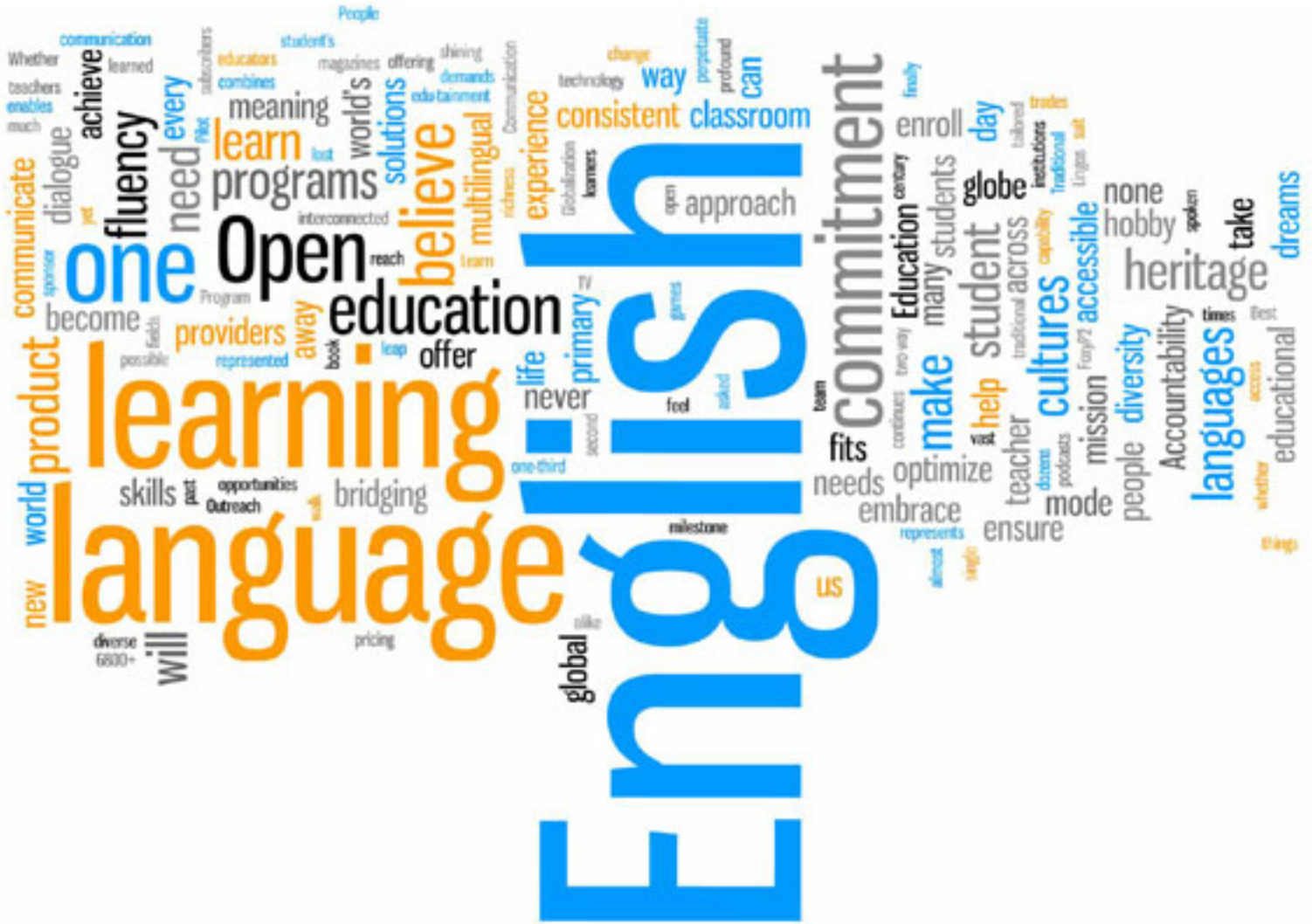


Handbook of English Phonology



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Chapter- 1

Introduction to English Phonology

English phonology is the study of the phonology (i.e., the sound system) of the English language. Like all other languages, spoken English has wide variation in its pronunciation both diachronically and synchronically from dialect to dialect. This variation is especially salient in English, because the language is spoken over such a wide territory, being the predominant language in Australia, Canada, the Commonwealth Caribbean, Ireland, New Zealand, the United Kingdom and the United States, in addition to being spoken as a first or second language by people in countries on every continent, notably South Africa and India. In general, the regional dialects of English are mutually intelligible.

Although there are many dialects of English, the following are usually used as prestige or standard accents: Received Pronunciation for the United Kingdom, General American for the United States and General Australian for Australia.

Phonemes

The number of speech sounds in English varies from dialect to dialect, and any actual tally depends greatly on the interpretation of the researcher doing the counting. The *Longman Pronunciation Dictionary* by John C. Wells, for example, using symbols of the International Phonetic Alphabet, denotes 24 consonants and 23 vowels used in Received Pronunciation, plus two additional consonants and four additional vowels used in foreign words only. For General American, it provides for 25 consonants and 19 vowels, with one additional consonant and three additional vowels for foreign words. The *American Heritage Dictionary*, on the other hand, suggests 25 consonants and 18 vowels (including r-colored vowels) for American English, plus one consonant and five vowels for non-English terms.

Consonants

The following table shows the consonant phonemes found in most dialects of English. When consonants appear in pairs, fortis consonants (i.e., aspirated or voiceless) appear on the left and lenis consonants (i.e., lightly voiced or voiced) appear on the right:

Consonant phonemes of English

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar ²	Palatal	Velar	Glottal
Nasal¹	m			n			ŋ	
Plosive	p b			t d			k g	
Affricate					tʃ dʒ			
Fricative		f v	θ ð	s z	ʃ ʒ		(x) ³	h
Approximant				ɹ ^{1, 2, 5}		j	w ⁴	
Lateral				l ^{1, 6}				

1. Nasals and liquids may be syllabic in unstressed syllables, though these may be analysed phonemically as /əC/.
2. Postalveolar consonants are usually labialized (e.g., [ʃ^w]), as is word-initial or pre-tonic /r/, though this is rarely transcribed.
3. The voiceless velar fricative /x/ is dialectal, occurring largely in Scottish English. In other dialects, words with these sounds are pronounced with /k/. It may appear in recently-domiciled words such as *chutzpah*.
4. The sequence /hw/, a voiceless labiovelar approximant is sometimes considered an additional phoneme. For most speakers, words that historically used to have these sounds are now pronounced with /w/; the phoneme /hw/ is retained, for example, in much of the American South, Scotland, and Ireland.
5. Depending on dialect, /r/ may be an alveolar approximant [ɹ], postalveolar approximant, or labiodental approximant.
6. Many dialects have two allophones of /l/—the "clear" L and the "dark" or velarized L. In some dialects, /l/ may be always clear (e.g. Wales, Ireland, the Caribbean) or always dark (e.g. Scotland, most of North America, Australia, New Zealand).

/p/ pit	/b/ bit
/t/ tin	/d/ din
/k/ cut	/g/ gut
/tʃ/ cheap	/dʒ/ jeep
/f/ fat	/v/ vat
/θ/ thin	/ð/ then
/s/ sap	/z/ zap
/ʃ/ she	/ʒ/ measure
/x/ loch	
/w/ we	/m/ map
/l/ left	/n/ nap
/ɹ/ run (also /r/, /ɹ/) /j/ yes	

/h/ ham

/ŋ/ bang

Allophones

Although regional variation is very great across English dialects, some generalizations can be made about pronunciation in all (or at least the vast majority) of English accents:

- The voiceless stops /p t k/ are aspirated at the beginnings of words (for example *tomato*) and at the beginnings of word-internal stressed syllables (for example *potato*). They are unaspirated after /s/ (*stan, span, scan*) and at the ends of syllables.
- For many people, /r/ is somewhat labialized in some environments, as in *reed* [ɹʷiː d] and *tree* [tɹʷiː]. In the latter case, the [t] may be slightly labialized as well.
- /h/ becomes [ç] before [j], as in *human* [' çjuː mən] or [' çuː mən].

Vowels

The vowels of English differ considerably between dialects. Because of this, corresponding vowels may be transcribed with various symbols depending on the dialect under consideration. When considering English as a whole, no specific phonemic symbols are chosen over others; instead, lexical sets are used, each named by a word containing the vowel in question. For example, the vowel of the LOT set ("short o") is transcribed /ɒ/ in Received Pronunciation, /ɔ/ in Australian English, and /ɑ/ in General American.

Monophthongs of Received Pronunciation						Monophthongs of Australian English					
Front		Central		Back		Front		Central		Back	
long	short	long	short	long	short	long	short	long	short	long	short
Close	iː	ɪ		uː	ʊ	Close	iː	ɪ	ʊ		ʊ
Mid		ɛ	ɜː	ə	ɔː	Mid	eː	e	ɜː	ə	oː
Open		æ		ʌ*	ɑː	Open	æː	æ	aː	a	

^* The vowel of STRUT is closer to a Near-open central vowel ([ɐ]) in RP, though ʌ is still used for tradition (it was historically a back vowel) and because it is still back in other varieties.

The monophthong phonemes of General American differ in a number of ways from Received Pronunciation:

1. The central vowel of *nurse* is rhotic [ɜ̃] (also transcribed as a syllabic [ɹ̥]).
2. Speakers make a phonemic distinction between rhotic /ɜ̃/ and non-rhotic /ə/.

3. No distinction is made between /ʊ/ and /ɑː /, nor for many speakers between these vowels and /ɔː /.

Reduced vowels occur in some unstressed syllables. (Other unstressed syllables may have full vowels, which some dictionaries mark as secondary stress.) The number of distinctions made among reduced vowels varies by dialect. In some dialects vowels are centralized but otherwise kept mostly distinct, while in Australia, New Zealand and many US dialects all reduced vowels collapse to a schwa [ə]. In Received Pronunciation, there is a distinct high reduced vowel, which the OED writes ⟨ə̯⟩.

- [ɹ]: roses (merged with [ə] in Australian and New Zealand English)
- [ə]: Rosa's, runner
- [ɪ]: bottle
- [n̩]: button

English diphthongs

	RP	Australian	American GA	Canadian
<i>low</i>	/əʊ/	/əʊ/		/oʊ/
<i>loud</i>				/aʊ/
<i>lout</i>	/aʊ/	/æɔ/	/aʊ/	[əʊ] ¹
<i>lied</i>				/aɪ/
<i>light</i>	/aɪ/	/aɛ/	/aɪ/	[əɪ] ¹
<i>lane</i>	/eɪ/	/æɪ/		/eɪ/
<i>loin</i>	/ɔɪ/	/oɪ/		/ɔɪ/
<i>leer</i>	/ɪə/	/ɪə/		/ɪə̯/ ³
<i>lair</i>	/ɛə/ ²	/eː / ²		/ɛə̯/ ³
<i>lure</i>	/ʊə/ ²	/ʊə/		/ʊə̯/ ³

1. Canadian English exhibits allophony of /aʊ/ and /aɪ/ called Canadian raising. This phenomenon is also realized (especially for /aɪ/) by many US speakers, notably in the Northeast, as well as in South Atlantic English and the Fens of eastern England. In some areas, especially the Northeast US, /aɪ/) actually shifts to /ʌɪ/.
2. In Received Pronunciation, the vowels in *lair* and *lure* may be monophthongized to [ɛː] and [oː] respectively. Australian English speakers more readily monophthongize the former but it is listed here anyway.
3. In rhotic dialects, words like *pair*, *poor*, and *peer* can be analyzed as diphthongs, although other descriptions analyze them as vowels with /r/ in the coda.

Reduced vowels

Linguists such as Ladefoged and Bolinger argue that vowel reduction is phonemic in English, and that there are two "tiers" of vowels in English, full and reduced; traditionally many English dictionaries have attempted to mark the distinction by transcribing unstressed full vowels as having "secondary" stress, though this was later abandoned by the *Oxford English Dictionary*. Though full unstressed vowels may derive historically from stressed vowels, either because stress shifted over time (such as stress shifting away from the final syllable of French loan words in British English) or because of loss or shift of stress in compound words or phrases (*óverseas vóyage* from *overséas* or *óverséas* plus *vóyage*), the distinction is not one of stress but of vowel quality (Bolinger 1989:351), and over time, if the word is frequent enough, the vowel will tend to reduce.

English has up to five reduced vowels, though this varies with dialect and speaker. Schwa /ə/ is found in all dialects, and a rhotic schwa ("schwer") /ɜ/ is found in rhotic dialects. Less common is a high reduced vowel ("schwi") /ɪ / (also "/ɜ/"); the two are distinguished by many people in *Rosa's* /' rɒʊzəz/ vs *roses* /' rɒʊzɪ z/. More unstable is a rounded schwa, /ɔ/ (also /ə/); this contrasts for some speakers in *a mission* /ə' mɪʃən/, *emission* /ɪ' mɪʃən/, and *omission* /ə' mɪʃən/. In words like *following*, the following vowel is preceded by a [w] even in dialects which do not otherwise have a rounded schwa: [' fɒləwɪŋ, ' fɒləwɪŋ]. A high rounded schwa /ʊ / (also "/ɜ/") may be found in words such as *into* /' ɪntʊ /, though in many dialects this is not be distinguished from /ə/.

Though speakers vary, full and reduced unstressed vowels may contrast in pairs of words like *Shogun* /' ʃoʊɡʌn/ and *slogan* /' sloʊɡən/, *chickaree* /' tʃɪkəri: / and *chicory* /' tʃɪkəri /, *Pharaoh* /' fɛəroʊ/ and *farrow* /' færoʊ/ (Bolinger 1989:348), *Bantu* /' bæntu: / and *into* /' ɪntʊ / (OED).

Allophones

- A distinction is made between tense and lax vowels in pairs like *beet/bit* and *bait/bet*, although the exact phonetic implementation of the distinction varies from accent to accent. However, this distinction collapses before [ŋ].
- Wherever /r/ originally followed a tense vowel or diphthong (in Early Modern English) a schwa offglide was inserted, resulting in centering diphthongs like [ɪə] in *beer* [bɪə], [ʊə] in *poor* [puə], [aɪə] in *fire* [faɪə], [aʊə] in *sour* [saʊə], and so forth. This phenomenon is known as *breaking*. The subsequent history depends on whether the accent in question is rhotic or not: In non-rhotic accents like RP the postvocalic [ɪ] was dropped, leaving [bɪə, puə, faɪə, saʊə] and the like (now usually transcribed [bɪə, puə] and so forth). In rhotic accents like General American, on the other hand, the [ɪə] sequence was coalesced into a single sound, a non-syllabic [ɪ̯], giving [bɪ̯ə, pu̯ə, faɪ̯ə, saʊ̯ə] and the like (now usually transcribed [bɪɪ, puɪ, faɪɪ, saʊɪ] and so forth). As a result, originally

monosyllabic words like those just mentioned came to rhyme with originally disyllabic words like *seer*, *doer*, *higher*, *power*.

- In many (but not all) accents of English, a similar breaking happens to tense vowels before /l/, resulting in pronunciations like [piəɫ] for *peel*, [puəɫ] for *pool*, [peəɫ] for *pail*, and [poəɫ] for *pole*.

Transcription variants

The choice of which symbols to use for phonemic transcriptions may reveal theoretical assumptions or claims on the part of the transcriber. English "lax" and "tense" vowels are distinguished by a synergy of features, such as height, length, and contour (monophthong vs. diphthong); different traditions in the linguistic literature emphasize different features. For example, if the primary feature is thought to be vowel height, then the non-reduced vowels of General American English may be represented according to the table to the left and below. If, on the other hand, vowel length is considered to be the deciding factor, the symbols in the table to the below and center may be chosen (this convention has sometimes been used because the publisher did not have IPA fonts available, though that is seldom an issue any longer.) The rightmost table lists the corresponding lexical sets.

General American full vowels, vowel height distinctive			General American full vowels, vowel length distinctive			Lexical sets representing General American full vowels		
i		u	i:		u:	FLEE	GOOS	
ɪ		ʊ				CE	E	
e	ə	o	i		u	KIT	FOOT	
ɛ	ʌ	ɔ	e:	ɪ	o:	FACE	NURS	GOAT
			e	ʌ	o	E		
æ		ɑ	a		a:	DRESS	STRUT	THOUGHT
						S	T	GHT
						TRAP		LOT

If vowel transition is taken to be paramount, then the chart may look like one of these:

General American full vowels, vowel contour distinctive			General American full vowels, vowel contour distinctive		
ij		uw	iɪ		ʊu
i		u	ɪ		ʊ
ej	ər	ow	ɛɪ	əɪ	ɔʊ
e	ə	o	ɛ	ʌ	ɔ
æ		ɑ	æ		ɑ

(The transcriber at left assumes that there is no phonemic distinction between semivowels and approximants, so that /ej/ is equivalent to /eɪ /.)

Many linguists combine more than one of these features in their transcriptions, suggesting they consider the phonemic differences to be more complex than a single feature.

General American full vowels, height & length distinctive

i:		u:
ɪ		ʊ
e:	ɜ:	o:
ɛ	ʌ	ɔ
æ		ɑ:

Stress

Stress is phonemic in English. For example, the words ***desert*** and ***dessert*** are distinguished by stress, as are the noun *a **record*** and the verb *to **record***. Stressed syllables in English are louder than non-stressed syllables, as well as being longer and having a higher pitch. They also tend to have a fuller realization than unstressed syllables.

Examples of stress in English words, using boldface to represent stressed syllables, are ***holiday***, ***alone***, ***admiration***, ***confidential***, ***degree***, and ***weaker***. Ordinarily, grammatical words (auxiliary verbs, prepositions, pronouns, and the like) do not receive stress, whereas lexical words (nouns, verbs, adjectives, *etc.*) must have at least one stressed syllable.

English is a *stress-timed* language. That is, stressed syllables appear at a roughly steady tempo, and non-stressed syllables are shortened to accommodate this.

Traditional approaches describe English as having three degrees of stress: **Primary**, **secondary**, and **unstressed**. However, if stress is defined as relative respiratory force (that is, it involves greater pressure from the lungs than unstressed syllables), as most phoneticians argue, and is inherent in the word rather than the sentence (that is, it is lexical rather than prosodic), then these traditional approaches conflate two distinct processes: Stress on the one hand, and vowel reduction on the other. In this case, primary stress is actually prosodic stress, whereas secondary stress is simple stress in some positions, and an unstressed but not reduced vowel in others. Either way, there is a three-way phonemic distinction: Either three degrees of stress, or else **stressed**, **unstressed**, and **reduced**. The two approaches are sometimes conflated into a four-way 'stress' classification: *primary* (tonic stress), *secondary* (lexical stress), *tertiary* (unstressed full vowel), and *quaternary* (reduced vowel).

Initial-stress-derived nouns mean that stress changes in many English words came about between noun and verb senses of a word. For example, a *rebel* [' ɹɛb.əl] (stress on the first syllable) is inclined to *rebel* [ɹɪ.' bəl] (stress on the second syllable) against the powers that be. The number of words using this pattern as opposed to only stressing the second syllable in all circumstances doubled every century or so, now including the English words *object*, *convict*, and *addict*.

Intonation

Prosodic stress is extra stress given to words when they appear in certain positions in an utterance, or when they receive special emphasis. It normally appears on the final stressed syllable in an intonation unit. So, for example, when the word *admiration* is said in isolation, or at the end of a sentence, the syllable *ra* is pronounced with greater force than the syllable *ad*. (This is traditionally transcribed as /, ædmɪ' reɪʃən/.) This is the origin of the primary stress-secondary stress distinction. However, the difference disappears when the word is not pronounced with this final intonation.

Prosodic stress can shift for various pragmatic functions, such as focus or contrast. For instance, consider the dialogue

"Is it brunch tomorrow?"
 "No, it's *dinner* tomorrow."

In this case, the extra stress shifts from the last stressed syllable of the sentence, *tomorrow*, to the last stressed syllable of the emphasized word, *dinner*. Compare

"I'm going *tomorrow*." /aɪm ' ɡoʊɪŋ tə" mɒroʊ/

with

"It's *dinner* tomorrow." /ɪts " dɪnə tə' mɒroʊ/

Although grammatical words generally do not have lexical stress, they do acquire prosodic stress when emphasized. Compare ordinary

"Come in!" /" kʌm ɪn/

with more emphatic

"Oh, *do* come in!" /oʊ " du: kʌm ' ɪn/

Phonotactics

Most languages of the world syllabify CVCV and CVCCV sequences as /CV.CV/ and /CVC.CV/ or /CV.CCV/, with consonants preferentially acting as the onset of a syllable

containing the following vowel. According to one view, English is unusual in this regard, in that stressed syllables attract following consonants, so that ' CVCV and ' CVCCV syllabify as /' CVC.V/ and /' CVCC.V/, as long as the consonant cluster CC is a possible syllable coda. In addition, according to this view, /r/ preferentially syllabifies with the preceding vowel even when both syllables are unstressed, so that CVrV occurs as /CVr.V/. However, many scholars do not agree with this view.

Syllable structure

The syllable structure in English is (C)³V(C)⁵, with a near maximal example being *strengths* (/ ' strɛŋkθs/, although it can be pronounced / ' strɛŋθs/). Because of an extensive pattern of articulatory overlap, English speakers rarely produce an audible release in consonant clusters. This can lead to cross-articulations that seem very much like deletions or complete assimilations. For example, *hundred pounds* may sound like [hʌnd.ɪɛb p^haʊndz] but X-ray and electropalatographic studies demonstrate that inaudible and possibly weakened contacts may still be made so that the second /d/ in *hundred pounds* does not entirely assimilate a labial place of articulation, rather the labial co-occurs with the alveolar one.

When a stressed syllable contains a pure vowel (rather than a diphthong), followed by a single consonant and then another vowel, as in *holiday*, many native speakers feel that the consonant belongs to the preceding stressed syllable, /' hɒl.i.deɪ/. However, when the stressed vowel is a long vowel or diphthong, as in *admiration* or *pekoe*, speakers agree that the consonant belongs to the following syllable: /' æd.mɪ.' reɪ.ʃən/, /' pi: .koʊ/. Wells (1990) notes that consonants syllabify with the preceding rather than following vowel when the preceding vowel is the nucleus of a more salient syllable, with stressed syllables being the most salient, reduced syllables the least, and secondary stress / full unstressed vowels intermediate. But there are lexical differences as well, frequently with compound words but not exclusively. For example, in *dolphin* and *selfish*, he argues that the stressed syllable ends in /f/; in *shellfish*, the /f/ belongs with the following syllable: /' dɒlf.ɪn/, /' sɛlf.ɪʃ/ → [' dɒlfɪn], [' sɛlfɪʃ] vs /' ʃɛl.fɪʃ/ → [' ʃɛl' fɪʃ], where the /l/ is a little longer and the /ɪ/ not reduced. Similarly, in *toe-strap* the /t/ is a full plosive, as usual in syllable onset, whereas in *toast-rack* the /t/ is in many dialects reduced to the unreleased allophone it takes in syllable codas, or even elided: /' toʊ.stræp/, /' toʊst.ræk/ → [' t^ho' ʊstɪæp], [' toʊs(t̚)ɪwæk]; likewise *nitrate* /' naɪ.treɪt/ → [' nʌɪt̚ɪw'eɪt] with a voiceless /t̚/, vs *night-rate* /' naɪt.reɪt/ → [' nʌɪt̚ɪw'eɪt] with a voiced /r/. Cues of syllable boundaries include aspiration of syllable onsets and (in the US) flapping of coda /t, d/ (*a tease* /ə.' ti: z/ → [ə' t^hi: z] vs. *at ease* /æt.' i: z/ → [æɾ' i: z]), epenthetic plosives like [t] in syllable codas (*fence* /' fɛns/ → [' fɛnts] but *inside* /ɪn.' saɪd/ → [ɪn' saɪd]), and r-colored vowels when the /r/ is in the coda vs. labialization when it is in the onset (*key-ring* /' ki: .rɪŋ/ → [' k^hi: ɪwɪŋ] but *fearing* /' fi: r.ɪŋ/ → [' fɪəɪɪŋ]).

Onset

There is an on-going sound change (yod-dropping) by which /j/ as the final consonant in a cluster is being lost. In RP, words with /sj/ and /lj/ can usually be pronounced with or without this sound, e.g., [su: t] or [sju: t]. For some speakers of English, including some British speakers, the sound change is more advanced and so, for example, in General American /j/ is also not present after /n/, /l/, /s/, /z/, /θ/, /t/ and /d/. In Welsh English it can occur in more combinations, for example in /tʃj/.

The following can occur as the onset:

All single consonant phonemes except /ŋ/

Plosive plus approximant other than /j/:

/pl/, /bl/, /kl/, /gl/,
/pr/, /br/, /tr/, /dr/, /kr/, /gr/,
/tw/, /dw/, /gw/, /kw/

play, blood, clean, glove, prize, bring, tree,
dream, crowd, green, twin, dwarf, language,
quick

Voiceless fricative plus approximant other than /j/:

/fl/, /sl/,
/fr/, /θr/, /ʃr/,
/sw/, /θw/, /hw/

floor, sleep, friend, three, shrimp, swing,
thwart, which

Consonant plus /j/:

/pj/, /bj/, /tj/, /dj/, /kj/, /gj/,
/mj/, /nj/, /fj/, /vj/, /θj/,
/sj/, /zj/, /hj/, /lj/

pure, beautiful, tube, during, cute, argue,
music, new, few, view, thew, suit, Zeus,
huge, lurid

/s/ plus voiceless plosive:
/sp/, /st/, /sk/

speak, stop, skill

/s/ plus nasal:
/sm/, /sn/

smile, snow

/s/ plus voiceless plosive plus approximant:

/spl/, /skl/,
/spr/, /str/, /skr/,
/skw/, /smj/, /spj/, /stj/, /skj/

split, sclera, spring, street, scream, square,
smew, spew, student, skewer

Notes:

1. In some American dialects, /tr/ and /dr/ tend to affricate, so that *tree* resembles "chree", and *dream* resembles "jream". This is sometimes transcribed as [tʃr] and [dʒr] respectively, but the pronunciation varies and may, for example, be closer to [tʃ̥] and [dʒ̥] or with a fricative release similar in quality to the rhotic, ie. [tʃ̥̚], [dʒ̥̚], or [tʃ̥̚̚], [dʒ̥̚̚].
2. In some dialects, /wr/ (rather than /r/) occurs in words beginning in wr- (*write*, *wrong*, *wren*, etc.).
3. Many clusters beginning with /ʃ/ and paralleling native clusters beginning with /s/ are found initially in German and Yiddish loanwords, such as /ʃl/, /ʃp/, /ʃt/, /ʃm/, /ʃn/, /ʃpr/, /ʃtr/ (in words such as *schlep*, *spiel*, *shtick*, *schmuck*, *schnapps*, *Shprintzen's*, *strudel*). /ʃw/ is found initially in the Hebrew loanword *schwa*. Before /r/ however, the native cluster is /ʃr/. The opposite cluster /sr/ is found in loanwords such as *Sri Lanka*, but this can be nativized by changing it to /ʃr/.
4. /skl/ occurs in the Greek loanword *sclerosis*; there is also /sf/ (*sphere*), /sfr/ (*sphragistics*), /sθ/ (*sthenics*), and /θl/ (*thlipsis*).

Other onsets

Certain English onsets appear only in contractions: e.g., /zbl/ ('*sblood*), /zd/ (*sdein*), and /zw/ or /dzw/ ('*swounds* or '*dswounds*). Some, such as /pʃ/ (*pshaw*) or /fw/ (*fwoosh*), can occur in interjections. An archaic voiceless fricative plus nasal exists, /fn/ (*fnese*).

A few other onsets occur in further (anglicized) loan words, including /bw/ (*bwana*), /mw/ (*moiré*), /nw/ (*noire*), /pw/ (*pueblo*), /zw/ (*zwieback*), /vw/ (*voilà*), /kv/ (*kvetch*), /ʃv/ (*schvartze*), /tv/ (*Tver*), /vl/ (*Vladimir*), and /zl/ (*zloty*).

Some clusters of this type can be converted to regular English phonotactics by simplifying the cluster: e.g. /(d)z/ (*dziggetai*), /(h)r/ (*Hrolf*), /kr(w)/ (*croissant*), /(p)f/ (*pfennig*), /(f)θ/ (*phthalic*), and /(t)s/ (*tsunami*).

Others can be substituted by native clusters differing only in voice: /zb ~ sp/ (*sbirro*), and /zgr ~ skr/ (*sgraffito*).

Nucleus

The following can occur as the nucleus:

- All vowel sounds
- /m/, /n/ and /l/ in certain situations
- /r/ in rhotic varieties of English (eg General American) in certain situations

Coda

Most, and in theory all, of the following except those which end with /s/, /z/, /ʃ/, /ʒ/, /tʃ/ or /dʒ/ can be extended with /s/ or /z/ representing the morpheme -s/z-. Similarly most, and in theory all, of the following except those which end with /t/ or /d/ can be extended with /t/ or /d/ representing the morpheme -t/d-.

Wells (1990) argues that a variety of syllable codas are possible in English, even /ntr, ndr/ in words like *entry* /'ɛntrɪ/ and *sundry* /'sʌndrɪ/, with /tr, dr/ being treated as affricates along the lines of /tʃ, dʒ/. He argues that the traditional assumption that pre-vocalic consonants form a syllable with the following vowel is due to the influence of languages like French and Latin, where syllable structure is CVC.CVC regardless of stress placement. Disregarding such contentious cases, which do not occur at the ends of words, the following sequences can occur as the coda:

The single consonant phonemes except /h/, /w/,

/j/ and, in non-rhotic varieties, /r/

Lateral approximant + plosive or affricate: /lp/, help, bulb, belt, hold,
/lb/, /lt/, /ld/, /ltʃ/, /ldʒ/, /lk/ belch, indulge, milk

In rhotic varieties, /r/ + plosive or affricate: harp, orb, fort, beard,
/rp/, /rb/, /rt/, /rd/, /rtʃ/, /rdʒ/, /rk/, /rg/ arch, large, mark, morgue

Lateral approximant + fricative: /lf/, /lv/, /lθ/, golf, solve, wealth, else,
/ls/, /lʃ/ Welsh

In rhotic varieties, /r/ + fricative: /rf/, /rv/, /rθ/, dwarf, carve, north, force,
/rs/, /rʃ/ marsh

Lateral approximant + nasal: /lm/, /ln/ film, kiln

In rhotic varieties, /r/ + nasal or lateral: /rm/, arm, born, snarl
/rn/, /rl/

Nasal + homorganic plosive or affricate: /mp/, jump, tent, end, lunch,
/nt/, /nd/, /ntʃ/, /ndʒ/, /ŋk/ lounge, pink

Nasal + fricative: /mf/, /mθ/ in non-rhotic triumph, warmth, month,
varieties, /nθ/, /ns/, /nz/, /ŋθ/ in some varieties prince, bronze, length

Voiceless fricative + voiceless plosive: /ft/, left, crisp, lost, ask
/sp/, /st/, /sk/

Two voiceless fricatives: /fθ/ fifth

Two voiceless plosives: /pt/, /kt/ opt, act

Plosive + voiceless fricative: /pθ/, /ps/, /tθ/, /ts/, depth, lapse, eighth,
/dθ/, /dz/, /ks/ klutz, width, adze, box

Lateral approximant + two consonants: /lpt/, sculpt, twelfth, waltz,
/lfθ/, /lts/, /lst/, /lkt/, /lks/ whilst, mullet, calx

In rhotic varieties, /r/ + two consonants: /rmθ/, warmth, excerpt, corpse,
/rpt/, /rps/, /rts/, /rst/, /rkt/ quartz, horst, infarct

Nasal + homorganic plosive + plosive or fricative: /mpt/, /mps/, /ndθ/, /ŋkt/, /ŋks/, /ŋkθ/ in some varieties	prompt, glimpse, thousandth, distinct, jinx, length
Three obstruents: /ksθ/, /kst/	sixth, next

Note: For some speakers, a fricative before /θ/ is elided so that these never appear phonetically: /' fɪfθ/ becomes [' fɪθ], /' siksθ/ becomes [' sikθ], /' twelfθ/ becomes [' twelθ].

Syllable-level rules

- Both the onset and the coda are optional
- /j/ at the end of an onset cluster (/pj/, /bj/, /tj/, /dj/, /kj/, /fj/, /vj/, /θj/, /sj/, /zj/, /hj/, /mj/, /nj/, /lj/, /spj/, /stj/, /skj/) must be followed by /u: / or /ʊə/
- Long vowels and diphthongs are not found before /ŋ/ except for the mimetic word *boing!*
- /ʊ/ is rare in syllable-initial position
- Stop + /w/ before /u: /, ʊ, ʌ, aʊ/ (all presently or historically /u(:)/) are excluded
- Sequences of /s/ + C₁ + V + C₁, where C₁ is a consonant other than /t/ and V is a short vowel, are virtually nonexistent

Word-level rules

- /ə/ does not occur in stressed syllables
- /ɜ/ does not occur in word-initial position in native English words although it can occur syllable-initial, e.g., *luxurious* /lʌg' ɜəriəs/
- /m/, /n/, /l/ and, in rhotic varieties, /r/ can be the syllable nucleus (ie a syllabic consonant) in an unstressed syllable following another consonant, especially /t/, /d/, /s/ or /z/
- Certain short vowel sounds, called checked vowels, cannot occur without a coda in a single syllable word. In RP, the following short vowel sounds are checked: /ɪ/, /ɛ/, /æ/, /ʊ/, /ʌ/, and /ɔ/.

History of English pronunciation

English consonants have been remarkably stable over time, and have undergone few changes in the last 1500 years. On the other hand, English vowels have been quite unstable. Not surprisingly, then, the main differences between modern dialects almost always involve vowels.

Around the late 14th century, English began to undergo the Great Vowel Shift, in which

- the high long vowels [i:] and [u:] in words like *price* and *mouth* became diphthongized, first to [ɛɪ] and [əʊ] (where they remain today in some

environments in some accents such as Canadian English) and later to their modern values [aɪ] and [aʊ]. This is not unique to English, as this also happened in Dutch (first shift only) and German (both shifts).

The other long vowels became higher:

- [e:] became [i:] (for example *meet*),
- [a:] became [e:] (later diphthongized to [eɪ], for example *name*),
- [o:] became [u:] (for example *goose*), and
- [ɔ:] become [o:] (later diphthongized to [oʊ], for example *bone*).

Later developments complicate the picture: whereas in Geoffrey Chaucer's time *food*, *good*, and *blood* all had the vowel [o:] and in William Shakespeare's time they all had the vowel [u:], in modern pronunciation *good* has shortened its vowel to [ʊ] and *blood* has shortened and lowered its vowel to [ʌ] in most accents. In Shakespeare's day (late 16th-early 17th century), many rhymes were possible that no longer hold today. For example, in his play *The Taming of the Shrew*, *shrew* rhymed with *woe*.

æ-tensing

æ-tensing is a phenomenon found in many varieties of American English by which the vowel /æ/ has a longer, higher, and usually diphthongal pronunciation in some environments, usually to something like [eə]. Some American accents, for example that of New York City, Philadelphia, or Baltimore make a marginal phonemic distinction between /æ/ and /eə/ although the two occur largely in mutually exclusive environments.

Bad-lad split

The **bad-lad split** refers to the situation in some varieties of southern British English and Australian English, where a long phoneme /æ:/ in words like *bad* contrasts with a short /æ/ in words like *lad*.

Cot-caught merger

The **cot-caught** merger is a sound change by which the vowel of words like *caught*, *talk*, and *tall* (/ɔ/), is pronounced the same as the vowel of words like *cot*, *rock*, and *doll* (/ɒ/ in New England /ɑ:/ elsewhere). This merger is widespread in North American English, being found in approximately 40% of American speakers and virtually all Canadian speakers.

Father-bother merger

The **father-bother merger** is the pronunciation of the short O /ɒ/ in words such as "bother" identically to the broad A /ɑ:/ of words such as "father", nearly universal in all

of the United States and Canada save New England and the Maritime provinces; many American dictionaries use the same symbol for these vowels in pronunciation guides.

Chapter- 2

Phonological History of English

The **phonological history of English** describes changing phonology of the English language over time, starting from its roots in proto-Germanic to diverse changes in different dialects of modern English.

Within each section, changes are in approximate chronological order.

NOTE: In the following description, abbreviations are used as follows:

- | | | |
|---------------------------|------------------------------|-----------------------------|
| • OE = Old English | • PrePG = Pre-Proto-Germanic | |
| • PreOE = Pre-Old English | • NWG = Northwest Germanic | • Goth = Gothic |
| • ME = Middle English | • OHG = Old High German | • PN = Proto-Norse |
| • NE = Modern English | • MHG = Middle High German | • ON = Old Norse |
| • PG = Proto-Germanic | • NHG = Modern German | • OS = Old Saxon |
| | | • PIE = Proto-Indo-European |

The time periods for many of the following stages are extremely short due to the extensive population movements occurring during the early AD period, which resulted in rapid dialect fragmentation:

- The migration of the Goths from southeast Sweden to the Baltic Sea area around AD 1, followed by the migration to southeast Romania around AD 200. (Later migrations carried the Ostrogoths eastward to the Crimea area in modern Ukraine, and carried the Visigoths westward to Spain.)
- The migration of the High German ancestors southward, starting around AD 260, and renewed in the 5th century AD.
- The migration of the Anglo-Saxons westward into Britain, starting around AD 450.

Late Proto-Germanic period

This period is estimated to be c. AD 0–200. This includes changes in late Proto-Germanic, up to the appearance of Proto-West-Germanic c. AD 200:

- Early i-mutation: /e/ is raised to /i/ when an /i/ or /j/ follows in the next syllable.
 - This occurs before deletion of any unstressed vowels; hence PIE **bereti* > PG **berepi* > **beripi* > Goth *bairip* /beriθ/ "(he) carries".
 - The /i/ produced by this change can itself trigger later i-mutation. Hence WG **berip* > **birip* > OE *birp* "(he) bears".
 - As a consequence of this change, /ei/ > /i:/ . The Elder Futhark of the Proto-Norse language still contain different symbols for the two sounds.
- a-mutation: /u/ is lowered to /o/ when a non-high vowel follows in the next syllable.
 - This is blocked when followed by a nasal followed by a consonant, or by a cluster with /j/ in it. Hence PG **gulda* > OE/NE *gold*, but PG *guldjanan* > OE *gyldan* > NE *gild*.
 - This produces a new phoneme /o/, due to inconsistent application and later loss of unstressed /a/ and /e/.
- Loss of /n/ before /x/, with nasalization and compensatory lengthening of the preceding vowel.
 - The nasalization was eventually lost, but remained through the Ingvaemonic period.
 - Hence PrePG **tongjonon* > PG **þankjanan* > OE *þencan* > NE *think*, but PrePG **tonktōm* > PG **þanxtōn* > **þāxtōn* > OE *þōhte* > NE *thought*.
- Loss of final /m/, with nasalization (eventually lost) of the preceding vowel.
Hence PrePG **d^hog^hom* > PG **dagam* > OE *dæg* "day (acc. sg.)".
- Pre-nasal raising: /e/ > /i/ before nasal + consonant. PrePG **b^hend^honom* > PG **bendanan* > **bindanan* > OE *bindan* > NE *bind* (Latin *of-fendō*).
 - This post-dated loss of /n/ before /x/.
 - This was later extended in PreOE times to vowels before all nasals; hence OE *niman* "take" but OHG *neman*.
- Vowels in unstressed syllables were reduced or eliminated. The specifics are quite complex and occurred as a result of many successive changes, with successive stages often happening hundreds of years after the previous stage. Some specifics of the initial stage:
 - Final-syllable short vowels inherited from Proto-Germanic were generally deleted. Hence Goth *bairip* /beriθ/ "(he) carries" < PG **berepi* (see above).
 - This operated universally only in words of three syllables or more. In words of two syllables, final-syllable /a/ and /e/ were deleted, but /i/ and /u/ were unaffected following a short syllable (i.e. one with a short vowel followed by a single consonant.) Hence PG **dagaz* > Goth *dags* "day (nom. sing.)" (OE *dæg*), PIE **woidh₂e* > PG **waita* > Goth *wāit* "(I) know" (OE *wāt*), PIE **woide* > PG

- *waite* > Goth *wāit* "(he) knows" (OE *wāt*); but PIE **sunus* > PG **sunuz* > Goth *sunus* "son (nom. sing.)" (OE *sunu*), PIE **peḱu* > PG **fehu* > Goth *faihu* /*fehu*/ "cattle (nom. sing.)" (OE *feohu*), PIE **wenis* > PG **weniz* > **winiz* > OHG *wini* "friend (nom. sing.)" (OE *wine*), PIE **pōdi* > PG **fōti* > PreOE **fōti* > OE *fēt* "foot (dat. sing.)".
- Final-syllable /a/ and /e/ were protected in words of two syllables by following /r/ and /ns/. Hence PG **fader* > NE *father*; PG **stainans* > Goth *stáinans* "stone (acc. pl.)".
 - Final-syllable /a/ and /e/ in two-syllable words were still present in Proto-Norse. PN **dagaz*, Goth *dags* "day (nom. sg.)". PN **daga*, Goth *dag* "day (acc. sg.)".
 - Final-syllable long vowels were shortened.
 - But final-syllable /o:/ becomes /u/ in NWG, /a/ in Gothic. Hence PG **berō* > early OE *beru* "(I) carry", but Goth *baíra*; PG **gebō* > OE *giefu* "gift (nom. sg.)", but Goth *giba*.
 - Middle-syllable vowels of all types were unchanged; likewise in monosyllables, since they were stressed.
 - "Extra-long" vowels were shortened to long vowels. There is a great deal of argument about what is exactly going on here.
 - The traditional view is that a circumflex accent arose (as in Ancient Greek) when two adjacent vowels were contracted into a single long vowel in a final syllable. This circumflexed vowel then remained long when other long vowels shortened.
 - A newer view holds that "overlong" (tri-moraic) vowels arose from the contraction of two vowels, one of which was long. Furthermore, final-syllable long vowels remained long before certain final consonants (/z/ and /d/).
 - The reason why such theories are necessary is that some final-syllable long vowels are shortened, while others remain. Nominative singular **-ōn* shortens, for example; likewise first singular **-ōn* < **-ōm*; while genitive plural **-ōn* < **-ōm* remains long. Both of the above theories postulate an overlong or circumflex ending **-ōn* in the genitive plural arising in the vocalic (PIE /o/ and /a:/, PG *a-* and *ō-*declensions, arising from contraction of the vocalic stem ending with the genitive plural ending.
 - Other examples of vowels that remain long are *a*-stem and *ō*-stem nominative plural **-ōz* < early PIE **-o-es* and *-eh₂-es*; PrePG ablative singular **-ôd*, **-êd* (Gothic *hadrē* "whither", *undarō* "under"); *ō*-stem dative singular PG **gibâi* > Goth *gibái* "gift" (but *a*-stem dative singular PG **stainai* > Goth *staina* "stone").

West Germanic period

This period is estimated to be c. AD 200–400. This includes changes up through the split of Ingvaemonic and High German (c. AD 400):

- Unstressed diphthongs were monophthongized. /ai/ > /æ:/, /au/ > /o:/.
 - Results were different in Gothic. Diphthongs remained except for absolutely final diphthongs stemming from PIE short diphthongs, which became short /a/.
 - Hence PIE **sunous* > PG **sunauz* > Goth *sunáus*, but > PWG **sunō* > OE *sun* "son (gen. sing.)"; PIE **nemoit* > PG **nemait* > **nimait* > Goth *nimái*, but > PWG **nimæ* > OE *nime* "(he) takes (subj.)"; PIE (loc.?) **stoinoi* > PG **stainai* > Goth *staina*, but > PWG **stainæ* > OE *stāne* "stone (dat. sing.)"; PIE (loc.?) **g^heb^hāi* > PG **gebāi* > Goth *gibái*, but > PWG **gebæ* > OE *giefe* "gift" (dat. sing.).
- /æ:/ becomes /a:/ [a:].
- Elimination of word-final /z/.
 - Note that this change must have occurred before rhotacization, as original word-final /z/ did not become /r/.
 - But it must have occurred after the North-West-Germanic split, since word-final /z/ was not eliminated in Old Norse, instead merging with /r/.
- Rhotacization: /z/ > /r/.
 - This change also affected Proto-Norse; but in Proto-Norse, the date and nature are contested. /z/ and /r/ were still distinct in the Danish and Swedish dialect of Old Norse, as is testified by distinct runes. (/z/ is normally assumed to be a rhotic fricative in this language, but there is no actual evidence of this.)
- West Germanic Gemination of consonants except /r/, when followed by /j/. This only affected consonants preceded by a short vowel, because those preceded by a long vowel or by another consonant were never followed by /j/ due to Sievers' law.
- OE nominative plural *-as* (ME *-s*), OS nominative plural *-ōs* may be from original accusative plural **-ans* (rather than original nominative plural **-ōz*; cf. ON nominative plural **-ar*), following Ingvaemonic nasalization/loss of nasals before fricatives.

Ingvaemonic and Proto-Anglo-Frisian period

This period is estimated to be c. AD 400–475. This includes changes from c. AD 400 up through the split of the Anglo-Frisian languages from Ingvaemonic, followed by the split of pre-Old English from pre-Old Frisian (c. AD 475). The time periods for these stages are extremely short due to the migration of the Anglo-Saxons westward through Frisian territory and then across the English Channel into Britain, around AD 450.

- Ingvaenonic nasal spirant law: Loss of nasals before fricatives, with compensatory lengthening. Hence PG **munθaz* > NHG *Mund* but OE *mūþ*, NE *mouth*.
 - An intermediate stage was a long nasal vowel, where nasal /ǣ: / > /ō: /. PIE **dontos* > PG **tanþaz* > OE *tōþ* "tooth". (NHG *Zahn* < OHG *zant*.)
- Development of new /ɑ/-/æ/ distinction through Anglo-Frisian brightening and other changes:
 - Fronting of /ɑ: / to /æ: / (generally, unless /w/ followed).
 - Fronting of /ɑ/ to /æ/ (unless followed by a geminate, by a back vowel in the next syllable, or in certain other cases). Hence OE *dæg* /dæj/ "day", plural *dagas* /dɑγas/ "days" (dialectal NE "dawes"; compare NE "dawn" < OE *dagung* /dɑγung/). Gothic *dags*, plural *dagos*.
 - Change of /ai/ to /ɑ: /. PG **stainaz* > OE *stān* > NE *stone*.

Old English period

This period is estimated to be c. AD 475–900. This includes changes from the split between Old English and Old Frisian (c. AD 475) up through historic early West Saxon of AD 900:

- Breaking of front vowels
 - Most generally, before /x/, /w/, /r/ + consonant, /l/ + consonant (assumed to be velar [ɭ], [ɮ] in these circumstances), but exact conditioning factors vary from vowel to vowel
 - Initial result was a falling diphthong ending in /u/, but this was followed by diphthong height harmonization, producing short /ǣ ǣ /, /ē ǝ /, /ī ǔ / from short /æ/, /ɛ/, /ɪ/, long /æɑ/, /eo/, /iu/ from long /æ: /, /e: /, /i: /. (Written *ea*, *eo*, *io*, where length is not distinguished graphically.)
 - Result in some dialects, for example Anglian, was back vowels rather than diphthongs. West Saxon *ceald*; but Anglian *cald* > NE *cold*.
- Shortening of Vowels
 - In two particular circumstances, vowels were shortened when falling immediately before either three consonances or the combination of two consonants and two additional syllables in the word. Thus, OE *gāst* > NE *ghost*, but OE *gǣstlic* > NE *ghastly* (ǣ > ǣ/_CCC) and OE *crīst* > NE *Christ*, but OE *crīstesmæsse* > NE *Christmas* (ī > ī/_CC\$).
 - Probably occurred in the seventh century as evidenced by eighth century Anglo-Saxon missionaries' translation into Old Low German, "Gospel" as *Gotspel*, lit. "God news" not expected **Guotspel*, "Good news" due to *gōdspell* > *gōdspell*.
- /ī ǔ / and /iu/ were lowered to /ē ǝ / and /eo/ between 800 and 900 AD.
- By the above changes, /au/ was fronted to /æu/ and then modified to /æa/ by diphthong height harmonization.

- PG **draumaz* > OE *drēam* "joy" (cf. NE *dream*, NHG *Traum*). PG **daupuz* > OE *dēap* > NE *death* (Goth *dáupus*, NHG *Tod*). PG **augō* > OE *ēage* > NE *eye* (Goth *áugo*, NHG *Auge*).
- /sk/ was palatalized to /ʃ/ in almost all circumstances. PG **skipaz* > NE *ship* (cf. *skipper* < Dutch *schipper*, where no such change happened). PG **skurtjaz* > OE *scyrte* > NE *shirt*, but > ON *skyrt* > NE *skirt*.
- /k/, /x/, /g/ were palatalized to /tʃ/, /j/, /dʒ/ in certain complex circumstances.
 - This change, or something similar, also occurred in Old Frisian.
- Back vowels were fronted when followed in the next syllable by /i/ or /j/, by i-mutation (c. 500 AD).
 - i-mutation affected all the Germanic languages except for Gothic, although with a great deal of variation. It appears to have occurred earliest, and to be most pronounced, in the Schleswig-Holstein area (the home of the Anglo-Saxons), and from there to have spread north and south.
 - This produced new front rounded vowels /œ/, /ø/ /, /y/, /y:/ /, /œ/ and /ø:/ / were soon unrounded to /ɛ/ and /e:/ /, respectively.
 - All short diphthongs were mutated to /ĩ ỹ /, all long diphthongs to /iy/. (This interpretation is controversial. These diphthongs are written *ie*, which is traditionally interpreted as short /ĩ ẽ /, long /ie/.)
 - Late in Old English (c. AD 900), these new diphthongs were simplified to /ɪ/ and /y:/ /, respectively.
 - The conditioning factors were soon obscured (loss of /j/ whenever it had produced gemination, lowering of unstressed /i/), phonemicizing the new sounds.
- Loss of /j/ and /ij/ following a long syllable.
 - A similar change happened in the other West Germanic languages, although after the earliest records of those languages.
 - This did not affect the new /j/ formed from palatalisation of PG **/x/*, suggesting that it was still a (palatal) fricative at the time of the change. For example, PG **wrōgijanan* > early OE **wrōgijjan* > OE *wrēgan* (/wre: jan/).
 - Following this, PG **/j/* occurred only word-initially and after /r/ (which was the only consonant that was not geminated by /j/ and hence retained a short syllable).
- More reductions in unstressed syllables:
 - /o:/ / became /ɑ/.
 - Germanic high vowel deletion eliminated /ɪ/ and /ʊ/ when following a heavy syllable.
- Palatal diphthongization: Initial palatal /j/, /tʃ/, /ʃ/ trigger spelling changes of *a* > *ea*, *e* > *ie*. It is disputed whether this represents an actual sound change or merely a spelling convention indicating the palatal nature of the preceding consonant (written *g*, *c*, *sc* were ambiguous in OE as to palatal /j/, /tʃ/, /ʃ/ and velar /g/ or /x/, /k/, /sk/, respectively).

- Similar changes of *o* > *eo*, *u* > *eo* are generally recognized to be merely a spelling convention. Hence WG /jung/ > OE *geong* /jung/ > NE "young"; if *geong* literally indicated an /ɛ̃ ɔ̃ / diphthong, the modern result would be **yeng*.
 - It is disputed whether there is Middle English evidence of the reality of this change in Old English.
- Initial /ɣ/ became /g/ in late Old English.

Until Middle English

This period is estimated to be c. AD 900–1400.

- Vowels were lengthened before /ld/, /mb/, /nd/, /rd/, probably also /ŋg/, /rl/, /rn/, when not followed by a third consonant or two consonants and two syllables.
 - This probably occurred around AD 1000.
 - Later on, many of these vowels were shortened again; but evidence from the *Ormulum* shows that this lengthening was once quite general.
 - Remnants persist in the Modern English pronunciations of words such as *child* (but not *children*, since a third consonant follows), *field* (plus *yield*, *wield*, *shield*), *old* (but not *alderman* as it is followed by at least two syllables), *climb*, *find* (plus *mind*, *kind*, *bind*, etc.), *long* and *strong* (but not *length* and *strength*), *fiend*, *found* (plus *hound*, *bound*, etc.).
- Vowels were shortened when followed by two or more consonants, except when lengthened as above.
 - This occurred in two stages, the first stage affecting only vowels followed by three or more consonants.
- Inherited height-harmonic diphthongs were monophthongized by the loss of the second component, with the length remaining the same.
- /æ: / and /ɑ: / became /ɛ: / and /ɔ: /.
- /æ/ and /ɑ/ merged into /a/.
- /ɣ/ and /y: / were unrounded to /ɪ/ and /i: /.
- /ɣ/ became /w/ or /j/, depending on surrounding vowels.
- New diphthongs formed from vowels followed by /w/ or /j/ (including from former /ɣ/).
 - Length distinctions were eliminated in these diphthongs.
 - Middle English breaking: Diphthongs also formed by the insertion of a glide /w/ or /j/ (after back and front vowels, respectively) preceding /x/.
 - Many diphthong combinations soon merged.
- Trisyllabic laxing: Shortening of stressed vowels when two syllables followed.
 - This results in pronunciation variants in Modern English such as *divine* vs *divinity* and *south* vs. *southern* (OE *súðerne*).
- Middle English open syllable lengthening: Vowels were usually lengthened in open syllables (13th century), except when trisyllabic laxing would apply.
- Remaining unstressed vowels merged into /ə/.
- Initial clusters /hr/, /hl/, /hn/ were reduced by loss of /h/.

- Voiced fricatives became independent phonemes through borrowing and other sound changes.
- /sw/ before back vowel becomes /s/; /mb/ becomes /m/.
 - Modern English *sword*, *answer*, *lamb*.
 - /w/ in *swore* is due to analogy with *swear*.

Up to Shakespeare's English

This period is estimated to be c. AD 1400–1600.

- Loss of most remaining diphthongs.
 - /ai/ (and former /ɛi/, merged into /ai/ in Early Middle English) became /ɑ:/ before the Great Vowel Shift.
 - /ou/ (and former /ɔu/, merged into /ou/ in Early Middle English) became /o:/ and /ei/ became /e:/ after the shift causing the long mid mergers.
 - /au/ became /ɔ:/ after the shift.
 - The dew-new merger: /ɛu/ and /iu/ merge, and they then become /ju:/ after the shift.
 - The vein-vain merger: /ai/ and /ei/ merge, so that *vain* and *vein* are now homonyms.
 - The dew-duke merger: /y/ and /iu/ merge, so that *dew* and *duke* now have the same vowel.
 - /oi/ remained.
 - In a few regional accents, including some in Northern England, East Anglia, South Wales, and even Newfoundland, monophthongization has not been complete, so that pairs like *pane* /*pain* and *toe* /*tow* are distinct. (Wells 1982, pp. 192–94, 337, 357, 384–85, 498)
- /x/ (written *gh*) lost in most dialects causing the taut-taught merger.
- Great Vowel Shift; all long vowels raised or diphthongized.
 - /ɑ:/, /ɛ:/, /e:/ become /ɛ:/, /e:/, /i:/, respectively.
 - /ɔ:/, /o:/ become /o:/, /u:/, respectively.
 - /i:/, /u:/ become /əi/ and /əu/, later /ai/ and /au/.
 - New /ɔ:/ developed from old /au/ (see above).
 - Note that /ɔ:/, /o:/, /u:/, /au/ effectively rotated in-place.
 - /ɛ:/, /e:/ are shifted again to /e:/, /i:/ in Early Modern English, causing merger of former /e:/ with /i:/; but the two are still distinguished in spelling as *ea*, *ee*.
- Loss of /ə/ in final syllables.
- Initial cluster /gn/ loses first element; but still reflected in spelling.
- /kn/ reduces to /n/ in most dialects, causing the not-knot merger.
- /r^w/ and /r/ merge to a single sound in most dialects, causing the rap-wrap merger.
- Doubled consonants reduced to single consonants.

Up to the American–British split

This period is estimated to be c. AD 1600–1725.

- At some preceding time after Old English, all /r/ become /ɹ/.
 - Evidence from Old English shows that, at that point, the pronunciation /ɹ/ occurred only before a consonant.
 - Scottish English has /r/ consistently.
- The foot-strut split: Except in northern England, /ʊ/ splits into /ʊ/ (inconsistently after labials), as in *put*, and /ʌ/ (otherwise), as in *cut*.
- Ng-coalescence: Reduction of /ng/ in most areas produces new phoneme /ŋ/.
- Palatalization of /tj/, /sj/, /dj/, /zj/ produces /tʃ/, /ʃ/, /dʒ/, and new phoneme /ʒ/ (for example *measure*, *vision*). Received Pronunciation resisted against this kind of coalescence until the 20th century.
 - These combinations mostly occurred in borrowings from French and Latin.
 - Pronunciation of *-tion* was /sjən/ from Old French /sjon/, thus becoming /ʃən/.
- Long vowels /e:/ and /u:/ (Middle English /ɛ:/ and /o:/) inconsistently shortened, especially before /t/, /d/, /θ/ and /ð/. Shortening of /u:/ occurred at differing time periods, both before and after the centralizing of /ʊ/ to /ʌ/; hence *blood* /blʌd/ vs. *good* /gʊd/. (Modern English *sweat*, *head*, *bread*, *breath*, *death*, *leather*, *weather*, *foot*, *soot*, *blood*, *good*, etc.)
- The meet-meat merger: *Meet* and *meat* become homonyms in most accents.
- Changes affect short vowels in many varieties before an /r/ at the end of a word or before a consonant
 - /a/ as in *start* and /ɔ/ as in *north* are lengthened.
 - /ɛ/, /ɪ/ and /ʌ/ merge before /r/, hence most varieties of Modern English have the same vowel in each of *fern*, *fir* and *fur*.
 - Also affects vowels in derived forms, so that *starry* no longer rhymes with *marry*.
 - Scottish English unaffected.
- [aɪ] and [ɔɪ] undergo mutations:
 - Before /f/ or /v/, the [ɪ] becomes silent, so that *half* and *calf* are pronounced with /af/, and *salve* and *halve* are pronounced with /av/. [ɔɪv] is exempt, so that *solve* keeps its [ɪ]. [ɔɪf] is not wholly exempt, as the traditional pronunciation of *golf* was [gɔf].
 - Before /m/, [aɪ] and [ɔɪ] become /ɑ:/ and /o:/, as in *alms*, *balm*, *calm*, *Holmes*, *palm*.
 - Before /k/, a coronal consonant or word-finally, [aɪ] and [ɔɪ] are diphthongized to [aʊ] and [oʊ] (today /ɔ:/ and /oʊ/), as in *all*, *bald*, *colt*, *false*, *folk*, *malt*, *roll*, *sold*, *talk*, *Walsh*. But then:

- The combinations [ɔʊtʃk] and [ouʔk] lose their [ɪ] in most accents to become [ɔʊk] and [ouk] (today /ɔ: k/ and /ouk/), affecting words like *caulk*, *folk* and *talk*. Words acquired after this change (such as *talc*) were not affected. *falcon* was also historically affected, but in some modern dialects (notably American English) has acquired a /' fælkən/ spelling pronunciation.
- /a/, as in *cat* and *trap*, fronted to [æ] in many areas. In certain other words it becomes /ɑ: /, for example *father* /' fɑ: ðər/. /ɑ: / is actually a new phoneme deriving from this and words like *calm* (see above).
 - Most varieties of northern English English, Welsh English and Scottish English retain [a] in *cat*, *trap* etc.
- The pane-pain merger: The words *pane* and *pain* become homophones in most accents.
- The toe-tow merger: The words *toe* and *tow* become homophones in most accents.
- The above two mergers happen in the most important dialects, but remain distinct in many regional dialects as late as the 20th century.
- /ɔʊ/ likewise becomes /ɔ: /, merging with the vowel in *broad* and the /ɔ: / of the lot-cloth split below.
- The lot-cloth split: in some varieties, lengthening of /ɔ/ before voiced velars (/ŋ/, /g/) (American English only) and voiceless fricatives (/s/, /f/, /θ/). Hence American English *long*, *log*, *loss*, *cloth*, *off* with /ɔ: / (except in dialects with the cot-caught merger where the split is made completely moot).
- /u: / becomes /ʊ/ in many words spelt *oo*: for example, *book*, *wool*, *good*, *foot*. This is partially resisted in the northern and western variants of English English, where words ending in -ook might still use /u: /. (Trudgill, p. 71)

After American–British split, up to the 20th century

This period is estimated to be c. AD 1725–1900.

- Split into rhotic and non-rhotic accents: loss of syllable-final /ɹ/ in some varieties, especially of English English, producing new centering diphthongs /ɛə/ (*square*), /ɪə/ (*near*), /ɔə/ (*cord*), /oə/ (*sore*), /ʊə/ (*cure*), and highly unusual phoneme /ɜ: / (*nurse*).
- The father-bothor merger: North American English merger of /ɒ/ as in *lot*, *bother* with /ɑ/ as in *father*; result is /ɑ/.
 - Exceptions are accents in Eastern New England (such as the Boston accent) and New York-New Jersey English. (Wells 1982, pp. 245–47)
 - Unrounding of EME /ɒ/ is found also in Norwich, the West Country and in Hiberno-English, but apparently with no phonemic merger. (Wells 1982, pp. 339–40, 419)

- The trap-bath split: southern English English /æ/ inconsistently becomes /ɑ: / before /s/, /f/, /θ/ and /n/ or /m/ followed by another consonant.
 - Hence RP has *pass*, *glass*, *grass*, *class* with /ɑ: / but *mass*, *crass* with /æ/.
 - (All six words rhyme in most American English, Scottish English and northern English English.)
- Reduction of /hw/ to /w/, causing *whine* and *wine* to be homophones, in most varieties of English English; also, regionally, in American English.
- American and Australian English flapping of /t/ and /d/ to [ɾ] in some circumstances.
 - Generally, between vowels when the following syllable is completely unstressed.
 - But not before syllabic [n̩] in American English, for example *cotton* [kɑʔn̩].
- Happy tensing (the term is from Wells 1982): final lax [ɪ] becomes tense [i] in words like *happy*. Absent from some dialects.
- Line-loin merger: merger between the diphthongs /aɪ/ and /ɔɪ/ in some accents of Southern English English, Hiberno-English, Newfoundland English, and Caribbean English.
- H dropping begins in English English and Welsh English, but this does not affect the upper-class southern accent that developed into Received Pronunciation, nor does it affect the far north of England or East Anglia. (Trudgill, p. 28-30)

After 1900

Some of these changes are in progress.

- æ-tensing: raising, lengthening and/or diphthongization of /æ/ in some varieties of American English
- Bad-lad split: the lengthening of /æ/ to [æ:] in some words, found especially in Australian English
- Lock-loch merger: the replacement of /x/ with /k/ among some younger Scottish English speakers from Glasgow
- Pin-pen merger: the raising of /ɛ/ to /ɪ/ before nasal consonants; can be found in Southern American English and southwestern varieties of Hiberno English.
- Back Vowel Fronting: in many varieties of English all over the world, /u/ and to a lesser extent /o/ are gradually moving forward in the mouth. (Compare casual pronunciation of "food" to [fud].)
- T glottalization becomes increasingly widespread in Great Britain. (Trudgill, pp. 77–78)
- Various treatments of th: Th-fronting, th-stopping, th-debuccalization and th-alveolarization
- L-vocalization in the south-east of England, including London. This is not unique to the south-east of England, however, and is found in many other dialects. (Trudgill, pp. 63–66)
- Yod-dropping losing /j/ in initial consonant clusters

Summary of vowel developments

From the Old and Middle English perspective

This table describes the main changes from Late Proto-Indo-European and Proto-Germanic up through Old English, Middle English and Modern English. It focuses on the Old English and Middle English changes leading to the modern forms. Other tables are also available to cover specific areas in more detail:

- A table specifically covering the vowel history from Proto-Germanic to Old English.
- A table specifically covering the vowel history from Old English to Modern English, providing particular detail about the Modern English developments.
- A table specifically focusing on the history of Middle English diphthongs, covering the period from Old English to Modern English.

This table only describes the changes in accented syllables. Vowel changes in unaccented syllables were very different and much more extensive. In general:

1. In Old English, long vowels were reduced to short vowels (and sometimes deleted entirely) and short vowels were very often deleted. All remaining vowels were reduced to only the vowels /u/, /a/ and /e/, and sometimes /o/. (/o/ also sometimes appears as a variant of unstressed /u/.)
2. In Middle English, almost all unstressed vowels were reduced to /ə/; then, final /ə/ was dropped. The main exception is Old English *-ig*, which becomes Modern English *-y*.
3. Unstressed vowels in Modern English other than those spelled <e> are due either to compounds or to borrowed words (especially from Latin and Old French).

NOTE: The Old English words in this table are given in their Anglian form, since this is the form that underlies Modern English. However, standard Old English was based on the West Saxon dialect, and when the two dialects differ, the West Saxon form is indicated with a *WS* in parentheses following the Anglian form.

NOTE: In this table, abbreviations are used as follows:

- | | |
|--|---|
| • PIE = Proto-Indo-European | • indic. = indicative |
| • PreG = Pre-Germanic ¹ | • leng. = lengthened by open-syllable lengthening |
| • PG = Proto-Germanic | • occ. = occasionally |
| • OE = Old English | • plur. = plural |
| • WS = West Saxon (dialect of Old English) | • pres. = present |
| • ME = Middle English | • sing. = singular |
| • NE = Modern English | • superl. = superlative |
| • GA = General American (dialect of | • > = produces by regular sound |

- Modern English)
 - RP = Received Pronunciation (British dialect of Modern English)
- change
 - >> = produces by analogy or irregular change

¹"Pre-Germanic" in this context refers to a post-PIE language that maintains PIE phonology but with morphological adjustments made as necessary to account for the Proto-Germanic form. Reconstructions are only given for solidly reconstructible Proto-Indo-European roots.

Late PIE1	Proto-Germanic1	Condition	Old English	Middle English	Modern English	Examples
			i-umlaut2	i-umlaut2	i-umlaut2	
				/a/	/æ/; RP /ɑ:/	PG *paþaz > OE pæþ > "path"; PG *batizôN > OE betera > "better"; PG *taljanaN > OE tellan > "to tell"
a, o, h ₂ e, h ₃ e, H	a		æ e	(leng.) /a:/	/ε/; /ei/	PG *hwalaz > OE hwæl > "whale"; PG *matiz > OE, ME mete "food" > "meat"; PG *stadiz > OE, ME stede > "stead"
				/εi (+g) /ai/	/εi/; /ei/	PG *dagaz > OE dæg > "day"
				/εu /ɔ:/	/εi/; /æf/	PG *hlahtraz > OE hlæhtor (WS hleahtor) > "laughter"; PG *slahtiz > OE sleht (WS sliht) > ME

				sleight "slaughter"
				PG *mannz, manniz > OE man, mon > "man", plur. men > "men"; PG *hamuraz > OE hamor > "hammer"; PG *handuz > OE hand > "hand"; PG *sange > OE past sang > "sang"; PG *lambaz > OE lamb > "lamb"; Latin candēla > OE candel > "candle"; PG *'gandrôn > gandra > "gander"; PG *langaz > OE lang, long > "long"; PG *sandijanaN > OE sendan > "send"; PG *bankiz > OE benç > "bench"; PG *hanjō > OE henn > "hen" PG *namôN > OE nama > "name"; PG lamôN > OE lama "lame"; PG *banôN > OE bana "slayer" > "bane"
	/æ/;			
	occ.			
/a/ (occ.	/e/	GA	/ɛ/	
/o/)		/ɔ/, RP		
		/ʊ/		
+n,m	a,o	e		
(leng.)	/ɛ	/ei/	/i:/	
/a:/	:	/:	/ei/;	
			/ɛ/	

						PreG *donts, dontes > *PG *tanþz, tanþiz > OE tōþ > "tooth", plur. tēþ > "teeth"; PG *gans, gansiz > OE gōs > "goose", plur. gēs > "geese"; PG *anþaraz > OE ōþer > "other"
+nf,nþ,ns	ō	ē	/o: /	/e /u: /; : /ʌ/; /ʊ/	/i: /	
			(+CC) /o/	GA /ɔ/, RP /e/ /ʊ/; GA /ɔ: /	/ε/	PG *samftōN > OE sōfte > "soft(ly)"; PG *anstiz > OE ēst "favor" > ME "este"
			/a/	/e/ /ɔ: /	/ε/	PG *fallanaN > OE fallan (WS feallan) > "to fall"; PG *fallijanaN > OE fællan > fellan (WS fiellan) > "to fell"
+IC	a	æ > e		(+ld) /ɔ: /	GA /ε /ou/, : / RP /əu/	/i: /; /ei/; /ε/
						PG *aldaz, aldizōN > OE ald (WS eald) > "old", ældra (WS ieldra) "older" > "elder"; PG *haldanaN > OE haldan (WS healðan) > "to hold"
+rc,rg,rh	æ > e	e	/e/	/e/	GA /ɑ/(+r), RP /ɑ: /	GA /ɑ/(+r) , RP /ɑ: /
						Latin arca > OE erc (WS earc) > "ark"

+rC (C not c,g,h)	ea	e	/a/	/e/	GA	GA	PG *harduz > OE heard > "hard"
					/ɑ/(+r), RP	/ɑ/(+r), , RP	
					/ɑ: /	/ɑ: /	
			/a/	/a/	/æ/;	/æ/;	Latin cattus >
					(RP)	(RP)	OE catt > "cat"
					/ɑ: /	/ɑ: /	
							PG *talō > OE talu > "tale"; PG
			(leng.)	/a	/ei/	/ei/	*bakanaN, -ip
			/a: /	: /			> OE bacan > "to bake", 3rd
before a,o,u	a	(by anal ogy) æ					sing. pres. indic. bæcþ "bakes"
							PG plur. *dagôs > OE dagas "days"
							> dial. "dawes"; PG
			(+g,w)	/au	/ɔ: /	/ɔ: /	*laguz > OE
			/au/	/			lagu > "law"; PG *clawō > OE clawu > "claw"
					/æ/;		
			/a/	/e/	(RP)	/ɛ/	
					/ɑ: /		
							PG *alu(b) > OE ealu > "ale"; PG
before later a,o,u	ea	eo	(leng.)	/ɛ	/ei/	/i: /;	*asiluz > OE
			/a: /	: /		/ei/;	eosol (WS esol) "donkey"
						/ɛ/	
			(+g,w)	/ɛu	/ɔ: /	/(j)u	PG *awī >
			/au/	/			OE eowu > "ewe"
before hs,ht,hþ + final -iz		i (occ N/A . ie)	/i/	N/A	/ai/		PIE *nokwtis > PG *nahtiz > OE nieht > OE niht > "night"

						PIE *nizdos > PG *nestaz > OE nest > "nest"; PG *helpanaN > OE helpan > "to help"; PG *fehtanaN > OE fehtan (WS feohtan) "to fight" (irreg.); PG *berkanaN > OE bercan (WS beorcan) > "to bark" PG *brekanaN > OE brecan > "to break"; PG *ebnaz > OE ef(e)n > "even"; OE feþer > "feather" PG *wegaz > OE weg > "way"; PG *regnaz > OE regn > "rain"; PG *seglaz > OE seġl > "sail" PG *felduz > OE feld > "field"; PG *geldanaN > OE ġeldan (WS ġieldan) "to pay" > "to yield" PG *remôN > OE rima > "rim"; PG *nemanaN >
		/e/	N/ A	/ε/	N/A	
e, h ₁ e, occ. i+C*e,a, o	e	N/A	(leng.) /ε: /	N/ /i: /; A /ei/; /ε/	N/A	
		(+g,h) /εi/ > /ai/	N/ A	/ei/	N/A	
		(+ld) /e: /	N/ A	/i: /	N/A	
+m	i	N/A	/i/	N/ A	/ɪ/	N/A

				(leng.) /e:/ /	N/ A	/i:/ /	N/A	OE niman "to take" > archaic "to nim"
						/ε/;		PG
						(+r)		*werþanaN >
				/e/	N/ A	GA /α/(+r),	N/A	OE weorðan "to become";
						RP /ɑ:/ /		PG *hertōN > OE heorte > "heart"
+rC (C not c,g,h); wV; C (C not c,g) +later a,o,u	eo	N/A		(leng.) /ε:/ /	N/ A	/i:/ /; /ei/;/ε/	N/A	*etanaN > OE eotan (WS etan) > "to eat"; PG *beranaN > OE beoran (WS beran) > "to bear"
				(+w) /εu/	N/ A	/(j)u: /	N/A	
	+ late final hs,ht,hþ	i (occ. N/A /i/ ie)			N/ A	/I/	N/A	PG *sehs > OE siex > "six"; PG *rehtaz > OE riht > "right" PG *fiskaN > OE fisc > "fish"; PG *hringaz > OE hring > "ring"; PG *bidjanaN > OE biddan "to pray" > "to bid"; PG *itip > OE 3rd sing. pres. indic. itep "eats"; PG *skirip > OE 3rd sing. pres. indic. sçirp
i, (h ₁)e+C *i, (h ₁)e+C i *y, (h ₁)e+n C		i i	/i/	/i/	/I/	/I/		

					(WS scierþ) "shears"; PG *stihtōjanaN > OE stihtian "to establish"
	(leng.)	/e/			PG *wikō > OE wicu > "week"
	/e:/	/	/i:/	/i:/	
		:	/		Latin tegula > OE tigele > "tile"; PG *brigdilaz > OE brīgdel > "bridle"
	(+g)	/i/			PG *blindaz > OE blind > "blind"
	/i:/	/	/ai/	/ai/	/blaind/; PG *kildaz (plur. *kildōzō) OE čild > "child"
		:	/		/tʃaild/; PG *wildijaz > OE wilde > "wild" /waild/
	(+ld,nd)	/i/			PG *fīmf > OE fīf > "five"; PG *linþijō > OE līþe "gentle"
	/i:/	/	/i/	/ai/	> "lithe"
	:	/			PG *fīmf tigiwiz > OE fīftig > "fifty"
		:	/ai/	/ai/	PG *liznōjanaN > OE liornian > OE leornian > "learn"; PG
+ nf,nþ,ns ī					*a + firrijanaN > OE afirran (WS afierran) "to remove"
	(+CC)	/i/	/I/	/I/	(cf. feorr
	/i/	/	/I/	/I/	
+rC (C not c,g,h); w	io > eo	i	/e/	/i/ /ε/	
				/I/	

							"far") PG *niwulaz > OE niowul, neowul "prostrate"; PG *spiwiz > OE spiwe "vomiting"; PG *hiwiz > OE hīw > "hue"
			(+w) /eu/ > /iu/	/iu/	/(j)u: /	/(j)u :	PG *milukz > OE mioluc,meolc > "milk"
			/i/ (/e/)	N/ A	/ɪ/ (/ɛ/)	N/A	
before a,o,u	i (io, eo)	N/A	(leng.) /e: / (/ɛ: /)	N/ A	/i: / (/i: /; /ei; /ɛ/)	N/A	
			(+g) /i: / (/ɛi/ > /ai/)	/i :	/ai/ (/ei/)	/ai/	
			/u/	/i/	/ʌ/; /ʊ/	/ɪ/	PG *sunuz > OE sunu > "son"; PG *kumanaN, - iþ > OE cuman > "to come", 3rd sing. pres. indic. cymb "comes"; PG *guldijanaN > OE gylðan > "to gild"
u, n (H), m (H), l (H), r (H)3	u	y			/u: /; /ʌ/; /ʊ/; (leng.) /e (+r) /o: /	/i: / /i: /	PreG *dhurus > PG *duruz > OE duru > "door"; PG *widuz > OE widu >> OE wudu > "wood"; PG
					/ɔr/; RP /ɔ: /		

			RP /ɒf/	PG *trugaz > OE trog > "trough"; PG *bugôN > OE boga > "bow" /bou/
			GA /ou/; RP /əu/; /i:/ /; (+ld,rd) /ɛ / /ɔ:/ / : /	PG *guldaz > OE gold > "gold"; PG *burdaN > OE bord > "board"
			GA /ɔr/; RP /ɔ:/ /	PG *slǣpanaN > OE slēpan (WS slǣpan) > "to sleep", Latin strāta > OE strēt (WS strǣt) > "street"; PG *dǣdiz > OE dēd (WS dǣd) > "deed"; Latin cāseus > OE cēse (WS cīese) > "cheese"
ē(H), eh ₂	ǣ > ā	ē ē	(+CC) /e/	PG *nǣhaz, nǣhistaz > OE nēh (WS nēah) "near" > "nigh", superl. nēhst (WS nīehst) "nearest" > "next"
			/e/ /ɛ/ /ɛ/ /ɛ/	
			(+g,h) /i/ /ai/ /ai/	
			/i:/ / : /	

									PG *mǣnôN > OE mōna > "moon"; PG *kwǣniz > OE kwēn > "queen"
	+n,m	ō	ē	/o:/	/e:/	/u:/	/i:/		
				/ɔ:/	/ɛ:/	/ou/	/i:/		
						GA	/i:/		
						RP	/ei/		
						/əu/	/ɛ/		
				(+g)	/ɛi/	GA	/ou/		PG *mǣgôz > OE māgas "relatives"
				/ɔu/	/>/	RP	/ei/		
					/ai/	/əu/			
	+w; ga,go,gu	ā	ǣ						PG *knǣwanaN, -iþ > OE cnāwan > "to know", 3rd sing. pres. indic. cnǣwþ "knows"
				(+w)	/ɛu/	GA	/ou/		
				/ɔu/	/	RP	:/		
						/əu/			
									PG *hēr > OE hēr > "here"; PIE *mizdhā > PG *mēdō > OE mēd "reward"
				/e:/	/e:/	/i:/	/i:/		
ēi, iz, etc.4	ē	ē	ē	(+g,h)	/i/	/ai/	/ai/		OE past hēht "called" > "hight"
				/i:/	/i:/	/ai/	/ai/		
				(+w)	/eu/	/>/	/i:/		
				/eu/	/>/	/i:/	/i:/		
				/iu/	/iu/	/	/		
				/o:/	/e/	/u:/	/i:/		PG *fōtz, fōtiz > OE fōt > "foot", plur. fēt > "feet"
						/Λ/	/v/		
ā, ō, aH, oH, eh ₂ , eh ₃ ; an+K, on+K, h ₂ en+K, h ₃ en+K	ō; āN+h	ō	ē	(+CC)	/e/	GA	/ɔ/, RP		PG PG *kōpi- dǣþ > OE cēpte > "kept"; PG
				/o/	/e/	/v/	/ɛ/		
						GA			

				/ɔr/, RP /ɔ: /	OE rād > "rode"; PreG *oyerā > PG *airō > OE ār > "oar"; PIE *ayes > PG *aiz > OE ār "bronze" > "ore"; PG *hwaitijaN > OE hwǣte > "wheat"	
	(+CC)	/a/	/æ/; RP /ɑ: /	/æ/; RP /ɑ: /	PG *faittiz > OE fǣtt > "fat"	
	(+g,h)	/ɔu/	/ɛi > /ai/	GA /ou/, RP /əu/	/ei/	PG *aiganaN > OE āgan > "owe"; PG *daigaz > OE dāg, dāh > "dough"
	(+w)	/ɔu/	/ɛu / /əu/	GA /ou/, RP /əu/	/ (j) u : /	PG *maiwiz > OE mǣw > "mew"
		/ɛ: /	/e : /	/i: /; /ei/; /ɛ/	/i: /	PG *auzōN > OE ēare > "ear"; PG *hauzijanaN > OE hēran (WS hīeran) > "to hear"
		ēa ē				
au, ou, h ₂ eu, au h ₃ eu			(+w)	/eu > /ɛu/	/ (j) u: / (j) u : /	PG *skrawwōN > OE sċrēawa > ME "shrewe" > "shrew"
	+c,g,h; rc,rg,rh;lc, ē lg,lh	ē	/e: /	/e : /	/i: /	PG *auke(?), *aukijanaN > OE ēc, ēcan (WS ēac, īēcan) "also, to increase" > ME "eke,

					eche" > "eke" (archaic), "to eke"
					PG *augōN > OE ēge (WS ēage) > "eye"; PG *hauhaz, hauhastaz > OE hēh (WS hēah) > "high", superl. hēhst (WS hīehst) "highest"; PIE *leuktos > PG *leuhtaz > OE lēht (WS lēoht) > "light" (brightness)
		(+g,h) /i:/	/i/	/ai/	
			:	/ai/	
					PG *deupaz > OE dēop > "deep"; PG *beudanaN > OE bēodan "to command"
	ēo	N/A			
		(+w) /eu/ > /iu/	N/ A	/(j)u: /	N/A
(h ₁)eu	eu				PG *hrewwanaN > OE hrēowan > "to rue"
		/e:/	N/ A	/i:/	N/A
					PG *reukanaN > OE rēcan (WS rēocan) > "to reek"
	+c,g,h; rc,rg,rh; lc,lg,lh	ē	N/A		PG *fleugōN > OE flēge (WS flēoge) > "fly"; PG *leuganaN > OE lēgan (WS lēogan) > "to lie"
		(+g,h) /i:/	N/ A	/ai/	N/A

From the Middle and Modern English perspective

This table describes the main historical developments of English vowels in the last 1000 years, beginning with late Old English and focusing on the Middle English and Modern English changes leading to the current forms. It takes a later perspective than the previous table. In particular, it provides much more detail about the changes taking place in the last 600 years (since Middle English), while omitting any detail in the Old English and earlier periods.

NOTE: In this table, abbreviations are used as follows:

- OE = Old English
- WS = West Saxon (dialect of Old English)
- ME = Middle English
- NE = Modern English
- GA = General American (dialect of Modern English)
- RP = Received Pronunciation (British dialect of Modern English)
- leng. = lengthened by open-syllable lengthening
- occ. = occasionally
- superl. = superlative
- > = produces by regular sound change
- >> = produces by analogy or irregular change

Late Old English (Anglian), c. 1000	Middle English pronunciation, c. 1400	Modern English spelling, c. 1500	Early Modern English pronunciation, c. 1600	Modern English pronunciation, c. 2000	Source	Example
a; æ; ea; ā+CC; often ǣ+CC, ēa+CC; /a/ occ. ē+CC (WS ǣ+CC)		a	/a/	/æ/	OE a	OE <i>mann</i> > "man"; OE <i>lamb</i> > "lamb"; OE <i>sang</i> > "sang"; OE <i>sacc</i> > "sack"; OE <i>assa</i> > "ass" (donkey) OE <i>fæþm</i> "embrace" > "fathom"; OE <i>sæt</i> > "sat"; OE

		<i>æt</i> > "at"; OE <i>mæsse</i> > "mass" (at church)
	OE ea	OE <i>weax</i> > "wax"; OE <i>healf</i> > "half" /hæf/
		OE <i>fǣtt</i> > "fat"; OE <i>lǣstan</i> > "to last"; OE <i>blēddre</i> (WS
	OE +CC	<i>blǣddre</i>) > "bladder"; OE <i>brēmbel</i> (WS <i>brǣmbel</i>) > "bramble"
		OE <i>swan</i> > "swan"; OE <i>wascan</i> > "to wash"; OE <i>wann</i> "dark" > "wan"
(w+, not +g,ck,ng,nk) GA /ɑ/, RP /ɒ/	OE a	OE <i>swæp</i> > "swath"
	OE æ	OE <i>wealwian</i> > "to wallow"
(+r) /ar/ > GA /ɑr/, RP /ɑ:/	OE ea	OE <i>heard</i> > "hard"
(w+ and +r) /ɔr/ > GA /ɔr/, RP /ɔ:/	OE ea	OE <i>swearm</i> > "swarm"; OE <i>sweart</i> > old poetic

					"swart" >> "swarthy"; OE <i>weardian</i> > "to ward"; OE <i>wearm</i> > "warm"; OE <i>wearnian</i> > "to warn" OE <i>smæġ</i> > "small"; OE <i>all</i> (WS <i>eall</i>) > "all"; OE <i>walcian</i> (WS <i>wealcian</i>) "to roll" > "to walk" OE <i>æġmesse</i> > "alms"; Latin <i>palma</i> > OE <i>palm</i> > "palm" OE <i>glæs</i> > "glass"; OE <i>græs</i> > "grass"; OE <i>pæþ</i> > "path"; OE <i>æfter</i> > "after"; OE <i>āscian</i> > "to ask" OE <i>nama</i> > "name"; OE <i>nacod</i> > "naked"; OE <i>bacan</i> > "to bake" OE <i>æcer</i> > "acre"; OE
				(+IC,l#) /ɔ:/	
				(+Im) GA /ɑ/, RP /ɑ:/	
				(RP, often +f,s,th) /ɑ:/	
(leng.) /ɑ:/ [æ:]	aCV	/ɛ:/	/e:/ > /ei/		OE a
					OE æ

						<i>hwæl</i> > "whale"; OE <i>hræfn</i> > "raven" OE <i>caru</i> > "care"; OE <i>faran</i> > "to fare"; OE <i>starian</i> > "to stare" OE <i>helpan</i> > "to help"; OE <i>elh</i> (WS <i>eolh</i>) > "elk"; OE <i>tellan</i> > "to tell"; OE <i>betera</i> > "better"; OE <i>streccan</i> > "to stretch"
					OE a	
						OE e
						OE eo
e; eo; occ. y; ē+CC; ēo+CC; occ.	/e/	e	/ε/	/ε/		OE y
ǣ+CC, ēa+CC						OE +CC
						OE <i>myrig</i> > "merry"; OE <i>byrgan</i> > "to bury" /bɛri/; OE <i>lyft</i> - "weak" > "left" (hand) OE <i>cēpte</i> > "kept"; OE <i>mētte</i> > "met"; OE <i>bēcnan</i> (WS <i>bīecnan</i>) > "to beckon"; OE <i>clǣnsian</i> > "to

		OE <i>hērd</i> (WS <i>hīerde</i>) > "heard"
	OE +CC	OE <i>specan</i> > "to speak"; OE <i>mete</i> > "meat"; OE <i>meotan</i> (WS <i>metan</i>) > "to mete"
	/i: /	/mi: t/; OE <i>eotan</i> (WS <i>etan</i>) > "to eat"; OE <i>meodu</i> (WS <i>medu</i>) > "mead"
	(+r) /i: r/ > GA /ɪr/, RP /ɪə/	OE <i>spere</i> > "spear"; OE <i>mere</i> > "mere" (lake)
(leng.) /ɛ: /	ea,eC V	OE <i>brecan</i> > "to break" /breik/
	(occ.) /ei/	OE <i>beoran</i> (WS <i>beran</i>) > "to bear"; OE <i>pere</i> , <i>peru</i> > "pear"; OE <i>swerian</i> > "to swear"; OE <i>wer</i> "man" > "were-"
	(occ. +r) /e: r/ > GA /ɛr/, RP /ɛə/	OE <i>leþer</i> > "leather" /lɛðə/; OE <i>stede</i> >
	(often +th,d,t,v) /ɛ/	

i; y;
 ī+CC,ȳ+CC;
 occ. ēoc,ēc; /i/ i /I/ /I/
 occ.
 ī+CV,ȳ+CV

"stead";
 OE *weder*
 >
 "weather";
 OE *heofon*
 >
 "heaven";
 OE *hefig* >
 "heavy"
 OE *writen*
 >
 "written";
 OE *sittan* >
 "to sit"; OE
 OE i *dyde* >
 "did"; OE
fisc >
 "fish"; OE
lifer >
 "liver"
 OE *brycg* >
 "bridge";
 OE *cyssan*
 > "to kiss";
 OE *synn* >
 OE y "sin"; OE
gyldan >
 "to gild";
 OE *bysig* >
 "busy"
 /bɪzi/
 OE *wīsdōm*
 >
 "wisdom";
 OE *fiftig* >
 "fifty"; OE
 OE +CC *wīscan* >
 "to wish";
 OE *cȳpp(u)*
 > "kith";
 OE *fȳst* >
 "fist"
 OE *cīcen* >
 OE *lȳtel* >
 OE
 ȳ+CV,ī+CV "chicken";

			/ɔr/, RP /ɔ: /	"corn"; OE <i>storc</i> > "storc"; OE <i>storm</i> > "storm"
			GA /ou/, RP /əu/	OE <i>fola</i> > "foal"; OE <i>nosu</i> > "nose"; OE <i>ofer</i> > "over"
(leng.) /ɔ: /	oa, oC V	/o: /		OE <i>borian</i> > "to bore"; OE <i>fore</i> > "fore"; OE <i>bord</i> > "board"
			(+r) /o: r/ > GA /ɔr/, RP /ɔ: /	OE <i>bucc</i> > "buck" /bʌk/; OE <i>lufian</i> > "to love" /lʌv/; OE <i>uppe</i> > "up"; OE <i>on bufan</i> > "above"
u; occ. y; ū+CC; w+ e, eo, o, y +r	/u/	u, o	/ʊ/	OE u love" /lʌv/; OE <i>uppe</i> > "up"; OE <i>on bufan</i> > "above"
			/ʌ/	OE <i>mycel</i> >> "much"; OE <i>blyscan</i> > "to blush"; OE <i>cyčgel</i> > "cudgel"; OE <i>clyčcan</i> > "to clutch"; OE <i>scytel</i> > "shuttle"
				OE y "cudgel"; OE <i>clyčcan</i> > "to clutch"; OE <i>scytel</i> > "shuttle"
				OE <i>dūst</i> > "dust"; OE <i>tūsc</i> > "tusk"; OE <i>rūst</i> > "rust"
				OE +CC "tusk"; OE <i>rūst</i> > "rust"

						OE <i>full</i> > "full" /fʊl/; OE <i>bula</i> > "bull"; OE <i>bysc</i> > "bush"
				(b,f,p+ and +l,sh) /ʊ/		
					OE u	OE <i>spurnan</i> > "to spurn"
					OE y	OE <i>cyrice</i> > "church"; OE <i>byrþen</i> > "burden"; OE <i>hyrðel</i> > "hurdle"
				(+r) /əɾ/ > GA /əɾ/, RP /ɜː /		OE <i>word</i> > "word"; OE <i>werc</i> (WS <i>weorc</i>) > "work"; OE <i>werold</i> > "world"; OE <i>wyrm</i> > "worm"; OE <i>wersa</i> (WS <i>wiersa</i>) > "worse"; OE <i>weorþ</i> > "worth"
					OE w+,+r	OE <i>guma</i> >> "groom"
				/uː /		
				(+r) /uː r/ > /oː r/ > GA /ɔɾ/, RP /ɔː /		OE <i>duru</i> > "door"
	(leng. — occ.)	oo	/uː /	(often +th,d,t) /ʌ/		?
	/oː /			(occ. +th,d,t) /ʊ/		OE <i>wudu</i> > "wood" /wʊd/
ā; often a+ld,mb	/ɔː /	oa,oC V	/oː /	GA /ou/, RP /əʊ/	OE ā	OE <i>āc</i> > "oak"; OE

				<i>hāl</i> > "whole"
				OE <i>camb</i> > "comb";
				OE <i>ald</i> (WS <i>eald</i>)
			OE +ld,mb	> "old";
				OE <i>haldan</i> (WS
				<i>healdan</i>) > "to hold"
				OE <i>ār</i> > "oar",
				"ore"; OE
			(+r) /o: r/ >	<i>māra</i> >
			GA /ɔr/, RP	"more";
			/ɔ: /	OE <i>bār</i> >
				"boar"; OE
				<i>sār</i> > "sore"
				OE <i>hǣlan</i> > "to heal"
				/hi: l/; OE
			OE ǣ	<i>hǣtu</i> > "heat"; OE
				<i>hwǣte</i> > "wheat"
			/i: /	OE <i>bēatan</i> > "to beat"
				/bi: t/; OE
			OE ēa	<i>lēaf</i> > "leaf"; OE
				<i>ċēap</i> > "cheap"
				OE <i>rǣran</i> > "to
				rear" ; OE
				<i>ēare</i> >
			(+r) /i: r/ >	"ear"; OE
			GA /ɪr/, RP	<i>sēar</i> >
			/ɪə/	"sere"; OE
				<i>sēarian</i> > "to sear"
ǣ; ēa	/ɛ: /	ea,eC V	/e: /	

				(occ.) /ei/	OE <i>grēat</i> > "great" /greit/
				(occ. +r) /e: r/ > GA /ɛr/, RP /ɛə/	OE <i>ǣr</i> > "ere" (before)
					OE <i>brǣþ</i> "odor" > "breath"; OE
					OE <i>ǣ</i> <i>swǣtan</i> > "to sweat"; OE -
					<i>sprǣdan</i> > "to spread"
				(often +th,d,t) /ɛ/	OE <i>dēad</i> > "dead" /dɛd/; OE <i>dēap</i> "death";
					OE <i>ǣa</i> <i>prēat</i> "menace" > "threat"; OE <i>rēad</i> > "red"; OE <i>dēaf</i> > "deaf"
					OE <i>fēdan</i> > "to feed"; OE <i>grēdig</i> (WS <i>grǣdig</i>) > "greedy"; OE <i>mē</i> > "me"; OE <i>fēt</i> > "feet"; OE <i>dēd</i> (WS <i>dǣd</i>) > "deed"; OE <i>nēdl</i> (WS <i>nǣdl</i>) > "needle"
ē; ēo; often e+ld	/e: /	ee,ie(n d/ld)	/i: /	/i: /	OE <i>ē</i> OE <i>ēo</i>

				"deep"; OE <i>fēond</i> > "fiend"; OE <i>betwēonum</i> > "between"; OE <i>bēon</i> > "to be"
				OE <i>feld</i> > "field"; OE <i>geldan</i> (WS <i>ġieldan</i>) "to pay" > "to yield"
			OE +ld	OE <i>hēr</i> > "here"; OE <i>hēran</i> (WS <i>hīeran</i>) > "to hear"; OE <i>fēr</i> (WS <i>fǣr</i>) > "fear"
		/i: r/ > GA /ɪr/, RP /ɪə/	OE ē	OE <i>dēore</i> (WS <i>dīere</i>) > "dear"
(often +r) /ɛ: r/ V	ear,er /e: r/		OE ēo	OE <i>pēr</i> (WS <i>pǣr</i>) > "there"; OE <i>hwēr</i> (WS <i>hwǣr</i>) > "where"
		(occ.) /e: r/ > GA /ɛr/, RP /ɛə/		OE <i>bēor</i> > "beer"; OE <i>dēor</i> > "deer"; OE <i>stēran</i> (WS <i>stīeran</i>) > "to steer"; OE <i>bēr</i> (WS <i>bǣr</i>) > "bier"
(occ. +r) /e: r/	eer	/i: r/	/i: r/ > GA /ɪr/, RP /ɪə/	

			OE ī	OE <i>rīdan</i> > "to ride"
			OE ŷ	OE <i>mŷs</i> > "mice"
		/ai/		OE <i>findan</i> > "to find"; OE <i>cild</i> > "child"; OE +ld,mb,nd <i>climban</i> > "to climb"; OE <i>mynd</i> > "mind"
ī; ŷ; often i+ld,mb,nd; often y+ld,mb,nd	/i: /	i,iCV /əi/		
		(+r) /air/ > GA /air/, RP /aɪə/		OE <i>fŷr</i> > "fire"; OE <i>hŷrian</i> > "to hire"; OE <i>wīr</i> > "wire"
			OE ō	OE <i>mōna</i> > "moon"; OE <i>sōna</i> > "soon"; OE <i>fōd</i> > "food"
		/u:/		/fu: d/; OE <i>dōn</i> > "to do"
			OE ēo	OE <i>cēosan</i> > "to choose"; OE <i>scēotan</i> > "to shoot"
ō; occ. ēo	/o: /	oo /u:/		OE <i>flōr</i> > "floor"; OE <i>mōr</i> > "moor"
		(+r) /u: r/ > /o: r/ > GA /ɔr/, RP /ɔ: /		OE <i>blōd</i> > "blood"
		(occ. +th,d,v) /ʌ/		/blʌd/; OE <i>mōdor</i> > "mother"
				/mʌðə(r)/; OE <i>glōf</i> >

			"glove" /glʌf/ OE <i>gōd</i> > "good" /gʊd/; OE <i>bōc</i> > "book" /bʊk/; OE <i>lōcian</i> > "to look" /lʊk/; OE <i>fōt</i> > "foot" /fʊt/ OE <i>mūs</i> > "mouse"; OE <i>ūt, ūte</i> > "out"; OE <i>hlūd</i> > "loud"
	(often +th,d,t,k) /ʊ/		
		OE ū	
	/au/		OE <i>ġefunden</i> > "found"; OE <i>hund</i> > "hound"; OE <i>gesund</i> > "sound" (safe) OE <i>ūre</i> > "our"; OE <i>scūr</i> > "shower"; OE <i>sūr</i> > "sour" OE <i>būtan</i> > "but"; OE <i>strūtian</i> > ME <i>strouten</i> > "to strut"
ū; often u+nd /u:/ /		OE +nd	
ou /əu/			
	(+r) /aur/ > GA /aur/, RP /auə/	OE	
	(occ. +t) /ʌ/		

History of Middle English diphthongs

This table describes the main developments of Middle English diphthongs, starting with the Old English sound sequences that produced them (sequences of vowels and *g*, *h* or *w*) and ending with their Modern English equivalents. Many special cases have been ignored.

Note: *V* means "any vowel"; *C* means "any consonant"; # means "end of word".

Late Old English (Anglian)	Early Middle English	Late Middle English	Early Modern English	Modern English	Example
æg, æ̃g	/ai/				<i>dæg</i> > "day"; <i>græ̃g</i> > "gray"
		/ai/	/e: /	/ei/	
eg	/ɛi/				<i>weg</i> > "way"; <i>regn</i> > "rain"
ēg	/ei/ > /i: /				<i>ēage</i> > <i>ēge</i> > "eye"; <i>lēogan</i> > <i>lēgan</i> > "lie"
		/i: /	/əi/	/ai/	
ig, īg, yg, ŷg	/i: /				<i>tigel</i> > "tile"; <i>hīgian</i> > "hie"; <i>ryge</i> > "rye"; <i>drỹge</i> > "dry"
æw, aw, agV	/au/	/au/	/ɔ: /	/ɔ: /	<i>clawu</i> > "claw"; <i>lagu</i> > "law"
æ̃w, ēaw, ew, eow	/ɛu/	/ɛu/			<i>mæ̃w</i> > "mew"; <i>læ̃wede</i> > "lewd"; <i>scrēawa</i> > "shrew"; <i>eowu</i> > "ewe"
			/ju: /	/ju: /	
ēw, ēow	/eu/				<i>hrēowan</i> > "rue"
iw, īw, yw, ŷw	/iu/	/iu/			<i>hīw</i> > "hue"; <i>nīwe</i> > "new"
āw, āgV, ow, ogV, ōw, ōgV	/ɔu/	/ɔu/	/ou/ > /o: /	/əu/ (British), /ou/ (American)	<i>cnāwan</i> > "know"; <i>āgan</i> > "owe"; <i>grōwan</i> > "grow"; <i>boga</i> > "bow" /bou/
ugV, ūgV	/u: /	/u: /	/əu/	/au/	<i>drugap</i> > <i>drouth</i> > "drought"; <i>būgan</i> > "bow" /bau/
			([x] → nil) /ɔ: /	/ɔ: /	<i>slæht</i> (WS <i>sleht</i>) + -or > "slaughter"
æh, ah, ag#	/auh/	/auh/	([x] → /f/) /af/	/æf/	<i>hlæhtor</i> > "laughter"
eh	/ɛih/	/ɛih/	/ei/ > /e: /	/ei/	<i>streht</i> > "straight"

ēh	/eih/ > /i: h/					<i>hēah</i> > <i>hēh</i> > "high"; <i>þēoh</i> > <i>þēh</i> > "thigh"; <i>nēh</i> > "nigh"
		/i: h/	/əi/	/ai/		
ih, īh, yh, ŷh	/i: h/					<i>reht</i> > <i>riht</i> > "right"; <i>flyht</i> > "flight"; <i>līoht</i> > <i>līht</i> > "light"
āh, āg#, oh, og#	/ɔuh/	/ɔuh/				
āhC, ohC, ōhC	/ɔuh/	/ɔuh/				
ōh#, ōg#	/ouh/ > /u: h/					
uh, ug#, ūh, ūg#	/u: h/					

([x] → nil) /ʊf/ (British),

/ou/ > /ɔ: f/

/o: / (American)

([x] → /f/) /ʊf/ (British),

/ɔ: f/ (American)

([x] → nil) /au/

/əu/

(centralized)

([x] → /f/) /ʌf/

/ʊf/

(non-centralized) /ʊf/ ?

dāg > *dāh* > "dough"

trog > "trough"

dohtor > "daughter";

sōhte > "sought"

bōg > "bough"; *plōg* >

plōh > "plough"

tōh > "tough"; *ruh* >

"rough"



Chapter- 3

Old English Phonology

The **phonology of Old English** is necessarily somewhat speculative, since it is preserved purely as a written language. Nevertheless, there is a very large corpus of Old English, and the written language apparently indicates phonological alternations quite faithfully, so it is not difficult to draw certain conclusions about the nature of Old English phonology.

Sound inventory

The inventory of surface sounds (whether allophones or phonemes) of Old English is as shown below.

Consonants

	Labial	Dental	Alveolar	Postalveolar	Palatal	Velar	Glottal
Nasal	m		n			(ŋ)	
Stop	p b		t d	tʃ (dʒ)		k ɡ	
Fricative	f (v)	θ (ð)	s (z)	ʃ	(ç)	(x) (ɣ)	h
Approximant			r		j	w	
Lateral			l				

1. ^ The exact nature of Old English *r* is not known. It may have been an alveolar approximant [ɹ], as in most Modern English accents, an alveolar flap [ɾ], or an alveolar trill [r]. Here we will use the symbol /r/ indiscriminately to stand for this phoneme.

Consonant allophones

The sounds marked in parentheses in the table above are allophones:

- [dʒ] is an allophone of /j/ occurring after /n/ and when geminated
 - For example, *senġan* "to singe" is [sendʒan] < /senjan/ < *sangjan
 - and *brycġ* "bridge" is [bryddʒ] < /bryjj/ < *bruggjō < *bruyjō
- [ŋ] is an allophone of /n/ occurring before /k/ and /g/

- For example, *hring* "ring" is [hriŋg]; [ŋ] did not occur alone word-finally in Old English as it does in Modern English.
- [v, ð, z] are allophones of /f, θ, s/ respectively, occurring between vowels or voiced consonants.
 - For example, *stafas* "letters" is [stavas] < /stafas/, *smiþas* "blacksmiths" is [smiðas] < /smiθas/, and *hūses* "house (genitive)" is [hu: zes] < /hu: ses/.
- [ç, x] are allophones of /h/ occurring in coda position after front and back vowels respectively. The evidence for the allophone [ç] after front vowels is indirect, as it is not indicated in the orthography. Nevertheless, the fact that there was historically a fronting of *k to /tʃ/ and of *ɣ to /j/ after front vowels makes it very likely. Moreover, in late Middle English, /x/ sometimes became /f/ (e.g. *tough*, *cough*), but only after back vowels, never after front vowels. This is explained if we assume that the allophone [x] sometimes became [f] but the allophone [ç] never did.
 - For example, *cniht* "boy" is [kniçt], while *gēþōht* "thought" is [je' θo: xt]
- [ɣ] is an allophone of /g/ occurring after a vowel or liquid. Historically, [ɣ] is older, and originally appeared in word-initial position as well; for Proto-Germanic (PGmc) and probably the earliest Old English it makes more sense to say that [g] is an allophone of /ɣ/ after a nasal. But after [ɣ] became [g] word-initially, it makes more sense to treat the stop as the basic form and the fricative as the allophonic variant.
 - For example, *dagas* "days" is [davas] and *burgum* "castles (dative)" is [burɣum]
- /l/ and /r/ apparently had velarized allophones [ɫ] and [ɾʷ], or similar, when followed by another consonant. This conclusion is based on the phenomena of breaking and retraction, which appear to be cases of assimilation to a following velar consonant.

Vowels

Monophthongs	Short		Long	
	Front	Back	Front	Back
Close	i y	u	i: y:	u:
Mid	e (ø)	o	e: (ø:)	o:
Open	æ	ɑ	æ:	ɑ:

The front mid rounded vowels /ø(:)/ occur in some dialects of Old English, but not in the best attested Late West Saxon dialect. There is also historical evidence suggesting that short /e/ and /o/ were phonetically lower and/or more centralized (perhaps /ɛ/ and /ɔ/) than the corresponding long ones.

Diphthongs	Short (monomoraic)	Long (bimoraic)
First element is close	iy	i: y
Both elements are mid	eo	e: o
Both elements are open	æɑ	æ: ɑ

2. ^ It is uncertain whether the diphthongs spelt *ie/īe* were pronounced [i(:)y] or [i(:)e]. The fact that this diphthong was merged with /y(:)/ in many dialects suggests the former.

The distribution of velars and palatals

The pairs /k/~/tʃ/ and /g/~/j/ are almost certainly distinct phonemes synchronically in Late West Saxon, the dialect in which the majority of Old English documents are written. This is shown by such near-minimal pairs as:

- *drincan* [driŋkan] "to drink" vs. *drenċan* [drentʃan] "to drench"
- *gēs* [ge: s] "geese" vs. *gē* [je:] "you"

Nevertheless there are very few environments in which both the velars and the palatals can occur; in most environments only one or the other set occurs. Also, the two sets alternate with each other in ways reminiscent of allophones, for example:

- *ċēosan* [tʃe: ozan] "to choose" vs. *curon* [kuron] "chose (pl.)"
- *ġēotan* [je: otan] "to pour" vs. *guton* [guton] "poured (pl.)"

(In the standardized orthography used on this page, *c* stands for /k/, *ċ* for /tʃ/, *g* for /g/ and [ɣ], and *ġ* for /j/ and [dʒ]. The geminates of these are spelled *cc*, *ċċ*, *cg*, *ċġ*.)

The best way to explain the distribution of *c*~*ċ* and *g*~*ġ* is through historical linguistics. The PGmc ancestor of both *c* and *ċ* is *k; the ancestor of both *g* and *ġ* is *ɣ. Palatalization of *k to *ċ* and of *ɣ to *ġ* happened in the following environments:

- before PGmc nonlow front vowels (*i, *ī, *e, *ē, *eu) as well as PGmc *j
 - Examples: *ġifþ* "(he) gives" < *ɣifipī, *ċīdan* "to chide" < *kīdan, *ċeorl* "churl" < *kerlaz, *ġēotan* "pour" < *ɣeutan; non-initially *bēċ* "books" < *bōkīz, *sēċan* "seek" < *sōkjan, *bryċġ* "bridge" < *bruyjō
- before OE /æ, ǣ: / < PGmc *a, ā (but not before OE /ɑ, ɑ: / < PGmc *a, ǣ by a-restoration)
 - Examples: *ġeaf* /jæf/ "gave" < *ɣaf, *ċēace* /tʃæ: ke/ "cheek" < *kāk-
- before OE /æ: ɑ/ < PGmc *au
 - Examples: *ċēas* "chose (sg.)" < *kaus, *ġēat* "poured (sg.)" < *ɣaut
- before OE /æɑ/ < PGmc *a by breaking
 - Examples: *ċeald* "cold" < *kaldaz, *ġeard* "yard" < *ɣardaz

- after OE /i, i: /, unless a back vowel followed
 - Examples: *iċ* "I" < PGmc *ik, *dīċ* "ditch, dike" < PGmc *dīk- (but *wicu* "weak")
- after OE /e, e: / and /æ, æ: / (*v only!), unless a back vowel followed
 - Examples: *weg* "way" < PGmc *wevaz, *nægġl* "nail" < PGmc *navlaz, *mæġ* "relative" < PGmc *māvaz (but *wegas* "ways")

The velars remained velar, however, before back vowels that underwent i-mutation (umlaut):

- *cýning* "king" < *kuningaz
- *gēas* "geese" < *vōsīz
- *cemban* "to comb" < *kambjan
- *macian* "to make" < *makōjan

Palatalization was undone before consonants in OE:

- *sēċþ* "he seeks" < *sēċþ < *sōkjīþi
- *sengþ* "he sings" < *sengþ < *sangjīþi

The palatalization of PGmc *sk to OE /ʃ/ (spelt *sc*) is much less restricted: word-initially it is found before back vowels and *r* as well as in the environments where *ċ* and *ġ* are found.

- *sculdor* "shoulder" < *skuldr-
- *scort* "short" < *skort-
- *scrūd* (= "shroud") "dress" < *skrūd-

Non-initially palatalization to *sc* is found before PGmc front vowels and *j*, and after front vowels in OE, but not before an OE back vowel

- *fisc* "fish" < *fiskaz
- *āscian* "ask" < *aiskōjan

In addition to /j/ from the palatalization of PGmc *v, Old English also has /j/ from PGmc *j, which could stand before back vowels:

- *ġeong* /jung/ "young" < PGmc *jungaz
- *ġeoc* /jok/ "yoke" < PGmc *jokan

Many instances where a *ċ/c*, *ġ/g*, or *sc/sc* alternation would be expected within a paradigm, it was levelled out by analogy at some point in the history of the language. For example, the velar of *sēċþ* "he seeks" has replaced the palatal of *sēċan* "to seek" in Modern English; on the other hand, the palatalised forms of *besēċan* have replaced the velar forms, to create "beseech".

Phonological processes

A number of phonological processes affected Old English in the period before the earliest documentation. These processes especially affected vowels, and are the reason why many Old English words look significantly different from related words in languages such as Old High German, which is much closer to the common West Germanic ancestor of both languages. The processes took place chronologically in the order described below (with uncertainty in ordering as noted).

Various conventions are used below for describing Old English words, reconstructed parent forms of various sorts, and reconstructed Proto-West-Germanic (PWG), Proto-Germanic (PG) and Proto-Indo-European (PIE) forms:

- Forms in *italic* denote either Old English words as they appear in spelling, or reconstructed forms of various sorts. Where phonemic ambiguity occurs in Old English spelling, extra diacritics are used (ċ, ġ, ā, ð, ē, ī, ō, ū, ȳ).
- Forms between /slashes/ or [brackets] indicate, respectively, broad (phonemic) or narrow (allophonic) pronunciation. Sounds are indicated using standard IPA notation.
- Long vowels appear as e.g. *ō* but /o: /.
- Nasal vowels appear as e.g. *oN* but /õ/.
- Overlong vowels appear as e.g. *ô* but /o: : /.
- Nasal overlong vowels appear as e.g. *ôN* but /õ: : /.
- "Long" diphthongs appear as e.g. *ēa* but /æa/.
- "Short" diphthongs appear as e.g. *ea* but /ǣ ǣ/, [ǣ ǣ].
- Velar /k/ appears *c* in old English spelling and sometimes in reconstructed intermediate forms, but *k* elsewhere.

A-fronting ("Anglo-Frisian brightening"), part 1

The Anglo-Frisian languages underwent a sound change in their development from Proto-West Germanic by which *ā* [ɑ:], unless followed by /n, m/ or nasalized, was fronted to *ǣ* [æ:]. This is part of a process known in the literature as **Anglo-Frisian brightening**. Note that nasalized *āN* was unaffected, and was later raised to *ōN* (see below). Similarly, the sequences *ān*, *ām* were unaffected and later raised to *ōn*, *ōm*. (It can be assumed, therefore, that a nasal consonant *n*, *m* caused a preceding long vowel to nasalize.)

Monophthongization of /ai/

Proto-Germanic /ai/ was monophthongized to /a: / ([a:]). This occurred after the fronting of West Germanic [ɑ:] to [æ:] by Anglo-Frisian brightening. Examples are numerous, e.g. *stān* "stone" < Proto-Germanic /stain/ (cf. Gothic *stáin*, Old High Germanic *stein*). In many cases the resulting [ɑ:] was later fronted to [æ:] by i-mutation, e.g. *dǣlan* "to divide" (cf. Gothic *dáiljan*, Modern English "deal").

A-fronting ("Anglo-Frisian brightening"), part 2

Part two of a-fronting (or "Anglo-Frisian brightening") is very similar to part one except that it affects short *a* [a] instead of long *ā* [ɑ:]. *a* [a] is fronted to *æ* [æ] unless followed by /n, m/ or nasalized — the same conditions as applied in part one.

See a-restoration below for examples.

Importantly, a-fronting was blocked by *n, m* only in stressed syllables, not unstressed syllables. This accounts for forms like *ġefen* (archaic *ġefæn*) "given" from Proto-Germanic **gebanaz*.

Diphthong height harmonization

Diphthongs in most languages are of the "closing" type, where the second segment is higher (if possible) than the first, e.g. Modern English /ai, au, oi, ei, ou/. Proto-Germanic likewise had /ai, au, eu/ and [iu] ([iu] was an allophone of /eu/ when an /i/ or /j/ followed in the next syllable). Old English, however, had unusual "harmonic" diphthongs, where both segments were of the same height: *ea* /æa/, *eo* /eo/, *io* /iu/, *ie* /iy/. Note that all of these diphthongs could occur both short (monomoraic), i.e. /ǣ ā, ēō, īū, īȳ /, and long (bimoraic), i.e. /æa, eo, iu, iy/. Note also that the spelling of the diphthongs differs somewhat from their assumed pronunciation. The interpretations *ea* /æa/ and *eo* /eo/ are generally accepted (evidence for the former comes from various sources, e.g. the behavior of breaking and back mutation [see below]) and the Middle English development of *ea* into the short low-central vowel /a/). However, the interpretations *io* /iu/ and especially *ie* /iy/ are controversial, with many (especially more traditional) sources assuming that the pronunciation matched the spelling, i.e. *io* /io/ and *ie* /ie/ — that is, these diphthongs were of the "opening" rather than harmonic type.

The process that produced harmonic diphthongs from earlier closing diphthongs is called **diphthong height harmonization**. Specifically, the second segment of a diphthong was changed to be the same height as the first segment. Proto-Germanic diphthongs were affected as follows:

- /ai/ [ai] had earlier been monophthongized to /a: / ([ɑ:]).

- /au/ [au] was fronted by a-fronting (aka Anglo-Frisian brightening) to /æu/, and then harmonized to /æa/, spelled *ea*
- /eu/ [eu] was harmonized to *eo* /eo/
- [iu] was already harmonic; it became phonemic, and remained as *io* /iu/ (this interpretation is somewhat controversial; see above)

Note that the remaining Old English diphthongs were due to other processes, such as breaking, back mutation and i-mutation.

Late in the development of the standard West Saxon dialect, *io* (both long and short) became *eo*, merging with existing *eo*. This is in fact one of the most noticeable differences between early Old English (c. 900 AD) and late Old English (c. 1000 AD).

Breaking and retraction

Breaking in Old English is the diphthongization of the short front vowels /i, e, æ/ to short (monomoraic) /iũ, ẽõ, ǣ ǣ / when followed by /h/ or by /r/ or /l/ plus another consonant. Long *ī*, *ē* similarly broke to *iu*, *ea*, but only when followed by /h/. Note that /l/ in coda position has a velar quality (the "dark l" allomorph on present-day English *all*, *cold*), and is therefore indicated as [ɫ]. The geminates *rr* and *ll* usually count as *r* or *l* plus another consonant, although *ll* produced by West Germanic gemination doesn't count. (More correctly, /i/ or /j/ in the following syllable prevents breaking from occurring.)

Note that /iũ, iu/ were lowered to /ẽõ, eo/ in late Old English (see above).

The exact conditions for breaking vary somewhat depending on the sound being broken:

- Short /æ/ breaks before *h*, *rC*, *lC*, where C is any consonant.
- Short /e/ breaks before *h*, *rC*, *lh*, *lc*, *w*, i.e. compared to /æ/ it's also broken before *w*, but is broken before *l* only in the combination *lh* and sometimes *lc*.
- Short /i/ breaks before *h*, *rC*, *w*. However, breaking before *wi* does not happen, and in the Anglian dialect breaking before *rCi* happens only in the combination **rzi* (e.g. Anglian *iorre* "anger" from **irzijaN* but *afirran* from **a+firrijanaN*).
- Long *ī* and *ē* break only before *h*.

Examples:

- *weorpan* [wẽõrpan] "to throw" < */werpan/
- *wearp* [wǣ ǣ rp] "threw (sing.)" < */wærp/
- *feoh* [fẽõx] "money" < */feh/
- *feahht* [fǣ ǣxt] "fought (sing.)" < */fæht/
- *healp* [hǣ ǣlp] "helped (sing.)" < */hælp/ (but no breaking in *helpan* "to help" because the consonant after /l/ is not /h/)
- *feorr* [fẽõrr] "far" < */ferr/

- *feallan* [fǣ ǣ llan] "to fall" < */fællan/ (but *tellan* < earlier */tælljan/ is not broken because of the following /j/)
- *eolh* [ĕðl̥x] "elk" < */elh/
- *liornian*, *leornian* [līurnian], [lēornian] "to learn" < earlier */lirno: jan/
- *nēah* "near" [næax] (cf. "nigh") < */næ: h/
- *lēon* "to lend" [leon] (cf. "nigh") < */liun/ < */liuhan/ < */li: han/

The i-mutation of broken /iu, eo, æa/ (whether long or short) is spelled *ie* (possibly /iy/, see above).

Examples:

- *hwierfþ* "turns" (intr.) < /hwīŕfiθ/ + i-mutation < /hwirfiθ/ + breaking < Proto-Germanic *hwirbipi < early Proto-Germanic *hwerbipi
- *hwierfan* "to turn" (tr.) < /hwǣ ǣrfijan/ + i-mutation < /hwærfijan/ + breaking < /hwarfijan/ + a-fronting < Proto-Germanic *hwarbijanaN
- *nīehst* "nearest" (cf. "next") < /næahist/ + i-mutation < /næ: hist/ + breaking < /na: hist/ + a-fronting < Proto-Germanic *nēhist
- *līehtan* "to lighten" < /liuhtijan/ + i-mutation < /li: htijan/ + breaking < Proto-Germanic *līhtijanaN

Note that in some dialects /æ/ was backed (**retracted**) to /a/ (/ɑ/) rather than broken, when occurring in the circumstances described above that would normally trigger breaking. This happened in the dialect of Anglia that partially underlies Modern English, and explains why Old English *ceald* appears as Modern English "cold" (actually from Anglian Old English *cald*) rather than "*cheald" (the expected result of *ceald*).

Both breaking and retraction are fundamentally phenomena of assimilation to a following velar consonant. Note that /w/ is in fact a velar consonant, while /h/, /l/, and /r/ are less obviously so. It is therefore assumed that, at least at the time of the occurrence of breaking and retraction, /h/ was pronounced [x] or similar — at least when following a vowel — and /l/ and /r/ before a consonant had a velar or retroflex quality and were pronounced [ɭ] and [ɽ], or similar. Breaking and retraction occurred several hundred years before recorded Old English. However, based on evidence from Middle and Modern English, it is assumed that /l/ and /r/ maintained the same velar/retroflex allophones in the same contexts into recorded Old English. As for /h/, the later changes of h-loss and palatalization indicate that some changes occurred in the allophones of /h/; see above.

A-restoration

After breaking occurred, short /æ/ (and in some dialects long /æ: / as well), was backed to /a/ (/ɑ/) when there was a back vowel in the following syllable. This is called "a-restoration" because it partly restored original /a/, which had earlier been fronted to /æ/ (see above). (Note: The situation is complicated by a later change in some dialects called

"Second Fronting" that fronted short restored /a/ to /æ/ for the second time, while raising /æ/ to /e/. This did not affect the standard West Saxon dialect of Old English.)

Because strong masculine and neuter nouns have back vowels in the plural, alternations like /æ/ in the singular vs. /a/ in the plural are common in this noun class:

/æ/~a/ alternation in masculine and neuter strong nouns				
Case	Masculine		Neuter	
	Singular	Plural	Singular	Plural
Nominative	dæg	dagas	fæt	fatu
Accusative	dæg	dagas	fæt	fatu
Genitive	dægēs	daga	fætes	fata
Dative	dæge	dagum	fæte	fatum

A-restoration occurred before the **ō* of the weak verb suffix *-*ōj*-, although this surfaces in Old English as the front vowel *i*, as in *macian* "to make" < **makōjan*-.

Breaking (see above) occurred between a-fronting and a-restoration. This order is necessary to account for words like *slēan* "to slay" (actually pronounced /slæan/) from original **slahan*: /slahan/ > /slæhan/ (a-fronting) > /slǣ ǣ han/ (breaking; inhibits a-restoration) > /slǣ ǣ an/ (h-loss) > /slæan/ (vowel coalescence, compensatory lengthening).

A-restoration interacted in a tricky fashion with a-fronting (Anglo-Frisian brightening) to produce e.g. *brecan* "to break" from Proto-Germanic **brekanaN* but *brecen* "broken" from Proto-Germanic **brekanaz*. Basically:

Step "to break" "broken"	Reason
1 /brekanaN/ /brekanaz/ original form	
2 /brekanaN/ /brekana/ loss of final z	
3 /brekænaN/ /brekænæ/ Anglo-Frisian brightening	

- | | | | |
|---|---------------|---------------|--|
| 4 | /brekanaN/ | /brekænæ/ | a-restoration |
| 5 | /brekan/ | /brekæn/ | loss of final short vowels |
| 6 | /brekan/ | /breken/ | collapse of unstressed short front vowels to /e/ |
| 7 | <i>brecan</i> | <i>brecen</i> | spelled normally |

Note that the key difference is in steps 3 and 4, where nasalized *aN* is unaffected by a-fronting even though the sequence *an* is in fact affected, since it occurs in an unstressed syllable. This leads to a final-syllable difference between *a* and *æ*, which is transferred to the preceding syllable in step 4.

Palatalization

Palatalization of velars occurred before, and sometimes after, front vowels. This occurred after a-restoration and before i-mutation, but it is unclear whether it occurred before or after h-loss. Thus, it did not occur in *galan* "to sing" (cf. modern English "regale"), with the first /a/ backed from /æ/ due to a-restoration. Nor did it occur in *cyning* "king", with front /y/ developed from /u/ due to i-mutation.

The exact circumstances in which palatalization occurred are complicated; see the above section on the distribution of velars and palatals for more information.

Second fronting

Second fronting fronted /a/ to /æ/, and /æ/ to /e/, later than related processes of a-fronting and a-restoration. Second fronting did **not** affect the standard West Saxon dialect. In fact, it took place only in a relatively small section of the area (English Midlands) where the Mercian dialect was spoken. Mercian itself was a subdialect of the Anglian dialect (which includes all of Central and Northern England).

Palatal diphthongization

The vowels *ie/īe* and *ea/ēa* generally occur in Old English after *ċ, ġ, sċ* where the vowels *e/ē* and *æ/ǣ* would be expected.

Examples:

- *sċieran* "to cut", *sċear* "cut (past sing.)", *sċēaron* "cut (past pl.)", which belongs to the same conjugation class (IV) as *beran* "to carry", *bær* "carried (sing.)", *bǣron* "carried (pl.)"
- *ġiefan* "to give", *ġeaf* "gave (sing.)", *ġēafon* "gave (pl.)", *ġiefen* "given", which belongs to the same conjugation class (V) as *tredan* "to tread", *træd* "trod (sing.)", *trǣdon* "trod (pl.)", *treden* "trodden"

A similar process produces *eo* in place of *o* or *u*, and *ea* in place of *a*, when following *ċ*, *ġ*, *sc*:

- **ġung* > *geong* "young" (cf. German *jung*)
- **scolde* > *sceolde* "should" (cf. German *sollte*)
- **scadu* > **sceadu* "shadow"

It is generally agreed that the second process (affecting *a*, *o*, *u*) is purely an orthographic convention, i.e. the vowels continued to be pronounced *a*, *o*, *u* despite their spelling as diphthongs. Evidence from this comes from Middle and Modern English. For example, if *geong* and *sceolde* were really pronounced as written, they should appear in Modern English as **yeng* and **shield* instead of *young* and *should*.

The traditional view of the first process (e.g. Campbell 1959, Mitchell and Robinson 2001) is that the vowels *e/ē* and *æ/ǣ* were actually diphthongized in this position.

A minority view (e.g. Lass 1994) is that this phenomenon is purely orthographic, and that no diphthongization took place. Under this view, the words listed above have the following pronunciations:

- *scieran* [ʃeran]
- *scear* [ʃær]
- *scēaron* [ʃæ: ron]
- *giefan* [jevan]
- *geaf* [jæf]
- *gēafon* [jæ: von]
- *giefen* [jeven]

The main arguments in favor of this view are the fact that the corresponding process involving back vowels is indeed purely orthographic, and that diphthongizations like */æ/* → [æɑ] and */e/* → [iy] (if this is the correct interpretation of orthographic *ie*) are phonetically unmotivated in the context of a preceding palatal or postalveolar consonant.

It is disputed whether there is Middle English evidence of the reality of this change in Old English.

Metathesis of *r*

Original sequences of an *r* followed by a short vowel metathesized, with the vowel and *r* switching places. This normally only occurred when the next following consonant was *s* or *n*, and sometimes *d*.

- Before *s*: *berstan* "to burst", *hors* "horse" (German *Ross*), *gærs* "grass" (Gothic *gras*), *þerscan* "to thresh" (Gothic *þriskan*)

- Before *n*: *birnan* "to burn" (Gothic *brinnan*), *irnan* "to run" (Gothic *rinnan*), *īren* "iron" (< **īsren* < *īsern*; Gothic *eisarn*), *wærna* "wren", *ærn* "house" (Gothic *razn*)
- Before *d*: *þirda* "third" (Gothic *þridja*), *bird* "young bird"

Not all potential words to which metathesis can apply are actually affected, and many of the above words also appear in their unmetathesized form (e.g. *græs* "grass", *rinnan* "to run", *wrenna* "wren", rare forms *brustæn* "burst (past part.)", *þrescenne* "to thresh", *onbran* "set fire to (past)", *īsern* "iron", *ren-* "house", *þridda* "third"; *bridde* "birds" in Chaucer). Note also that many of the words have come down to Modern English in their unmetathesized forms.

Metathesis in the other direction occasionally occurs before *ht*, e.g. *wrohte* "worked" (cf. obsolescent "wrought"; Gothic *wurhta*), *breht* "bright" (Gothic *baírhts*), *fryhto* "fright" (Gothic *faúrhtei*), *wrihta* "maker" (cf. "wright"). Unmetathesized forms of all of these words also occur in Old English.

Anglian smoothing

In the Anglian (i.e. Mercian and Northumbrian) dialects of Old English, a process called **smoothing** undid many of the effects of breaking. In particular, before a velar (/h/, /g/, /k/) or before an /r/ or /l/ followed by a velar, diphthongs were reduced to monophthongs. Note that the context for smoothing is similar to the context for the earlier process of breaking that produced many of the diphthongs in the first place. In particular:

- *ea* > *æ* before a velar, *e* before /r/ or /l/ + velar
- *ēa* > *ē*
- *eo* > *e*
- *ēo* > *ē*
- *io* > *i*
- *īo* > *ī*

This change preceded h-loss and vowel assimilation.

Note also that the diphthongs *ie* and *īe* did not exist in Anglian (or in fact in any dialect other than West Saxon).

H-loss

In the same contexts where the voiceless fricatives /f, θ, s/ become voiced, i.e. between vowels and between a voiced consonant and a vowel, /h/ is lost, with compensatory lengthening of the preceding vowel if it is short. This occurs after breaking; hence breaking before /rh/ and /lh/ takes place regardless of whether the /h/ is lost by this rule. An unstressed short vowel is absorbed into the preceding long vowel.

Examples:

- *scōs* "shoe" (gen.) < /ʃo: es/ < /ʃo: hes/, cf. *scōh* (nom.)
- *fēos* "money" (gen.) < /feoes/ < /fēōhes/ < /fehes/, cf. *feoh* (nom.)
- *wēalas* "foreigners, Welsh people" < /wǣ ālhas/ < /wælhas/, cf. *wealh* (sing.)

Vowel assimilation

Two vowels that occurred in hiatus (i.e. next to each other, with no consonant separating) collapsed into a single long vowel. Many occurrences were due to h-loss, but some came from other sources, e.g. loss of /j/ or /w/ after a front vowel. (Loss of /j/ occurred early, in Proto-Germanic times. Loss of /w/ occurred later, after i-umlaut.) If the first vowel was *e* or *i* (long or short), and the second vowel was a back vowel, a diphthong resulted.

Examples:

- *scōs* "shoe" (gen.) < Proto-Germanic **skōhas*
- *fēos* "money" (gen.) < pre-Old-English **fehas*
- *frēond* "friend" < *frīond* < Proto-Germanic **friōnd* (two syllables, cf. Gothic *frijōnd*)
- *sǣm* "sea" (dat. pl.) < *sǣum* < **sǣwum* < **sǣwim* < Proto-Germanic **saiwim*

Back mutation

Back mutation (sometimes **back umlaut**, **guttural umlaut** or **u-umlaut**) is a change that took place in late prehistoric Old English and caused short *e*, *i* and sometimes *a* to break into a diphthong (*eo*, *io*, *ea* respectively, similar to breaking) when a back vowel (*u*, *o*, *ō*, *a*) occurred in the following syllable. Examples:

- *seofon* "seven" < **sebun* (cf. Gothic *sibun*)
- *heol(o)stor* "hiding place" (cf. "holster") < **helustr*
- *eofor* "boar" < **ebur* (cf. Old High German *ebur*)
- *heorot* "hart" < **herut*
- *mioluc*, *meoluc* "milk" < **miluk* (cf. Gothic *miluks*)
- *liofast*, *leofast* "you (sg.) live" < **libast*
- *ealu* "ale" < **alu*

Note that *io* turned into *eo* in late Old English.

A number of restrictions governed whether back mutation took place:

- Generally it only took place when a single consonant followed the vowel being broken.
- In the standard West Saxon dialect, back mutation only took place before labials (*f*, *b*, *w*) and liquids (*l*, *r*). In the Anglian dialect, it took place before all consonants except *c*, *g* (Anglian *meodu* "mead", *eosol* "donkey" vs. West Saxon

- medu, esol*). In the Kentish dialect, it took place before all consonants (Kentish *breogo* "price" vs. West Saxon, Anglian *bregu, brego*).
- Back mutation of *a* normally took place only in the Mercian subdialect of the Anglian dialect. Standard *ealu* "ale" is a borrowing from Mercian. Similar borrowings are poetic *beadu* "battle" and *eafora* "son, heir", cf. Gothic *afar* (many poetic words were borrowed from Mercian). On the other hand, standard *bealu* "evil" (cf. "bale"), *bearu* "grove" (cf. "barrow") owe their *ea* due to breaking — their forms at the time of breaking were **balwaN*, **barwa(z)*, and the genitive singulars in Old English are *bealwes*, *bearwes*.

Palatal umlaut

Palatal umlaut is a process whereby short *e*, *eo*, *io* appear as *i* (occasionally *ie*) before final *ht*, *hs*, *hp*. Examples:

- *riht* "right" (cf. German *recht*)
- *cniht* "boy" (cf. "knight") (cf. German *Knecht*)
- *siex* "six" (cf. German *sechs*)
- *briht, bryht* "bright" (cf. non-metathesized Old English form *beorht*)
- *hlihþ* "(he) laughs" < **hlehp* < **hlæhiþ* + i-mutation < Proto-Germanic **hlahiþ* (cf. *hliehhan* "to laugh" < Proto-Germanic **hlahjanaN*)

Dialect differences

As noted in the main page on Old English, there were four major dialect groups in Old English: West Saxon, Mercian, Northumbrian, and Kentish. West Saxon and Kentish occurred in the south, approximately to the south of the Thames river. Mercian constituted the middle section of the country, divided from the southern dialects by the Thames and from Northumbrian by the Humber river. In the south, the easternmost portion was Kentish and everywhere else was West Saxon. Mercian and Northumbrian are often grouped together as "Anglian".

The biggest differences occurred between West Saxon and the other groups. The differences occurred mostly in the front vowels, and particularly the diphthongs. (However, Northumbrian was distinguished from the rest by much less palatalization. Forms in Modern English with hard /k/ and /g/ were a palatalized sound would be expected from Old English are due either to Northumbrian influence or to direct borrowing from Scandinavian. Note that, in fact, the lack of palatalization in Northumbrian was probably due to heavy Scandinavian influence.)

The early history of Kentish was similar to Anglian, but sometime around the ninth century all of the front vowels *æ*, *e*, *y* (long and short) merged into *e* (long and short). The further discussion concerns the differences between Anglian and West Saxon, with the understanding that Kentish, other than where noted, can be derived from Anglian by front-vowel merger. The primary differences were:

- Original (post Anglo-Frisian brightening) *ǣ* was raised to *ē* in Anglian but remained in West Saxon. This occurred before other changes such as breaking, and did not affect *ǣ* caused by i-umlaut of *ā*. Hence, e.g., *dǣlan* "to divide" < **dailijan* appears the same in both dialects, but West Saxon *slǣpan* "to sleep" appears as *slēpan* in Anglian. (Note the corresponding vowel difference in the spelling of "deal" < *dǣlan* vs. "sleep" < Anglian *slēpan*.)
- The West Saxon vowels *ie/īe*, caused by i-umlaut of long and short *ea, eo, io*, did not appear in Anglian. Instead, i-umlaut of *ea* and rare *eo* is spelled *e*, and i-umlaut of *io* remains as *io*.
- Breaking of short */æ/* to *ea* did not happen in Anglian before */l/+consonant*; instead, the vowel was retracted to */a/*. When mutated by i-umlaut, it appears again as *æ* (vs. West Saxon *ie*). Hence, Anglian *cald* "cold" vs. West Saxon *ceald*.
- Merger of *eo* and *io* (long and short) occurred early in West Saxon, but much later in Anglian.
- Many instances of diphthongs in Anglian, including the majority of cases caused by breaking, were turned back into monophthongs again by the process of "Anglian smoothing", which occurred before *c, h, g*, alone or preceded by *r* or *l*. This accounts for some of the most noticeable differences between standard (i.e. West Saxon) Old English and Modern English spelling. E.g. *ēage* "eye" became *ēge* in Anglian; *nēah* "near" became Anglian *nēh*, later raised to *nīh* in the transition to Middle English by raising of *ē* before *h* (hence "nigh" in Modern English); *nēahst* "nearest" become Anglian *nēhst*, shortened to *nehst* in late Old English by vowel-shortening before three consonants (hence "next" in Modern English).

As mentioned above, Modern English derives mostly from the Anglian dialect rather than the standard West Saxon dialect of Old English. However, since London sits on the Thames near the boundary of the Anglian, West Saxon, and Kentish dialects, some West Saxon and Kentish forms have entered Modern English. For example, "bury" has its spelling derived from West Saxon and its pronunciation from Kentish (see below).

Changes leading up to Middle and Modern English

A summary of the main vowel changes is presented below. Note that the spelling of Modern English largely reflects Middle English pronunciation. Note also that this table presents only the general developments. Many exceptional outcomes occurred in particular environments, e.g. vowels were often lengthened in late Old English before */ld/, /nd/, /mb/*; vowels changed in complex ways before */r/*, throughout the history of English; vowels were diphthongized in Middle English before */h/*; new diphthongs arose in Middle English by the combination of vowels with Old English *w, g* */ɣ/ > /w/*, and *ġ* */j/*; etc. The only conditional development considered in detail below is Middle English open-syllable lengthening. Note that, in the column on modern spelling, *CV* means a sequence of a single consonant followed by a vowel.

NOTE: In this table, abbreviations are used as follows:

- OE = Old English
- WS = West Saxon (dialect of Old English)
- ME = Middle English
- NE = Modern English
- GA = General American (dialect of Modern English)
- RP = Received Pronunciation (British dialect of Modern English)
- leng. = lengthened by open-syllable lengthening
- occ. = occasionally
- superl. = superlative
- > = produces by regular sound change
- >> = produces by analogy or irregular change

Late Old English (Anglian), c. 1000	Middle English pronunciation, c. 1400	Modern English spelling, c. 1500	Early Modern English pronunciation, c. 1600	Modern English pronunciation, c. 2000	Source	Example
a; æ; ea; ā+CC; often ǣ+CC, ēa+CC; /a/ occ. ē+CC (WS ǣ+CC)		a	/a/	/æ/	OE a	OE <i>mann</i> > "man"; OE <i>lamb</i> > "lamb"; OE <i>sang</i> > "sang"; OE <i>sacc</i> > "sack"; OE <i>assa</i> > "ass" (donkey)
					OE æ	OE <i>fæþm</i> "embrace" > "fathom"; OE <i>scæt</i> > "sat"; OE <i>æt</i> > "at"; OE <i>mæsse</i> > "mass" (at church)
					OE ea	OE <i>weax</i> > "wax"; OE <i>healf</i> >

		"half" /hæf/
		OE <i>fǣtt</i> >
		"fat"; OE
		<i>lǣstan</i> >
		"to last";
		OE <i>blēddre</i>
		(WS
	OE +CC	<i>blǣddre</i>) >
		"bladder";
		OE
		<i>brēmbel</i>
		(WS
		<i>brǣmbel</i>)
		>
		"bramble"
		OE <i>swan</i> >
		"swan";
		OE <i>wascan</i>
		> "to
	OE a	wash"; OE
		<i>wann</i>
		"dark" >
		"wan"
(w+, not +g,ck,ng, nk) GA		OE <i>swæp</i> >
/ɑ/, RP /ɒ/	OE æ	"swath"
		OE
	OE ea	<i>wealwian</i> >
		"to
		wallow"
(+r) /ar/ >		OE <i>heard</i>
GA /ɑr/,		> "hard"
RP /ɑː /		
		OE <i>swearm</i>
		> "swarm";
		OE <i>sweart</i>
		> old
		poetic
(w+ and +r) /ɔr/ >	OE ea	"swart" >>
GA /ɔr/,		"swarthy";
RP /ɔː /		OE
		<i>weardian</i> >
		"to ward";
		OE <i>wearm</i>

					> "warm"; OE <i>wearnian</i> > "to warn" OE <i>smæl</i> > "small"; OE <i>all</i> (WS <i>eall</i>) > "all"; OE <i>walcian</i> (WS <i>wealcian</i>) "to roll" > "to walk" OE <i>ælmesse</i> > "alms"; Latin <i>palma</i> > OE <i>palm</i> > "palm" OE <i>glæs</i> > "glass"; OE <i>græs</i> > "grass"; OE <i>pæþ</i> > "path"; OE <i>æfter</i> > "after"; OE <i>āscian</i> > "to ask" OE <i>nama</i> > "name"; OE <i>nacod</i> > "naked"; OE <i>bacan</i> > "to bake" OE <i>æcer</i> > "acre"; OE <i>hwæl</i> > "whale"; OE <i>hræfn</i> > "raven" OE <i>caru</i> > "care"; OE
				(+IC,l#) /ɔ:/	
				(+lm) GA /ɑ/, RP /ɑ:/	
				(RP, often +f,s,th) /ɑ:/	
					OE a
				/e:/ > /ei/	
(leng.) /a:/ [æ:]	aCV	/ɛ:/			OE æ
				(+r) /e:/ r/ >	OE a

				GA /ɛr/, RP /ɛə/		<i>faran</i> > "to fare"; OE <i>starian</i> > "to stare" OE <i>helpan</i> > "to help"; OE <i>elh</i> (WS <i>eolh</i>) > "elk"; OE <i>tellan</i> > "to tell"; OE <i>betera</i> > "better"; OE <i>streccan</i> > "to stretch"
					OE e	OE <i>seofon</i> > "seven" OE <i>myrig</i> > "merry"; OE <i>byrgan</i> > "to bury"
					OE eo	/bɛri/; OE <i>lyft-</i> "weak" > "left" (hand) OE <i>cēpte</i> > "kept"; OE <i>mētte</i> > "met"; OE <i>bēcnan</i> (WS <i>bīecnan</i>) > "to beckon"; OE <i>clǣnsian</i> > "to cleanse"; OE <i>flǣsc</i> > "flesh"; OE <i>lǣssa</i> > "less"; OE
e; eo; occ. y; ē+CC; ēo+CC; occ. /e/ ǣ+CC, ēa+CC	e	/ɛ/	/ɛ/		OE y	
					OE +CC	

					<i>frēond</i> > "friend" /frɛnd/; OE <i>þēofþ</i> (WS <i>þīefþ</i>) > "theft"; OE <i>hēold</i> > "held" OE <i>heorte</i> > "heart"; OE <i>bercan</i> (WS <i>beorcan</i>) > "to bark"; OE <i>teoru</i> (WS <i>teru</i>) > "tar"; OE <i>steorra</i> > "star"; OE <i>erc</i> (WS <i>earc</i>) > "ark" AN <i>werra</i> > "war"; AN <i>werbler</i> > "to warble" OE <i>sterne</i> (WS <i>stierne</i> , <i>styrne</i>) > "stern" OE <i>eorl</i> > "earl"; OE <i>eorþe</i> > "earth"; OE <i>liornian</i> , <i>leornian</i> > "to learn" OE <i>hērde</i> (WS <i>hīerde</i>) > "heard" OE <i>specan</i> > "to
				GA /ɑr/, RP /ɑː /	
	(+r) ar	/ɑr/			
				(w+ and +r) /ɔr/ > GA /ɔr/, RP /ɔː /	
					OE e
	(occ. +r) er	/ɛr/	/əɾ/ > GA /əɾ/, RP /ɜː /	OE eo	
					OE +CC
(leng.)	ea,eCV	/eː / /iː /			

/ɛː /

(+r) /iː r/
> GA /ɪr/,
RP /ɪə/

(occ.) /ei/

(occ. +r)
/eː r/ >
GA /ɛr/,
RP /ɛə/

(often
+th,d,t,v)
/ɛ/

speak"; OE
mete >
"meat"; OE
meotan
(WS
metan) >
"to mete"
/miː t/;
OE *eotan*
(WS *etan*)
> "to eat";
OE *meodu*
(WS *medu*)
> "mead"
OE *spere* >
"spear";
OE *mere* >
"mere"
(lake)
OE *brecan*
> "to
break"
/breik/
OE *beoran*
(WS
beran) >
"to bear";
OE *pere*,
peru >
"pear"; OE
swerian >
"to swear";
OE *wer*
"man" >
"were-"
OE *leþer* >
"leather"
/lɛðə/; OE
stede >
"stead";
OE *weder*
>
"weather";
OE *heofon*
>

i; y;
 ī+CC,ȳ+CC;
 occ. ēoc,ēc; /i/ i /ɪ/ /ɪ/
 occ.
 ī+CV,ȳ+CV

"heaven";
 OE *hefig* >
 "heavy"
 OE *writen*
 >
 "written";
 OE *sittan* >
 "to sit"; OE
 OE i *dyde* >
 "did"; OE
fisc >
 "fish"; OE
lifer >
 "liver"
 OE *brycg* >
 "bridge";
 OE *cyssan*
 > "to kiss";
 OE *synn* >
 OE y "sin"; OE
gyltan >
 "to gild";
 OE *bysig* >
 "busy"
 /bɪzi/
 OE *wīsdōm*
 >
 "wisdom";
 OE *fiftig* >
 "fifty"; OE
 OE +CC *wȳscan* >
 "to wish";
 OE *cȳpp(u)*
 > "kith";
 OE *fȳst* >
 "fist"
 OE *cīcen* >
 "chicken";
 OE OE *lȳtel* >
 "little"
 OE *sēoc* >
 "sick"; OE
 OE ēoc,ēc *wēoce* >
 "wick"; OE
ēc + nama

	/ɔ: /		RP /əu/	"foal"; OE <i>nosu</i> > "nose"; OE <i>ofer</i> > "over" OE <i>borian</i> > "to bore"; OE <i>fore</i> > "fore"; OE <i>bord</i> > "board" OE <i>bucc</i> > "buck" /bʌk/; OE <i>lufian</i> > "to love" /ʌv/; OE <i>uppe</i> > "up"; OE <i>on bufan</i> > "above" OE <i>mycel</i> >> "much"; OE <i>blyscan</i> > "to blush"; OE <i>cyðgel</i> > "cudgel"; OE <i>clyccan</i> > "to clutch"; OE <i>scytel</i> > "shuttle" OE <i>dūst</i> > "dust"; OE <i>tūsc</i> > "tusk"; OE <i>rūst</i> > "rust" OE <i>full</i> > "full" /fʊl/; OE <i>bula</i> > "bull"; OE <i>bysc</i> > "bush"
			(+r) /o: r/ > GA /ɔr/, RP /ɔ: /	
				OE u
			/ʌ/	OE y
u; occ. y; ū+CC; w+ e, eo, o, y +r	/u/	u, o	/ʊ/	
				OE +CC
			(b, f, p+ and +l, sh) /ʊ/	

					OE u	OE <i>spurnan</i> > "to spurn"
					OE y	OE <i>ċyriċe</i> > "church"; OE <i>byrþen</i> > "burden"; OE <i>hyrðel</i> > "hurdle"
				(+r) /əɾ/ > GA /əɾ/, RP /ɜː /		OE <i>word</i> > "word"; OE <i>werc</i> (WS <i>weorc</i>) > "work"; OE <i>werold</i> > "world"; OE <i>wyrm</i> > "worm"; OE <i>wersa</i> (WS <i>wiersa</i>) > "worse"; OE <i>weorþ</i> > "worth"
					OE w+,+r	OE <i>guma</i> >> "groom"
				/uː /		
				(+r) /uː r/ > /oː r/ > GA /ɔr/, RP /ɔː /		OE <i>duru</i> > "door"
	(leng. — occ.) /oː /	oo	/uː /	(often +th,d,t) /ʌ/		?
				(occ. +th,d,t) /ʊ/		OE <i>wudu</i> > "wood" /wʊd/
ā; often a+ld,mb	/ɔː /	oa,oCV	/oː /	GA /ou/, RP /əu/	OE ā	OE <i>āc</i> > "oak"; OE <i>hāl</i> > "whole"
					OE +ld,mb	OE <i>camb</i> >

				"comb"; OE <i>ald</i> (WS <i>eald</i>) > "old"; OE <i>haldan</i> (WS <i>healdan</i>) > "to hold"
				OE <i>ār</i> > "oar", "ore"; OE <i>māra</i> > "more"; OE <i>bār</i> > "boar"; OE <i>sār</i> > "sore"
			(+r) /o: r/ > GA /ɔr/, RP /ɔ: /	
				OE <i>hǣlan</i> > "to heal" /hi: l/; OE OE <i>hǣtu</i> > "heat"; OE <i>hwǣte</i> > "wheat"
			/i: /	
				OE <i>bēatan</i> > "to beat" /bi: t/; OE OE <i>lēaf</i> > "leaf"; OE <i>ċēap</i> > "cheap"
ǣ; ēa	/ɛ: /	ea,eCV	/e: /	
				OE <i>rǣran</i> > "to rear" ; OE <i>ēare</i> > "ear"; OE <i>sēar</i> > "sere"; OE <i>sēarian</i> > "to sear"
			(+r) /i: r/ > GA /ɪr/, RP /ɪə/	
				OE <i>grēat</i> > "great" /greit/
			(occ.) /ei/	

			(occ. +r) /e: r/ > GA /ɛr/, RP /ɛə/	OE <i>ǣr</i> > "ere" (before)
				OE <i>brǣp</i> "odor" > "breath"; OE
				OE <i>ǣ</i> <i>swǣtan</i> > "to sweat"; OE -
			(often +th,d,t) /ɛ/	<i>sprǣdan</i> > "to spread" OE <i>dēad</i> > "dead" /dɛd/; OE <i>dēap</i> "death"; OE <i>prēat</i> "menace" > "threat"; OE <i>rēad</i> > "red"; OE <i>dēaf</i> > "deaf"
				OE <i>ēa</i> <i>fēdan</i> > "to feed"; OE <i>grēdig</i> (WS <i>grǣdig</i>) > "greedy"; OE <i>mē</i> > "me"; OE <i>fēt</i> > "feet"; OE <i>dēd</i> (WS <i>dǣd</i>) > "deed"; OE <i>nēdl</i> (WS <i>nǣdl</i>) > "needle"
ē; ēo; often e+ld	/e: /	ee,ie(nd/ ld)	/i: / /i: /	OE <i>ē</i> OE <i>dēop</i> "deep"; OE <i>fēond</i> >

						"fiend"; OE <i>betwēonum</i> > "between"; OE <i>bēon</i> > "to be" OE <i>feld</i> > "field"; OE <i>ġeldan</i> (WS <i>gieldan</i>) "to pay" > "to yield"
				OE +ld		
						OE <i>hēr</i> > "here"; OE <i>hēran</i> (WS <i>hīeran</i>) > "to hear"; OE <i>fēr</i> (WS <i>fǣr</i>) > "fear"
			/i: r/ > GA /ɪr/, RP /ɪə/	OE ē		
(often +r) /ɛ: r/	ear,erV	/e: r/		OE ēo		OE <i>dēore</i> (WS <i>dīere</i>) > "dear" OE <i>pēr</i> (WS <i>pǣr</i>) > "there"; OE <i>hwēr</i> (WS <i>hwǣr</i>) > "where" OE <i>bēor</i> > "beer"; OE <i>dēor</i> > "deer"; OE <i>stēran</i> (WS <i>stīeran</i>) > "to steer"; OE <i>bēr</i> (WS <i>bǣr</i>) > "bier"
			(occ.) /e: r/ > GA /ɛr/, RP /ɛə/			
(occ. +r) /e: r/	eer	/i: r/	/i: r/ > GA /ɪr/, RP /ɪə/			
ī; ŷ; often i+ld,mb,nd;	/i: /	i,iCV	/əi/	/ai/	OE ī	OE <i>rīdan</i> > "to ride"

often
y+ld,mb,nd

OE *ȳ*

OE *mȳs* >
"mice"

OE *findan*
> "to find";

OE *cild* >
"child"; OE
+ld,mb,nd *climban* >
"to climb";
OE *mynd* >
"mind"

(+r) /air/
> GA
/air/, RP
/aiə/

OE *fȳr* >
"fire"; OE
hȳrian >
"to hire";
OE *wīr* >
"wire"

OE *mōna* >
"moon";
OE *sōna* >
"soon"; OE

OE *ō*

fōd >
"food"

/u:/

/fu: d/;
OE *dōn* >
"to do"

OE *cēosan*
> "to
choose";
OE *scēotan*
> "to
shoot"

OE *ēo*

ō; occ. ēo

/o: /

oo

/u:/

(+r)
/u: r/ >
/o: r/ >
GA /ɔr/,
RP /ɔ: /

OE *flōr* >
"floor"; OE
mōr >
"moor"

OE *blōd* >
"blood"

/blʌd/; OE
mōdor >
"mother"

/mʌðə(r)/;

OE *glōf* >
"glove"

(occ.
+th,d,v)
/ʌ/

					/glʌf/ OE <i>gōd</i> > "good" /gʊd/; OE <i>bōc</i> > "book" /bʊk/; OE <i>lōcian</i> > "to look" /lʊk/; OE <i>fōt</i> > "foot" /fʊt/ OE <i>mūs</i> > "mouse"; OE <i>ūt, ūte</i> > "out"; OE <i>hlūd</i> > "loud"
				(often +th,d,t,k) /ʊ/	
					OE <i>ū</i>
				/au/	OE <i>ġefunden</i> > "found"; OE <i>hund</i> > "hound"; OE <i>ġesund</i> > "sound" (safe) OE <i>ūre</i> > "our"; OE <i>scūr</i> > "shower"; OE <i>sūr</i> > "sour"
ū; often u+nd	/u: /		ou		OE +nd
					OE
				(+r) /aur/ > GA /aur/, RP /auə/	
					OE
				(occ. +t) /ʌ/	OE <i>būtan</i> > "but"; OE <i>strūtian</i> > ME <i>strouten</i> > "to strut"

Note that the Modern English vowel usually spelled *au* (British /ɔ: /, American /ɔ/) does not appear in the above chart. Its main source is late Middle English /au/, which come from various sources: Old English *aw* and *ag* ("claw" < *clawu*, "law" < *lagu*);

diphthongization before /h/ ("sought" < *sōhte*, "taught" < *tāhte*, "daughter" < *dohtor*); borrowings from Latin and French ("fawn" < Old French *faune*, "Paul" < Latin *Paulus*). Other sources are Early Modern English lengthening of /a/ before /l/ ("salt, all"); occasional shortening and later re-lengthening of Middle English /ɔ: / ("broad" < /brɔ: d/ < *brād*); and in American English, lengthening of short *o* before unvoiced fricatives and voiced velars ("dog, long, off, cross, moth", all with /ɔ/ in American English, at least in dialects that still maintain the difference between /a/ and /ɔ/).

As mentioned above, Modern English is derived from the Middle English of London, which is derived largely from Anglian Old English, with some admixture of West Saxon and Kentish. One of the most noticeable differences among the dialects is the handling of original Old English /y/. By the time of the written Old English documents, the Old English of Kent had already unrounded /y/ to /e/, and the late Old English of Anglia unrounded /y/ to /i/. In the West Saxon area, /y/ remained as such well into Middle English times, and was written *u* in Middle English documents from this area. Some words with this sound were borrowed into London Middle English, where the unfamiliar /y/ was substituted with /u/. Hence:

- "gild" < *gyldan*, "did" < *dyde*, "sin" < *synn*, "mind" < *mynd*, "dizzy" < *dysig* "foolish", "lift" < *lyft* "air", etc. show the normal (Anglian) development.
- "much" < *mycel* shows the West Saxon development.
- "merry" < *myrig* shows the Kentish development.
- "build" < *byldan* and "busy" < *bysig* have their spelling from West Saxon but pronunciation from Anglian.
- "bury" /bəri/ < *byrgan* has its spelling from West Saxon but its pronunciation from Kentish.

Note that some apparent instances of modern *e* for Old English *y* are actually regular developments, particularly where the *y* is a development of earlier (West Saxon) *ie* from i-mutation of *ea*, as the normal i-mutation of *ea* in Anglian is *e*; for example, "stern" < *styrne* < **starnijaz*, "steel" < *stȳle* < **stahlijaN* (cf. Old Saxon *stehli*). Also, some apparent instances of modern *u* for Old English *y* may actually be due to the influence of a related form with unmutated *u*, e.g. "sundry" < *syndrig*, influenced by *sundor* "apart, differently" (cf. "to sunder" and "asunder").

Vowel changes in accented syllables: an overview

NOTE: Another version of this table is available at Phonological history of English#Through Middle English. This covers the same changes from a more diachronic perspective. It includes less information on the specific differences between the Anglian and West Saxon dialects of Old English, but includes much more information on the Proto-Indo-European changes leading up to the vowels below, and the Middle English vowels that resulted from them.

NOTE: This table only describes the changes in accented syllables. Vowel changes in unaccented syllables were very different and much more extensive. In general, long vowels were reduced to short vowels (and sometimes deleted entirely) and short vowels were very often deleted. All remaining vowels were reduced to only the vowels /u/, /a/ and /e/, and sometimes /o/. (/o/ also sometimes appears as a variant of unstressed /u/.)

West Germanic	Condition	Process	Old English <i>i</i> -umlaut		Examples
*a		Anglo-Frisian brightening	æ	e	* <i>daga(z)</i> > <i>dæg</i> "day"; * <i>batizôN</i> > <i>betera</i> "better"; * <i>taljanaN</i> > <i>tellan</i> "to tell"
	+n,m		a,o	e	* <i>mann(z)</i> , <i>manni(z)</i> > <i>man</i> , <i>mon</i> "man", plur. <i>men</i> "men"
	+nf,nþ,ns	Ingvaemonic nasal spirant law	ō	ē	* <i>tanþ(z)</i> , <i>tanþi(z)</i> > <i>tōþ</i> , plur. <i>tēþ</i> "tooth"; * <i>gans</i> , <i>gansi(z)</i> > <i>gōs</i> "goose", plur. <i>gēs</i> "geese"
	(West Saxon) +h,rC,lC	breaking	ea	ie	* <i>alda(z)</i> , <i>aldizôN</i> > <i>eald</i> "old", <i>ieldra</i> "older" (cf. "elder")
	(Anglian) +h	breaking, Anglian smoothing	æ	e	
	(Anglian) +lC	retraction	a	æ	* <i>alda(z)</i> , <i>aldizôN</i> > <i>ald</i> "old", <i>ældra</i> "older" (cf. "elder")
	(Anglian) +rc,rg,rh	breaking, Anglian smoothing	e	e	
	(Anglian) +rC (C not c,g,h)	breaking	ea	e	

*e ³	(West Saxon) +hV,hr,hl	breaking, h- loss	ēa	īe	*slahanaN, -iþ > slēan "to slay"; *stahlījaN > stīele "steel"
	(Anglian) +hV,hr,hl	breaking, Anglian smoothing, h-loss	ēa	ē	*slahanaN, -iþ > slēan "to slay, 3rd sing. pres. indic. slēþ "slays"; *stahlījaN > stēle "steel"
	(West Saxon) k,g,j+	palatal diphthongiza- tion	ea	ie	Lat. castra > ċeaster "town, fortress" (cf. names in "- caster, - chester"); *gasti(z) > ġiest "guest"
	before a,o,u ¹	a- restoration	a	(by analogy) æ	plur. *dagōs > dagas "days"; *talō > talu "tale"; *bakan, -iþ > bacanaN "to bake", 3rd sing. pres. indic. bæcþ "bakes"
	(mostly non-West- Saxon) before later a,o,u	back mutation	ea	eo ²	*alu > ealu "ale"; *awī > eowu "ewe", *asilu(z) > non- West-Saxon eosol "donkey"
	before hs,ht,hþ + final -i(z)	palatal umlaut	N/A	i (occ. ie)	*nahti(z) > nieht > niht "night"
			e	N/A ³	*etanaN > etan "to eat"
	+m		i	N/A	*nemanaN > niman "to take"
	(West Saxon) +h,rC,lc,lh,wV	breaking	eo	N/A	*fehtanaN > feohtan "to fight";

					<i>*berkanaN</i> > <i>beorcan</i> "to bark"; <i>*werþanaN</i> > <i>weorðan</i> "to become"
					<i>*fehtanaN</i> > <i>fehtan</i> "to fight"; <i>*berkanaN</i> > <i>bercan</i> "to bark"
	(Anglian) +h,rc,rg,rh	breaking, Anglian smoothing	e	N/A	<i>*werþanaN</i> > <i>weorðan</i> "to become"
	(Anglian) +rC (C not c,g,h); lc,lh,wV	breaking	eo	N/A	
	+hV,hr,hl	breaking, (Anglian smoothing,) h-loss	ēo	N/A	<i>*seh(w)anaN</i> > <i>sēon</i> "to see"
	+ late final hs,ht,hþ	palatal umlaut	i (occ. ie)	N/A	<i>*sehs</i> > <i>siex</i> "six"; <i>*rehta(z)</i> > <i>riht</i> "right"
	(West Saxon) k,g,j+	palatal diphthongiza- tion	ie	N/A	<i>*skeranaN</i> > <i>scieran</i> "shear"
			i	i	<i>*fiskaN</i> > <i>fisc</i> "fish"; <i>*itip</i> > 3rd sing. pres. indic. <i>iteþ</i> "eats"; <i>*nimip</i> > 3rd sing. pres. indic. <i>nimeþ</i> "takes"; <i>*skirip</i> > 3rd sing. pres. indic. <i>scirþ</i> "shears"
*i	+ nf,nþ,ns	Ingvaeonic nasal spirant law	ī	ī	<i>*finf</i> > <i>fif</i> "five"
	(West Saxon) +h,rC	breaking	io > eo	ie	<i>*Pihtōs</i> > <i>Piohtas</i> , <i>Peohtas</i> "Picts"; <i>*lirnōjanaN</i> > <i>liornian</i> ,

					leornian "to learn"; *hirdija(z) ² > hierde "shepherd"; *wirþip > 3rd sing. pres. indic. wierþ "becomes"
	(Anglian) +h,rc,rg,rh	breaking, Anglian smoothing	i	i	*stihtōjanaN > stihtian "to establish"
	(Anglian) +rC (C not c,g,h)	breaking	io > eo	i	*a + firrijanaN > afirran "to remove" (cf. feorr "far")
	(West Saxon) +hV,hr,hl	breaking, h-loss	īo > ēo	īe	*twihōjanaN > twīoġan, twēon "to doubt"
	(Anglian) +hV,hr,hl	breaking, Anglian smoothing, h-loss	īo > ēo	ī	*twihōjanaN > twīoġan, twēon "to doubt"; *sih(w)ip > 3rd sing. pres. indic. sīþ "sees"
	before w	breaking	io > eo	i	*niwulaz > *niowul, neowul "prostrate"; *spiwiz > *spiwe "vomiting"
	before a,o,u	back mutation	i (io, eo)	N/A	*miluk(z) > mioluc, meolc "milk"
*u			u	y	*sunu(z) > sunu "son"; *kuman, -ip > cumanaN "to come", 3rd sing. pres. indic. cymþ "comes"; *guldiġanaN > gylġdan "to gild"
	+ nf,nþ,ns	Ingvaemonic	ū	ȳ	*munþ(z) >

	nasal spirant law			<i>mūþ</i> "mouth"; <i>*wunskijanaN</i> > <i>wȳscan</i> "wish" <i>*guldaN</i> > gold "gold"; <i>*duhter</i> , <i>duhtri(z)</i> > <i>dohter</i> "daughter", <i>plur. dehter</i> "daughters"
before non-nasal + a,e,o ⁴	a-mutation	o	(by analogy) e	
+hV,hr,hl	h-loss	ū	ȳ	<i>*uhumista(z)</i> > <i>ȳmest</i> "highest" <i>*slāpanaN</i> > <i>slǣpan</i> "to sleep", Lat. <i>strāta</i> > <i>strǣt</i> "street"; <i>*dādi(z)</i> > <i>dǣd</i> "deed" <i>*slāpanaN</i> > <i>slēpan</i> "to sleep", Lat. <i>strāta</i> > <i>strēt</i> "street"; <i>*dādi(z)</i> > <i>dēd</i> "deed"; Lat. <i>cāseus</i> > <i>cēse</i> "cheese"; <i>*nāha(z)</i> , <i>nāhista(z)</i> > <i>nēh</i> "near" (cf. "nigh"), superl. <i>nēhst</i> "nearest" (cf. "next") <i>*jārō</i> > <i>ġear</i> "year"; Lat. <i>cāseus</i> > <i>cīese</i> "cheese"
	Anglo- Frisian brightening		(West Saxon) æ	
(*ē >) *ā			(Angli an) ē	
	palatal diphthongiza- tion	ēa	īe	
(West Saxon) k,g,j+				<i>*mānôN</i> > <i>mōna</i> "moon"; <i>*kwāni(z)</i> > <i>kwēn</i> "queen"
+n,m		ō	ē	<i>*nāha(z)</i> ,
(West Saxon) +h	breaking	ēa	īe	

	+w;ga,go,gu;la,lo,lu	a- restoration	ā	ǣ	<i>nāhista(z) > nēah "near" (cf. "nigh"), superl. nēhst "nearest" (cf. "next") *knāwan, -ip > cnāwanaN "to know", 3rd sing. pres. indic. cnǣwþ "knows" *mēdaN > mēd "reward" *fōt(z), fōti(z) > fōt "foot", plur. fēt "feet" *wībaN > wīf "wife"; *līhiþ > Anglian 3rd sing. pres. indic. līþ "lends" *līhanaN, -ip > lēon "to lend", 3rd sing. pres. indic. līehþ "lends" *mūs, mūsi(z) > mūs "mouse", plur. mȳs "mice" *staina(z) > stān "stone", Lat. <i>Caesar</i> > cāsere "emperor", *hwaitijaN > hwǣte "wheat" *auzōN > ēare "ear"; *hauzijanaN > hīeran "to hear"; *hauh, hauhist > hēah</i>
*ē			ē	ē	
*ō			ō	ē	
*ī			ī	ī	
	(West Saxon) +h	breaking	īo > ēo	īe	
*ū			ū	ȳ	
*ai			ā	ǣ	
*au			ēa	(West Saxon) īe	

					"high", superl. <i>hēhst</i> "highest"
					<i>*auzōN > ēare</i>
				(Anglian) ē	"ear"; <i>*hauzijanaN > hēran</i> "to hear"
					<i>*hauh, hauhist > hēh</i> "high", superl. <i>hēhst</i> "highest"
	(Anglian) +c,g,h;rc,rg,rh;lc,lg,lh	Anglian smoothing	ē	ē	<i>*deupa(z) > dēop</i> "deep"; <i>*fleugōN > flēoge</i> "fly"; <i>*beodanaN > bēodan</i> "to command"
*eu ⁵			ēo	N/A ⁵	<i>*fleugōN > flēoge</i> "fly"; <i>*beodanaN > bēodan</i> "to command"
	(Anglian) +c,g,h;rc,rg,rh;lc,lg,lh	Anglian smoothing	ē	N/A	<i>*fleugōN > flēge</i> "fly"
					<i>*biudip > 3rd sing. pres. indic. bīett</i> "commands"; <i>*liuhtijanaN > līhtan</i> "to lighten"
				(West Saxon) īe	<i>*liuhtijanaN > līhtan</i> "to lighten"
			N/A		<i>*biudip > 3rd sing. pres. indic. bīott</i> "commands"
*iu ⁵					<i>*liuhtijanaN > līhtan</i> "to lighten"
	(Anglian) +c,g,h;rc,rg,rh;lc,lg,lh	Anglian smoothing	N/A	ī	<i>*liuhtijanaN > līhtan</i> "to lighten"

¹ The process of a-restoration, as described here, reversed the previous process of Anglo-Frisian brightening, leaving an /a/. However, it was blocked when an /i/ or /j/ followed in the next syllable; instead, /a/ was converted to /æ/ by Anglo-Frisian brightening, and then umlauted to /e/. This accounts for the outcomes of PG **talō > talu* "tale" vs. the related PG **taljanaN > tellan* "to tell". However, in some instances when a-restoration was blocked, the /æ/ that remained from Anglo-Frisian brightening was still reverted to /a/ by analogy with related words where a-restoration did apply; this /a/ was then umlauted to /æ/. This happened especially in verbs when some forms (e.g. the third-person singular present indicative) had umlaut, and other forms (e.g. the infinitive) did not; for example, PG **bakanaN > OE bacan* "to bake" vs. PG **bakiþi > OE bæcþ* "(he) bakes". This

accounts for the "(by analogy)" notation in the i-umlaut column. The following diagrams show the processes involved in more detail:

No analogy:

Step	"tale"	"to tell"	Reason
1	/talō/	/taljanaN/	original forms
2	/talʊ/	/talljan/	after various changes, irrelevant here (e.g. West Germanic gemination)
3	/tælu/	/tælljan/	Anglo-Frisian brightening
4	/talʊ/	/tælljan/	a-restoration
5	/talʊ/	/tælljan/	unaffected by analogy
6	/talʊ/	/telljan/	i-mutation
7	<i>talʊ</i>	<i>tellan</i>	after further changes, irrelevant here

Analogy:

Step	"to bake"	"(he) bakes"	Reason
1	/bakanaN/	/bakipi/	original forms
2	/bakan/	/bakip/	after various changes, irrelevant here
3	/bækan/	/bækip/	Anglo-Frisian brightening
4	/bakan/	/bækip/	a-restoration
5	/bakan/	/bakip/	by analogy with the infinitive
6	/bakan/	/bækip/	i-mutation
7	<i>bacan</i>	<i>bæcp</i>	after further changes, irrelevant here

Analogy took place between related forms of a single lexical item, e.g. different forms of the same verb or noun. It generally did not take place between related lexical items derived from the same root, e.g. between *talʊ* "tale" and *tellan* "to tell".

² This entry is misleading. Back mutation actually took place after i-mutation; this is why the result of applying both i-mutation and back mutation to *a* is *eo* rather than *ie*, the normal i-mutation of *ea*. Note also that back mutation applies only when the following syllable contains *a*, *o*, *u*, while i-mutation applies only when the following syllable contains *i*, *j*; hence you would not expect both back mutation and i-mutation to apply in a single word. All instances in which this occurs had one suffix substituted for another between the operation of the two processes. For example:

- Latin *asellum* "donkey" > Proto-Germanic **asilu* (replacement of Latin diminutive suffix *-ell-* with similar Proto-Germanic diminutive suffix *-il*) > **æsil* (a-fronting) > **esil* (i-mutation) > **esel* (a normal change in unstressed syllables) > *esol* (substitution of more common *-ol* for less common *-el*) > *eosol* (back mutation)

- Proto-Germanic **awī* "ewe" > **awi* (vowel reduction in unstressed syllables) > **ewi* (i-mutation) > *ewu* (feminine *-i* disappeared in prehistoric Old English and was replaced with *-u*; a similar change occurred in e.g. *menigu* "multitude", cf. Gothic *managei* /managī/) > *eowu* (back mutation)

³ Proto-Indo-European /e/ was already mutated to /i/ in Proto-Germanic in two contexts: When occurring before /n/ plus consonant, and when occurring before /i/ or /j/. The more general *i-mutation* that applied to all vowels in Old English is a separate process that occurred many centuries later, although it had the same effect on /e/. (Note that due to this earlier change there were few instances of /e/ that could be affected by Old English i-mutation. For this reason, the i-mutations of /e/ are listed in parens, e.g. (*i*), to indicate that the given results are not due directly to i-mutation of /e/, but to i-mutation of /i/ or of some vowel derived from it, e.g. *io*.) This is also why the Proto-West-Germanic form of *hierde* "shepherd" appears already as **hirdija(z)* with /i/ in the root even though it's clearly related to *heord* "herd" (Proto-West-Germanic **herdō*). It's also why there's no entry for "+nf,nþ,ns" under /e/ even though it occurs for all other vowels. Furthermore, describing *i* as the i-mutation of *e*, or *ie* as the i-mutation of *eo*, is misleading at best. In fact, as just described, *e* was not mutated to *i* by i-mutation, but rather in an i-mutation environment *i* already appeared due to the earlier mutation of /e/ to /i/. Similarly, *eo* from earlier /e/ in a "breaking" environment was not mutated to *ie* by i-mutation. In this case again, /i/ already appeared in the i-mutation environment, which was broken to *io* due to the "breaking" environment it was in, and this *io* was then mutated to *ie* by i-mutation. Note further that the breaking environments for /i/ were more restrictive than those for /e/. Hence it's possible for post-breaking non-umlaut-context *eo* to correspond to umlaut-context *i* rather than *io* (e.g. before *lh* or *lc*), and therefore for a post-umlaut alternation between *eo* and *i* to exist. Presumably, these anomalous alternations were mostly eliminated by analogy.

⁴ A very similar process to what's described in note 1 resulted in the umlaut of /o/ sometimes appearing as /y/ (the "normal" outcome), and sometimes as /e/ (by analogy). Just like a-restoration, a-mutation (which lowered /u/ to /o/ before /a, e, o/) was blocked by a following /i/ or /j/, and the /u/ that was left over was sometimes changed into /o/ by analogy, and sometimes not changed.

⁵ Proto-Germanic mutation of /e/ to /i/ before /i/ or /j/ also affected /eu/, producing /iu/. In fact, /iu/ occurs *only* before /i/ or /j/ in the following syllable, and /eu/ never occurs in these circumstances. That is, /iu/ is in fact an allophone of /eu/. It is typically written as /iu/, rather than [iu], because in the later Germanic dialects the reflexes of the sound do in fact become separate phonemes.

Chapter- 4

Phonological History of English Vowels

In the history of English phonology, there were many diachronic sound changes affecting vowels, especially involving phonemic splits and mergers.

Tense–lax neutralization

Tense–lax neutralization refers to a neutralization, in a particular phonological context in a particular language, of the normal distinction between tense and lax vowels.

In most varieties of English, this occurs in particular before /ŋ/ and (in rhotic dialects) before coda /r/ (that is, /r/ followed by a consonant or at the end of a word); it also occurs, to a lesser extent, before tautosyllabic /ʃ/ and /g/. Some examples of neutralization of /ɛ/ to /eɪ/ before /g/ are *beg*, *egg*, *Greg*, *keg*, *leg* and *peg's* coming to rhyme with *Craig*, *Hague*, *plague* and *vague*.

Some varieties (including most American English dialects) have significant vocalic neutralization before intervocalic /r/, as well. See English-language vowel changes before historic r.

Monophthongs

Low front vowels

The pronunciation of "**short A**" varies in English.

Trap-bath split

The **trap-bath split** is a vowel split that occurs mainly in southern varieties of English (including Received Pronunciation), in Boston English, and in the Southern Hemisphere accents (Australian English, New Zealand English, South African English), by which the Early Modern English phoneme /æ/ was lengthened in certain environments and ultimately merged with the long /ɑː/ of *father*. (Wells 1982: 100–1, 134, 232–33)

In this context, the lengthened vowel in words such as *bath*, *laugh*, *grass*, *chance* in accents affected by the split is referred to as a **broad A** (also, in the UK, **long A**). Phonetically the vowel is a long back [ɑː] in Received Pronunciation (RP); it is a fronter vowel, [ɐː] or [aː], in some other accents, including many Australian and New Zealand accents, and it may be a rounded [ɒː] in South African English. In accents unaffected by the split, these words usually have the same vowel as words like *cat*, *trap*, *man*, the **short A** or **flat A**.

The sound change originally occurred in southern England, and ultimately changed the sound of [æ] to [ɑː] in some words in which the former sound appeared before [f, s, θ, ns, nt, ntʃ, mpl], leading to RP [pɑːθ] for *path* and [sɑːmpl] for *sample*, etc. The sound change did not occur before other consonants; thus accents affected by the split preserve /æ/ in words like *cat*. The lengthening of the *bath* vowel began in the 17th century but was "stigmatised as a Cockneyism until well into the 19th century".

British accents

The presence or absence of this split is one of the most noticeable differences between different accents of English English. An isogloss runs across the Midlands from the Wash to the Welsh border, passing to the south of the cities of Birmingham and Leicester. North of the isogloss, the vowel in most of the affected words is usually the same short-*a* as in *cat*; south of the isogloss, the vowel in the affected words is generally long. (Gupta 2005)

There is some variation close to the isogloss; for example in the dialect of Birmingham (the so-called "Brummie") most of the affected words have a short-*a*, but *aunt* and *laugh* usually have long vowels. Additionally, some words which have /æ/ in most forms of American English, including *half*, *calf*, *rather* and *can't*, are usually found with long vowels in northern England.

In northern English dialects, the short A is phonetically [a ~ ʌ], while the broad A varies from [ɑː] to [aː]; for some speakers, the two vowels may be identical in quality, differing only in length ([a] vs [aː]) (Wells 1982: 356, 360).

In some West Country accents of English English where the vowel in *trap* is realized as [a] rather than [æ], the vowel in the *bath* words was lengthened to [aː] and did not merge with the /ɑː/ of *father*. In those accents, *trap*, *bath* and *father* all have distinct vowels /a/, /aː/ and /ɑː/. (Wells 1982: 346–47).

In some other West Country accents, and in many forms of Scottish English, there is no distinction corresponding to the RP distinction between /æ/ and /ɑː/.

Southern Hemisphere accents

Evidence for the date of the shift comes from the Southern Hemisphere accents, those of Australia, New Zealand, and South Africa.

In Australian English, there is generally agreement with southern British in words like *path*, *laugh*, *class*. But before N+consonant, as in *dance*, *plant*, most Australians use a flat A; *aunt* and *can't*, however, are invariably pronounced with a broad A. Phonetically, the broad A is [ɐː]. In Australia there is variation in the word *castle*, both pronunciations are commonly heard.

South African and New Zealand English have a distribution of sounds similar to that of RP.

North American accents

Most accents of American English and Canadian English are unaffected by the split. The main exceptions are parts of New England, where the broad sound can be used in some of the same words as in southern England, such as *can't*, *aunt*, *ask*, *bath* etc. ("aunt" though is unique, as the broad a pronunciation is found sporadically throughout the U.S., not only in New England)

A related, but distinct, phenomenon is the phonemic tensing of /æ/ in the accents of New York and Philadelphia.

Variations

The change did not happen in all eligible words. It is hard to find a clear reason why some changed and others did not. Roughly, the more common a word the more likely that the change from flat /æ/ to broad /ɑː/ took place. It also looks as if monosyllables were more likely to change than polysyllables. The change very rarely took place in open syllables, except where closely derived from another word with /ɑː/. Thus *passing* is closely derived from *pass*, and so has broad A /pɑːsɪŋ/. *passage* is not so closely derived, and thus has flat A /pæsɪdʒ/. Here are some examples from RP, to illustrate the variety:

- Broad /ɑː f/ word-finally in *calf*, *half*, *giraffe*, *laugh*
- Flat /æf/ word-finally in *gaffe*, *chiffchaff*
- Broad /ɑː f/ preconsonantly in *laughter*, *shaft*, *raft*, *after*
- Flat /æf/ preconsonantly in *Aphrodite*, *kaftan*
- Broad /ɑː θ/ word-finally in *path*, *bath*
- Flat /æθ/ word-finally in *math(s)*, *hath*
- Broad /ɑː s/ word-finally in *class*, *pass*
- Flat /æs/ word-finally in *ass* (donkey), *crass*, *mass* (amount), *gas*
- Broad /ɑː st/ in *mast*, *past*, *master*, *plaster*

- Flat /æst/ in *masturbate, pastel, Aston*,
- Broad /ɑː sp/ word-finally in *clasp, grasp, gasp*
- Flat /æsp/ word-finally in *asp*,
- Broad /ɑː sk/ in *mask, task, ask, basket*
- Flat /æsk/ in *Asquith, mascot, gasket*
- Broad /ɑː sl/ in *castle*
- Flat /æsl/ in *hassle, vassal*
- Broad /ɑː sn/ in *fasten*
- Flat /æsn/ in *Masson*
- Broad /ɑː nt/ in *aunt, plant, can't, advantage*
- Flat /ænt/ in *ant, banter, cant* (slang), *scant, mantle*
- Broad /ɑː ns/ in *dance, chance, advance, answer*
- Flat /æns/ in *ransom, cancer, Anson*
- Broad /ɑː mpl/ in *sample, example*
- Flat /æmpl/ in *trample, ample*

There are some words in which both pronunciations are heard among southern speakers:

- Greek elements as in *telegraph, blastocyst, chloroplast*
- the prefix *trans-*
- the words *mass* (church service), *chaff, lather*

Use of broad A in *mass* is distinctly conservative and probably rare now. The other fluctuations are both common, but with further complications. While *graph, telegraph, photograph* can have either, *graphic, graphology* always have flat A. The broad A is more likely when the *s* is voiceless (thus *transfer* [trɑː nsfɜː], *transport* [trɑː nspɔː t]) than when it is voiced (thus *translate* [trænzleɪt], *trans-Atlantic* [trænzətələntɪk]).

Bad-lad split

The **bad-lad split** is a phonemic split of the Early Modern English short vowel phoneme /æ/ into a short /æ/ and a long /æː /. This split is found in some varieties of English English and Australian English in which *bad* (with long [æː]) and *lad* (with short [æ]) do not rhyme. (Wells 1982: 288–89, 596; Horvath and Horvath 2001; Leitner 2004).

The phoneme /æ/ is usually lengthened to /æː / when it comes before an /m/ or /n/, within the same syllable. It is furthermore lengthened in the adjectives *bad, sad, glad* and *mad; family* also sometimes has a long vowel, regardless of whether it is pronounced as two or three syllables. Some speakers and regional varieties also use /æː / before /g/, /ŋ/, /l/ and/or /dʒ/; such lengthening may be more irregular than others. Lengthening is prohibited in the past tense of irregular verbs and function words and in modern contractions of polysyllabic words where the /æ/ was before a consonant followed by a vowel. Lengthening is not stopped by the addition of word-level suffixes.

Note that British dialects with the bad-lad split have instead broad /ɑ: / in some words where an /m/ or /n/ follows the vowel. In this circumstance, Australian speakers usually (but not universally) use /æ: /, except in the words *aunt*, *can't* and *shan't*, which have broad /ɑ: /.

Daniel Jones noted for RP that some speakers had a phonemic contrast between a long and a short /æ/ which he wrote as /æ: / and /æ/, respectively. Thus, in *An outline of English phonetics* (1962, ninth edition, Cambridge: W. Heffer & Sons) he noted that *sad*, *bad* generally had /æ: / but *lad*, *pad* had /æ/. In his pronouncing dictionary, he recorded several minimal pairs, for example *bad* /' bæ: d/, *bade* /' bæd/ (also pronounced /' beɪd/). He noted that for some speakers, *jam* actually represented two different pronunciations, one pronounced /' dʒæ: m/ meaning 'fruit conserve', the other /' dʒæm/ meaning 'crush, wedging'. Later editions of this dictionary edited by Alfred C. Gimson, dropped this distinction.

Commonly also in these accents, *can* 'able to' is /' kæn/, whereas the noun *can* 'container' or the verb *can* 'to put into a container' is /' kæ: n/; this is similar to the situation found in æ-tensing in some varieties of American English. Perhaps the most consistent minimal pair of all in these accents is *band* /' bæ: nd/ versus *banned* /' bænd/. Australian speakers who use 'span' as the past tense of 'spin' also have a minimal pair between /' spæ: n/ 'to span' (the bridges /' spæ: n/ the river) and /' spæn/, the past tense of 'spin' (the ball /' spæn/). Various other minimal pairs can be created in the slang speech of social groups as /æɡ/ meaning 'agriculture' vs /æ: ɡ/, a La Trobe University-specific term referring to the part of the university known in full as the Agora.

Apart from Jones, dictionary makers never show a difference between these varieties of the historical /æ/.

æ-tensing

In the sociolinguistics of English, **æ-tensing** is a process that occurs in some accents of North American English by which the vowel [æ] is raised and lengthened or diphthongized in various environments. The realization of this "tense æ" varies from [æ̃] to [ɛə] to [eə] to [ɪə], depending on the speaker's regional accent. A common realization is [eə] (that is, a centering diphthong with a starting point closer than the vowel [ɛ] as in *dress*); that transcription will be used for convenience here.

Phonemic æ-tensing in the Mid-Atlantic region

In Baltimore, Philadelphia and metropolitan New York, the tense /eə/ is a separate phoneme from /æ/ (in Labovian linguistic variable notation, the phonemes are represented as (æh) and (æe) respectively), since certain minimal pairs can be found:

- *can* /keən/ 'metal container' vs. *can* /kæn/ 'be able'
- *halve* /heəv/ vs. *have* /hæv/

In these accents there has thus been a phonemic split. Nevertheless, the distribution between /æ/ and /eə/ is largely predictable in the Philadelphia, Baltimore, and New York regions: In Philadelphia and Baltimore, tense [eə] occurs in closed syllables before the /n/, /m/, /f/, /θ/, and /s/, as well as the words *mad*, *bad*, and *glad*. In New York, tensing occurs in all those environments as well as before voiced stops and /ʃ/. Lax [æ] usually occurs before /ŋ/, /l/, and voiceless stops, and also usually occurs in open syllables regardless of the following consonant. The word *avenue* normally has tense [eə] (unlike *average*, etc.).

In Philadelphia, tensing in some lexical items before /l/ and nontautosyllabic nasals has been reported.

Tense /eə/	Lax /æ/
man /meən/	hang /hæŋ/
ham /heəm/	pal /pæl/
laugh /leəf/	lap /læp/
bath /beəθ/	bat /bæt/
glass /gleəs/	manage /mænɪdʒ/

The main exceptions to the above generalizations are:

1. When a vowel-initial word-level suffix is added to a word with tense /eə/, the vowel remains tense even though it has come to stand in an open syllable:

mannish has /eə/ like *man*, not /æ/ like *manage*
classy has /eə/ like *class*, not /æ/ like *classic*
passing has /eə/ like *pass*, not /æ/ like *Pasadena*

2. When a polysyllabic word with /æ/ in an open syllable gets truncated to a single closed syllable, the vowel remains:

caf (truncation of *cafeteria*) has /æ/, not /eə/ like *calf*
path (truncation of *pathology*) has /æ/, not /eə/ like *path* 'way, road'
Mass (truncation of *Massachusetts*) has /æ/, not /eə/ like *mass*

3. Function words and irregular verb tenses have lax /æ/, even in an environment which would usually cause tensing:

and (a function word) has /æ/, not /eə/ like *sand*
ran (a strong verb tense) has /æ/, not /eə/ like *man*

The phoneme /eə/ is also used in these accents before intervocalic /ɪ/ in words like *dairy* and *Mary* and in non-rhotic varieties of these accents in words like *square* and *scarce* (which rhymes with *glass* for many non-rhotic speakers).

The phonemic tensing of æ is similar to the broad A phenomenon of certain other dialects. The environment of broad A overlaps with that of æ-tensing, in that broad A occurs before voiceless fricatives in the same syllable and before nasals in certain environments; and both phenomena involve replacement of the short lax vowel /æ/ with a longer and tenser vowel. However, the "broad A" is lower and backer than [æ], while the result of æ-tensing is higher and fronter.

It is also related to the bad-lad split of some Southern British and Australian dialects, in which a short flat /æ/ is lengthened to [æː] in some conditions. The most significant differences from the Philadelphian system described here are that bad-lad splitting dialects have the broad A phenomenon, so the split can't occur there; that 'sad' is long; and that lengthening can occur before /g/ and /l/.

In *Webster's Third New International Dictionary* (1961; Springfield, Mass: Merriam-Webster Inc.), the Mid-Atlantic tense æ (written with \aa(ə)\, the lax æ being \a\) is shown at individual entries as a variant pronunciation; for instance, the pronunciation of *can* "container" is \kan, -aa(ə)n\. In the 11th (2003) edition of *Merriam-Webster's Collegiate Dictionary*, which is partly derived from the Third unabridged, the distinction is discussed in an introductory section on pronunciation but ignored elsewhere in the text. The editors justify their decision by maintaining that "this distinction is sufficiently infrequent that the traditional practice of using a single symbol is followed in this book" (p. 34a).

Non-phonemic æ-tensing

In accents that have undergone the Northern cities vowel shift, the phoneme /æ/ is raised and tensed in all environments.

Most other dialects of North American English display an /æ/ which is raised and tensed in some environments and lower and laxer in others, without splitting it into two contrasting phonemes as the New York, Baltimore, and Philadelphia accents do. A common one is the "nasal system", in which /æ/ is raised and tensed exclusively before nasal consonants, regardless of whether there is a syllabic or morphemic boundary present. The nasal system is found in several separate and unrelated dialect regions, including the southern Midwest, northern New Jersey, Florida, and parts of Canada, among others, but it is most prominent—that is, the difference between the two allophones of /æ/ is greatest, and speakers with the nasal system are most concentrated—in eastern New England.

More widespread among speakers of the Western United States, Canada, and southern Midwest is a "continuous" system. This resembles the nasal system in that /æ/ is usually raised and tensed to [eə] before nasal consonants, but instead of a sharp divide between a

high, tense allophone before nasals and a low, lax one before other consonants, allophones of /æ/ occupy a continuum of varying degrees of height and tenseness between those two extremes, with a variety of phonetic and phonological factors interacting (sometimes differently in different dialects) to determine the height and tenseness of any particular example of /æ/.

In the Southern United States, the pattern most characteristic of Southern American English does not employ æ-tensing at all, but rather what has been called the "Southern drawl": /æ/ becomes in essence a triphthong [æjə]. However, many speakers from the South have the nasal æ-tensing system described above, particularly in Charleston, Atlanta, and Florida; and certain speakers from the New Orleans area have been reported to have a system very similar to the phonemic split of New York.

æ-tensing before /g/

For some speakers in Canada and the northern and northwestern United States, a following /g/ tenses an /æ/ as much as or more than a following nasal does; in much of the Midwest not affected by the Northern Cities Vowel Shift, this extends to the point that /æ/ merges with /eɪ/ before /g/, so that *bag* rhymes with *plague*. These usually remain distinct from /ɛg/ as in *egg*.

Development of the /ɑː / phoneme

In Modern English, a new phoneme /ɑː / developed that did not exist in Middle English. The phoneme /ɑː / comes from three sources: the word *father* lengthening from /a/ to /ɑː / for an unknown reason (thus splitting from *gather*); the compensatory lengthening of the short /a/ in words like *calm*, *palm*, *psalm* when /l/ was lost in this environment; and the lengthening of /a/ before /r/ in words like *car*, *card*, *hard*, *part*, etc. In most dialects that developed the broad A class, words containing it joined this new phoneme /ɑː / as well. The new phoneme also became common in onomatopoeic words like *baa*, *ah*, *ha ha*, as well as in foreign borrowed words like *spa*, *taco*, *llama*, *drama*, *lava*, *Bahamas*, *pasta*, many of which vary between /ɑː / and /æ/ among different dialects of English.

Low back vowels

The phonology of the low back vowels of the English language has undergone changes both overall and with regional variations, dating from Late Middle English (c. 1400) to the present. The sound changes heard in modern English mostly begin with the Great Vowel Shift, and continue through the development and recognition of the General American dialect and the progressing cot-caught merger.

Late Middle English

In Late Middle English (c. 1400) the following low back vowels were present, distinguished by length:

- /ɔ/ as in *dog*
- /ɔ:/ as in *boat*

Sixteenth century changes

By 1600 the following changes had occurred:

- The long vowel /ɔ:/ of *boat* had been raised to /o:/ as a result of the Great Vowel Shift. Before nonprevocalic /r/, this raising did not take place, thus *more* was still /mɔ:/r/.
- The diphthong /aʊ/ found in words such as *cause, law, all, salt, psalm, half, change, chamber, dance* had become an open back monophthong /ɒ:/
- The diphthong /ɔʊ/ found in *low* and *soul* had become a monophthong /ɔ:/
- Before nonprevocalic /r/, short /ɔ/ had become lowered to /ɒ/, thus *corn*, /kɒrn/.

There were thus four low back monophthongs at this time: /ɔ/ as in *dog*, /ɔ:/ as in *low* and (before /r/), in *more*, /ɒ/ in *corn* and /ɒ:/ as in *cause*.

Seventeenth century changes

By 1700 the following further developments had taken place:

- The monophthong /ɔ:/ of *soul* was raised to /o:/, merging with *boat*. This change did not happen before /r/.
- Short /a/ merged with /ɔ/ when following a /w/, as in *want, quality*. The merger was suppressed before a velar consonant, as in *quack, twang, wag, wax*. Before nonprevocalic /r/, the vowel was opened and lengthened, merging instead with /ɒ:/, as in *war*.
- Short /ɔ/ had begun to partake in lengthening before a nonprevocalic voiceless fricative. This resulted in words like *broth, cost, and off* having /ɒ:/ instead of /ɔ/.
- Short /ɒ/ before /r/ lengthened to /ɒ:/: thus *corn*, /kɒ:/rn/
- In words such as *change* and *chamber*, the pronunciation /ɒ:/ was gradually replaced in the standard language by a variant with /e:/, derived from Middle English /a:/ . This explains the contemporary pronunciation of these words with /eɪ/.

This left the language with three low back vowels:

- /ɔ/ in *dog* and *want*.
- /ɔ:/ in *more*.
- /ʊ:/ in *cause*, and *cost*, and *corn*.

Father-bother merger

The father-bother merger is a merger of the Early Modern English vowels /ɑ:/ and /ɒ/ that occurs in almost all varieties of North American English (exceptions are accents in northeastern New England, such as the Boston accent, and in New York City). In those accents with the merger *father* and *bother* rhyme, and *Kahn* and *con* are homophonous as [kan]. *Balm* and *bomb* may also be homophones as /bɑm/: however this merger is prevented for some speakers by the reintroduction of the historical "l" into "balm". Another possible merger is *lager* and *logger*, for some but by no means all speakers. Unrounding of EME /ɒ/ is found also in Norwich, the West Country, the West Midlands and in Hiberno-English, but apparently with no phonemic merger (typically because vowel length remains phonemic).

Lot-cloth split

The lot-cloth split is the result of a late 17th century sound change that lengthened /ɒ/ to [ɒ:] before voiceless fricatives, and also before /n/ in the word *gone*. In some accents, the lengthened [ɒ:] was raised, merging with the /ɔ:/ of words like *thought*. Words that entered the language later, or words that were used more in writing than speech, were often exempt from the lengthening, so that *joss* and *Goth* still have the short vowel.

As a result of the lengthening and raising, in the above-mentioned accents *cross* rhymes with *sauce*, and *soft* and *cloth* also have the vowel /ɔ:/ . Accents affected by this change include American English and, originally, RP, although today words of this group almost always have short /ɒ/ in RP. The split still exists in some older RP speakers, including Elizabeth II of the United Kingdom.

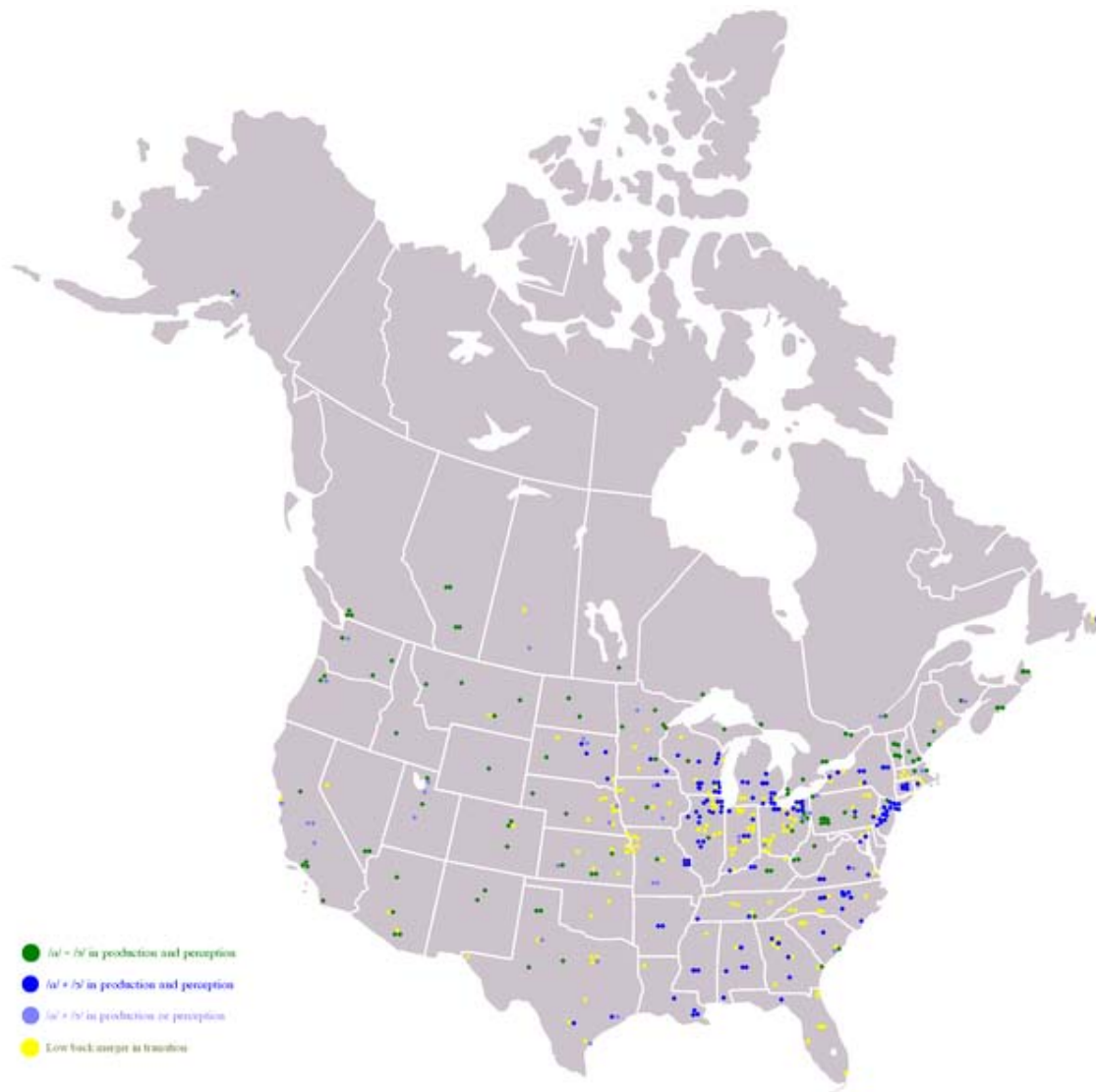
The lengthening and raising generally happened before the fricatives /f/, /θ/ and /s/. In American English the raising was extended to the environment before /ŋ/ and in a few words to the environment before /k, g/ as well, giving pronunciations like /lɔŋ/ for *long*, /tʃɔklət/ for *chocolate*, and /dɔg/ for *dog*. Obviously, in accents of American English that are subject to the cot-caught merger, there is no difference between words that did and those that did not undergo the change.

In the varieties of American English that have the lot-cloth split, many words vary as to whether or not they have the *cloth* vowel. For example, words that end in -og like *frog*, *hog*, *fog*, *log*, *bog* etc. have the *cloth* vowel in some accents with the lot-cloth split and the *lot* vowel in other accents with the split.

The word *gone* usually has the *cloth* vowel in accents with the lot-cloth split, but has the *lot* vowel in accents of New York and New Jersey which have the split.

The word *on* is pronounced with the *lot* vowel in the North, and with the *cloth* vowel in the Midland, Mid-Atlantic and South.

Cot-caught merger



On this map of English-speaking North America, the green dots represent speakers who have completely merged the vowels of *cot* and *caught*. The dark blue dots represent speakers who have completely resisted the merger. The medium blue dots represent speakers with a partial merger (either production or perception but not both), and the yellow dots represent speakers with the merger in transition. Based on the work of Labov, Ash and Boberg.

The cot-caught merger (also known as the *low back merger*) is a phonemic merger, a sound change, that occurs in some varieties of English. The merger occurs in some accents of Scottish English and to some extent in Mid Ulster English but is best known as a phenomenon of many varieties of North American English.

The sound change causes the vowel in *caught*, *talk*, and *small* to be pronounced like the vowel in *cot*, *rock*, and *doll*, so that *cot* and *caught*, for example, become homophones, and the two vowels merge into a single phoneme. The change does not affect a vowel followed by /r/, so *barn* and *born* remain distinct, and *starring* and *warring* do not rhyme.

The presence of the merger and its absence are both found in many different regions of the continent, and in both urban and rural environments.

The symbols traditionally used to transcribe the vowels in the words *cot* and *caught* as spoken in American English are /ɑ/ and /ɔ/, respectively, although their precise phonetic values may vary, as does the phonetic value of the merged vowel in the regions where the merger occurs.

According to Labov, Ash, and Boberg, the merger does not generally occur in the southern United States (with exceptions), along most of the American side of the Great Lakes region, or in the "Northeast Corridor" extended metropolitan region from Providence, Rhode Island to Baltimore. Areas that it occurs include:

- Canada
- Boston
- Northeastern New England
- the Pittsburgh area
- The Western United States
- Due to an apparent spread of the merger towards the center of the United States (from both the western and eastern states), portions of the Midwest also feature the merger:
 - Illinois
 - Indiana
 - Iowa
 - Minnesota
 - Missouri
 - Ohio

The distribution of the merger is complex, even without taking into account the mobility of the American population; there are pockets of speakers with the merger in areas that lack it, and vice versa. There are areas where the merger has only partially occurred, or is in a state of transition. For example, based on research directed by William Labov (using telephone surveys), younger speakers in Kansas, Nebraska, and the Dakotas exhibit the merger while speakers older than 40 typically do not. The 2003 Harvard Dialect Survey, in which subjects did not necessarily grow up in the place they identified as the source of their dialect features, indicates that there are speakers of both merging and contrast-

preserving accents throughout the country, though the basic isoglosses are almost identical to those revealed by Labov's 1996 telephone survey. Both surveys indicate that approximately 60% of American English speakers preserve the contrast, while approximately 40% make the merger.

For merged speakers in Canada and most of the United States, the two sounds [ɑ] and [ɔ] are allophones; they often do not perceive differences in their usage, hear neither of them as a separate phoneme, and hear the distinct vowels used by speakers whose dialects do distinguish them as variations on the same vowel. They hear the broad A of British Received Pronunciation as the same, single vowel sound. But in Received Pronunciation, there are three sounds distinguished: the long /ɑ:/ of *cart*, the long /ɔ:/ of *caught*, and the short rounded /ɒ/ of *cot*.

Speakers with the merger in northeastern New England still maintain a phonemic distinction between a fronted and unrounded /ɑ:/ and a back and usually rounded /ɒ:/, because in northeastern New England (unlike in Canada and the Western United States), the cot-caught merger occurred without the father-bother merger. Thus, although northeastern New Englanders pronounce both *cot* and *caught* as [kɒ:t], they pronounce *cart* as [kɑ:t].

Labov et al. also reveal that about 15% of respondents have the merger before /n/ but not before /t/, so that *Don* and *Dawn* are homophonous, but *cot* and *caught* are not. A much smaller group (about 4%) has the reverse situation: *cot* and *caught* are homophonous but *Don* and *Dawn* are distinct.

Possible homophone sets for speakers with the merger include (with the word corresponding to *cot* in non-merged dialects being listed first): *bobble/bauble*, *bock/balk*, *body/bawdy*, *bot/bought*, *clod/Claude-clawed*, *collar/caller*, *cock/caulk*, *chock/chalk*, *don/dawn*, *fond/fawned*, *holler/hauler*, *hottie/haughty*, *knotty/naughty*, *mod/Maud*, *nod/gnawed*, *not-knot/naught*, *odd/awed*, *Oz/awes*, *pod/pawed*, *pol/Paul-pall*, *popper/pauper*, *pond/pawed*, *rot/wrought*, *sod/sawed*, *stock/stalk*, *tock/talk*, *tot/taut-taught* and *wok/walk*.

Speakers who have the "father-bother" merger in addition to the "cot-caught" merger may have further homophones such as *ah-awe*, *Pa-paw*, *Pa's-pause/paws* and *shah-Shaw*.

Psalm-sum merger

The psalm-sum merger is a phenomenon occurring in Singaporean English where the phonemes /ɑ/ and /ʌ/ are both pronounced [a]. As a result, pairs like "psalm" and "sum" are homophones.

Bud-bird merger

The bud-bird merger is a merger of /ɜ/ and /ʌ/ occurring for some speakers of Jamaican English making *bud* and *bird* homophones as /bʌd/.

The conversion of /ɜ/ to [ʌ] or [ə] is also found in places scattered around England and Scotland. Some speakers, mostly rural, in the area from London to Norfolk exhibit this conversion, mainly before voiceless fricatives. This gives pronunciation like *first* [fʌst] and *worse* [wʌs]. The word *cuss* appears to derive from the application of this sound change to the word *curse*.

Table

	<i>law</i> <i>ball</i> <i>taught</i> <i>caught</i>	<i>off</i> <i>cloth</i> <i>loss</i>	<i>lot</i> <i>stop</i> <i>rob</i> <i>cot</i> <i>bother</i>	<i>father</i> <i>palm</i> <i>calm</i>
Middle English	aʊ	ɔ	ɔ	a
Quality change		ʊ	ʊ	
"Thought" monophthonging ɔ:				
Pre-fricative lengthening		ʊ:		
A - lengthening				a:
Quality change				ɑ:
"Lot" unrounding			ɑ	
Loss of distinctive length	ɔ	ʊ	(ɑ)	ɑ
Cloth-thought merger	(ɔ)	ɔ		
General American Output	ɔ	ɔ	ɑ	ɑ
<i>Cot-caught merger</i>	ɑ	ɑ	ɑ	ɑ

High back vowels

Most dialects of modern English have two **high back vowels**: the close back rounded vowel /u/ found in words like *goose*, and the near-close near-back rounded vowel /ʊ/ found in words like *foot*. Here we, discusses the history of these vowels in various dialects of English, focusing in particular on phonemic splits and mergers involving these sounds.

Foot-goose merger

The **foot-goose merger** is a phenomenon that occurs in Scottish English, Ulster varieties of Hiberno-English, Malaysian English and Singaporean English, where the vowels /ʊ/ and /u:/ are merged. As a result, pairs like *look/Luke* are homophones and *good/food* and *foot/boot* rhyme. The merged vowel is usually /ʊ/ or /y/ in Scottish English and /u/ in Singaporean English. The use of the same vowel in "foot" and "goose" in these dialects is not due to phonemic merger, but the appliance of different languages' vowel system to the English lexical incidence. The full-fool merger is a conditioned merger of the same two vowels before /l/, making pairs like *pull/pool* and *full/fool* homophones.

Foot-strut split

The **foot-strut split** is the split of Middle English short /ʊ/ into two distinct phonemes /ʊ/ (as in *foot*) and /ʌ/ (as in *strut*) that occurs in most varieties of English; the most notable exception is Northern England and the English Midlands.

The origin of the split is the unrounding of /ʊ/ in Early Modern English, resulting in the phoneme /ʌ/. In general (though with some exceptions), this unrounding did not occur if /ʊ/ was preceded by a labial consonant (e.g., /p/, /f/, /b/) and followed by /l/, /ʃ/, or /tʃ/, leaving the modern /ʊ/. Because of the inconsistency of the split, the words *put* and *putt* became a minimal pair, distinguished as /pʊt/ and /pʌt/. The first clear description of the split dates from 1644.

In non-splitting accents, *cut* and *put* rhyme, *putt* and *put* are homophonous as /pʊt/, and *pudding* and *budding* rhyme. However *luck* and *look* are not necessarily homophones; many accents in the area concerned have *look* as /lu:k/, with the vowel of *goose*.

The absence of this split is a less common feature of educated Northern English speech than the absence of the trap-bath split. The absence of the foot-strut split is sometimes stigmatized, and speakers of non-splitting accents often try to introduce it into their speech, sometimes resulting in hypercorrections such as pronouncing *pudding* /pʌdɪŋ/.

The name "foot-strut split" refers to the lexical sets introduced by Wells (1982), and identifies the vowel phonemes in the words, though that name may be a bit misleading as the word *foot* itself may have had a different vowel from *put* at the time the split occurred and so did not participate in the split.

Stages of the Foot-Strut split, as described by Wells (1982), p. 199

	<i>mood</i>	<i>good</i>	<i>blood</i>	<i>cut</i>	<i>put</i>
	<i>goose</i>	<i>foot</i>	<i>flood</i>	<i>dull</i>	<i>full</i>
	<i>tooth</i>	<i>book</i>	<i>brother</i>	<i>fun</i>	<i>sugar</i>
Middle English	o:	o:	o:	u	u
Great Vowel Shift	u:	u:	u:		
Early Shortening			u	(u)	(u)
Quality Adjustment			ʊ	ʊ	ʊ
Foot-Strut Split			ʌ	ʌ	
Later Shortening		ʊ			(ʊ)
Quality Adjustment			Λ	Λ	
RP Output	u:	ʊ	Λ	Λ	ʊ

Merger of Middle English /y/, /eu/, and /iu/

Middle English distinguished the close front rounded vowel /y/ (occurring in loanwords from Anglo-Norman like *duke*) and the diphthongs /iu/ (occurring in words like *new*) and /eu/ (occurring in words like *few*).

By Early Modern English, these three vowels merged as /iu/, which has remained as such in some Welsh, northern English, and American accents in which *through* /θɹu:/ is distinct from *threw* /θɹiu/. In the majority of accents, however, /iu/ later became /ju:/, which, depending on the preceding consonant, either remained or developed into /u:/ by the process of yod-dropping, hence the present pronunciations /d(j)u: k/, /n(j)u:/, and /fju: /.

Middle English /y/ was commonly represented by the spellings *uCe* and *ue* as in *duke* and *hue*, while /iu/ and /eu/ were commonly represented by the spellings *ew* and *eu* as in *dew*.

Shortening of /u:/ to /ʊ/

In a handful of words, including some very common ones, the vowel /u:/ was shortened to /ʊ/. In a few of these words, notably *blood* and *flood*, this shortening happened early enough that the resulting /ʊ/ underwent the "foot-strut split" and are now pronounced with /Λ/. Other words that underwent shortening later consistently have /ʊ/, such as *good*, *book*, and *wool*. Still other words, such as *roof*, *hoof*, and *root* are in the process of the shift today, with some speakers preferring /u:/ and others preferring /ʊ/ in such words. For some speakers in Northern England, words ending in *-ook* such as *book*, *cook* still have the long /u:/ vowel.

Ruin-smoothing

Ruin-smoothing is a process that occurs in many varieties of British English where bisyllabic /u: ɹɪ/ becomes the diphthong [ʊɪ] in certain words. As a result, "ruin" is pronounced as monosyllabic [ˈ ɹʊɪn] and "fluid" is pronounced [ˈ flʊɪd].

High front vowels

The **high front vowels of English** have undergone a variety of changes over time, which may vary from dialect to dialect.

Weak vowel merger

The **weak vowel merger** is a phonemic merger of /ə/ (schwa) with unstressed /ɪ/ (sometimes written as /i/, and occasionally called "schwi" by analogy with "schwa") in certain dialects of English. As a result of this merger the words *abbot* and *rabbit* rhyme; in accents without the merger they are distinct. The merger is complete in the Southern Hemisphere accents and Hiberno-English and variable in General American

This merger is not usually stigmatized. Dictionaries usually represent the distinction and not the merger.

The following are homophones for speakers with the merger, but distinct for those without it:

- Lennon, Lenin
- Rosa's, roses
- allusion, illusion
- accept, except
- affect (vb.), effect

The following end differently for speakers without the merger:

- ribbon, cabin
- carrot, merit

Kit-bit split

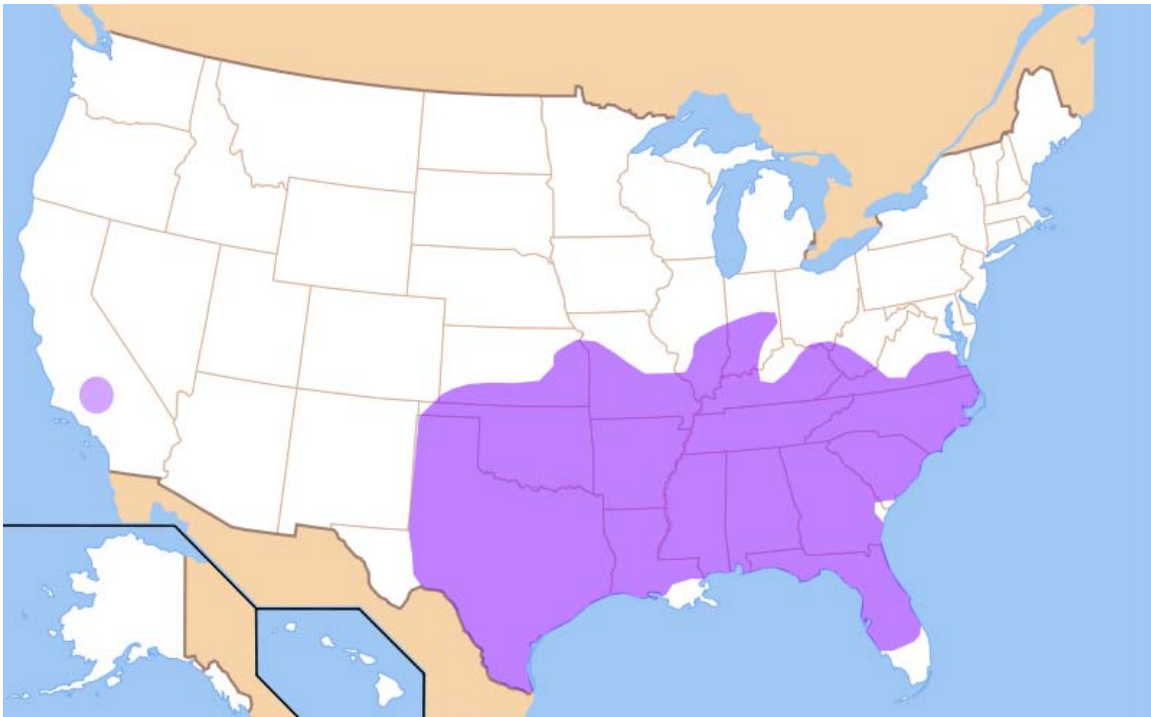
The **kit-bit split** is a split of EME /ɪ/ found in South African English, where *kit* [kɪt] and *bit* [bət] do not rhyme. It is not clear whether this is a true phonemic split, since the distribution of the two sounds is predictable: [ɪ] is used adjacent to velars (*kiss*, *gift*, *lick*, *big*, *sing*, *kit*), after /h/ (*hit*), word-initially (*inn*), generally before /f/ (*fish*), and by some

speakers before /tʃ, dʒ/; [ə] is used elsewhere (*limb, dinner, limited, bit*). Nevertheless because of the phonetic similarity of the two vowels in a word like *dinner* ['dənə], they may belong to the same phoneme /ə/, while the vowel of *kiss, big, hit, inn* etc. belongs to the phoneme /ɪ/.

The kit-bit split is perhaps the most distinctive feature of South African English, as many of its other features are also found in New Zealand English. In New Zealand English, however, a centralized realization of /ɪ/ as /ə/ is general: there is no split and the vowels of *kit* and *bit* are pronounced identically.

Because of the centralized realization of the vowel /ɪ/ in some words in South African English, South Africans are often stereotyped as pronouncing "woman" and "women" the same way, as "women" has the vowel [ə]. In reality, they are distinct in South African English. "woman" is /wʊmən/ and "women" is /wəməən/, so they are distinct and never confused.

Pin-pen merger



The merger of *pin* and *pen* in American English. The areas marked in purple are where the merger is complete for most speakers. Based on Labov, Ash, and Boberg 2006: 68.

The **pin-pen merger** is a conditional merger of /ɪ/ and /ɛ/ before the nasal consonants [m], [n], and [ŋ]. The merged vowel is usually closer to [ɪ] than to [ɛ] (examples include: *kin-ken, bin-ben, and him-hem*). The merger is widespread in Southern American

English, and is also found in many speakers in the Midland region immediately north of the South, as well as in less densely populated inland areas of the Western United States, particularly in Bakersfield, California. It is also a characteristic of African American Vernacular English.

Although this merger was not complete in the South even in fairly recent times, there is very little variation throughout the Southern States in general, except that Savannah, Miami, and New Orleans are excluded from the merger. The area of consistent merger includes southern Virginia and most of the South Midland, and extends westward to include much of Texas.

The northern limit of the merged area shows a number of irregular curves. Central and southern Indiana is dominated by the merger, but there is very little evidence of it in Ohio, and northern Kentucky shows a solid area of distinction around Louisville.

In the west, there is sporadic representation of merged speakers in Washington, Idaho, Kansas, Nebraska, and Colorado. But the most striking concentration of merged speakers in the west is around Bakersfield, California, a pattern that may reflect the trajectory of migrant workers from the Ozarks westward.

The pin-pen merger is one of the most widely recognized features of Southern speech. A study of the written responses of Civil War veterans from Tennessee, together with data from the *Linguistic Atlas of the Gulf States* and the *Linguistic Atlas of the Middle South Atlantic States*, show that the merger was at a very low level through the first sixty years of the 19th century, but then rose steeply to 90% in the middle of the 20th century.

Outside the South, the majority of North American English speakers maintain a solid distinction in perception and production, though there are in almost every region of the United States—and even a few places in Canada—a certain number of speakers that perceive the pairs of words as close or pronounce them acoustically closely.

The pin-pen merger also appears in slightly different form in the forms of English spoken in Counties Cork and Kerry, Ireland.

People that have the merger will often use terms like *ink pen* and *stick pin* to make a clear distinction between the two words that are otherwise homophonous.

Happy tensing

The term **happy tensing** refers to the process in which final lax [ɪ] becomes tense [i] in words like *happy*. Happy tensing is absent from many varieties of British English and, traditionally at least, from Southern American English. Other realizations of the final vowel are also possible, such as [e] in Scottish English. The history of happy tensing is difficult to pin down; the fact that it is uniformly present in South African English, Australian English, and New Zealand English implies that it was present in southern British English already at the beginning of the 19th century. Yet it is not mentioned by

descriptive phoneticians until the early 20th century, and even then at first only in American English. The British phonetician Jack Windsor Lewis believes that the vowel moved from [i] to [ɪ] in Britain the second quarter of the nineteenth century before reverting to [i] in Britain towards the last quarter of the twentieth century.

Meet-meat merger

The **meet-meat merger** is the merger of the Early Modern English vowel /e:/ (usually spelled *ea*, as in *meat*, *peace*, *sea*, *receive*) with the vowel /i:/ (as in *meet*, *piece*, *see*, *believe*). The merger is complete outside the British Isles and virtually complete within them. Some speakers in Northern England distinguish /ɪə/ in the first group of words from /i:/ or /əi/ in the second group. Old-fashioned varieties of Hiberno-English and the West Country dialects preserve the Early Modern English /e:/ –/i:/ contrast, for instance *piece* ≠ *peace* ≠ *pace*, but it is rare in these accents nowadays. A handful of words (such as *break*, *steak*, *great*) escaped the merger in the standard accents and thus have the same vowel as words like *brake*, *stake*, *grate* in almost all varieties of English. The word *threat* rhymes with neither *meat* or *great*, due to early shortening, although all three words once rhymed.

In some dialects that preserve the distinction, things are more complicated than simply all words in the *meat* set having /ɪə/. In those accents, some (but not all) words in the *meat* set actually have a sound resembling /ɛɪ/ as in *eight*. In Alexander (2001), a book about the traditional Sheffield dialect, the spelling "eigh" is used for the vowels of *eat* and *meat* but the spelling "eea" is used for the vowels of *team* and *cream*. However, a 1999 survey in Sheffield found that the /ɛɪ/ pronunciation is almost extinct.

The words *team* and *cream*, which have /ɪə/ in the traditional Yorkshire accents, have original long vowels, going back to Old English *tēam* and Old French *creme* respectively, while *eat* (< OE *etan*) and *meat* (< OE *mete*) have vowels that were originally short but lengthened by Middle English open syllable lengthening. This is the origin of the Yorkshire distinction.

In accents with the distinction, the vowels /ɪə/ and /ɛɪ/ are usually represented by the spellings *ea* and *ei*, as in *team* and *receive*, and the vowel /i:/ is usually represented by the spellings *ee*, *ie*, *eCe* and *iCe* as in *feet*, *thief*, *complete*, and *suite*.

Mitt-meet merger

The **mitt-meet merger** is a phenomenon occurring in Malaysian English and Singaporean English where the phonemes /i:/ and /ɪ/ are both pronounced /i/. As a result, pairs like "mitt" and "meet", "bit" and "beat", "bid" and "bead" etc. are homophones.

Met-mat merger

The **met-mat merger** is a phenomenon occurring in Malaysian English and Singaporean English where the phonemes /ɛ/ and /æ/ are both pronounced /ɛ/. For some speakers, this only occurs in front of voiceless consonants, so that pairs like "met", "mat", "bet", "bat" are homophones, but "bed", "bad" or "med", "mad" are kept distinct. For others, it occurs in all positions.

Met-mate merger

The **met-mate merger** is a phenomenon occurring for some speakers of Zulu English where /eɪ/ and /ɛ/ are both pronounced /ɛ/. As a result, the words "met" and "mate" are homophonous as /mɛt/.

Bred-bread merger

The **bred-bread merger** is a process that occurred in Middle English that caused Middle English /ɛ:/ to be shortened in some words. As a result, "bred" and "bread" became homophones as /brɛd/ which were previously distinguished as /brɛd/ and /brɛ: d/. The shortening of /ɛ:/ occurred mostly before /d/ and /ð/, and sometimes elsewhere.

Idea-smoothing

Idea-smoothing is a process that occurs in many non-rhotic dialects of British English where bisyllabic /i: ə/ becomes the diphthong /ɪə/ in certain words, leading to pronunciations like /vɪəkəl/, /θɪətə/ and /aɪdɪə/ for "vehicle", "theatre/theater" and "idea" respectively. The words which have the /i: ə/ to /ɪə/ may vary depending on dialect. Dialects that have idea-smoothing usually also have the diphthong /ɪə/ in words like "beer", "deer" and "fear" which are pronounced /bɪə/, /dɪə/ and /fɪə/ in those dialects. Some northern English accents have /ɪ:/ for the first vowel in words such as *period*, *serious*, etc. but then /i: ə/ for the second vowel. In addition, this practice is not restricted to Britain - some Americans and other cultures have idea-smoothing in their speech, but others do not.

Bit-bet merger

The **bit-bet merger** is a merger of /ɪ/ and /ɛ/ (both sounding like [ɪ]) occurring for some speakers of Newfoundland English (Wells Pg. 500). As a result, *bit* and *bet* are homophones as /bɪt/.

Diphthongs

- The vein–vain merger is the merger of the Middle English diphthongs /ai/ and /ei/ that occurs in all dialects of present English.
- The following mergers are grouped together by Wells as the long mid mergers. They occur in all but a few dialects of English.
 - The pane–pain merger is a merger of the long mid monophthong /e:/ and the diphthong /ɛi/.
 - The toe–tow merger is a merger of the Early Modern English vowels /o:/ and /ɔu/.
- The cot–coat merger is a phenomenon occurring for some speakers of Zulu English where the phonemes /ɒ/ and /oʊ/ are not distinguished.
- The rod–ride merger is a merger of /ɑ/ and /aɪ/ occurring for some speakers of African American Vernacular English.
- The pride–proud merger is a merger of the diphthongs /aɪ/ and /aʊ/ before voiced consonants occurring for some speakers of African American Vernacular English.
- The line–loin merger is a merger between the diphthongs /aɪ/ and /ɔɪ/ that occurs in some English dialects.
- The coil–curl merger is a merger of /ɔɪ/ and /ɜr/ which historically occurred in some dialects of English. It is particularly associated with the dialects of New York and New Orleans.

English-language vowel changes before historic r

Mergers before intervocalic r

Mergers before intervocalic r are quite widespread in North American English.

- The mary–marry–merry merger is the mergers of /æ/ and /ɛ/ with historical /eɪ/ before intervocalic /r/.
- The mirror–nearer merger is the merger of /ɪ/ with /i:/ before intervocalic /r/.
- The hurry–furry merger is the merger of /ʌ/ before intervocalic /r/ with /ɜr/.
- The furry–ferry merger, common in the Philadelphia accent, is the merger of (/ɛ/) and (/ʌ/) before intervocalic /r/.
- The tory–torrent merger is the merger of /ɒ/ and /ɔ:/ before intervocalic /r/.

Mergers before historic coda r

Various mergers before historic coda r are very common in English dialects.

- The cheer–chair merger is the merger of the Early Modern English sequences [i: r] and [e: r], which is found in some accents of modern English.

- The fern–fir–fur merger is the merger of the Middle English vowels /ɪ, ɛ, ʊ/ into [ɜr] when historically followed by /r/ in the coda of the syllable.
- The fur–fair merger is a merger of /ɜr/ with /ɛər/ that occurs in some accents.
- The steer–stir merger is a possible merger of /ɜr/ with /ɪər/ that may occur in some American and the English dialects.
- The tower–tire and tower–tar mergers are found in some accents of Southern British English. The tire–tar merger is found in some Midland and Southern U.S. accents.
 - The tower–tire causes the /aʊə/ of *tower* to merge with the /aɪə/ of *tire*.
 - The tower–tar merger causes the /aʊə/ of *tower* to merge with the /ɑː / of *tar*.
 - The tire–tar merger causes the /aɪr/ of *tire* to merge with the /ɑː r/ of *tar*.
- The cure–fir merger is a merger of /ʊər/ with /ɜr/ or /ʊr/ with /ɜr/ that occurs in East Anglian and American English in certain words.
- The pour–poor merger is the merger of /ʊər/ with /ɔr/ or /ʊr/ with /ɔr/.
- The pure–poor split occurs in Australian and New Zealand English that causing the centring diphthong /ʊə/ to disappear and split into /ʌː ə/ and /oː /.
- The card–cord merger is a merger of Early Modern English [ɑr] with [ɔr], found in some Caribbean, English West Country and Southern and Western U.S. accents.
- The horse–hoarse merger is the merger of /ɔ/ and /ʊ/ before historic /r/ occurring in most varieties of English.
- The nurse-square merger occurs in some areas of England. The two sets are sometimes merged to /ɛː / (Liverpool, east coast of Yorkshire) and sometimes to /ɜː / (south Lancashire).

English-language vowel changes before historic l

- The salary–celery merger is a conditioned merger of /æ/ and /e/ before /l/ occurring in New Zealand and Victorian (Australia) English.
- The fill–feel merger is a conditioned merger of /ɪ/ and /iː / before /l/ occurring in some dialects of American English.
- The fell–fail merger is a conditioned merger of /ɛ/ and /eɪ/ before /l/ occurring in some varieties of Southern American English.
- The full–fool merger is a conditioned merger of /ʊ/ and /uː / before /l/ mainly occurring the North Midland accent of American English.
- Four other conditioned mergers before /l/ which require more study have been mentioned in the literature and are as follows.
 - /ʊl/ and /ol/ (*bull* vs. *bowl*)
 - /ʌl/ and /ɔl/ (*hull* vs. *hall*)
 - /ʊl/ and /ʌl/ (*bull* vs. *hull*)
 - /ʌl/ and /ol/ (*hull* vs. *hole*)