Rounded
High	/i/		/u/
Low	/e/		/o/
Mid	[æ]	← /a/ →	[a]

Stage 3 (Anglo-Frisian and/or pre-English).

With the Anglo-Frisian fronting of NWG /ā/ > /ǣ/, and the monophthongization of /aj/ > /ā/ completed, and with the rise of phonemic opposition front spread vs. back rounded in the low series established, also the original allophones [æ] and [a] were phonemicized (cf. Krupatkin 1969 : 43)⁸. Even if at first the two were not contrastive, they were certainly each a distinct bundle of distinctive features, /æ/ being front (spread) and low, /a/ being back (rounded) and low. As a result the system consists now of six phonemes, three front spread vowels /i e æ/ and three back rounded vowels /u o a/, arranged in three degrees of opening: high, mid, low. (Cf. Reszkiewicz 1961 : 42).

Stage 4 (Very Early Prehistoric English).

At this stage, after the palatalization of velars before front vowels and /j/, the back rounded vowels develop front rounded allophones [y ø ā] before /i, j/ in the following syllable, and /æ/ develops a higher allophone [ɛ]⁹. At the same time the front spread vowels develop back spread allophones [ɪ ɐ ä] before /u/ and /r, l/+consonant and before /x/. In addition to that the front spread vowels /i, æ/ from combined umlaut 'when the retracting influence of /r/+consonant and the fronting influence of /-i/ counteracted on each other'

⁸ This is contrary to what I expressed years ago (1953 : 132).

⁹ There is a theoretical possibility that front round allophones might have developed before the palatalization of velars (because velars would not be palatalized before rounded vowels any way), whereas back umlaut could not have taken place, even on the allophonic level, before the palatalization of velars (because in that case velars would not be palatalized before back vowels, round or unround, as they were). Yet the simultaneous operation of the two umlauts is preferable on the following grounds:

a) both breaking and velar umlaut are essentially the same phenomenon (Hockett 1959 : 595; cf. Antonsen 1961 : 226);

b) combined umlaut (Antonsen 1961 : 227) could have arisen if the two opposite forces were operating at the same time;

c) simplicity of statement.

(Antonsen 1961 : 227) develop the central allophones [ɨ] and [ɛ̃]. In this way WG */girnian/ becomes *[girnian] (to give later on WS *giernan*) and WG */arming/, AF */ærmīng/ becomes *[ɛ̃rming] (WS *ierming*, non-WS *ermīng*). At this stage the phonemic-allophonic system was then as follows:

	Front Spread	Back Rounded
High	/i ~ i ~ ɨ/	/y ~ u/
Mid	/e ~ ɛ̃/	/ø ~ o/
Low	ɛ̃ ~ ɛ̃	/ä ~ a/

Stage 5 (Prehistoric Old English).

On the loss of the factors conditioning the umlauts (loss of /j, i, u/ in well known conditions) five allophones from the previous stage, [ɨ ɨ ɛ̃ ä], are phonemicized (> /i ɨ ɛ̃ ä/) and [ɛ̃] merges with /e/. The resulting system is then as follows¹⁰:

	Front		Central	Back	
	Spread	Rounded	Neutral	Spread	Rounded
High	/i/	/y/	/ɨ/	/ɨ/	/u/
Mid	/e/	/ø/	/e/	/ɛ̃/	/o/
Low	/æ/	/ä/	—	/ä/	/a/

This prehistoric Old English system of fourteen simple vowel phonemes undergoes reduction on different lines in different dialects, except that /ä/, if not followed by nasal, merged everywhere with /æ/ (as in *æþeling*, *gædeling*).

Stage 6a (Early West-Saxon).

In early West-Saxon in addition to the complete merger of /ä/ with /æ/, the following phonemic changes took place:

- 1) /e/ was raised and merged with /i/, e.g. *ierming* (cf. Antonsen 1961 : 227);
- 2) /ɨ/ was lowered and merged with /ɛ̃/, e.g. *leornian*;
- 3) /ø/ was unrounded and merged with /e/, e.g. *dehter*.

¹⁰ The proposed system differs from Hockett's system posited for early Anglian (1959 : 576) in having a front rounded /ä/ instead of his hole in the system ("none") and in positing two central phonemes /i e/ and two back spread phonemes /ɨ ɛ̃/ for his two back spread phonemes /i ø/.

It differs from Antonsen's system posited for pre-West-Saxon (1961 : 228) in three respects:

- (1) Antonsen has four degrees of opening and four central phonemes /i e ɛ̃ a/ whereas evidence requires only three degrees and two phonemes, /i/ and /e/;
- (2) *ea* should be interpreted as a back spread /ä/ rather than a low-mid /e/, and *a* as a back, structurally rounded (a) (cf. Hockett 1959 : 576);
- (3) a transitory short lived front rounded phoneme /ä/ should be posited to explain the frontness of *æ* in the historical forms such as *gædeling* and the lack of palatalization of their initial velar consonant. For more evidence see Reszkiewicz 1971 : 280.

Moreover, /ë/ and /ä/, phonemically still back unrounded, became phonetically central unrounded, i.e. [e] and [ä].

Early West-Saxon vocalic system was then as follows:

	Front		Non-front	
	Spread	Rounded	Spread	Rounded
High	/i/	/y/	/ɨ/	/u/
Mid	/e/	—	/e/	/o/
Low	/æ/	—	/ä/	/a/

Stage 6b (Old Anglian).

In Old Anglian beside the complete merger of /ä/ with /æ/, (but see also Reszkiewicz 1971 : 280), the following specific innovations took place:

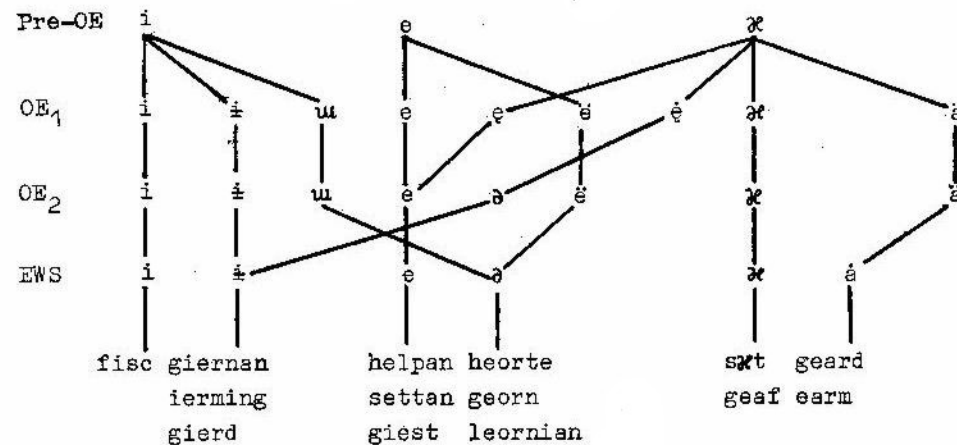
(1) /i/ and /ɨ/ merged together (cf. Antonsen 1961 : 228), hence *iorre*, *giorna*, *liornian*;

(2) /e/ and /ø/ merged together, hence *helpan*, *ermīng*.

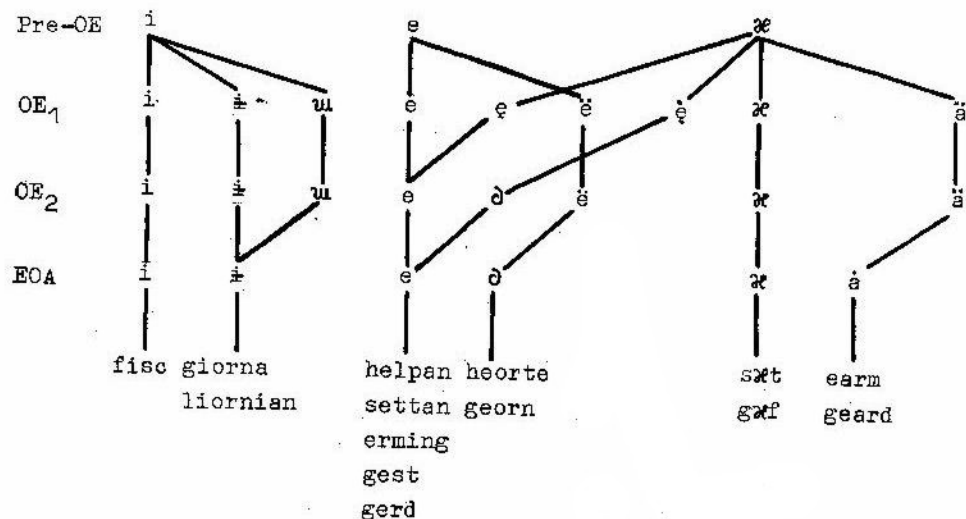
In addition to that /ɨ ɛ̃ ä/, phonemically still back unrounded vowels, became phonetically central unrounded, i.e. [i e ä]. The early Old Anglian vocalic system was then as follows (cf. Hockett 1959 : 576):

	Front		Non-front	
	Spread	Rounded	Spread	Rounded
High	/i/	/y/	/ɨ/	/u/
Mid	/e/	/ø/	/e/	/o/
Low	/æ/	—	/ä/	/a/

Appendix I



Appendix II



The two appendices shown above trace graphically the development of the Anglo-Frisian, or pre-English, front vowel phonemes /i e æ/ down to Early West-Saxon (App. I) and Early Old Anglian (App. II), thus summing up the prehistory of the Old English secondary (=spread) non-front phonemes /i̯ e̯ ä/ and their respective relationships in the two dialects to the original front vowels /i e æ/.

Row 1 (Pre-OE) corresponds to stage 3, discussed above, row 2 (OE₁) corresponds to stage 4, and row 3 (OE₂) to stage 5. Rows 1, 3, 4 are meant to represent phonemes, row 2 — allophones. In most cases the connecting lines directed to the right symbolize retraction (to central or back) and the connecting lines directed to the left symbolize fronting (to central or front).

In the West-Saxon examples *giest* is placed under /e/ to show that it is to be interpreted as /jɛst/ and *geaf* under /æ/ to be interpreted as /jæf/.

REFERENCES

- Antonsen, Elmer H. 1961. "Germanic umlaut anew". *Language* 37. 215 - 230.
- Antonsen, Elmer H. 1965. "On defining stages in prehistoric Germanic". *Language* 41. 19 - 36.
- Campbell, A. 1959. *Old English grammar*. Oxford: Clarendon.
- Fisiak, Jacek. 1967. "The Old English <wr-> and <wl->". *Linguistics* 32. 12 - 14.
- Hall, John R. Clark. 1962. *A concise Anglo-Saxon dictionary*, 4th ed. with a Supplement by Herbert D. Merritt. Cambridge: University Press.
- Hockett, Charles F. 1959. "The stressed syllabics of Old English". *Language* 35. 575 - 597.
- Jassem, Wiktor. 1953. "Regular changes of vocalic quantity in early New English." *Biuletyn Polskiego Towarzystwa Językoznawczego* 12. 149 - 178.
- Krupatkin, Y. B. 1969. "Ob allofoničeskix rekonstrukcijax". *Voprosy jazykoznanija* 4. 35 - 44.

- Kuhn, Sherman M. 1961. "On the syllabic phonemes of Old English". *Language* 37. 522 - 538.
- Ney, James W. 1968. "Old English digraph spellings". *Linguistics* 45. 36 - 49.
- Reszkiewicz, Alfred. 1953. "The phonemic interpretation of Old English digraphs". *Biuletyn Polskiego Towarzystwa Językoznawczego* 12. 179 - 187.
- Reszkiewicz, Alfred. 1961. *Elementy gramatyki historycznej języka angielskiego. Okres staroangielski*, II. 3rd ed. Warszawa: PWN.
- Reszkiewicz, Alfred. 1971. "The elimination of the front rounded and back unrounded short vowel phonemes from Medieval English: A reinterpretation". *Kwartalnik Neoflologiczny* 18. 279 - 295.
- Stockwell, Robert P. 1958. "The phonology of Old English: A structural sketch". *Studies in Linguistics* 13. 13 - 24.
- Stockwell, Robert P., and C. W. Barritt. 1951. "Some Old English graphemic-phonemic correspondences — æ, ea, and a". *Studies in Linguistics: Occasional Papers No. 4*: Washington.
- Twaddell, W. Freeman. 1948. "The prehistoric Germanic short syllabics". *Language* 24. 139 - 151. (Reprinted in *Readings in linguistics*, 2nd ed., ed. M. Joos, 1953, pp. 290 - 297).