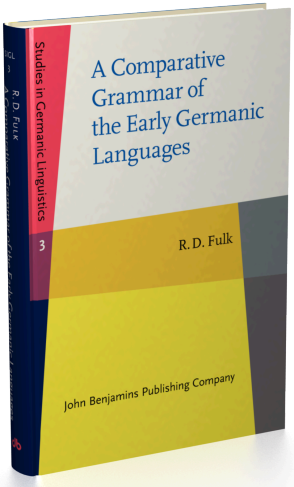
Studies in Germanic Linguistics 3

Chapter 3: The Vowels of Proto-Indo-European and Proto-Germanic

https://doi.org/10.1075/sigl.3.c3



Pages 43–54 of
A Comparative Grammar of the Early Germanic Languages
R.D. Fulk
[**Studies in Germanic Linguistics**, 3] 2018. xv, 420 pp.

CHAPTER 3

The Vowels of Proto-Indo-European and Proto-Germanic

3.1 The vowels of Proto-Indo-European

Vowel alternations in PIE are referred to as **ablaut** or vowel gradation, which may be qualitative or quantitative. The most fundamental alternation is the qualitative one between *e* and *o*, which may be observed in forms like Gk. *φέρω* 'bear' < **bher-* : *φορά* 'bearing' < **bhor-*. The *e*-grade of a root like **bher-* is to be regarded as the unmarked form or the dictionary form; sometimes the appearance of the *o*-grade alternant may appear to be related to the placement of the accent on a different syllable, as in the example given, though often no straightforward explanation is apparent, and doubt has been cast on the role of accent in this regard (see Szemerényi 1996: §6.3). As regards quantitative ablaut, *e*-grade and *o*-grade are both varieties of the full grade. In zero-grade the vowel disappears altogether, as with **-bhr-* in Gk. *ἐκφρέω* 'bring out'. When zero-grade causes a sonorant consonant (*l, r, n, m, i̯, u̯*) to appear between obstruents, or next to an obstruent at the beginning or end of a word, the sonorant must be syllabic (*l̥, r̥, n̥, m̥, i, u,* respectively), as in Old Irish *breth* 'bearing' < **bhr̥t-*. The difference between the nonsyllabic sonorant in **bhr-* and the syllabic one in **bhr̥t-* is thus purely phonotactic, and for this reason both are commonly referred to as examples of zero-grade. In certain instances, however, it is useful to have terminology to distinguish the two, and then the latter may be called the reduced grade; together, the zero and reduced grade are sometimes called the weak grade, as they are in this book.[1] Another quantitative alternation produces the lengthened grade, as in Gk. *φώρ* < **bhōr* 'thief', which may have either *e*- or *o*-quality (or *a*-quality, as explained below). Lengthened grade is frequently explicable on a phonological basis as compensatory lengthening, as in this instance, where the root vowel has been lengthened upon loss of final **-s* (see §1.6 n. 1). Frequently, however, the origin is obscure, as in Lat. *sēdēs* 'seat' (cf. OS *sittian* 'sit' < PGmc. **sit-j-ana*^{n} < PIE **sed-*).

Only in a circumscribed number of words does it appear necessary to reconstruct a PIE root vowel *a* rather than *e* or *o*. An example is **nas-*, as in Skt. *nás* 'nose', OIcel. *nes* 'headland' < **nasja-*, with a long ablaut alternant **nās-* in Lat. *nāris* 'nostril' and OE *nōse* 'promontory'. For evidence that *i* could be a phonemic vowel and not solely an allophone of *i̯*, see Mayrhofer in Kuryłowicz *et al*. 1986–2015: I, 160–1, 168.

In older reconstructions of PIE there is posited a vowel *ə*, called schwa (or schwa primum), reflected, where preserved, as *i* in Indo-Iranian and as *a* everywhere else (though it develops further to *o* in Slavic; about Greek see below).[2] The standard view now instead is that this represents a syllabic consonant referred to as a laryngeal consonant (though there is no consensus about its actual phonetic value), which may be represented as *H̥*, indicating, abstractly, any syllabic laryngeal consonant.[3] The grounds for regarding *ə* as a consonant were at first structural. For example, Saussure (1879)

observed that whereas a combination of vowel plus sonorant consonant in the full grade becomes a syllabic sonorant in weak grade (e.g. *o*-grade **pondh-* in Gk. perf. *πέπονθα* 'I have suffered' : weak-grade **pn̥dh-* in aorist *ἔπαθον*), a root with a long vowel where full grade should be expected produces *ə* in the weak grade (e.g. full-grade **-stā-* in Gk. *ἵστημι* 'stand' : weak-grade **stə-* in *στατός* 'positioned', Skt. *sthitá-*). Building on Saussure's discoveries, Möller (1911) observed that the vowel *ə* thus behaves the way a consonant does, and the vowel *ā* in **stā-* might thus better be analyzed as vowel plus *H* (hence **staH-*), a consonant to which he first applied the term 'laryngeal' (*laryngal*). It is particularly plain from Greek evidence that weak-grade *ə* corresponds to three different long vowels, *ē, ā,* and *ō*, in forms where a simple *e*-grade vowel should be expected to appear, as in the present indicative of verbs. If *H* can explain the length in these vowels, it can also be employed to explain the three different vowel qualities or 'colorations' if it is assumed that *H* actually represents three different consonants. The three are now commonly represented as h_1 (producing *e*-coloration), h_2 (*a*-coloration) and h_3 (*o*-coloration), though *H* may be retained to represent any of the three when the distinction is of no importance.[4] In Greek alone does a laryngeal perhaps retain its colorizing quality when syllabified, so that the three laryngeals are reflected as *α, ε,* and *o*, respectively, when they correspond to what used to be represented as *ə*.[5] Except when a laryngeal stood before a vowel, its loss resulted in the lengthening also of *i* and *u*, though without producing any coloration, as in Skt. *pīvan-* 'fat' < **piH-u̯on-* and OE *brū* 'brow' < **bhruH-*. Other syllabic sonorants might be lengthened, as well, as in Lat. *(g)nātus* 'born' < **ǵn̥tós* (cf. Go. *kunds*). When a laryngeal originally stood before a vowel, it might color the vowel, but its loss would not result in any lengthening of the vowel, as in **h₁es-ti* > Lat. *est* 'is', **h₂eǵ-* > Lat. *agō* 'do', and **h₃ekʷ-* > Gk. *ὄψομαι* 'I shall see'. Saussure's theory was dramatically confirmed by Kuryłowicz (1927) after Hittite was deciphered and discovered to preserve a consonantal reflex of h_2, and most likely of h_3, as well, as in **h₂ent-* in Hitt. *ḫant-s* 'forehead' (cf. Lat. *ante* 'in front') and **h₃erbh-* in Hitt. *ḫarapp-* 'become separated' (cf. Lat. *orbus* 'orphan'; *o* becomes *a* in Hittite). Regardless of the date at which Hittite branched off from the IE group (see §1.2), it is now generally assumed that the loss of laryngeal consonants was not a PIE phenomenon but took place independently in the daughter languages. Thus, technically, many long vowels formerly reconstructed for PIE must be assumed to have arisen in the post-PIE period, and long syllabic sonorant consonants should not be reconstructed for the protolanguage. No very consistent treatment has been adopted in the present book: long vowels of laryngeal origin and long syllabic resonants are frequently treated as if they arose in PIE, in the conviction that the older notation is not infrequently less opaque, and readers will recognize shorthand reconstructions for what they are. Long syllabic sonorants, for example, are included in the inventory of PIE vowels below.

In weak grade it should be expected that the vowel would disappear entirely between two obstruents, and this is very commonly the case, as with weak grade **-pt-* > in Lat. *neptis* 'granddaughter, niece' (cf. lengthened grade **-pōt-* in Lat. acc. sg. *nepōtem* 'grandson, nephew'). However, in many environments in which zero grade between two obstruents should be expected, instead a vowel appears, as in past participles, e.g. Gk. *πεπτός*, Lat. *coctus* 'cooked' from expected **pkʷ-tos* (cf. full grade in Gk. *πέττω*, Lat. *coquō* 'cook'). The unexpected vowel appears most commonly, but not consistently, in a morphological environment in which syllabicity can be explained as due to analogy:[6] in the given example, since reduced rather than zero grade is the norm in past participles (technically, verbal adjectives) of verb roots containing a sonorant consonant (as with

**k̂lu-* in Gk. *κλυτός* 'famous'; cf. full-grade **k̂leu̯-ō* > *klέ́ω* 'glorify'), presumably some variety of reduced vocalism was introduced analogically into the root of forms like **pkʷ-tos*. This reduced vowel is referred to as schwa secundum and is usually represented by a subscript *e*, or sometimes by *ь,* hence **pₑkʷ-tos* or **pьkʷ-tos*. The value of this sound is often thought to have been, at least originally, [ə], but these alternative representations of it came into use because at the time it was first posited, the graph ⟨ə⟩ was already in use to represent a syllabic laryngeal. The alternative representations are actually preferable for their abstractness, since it cannot be known whether the vowel, when introduced analogically, was not sometimes a full grade vowel from the start, or whether the analogical formations arose in PIE itself. It should be noted that quite a few scholars reject the idea of schwa secundum, e.g. Szemerényi (1996: §4.1.11).[7]

On the analysis presented here, originally there were no diphthongs in PIE, but once quantitative ablaut lost its phonological conditioning, except before a vowel, *i̯* and *u̯* would have combined with a preceding vowel to form diphthongs, hence *ai, ei, oi, au, eu, ou*. Long diphthongs also occurred rarely due to lengthening or contraction, and later by the loss of laryngeals. Again, long and short diphthongs are included in the inventory of PIE vocoids below to facilitate comparison among the daughter languages.

The following vocoids may thus be assumed to have been inherited by Germanic from PIE:

a, e, o, i, u, ḫ₁, ḫ₂, ḫ₃, ₑ
ā, ē, ō, ī, ū
n̥, m̥, r̥, l̥
n̄, m̄, r̄, l̄
ai, ei, oi, au, eu, ou
āi, ēi, ōi, āu, ēu, ōu

1. To call the syllabic and nonsyllabic sonorants both examples of zero grade is to treat the two sets as in allophonic variation with each other, which originally they were. When ablaut ceased to be phonologically conditioned, however, the distinction became phonemic.

2. On whether *ə* (i.e., *ḫ*) ever produces *u* in Germanic, see §5.5 *ad fin*.

3. For an enlightening account of laryngeal consonants, their traces in the IE languages, and various theoretical approaches to them, see Lindeman 1987.

4. The precise number of laryngeals posited for PIE varies, but the majority of scholars work with three.

5. It is perhaps likelier, though, that a syllabic laryngeal always develops to *α* in Greek, and the three short vowels are instead due to the analogical influence of the corresponding long vowels: so, e.g., Szemerényi 1996: §4.1.11. See Lindeman 1987: §§86–7 for discussion and references, and cf. Sihler 1995: 99–100.

6. In a form like **kʷtu̯r-* 'four' (as in Gk. *τράπεζα* '(four-footed) table'), the alternant **kʷₑtu̯or-* (as in Lat. *quattuor* 'four') perhaps arose in constructions in which the word followed a word-final consonant, creating an even more awkward consonant cluster. Hence, the assumption that schwa secundum had the value [ə] is not unreasonable.

7. One might prefer to think of ₑ as pure abstraction, representing processes of analogical restoration of vocalism in the IE branches, if not in the protolanguage itself. But since, for example, verbal adjectives like **pkʷ-tós*, without the schwa, are never attested as simplices (one might have expected the initial consonant cluster to have been simplified in that case), it really is necessary to assume some sort of vocoid in such forms in the protolanguage. That is all ₑ need be taken to represent, though differences among the daughter languages as to its reflex do raise the possibility of a sound distinct from any other in PIE.

3.2 The short vowels in early Germanic

In the stressed syllables of Proto-Germanic there occurred the unconditioned change of *o* to *a*, and of *H̥* to *a*. The short syllabic sonorant consonants of PIE, *n̥*, *m̥*, *r̥*, *l̥*, developed to PGmc. *un, um, ur, ul,* respectively. The fate of schwa secundum varies by environment: between obstruents (and, usually, between a resonant and an obstruent) it appears as a full-grade vowel *e*, whereas in front of an antevocalic resonant it develops to *u*, just as syllabic resonants develop to *u* plus resonant. On the standard view, the remaining short vowels retain their PIE values in Proto-Germanic except as the result of certain conditioned changes explained in §§4.1–4. Examples of the short vowels:

PIE *a*, Gmc. *a*: PIE **sal-* 'salt' > Gk. *ἅλς*, Lat. *sal*, Go. OIcel. OS *salt*, OHG *salz*; PIE **kan-* 'sing' > Lat. *canō*, Welsh *canu* 'sing', Go. OE OFris. *hana*, OHG OS *hano*, OIcel. *hani* 'cock' (cf. Gk. *ἠι-κάνος* 'cock'); PIE **dakru-* 'tear' > Gk. *δάκρυ*, Welsh *deigr*, Go. *tagr*, OHG *zahar*.

PIE *e*, Gmc. *e*: PIE **ḱel-* 'conceal' > Lat. *celō*, OIr. *celid*, OE OS OHG *helan*; PIE **medhu-* > Gk. *μέθυ* 'wine', Lith. *medùs* 'honey', OE *medu*, OFris. *mede*, OHG *metu* 'mead'; PIE **sekʷ-* > Gk. *ἕπομαι*, Lat. *sequor*, Lith. *sekù* 'follow', Go. *saihvan*, OS OHG *sehan* 'see'.

PIE *o* > Gmc. *a*:[1] PIE **ǵoǵh-* > Gk. *ὀχέω* 'lead, guide', OCS *voziti* 'drive, guide, lead', Go. *ga-wagjan* 'move, shake', also OE OS *wagian*, OHG *wagōn* 'move'; PIE **oḱtō(u)* 'eight' > Gk. *ὀκτώ*, Lat. *octō*, Go. *ahtáu*, OIcel. *átta*, OFris. *achta*, OS OHG *ahto*; PIE **bholǵh-* > OIr. *bolg* 'bag', OPruss. *balsinis* 'pillow', Go. *balgs* 'leather bag', OHG *balg* 'bag'.

PIE *i*, Gmc. *i*: PIE **pisk-* 'fish' > Lat. *piscis*, Go. *fisks,* OIcel. *fiskr*, OE OHG *fisc*; PIE **lipar-* > Gk. *λιπαρός* 'fat, greasy', OIcel. *lifr*, OE *lifer*, OFris. *livere* 'liver'; PIE **(h₃)migh-* > Gk. *ὀμίγλη* 'cloud', Lith. *miglà* 'fog', OIcel. *mistr*, OE *mist* 'mist' (Gmc. **mix-st-*).

PIE *u*, Gmc. *u*: PIE **dhubh-* > Gk. *τύφω* 'give off smoke', OIr. *dub* 'black', OIcel. *dupt* 'powder', OHG *tuft* 'fog'; PIE **dhur-* > Skt. (acc. pl.) *duráḥ*, Homeric Gk. *θύρᾱ*, OE *duru*, OHG *turi* 'door'; PIE **h₁rudh-* > Skt. *rudhirá-*, Gk. *ἐρυθρός* 'red', Lat. *rubor* 'redness, blush', OE *rudu* 'redness, ruddy complexion'.

PIE *l̥₁* > Gmc. *a*: PIE full-grade **bheh₁-* > **bhē-* in OHG *bāen*, *bājan* 'warm with covers, bake bread', reduced-grade **bhl̥₁-* in OIcel. *bað* 'steam bath' OS *bath*, OHG *bad* 'bath', OE *bacan* 'bake'; PIE full-grade **dheh₁-* > **dhē-* in Skt. *dhāya-* 'nourishing, nursing', Gk. *θήνιον* 'milk', Lat. *fēmina* 'woman', reduced-grade **dhl̥₁-* in Go. *daddjan* (< **dajjan*) 'suckle'; PIE full-grade **ǵhleh₁-* > **ǵhlē-* in OIcel. *glámr* 'moon', *glær* 'bright', reduced-grade **ǵhll̥₁-* in OIcel. *glan* 'radiance'.

PIE *l̥₂* > Gmc. *a*: PIE full-grade **steh₂-* > **stā-* in Lat. *stāre*, OS OHG *stān* 'stand', reduced-grade **stl̥₂-* in Skt. *sthita-*, Lat. *status*, Gk. *στατός* 'standing, placed', Go. *staþs*, OIcel. *staðr*, OHG *stat* 'place'; PIE full-grade **ḱeh₂d-* > **kād-* in Avestan *sādra-* 'affliction', Gk. *κῆδος* 'sorrow', reduced-grade **ḱl̥₂d-* in Go. *hatis*, OIcel. *hatr*, OHG *haz* 'hate'; PIE full-grade **deh₂p-* > **dāp-* in Skt. *dāpayati* 'divides', reduced-grade **dl̥₂p-* in Gk. *δαπανάω* 'consume', OIcel. *tafn* (**dap-no-*) 'sacrificial animal, sacrificial meal'.

PIE *l̥₃* > Gmc. *a*: PIE full-grade **dheh₃-* > **dhō-* in Skt. *dhā́rā* 'cutting edge, sharpness, blade', reduced-grade **dhl̥₃-* in Gk. *θοός* (< **dhl̥₃-ɥos*), OE *daroð* 'spear', *daru* 'injury'; PIE full-grade **ghreh₃-* > **ghrō-* in OIcel. *gróa*, OE *grōwan* 'grow', reduced-grade *ghrl̥₃-* in Go. OIcel. OS OHG *gras* 'grass'; PIE full-grade **Heh₃g-* > **ōg-*

in Lith. *úoga* ‘berry’, reduced-grade **Hl̥₃g-* in Go. *akran*, OIcel. *akarn*, MHG *ackeran* ‘fruit, acorn’.

PIE *e* (schwa secundum) gives Gmc. *u* before *r, l, n,* or *m* (which must be antevocalic, as otherwise there would be no schwa secundum, but *r̥*, *l̥*, *m̥*, *n̥*), otherwise a full-grade vowel, usually *e*: PIE **gʷem-o-* > OE *cuman* ‘come’ (cf. full grade in Skt. *gámati* ‘goes’, zero grade after a vowel in Avestan *frā-ɣmaṭ* ‘comes forth’); PIE **k̂el-* > Gk. *καλιά* ‘cottage’, Go. *hulundi* ‘cave’ (*k̂el-n̥tī*; cf. OE OS OHG *helan* ‘conceal’, with full grade); PIE **sed-* > Skt. *sattá-*, Lat. *sessus*, OIcel. *setinn*, OE *seten*, OS *gi-setan*, OHG *gi-sezzan* ‘having sat’; possibly PIE **legh-* > OIcel. *leginn*, OE *legen* ‘lain’ (cf. Gk. *λόχος* ‘lair’ < **logh-os*); compare also PIE **pl̥hu-* ‘many’ > **pelu-* > Skt. *purú-* (and probably Gk. *πολύς*: so Pokorny 1959–69: I, 800, cf. Bremmer 2005: 32–3), OFris. *fule, fula*.

PIE *n̥* > PGmc. *un*: PIE **bhn̥dh-* in Skt. *baddháḥ* ‘bound’ (full grade in *bándhuḥ* ‘relation’), Go. *bundans* ‘bound’; PIE **hₓdn̥t-* in Skt. gen. sg. *datá-ḥ*, Lat. gs. *dent-is* ‘tooth’, Go. nom. sg. **tunþus* ‘tooth’; PIE **n̥-* privative prefix in Skt. *a-*, Gk. *ἀ-*, Lat. *in-* < *en-*, PGmc. **un-*; PIE **kn̥k-* in Skt. *kákatē* ‘thirsts’, ON *hungr* ‘hunger’.

PIE *m̥* > PGmc. *um*: PIE **gʷm̥-t-is-* in Skt. *gáti-ḥ* ‘movement’, Go. *ga-qumþs* ‘assembly’; PIE *h₂m̥bhí(-)* in Skt. *abhí-taḥ* ‘to both sides’, OHG OS *umbi*, OIcel. *umb*, OE *ymb(e)*; PIE **k̂m̥tóm* ‘hundred’ (from **dk̂m̥-dk̂óm*) in Gk. *ἑ-κατόν*, Lat. *centum*, Go. OE *hund*.

PIE *r̥* > PGmc. *ur*: PIE **bhr̥ĝh-* in Czech *brh* ‘cave’, OE pret. pl. *burgon* ‘save’; PIE **tr̥n-* in Skt. *tr̥ṇam* ‘blade of grass’, Go. *þaúrnus* ‘thorn’; PIE **gr̥bh-* in Gk. *γράφω* ‘write’, OE *cyrf* ‘slice’ < **kurƀ-iz*; PIE **tr̥s-* in Skt. *tr̥ṣyati* ‘thirsts’, OE *þurst*, OHG *durst* ‘thirst’.

PIE *l̥* > PGmc. *ul*: PIE **ml̥d-* in Skt. *mr̥dnāti* ‘crushes’, Lat. *mollis* ‘soft, weak’, OE pret. pl. *multon* ‘melt’; PIE **u̯l̥kʷ-* ‘wolf’ in Skt. *vr̥kaḥ*, Lat. *lupus*, Go. *wulfs*; PIE **kl̥t-* ‘incline’ in Lat. *aus-cultō* ‘hear attentively’ (< **‘incline the ear’), Go. *hulþs*, OIcel. *hollr*, OHG OS OE *hold* ‘gracious, loyal’.

1. This change had not yet taken place when words from Celtic were borrowed into Gmc. on the Continent, e.g. *Volcae* > OE *Wealh-*, OHG *Walha* (ethnic name). In loans from Latin, however, *o* remains, as in OE *scolu* ‘host’ < Lat. *schola*. See Hirt 1931–4: I, §29.

3.3 The long vowels in early Germanic

In the stressed syllables of Proto-Germanic there occurred the unconditioned change of PIE *ā* to *ō*. Otherwise, the long vowels reconstructed for PGmc. (including the long vowels that developed from short vowels plus laryngeal consonants, §3.1) are the same as those reconstructed for PIE, though with some qualitative alterations noted below. The long syllabic sonorant consonants, lengthened chiefly by the loss of laryngeal consonants in the daughter languages (i.e., sonorant plus *H*, producing a long sonorant), developed in Gmc. the same way as the short, perhaps simply by loss of the laryngeal without compensatory lengthening. Examples of the long vowels:

PIE *ā* > Gmc. *ō*: PIE **bhāgós* ‘beech’ > Lat. *fāgus*, Gk. *φηγός* (Doric *φᾱγός*), OIcel. *bók*, OE *bōc*; PIE **mātēr*, **māter-* ‘mother’ > Skt. *mātár-*, Gk. *μήτηρ*, Lat. *māter*, OIcel. *móðir*, OE *mōdor*, OFris. OS *mōdar*, OHG *muoter*; PIE **kāp-* in Gk. *κῆπος* (Doric *κᾶπος*) ‘garden’, OHG *huoba*, OS *hōƀa* ‘piece of land’; PIE **pā-* in Lat. *pascō* ‘feed’ (cf. Oscan *paastores*), OIr. *ás* ‘growth’, Go. *fōdjan*, ‘feed’, OIcel. *fóðr*, OE *fōðor*, *fōd(d)or*, OHG *fuotar* ‘food, fodder’.

PIE *ē*, PGmc. *ē* (i.e., *ē*$_1$, which yields NWGmc. *ǣ* or *ā* (§4.6)):[1] PIE **bhlē-* in Gk. *φλήναφος* 'idle talk', Go. *uf-blēsan* 'puff up', OIcel. *blása*, OHG *blāsan* 'blow'; PIE **dhē-* in Gk. *ἔ-θηκα* 'I placed', Lat. *fēcī* 'I did', Go. *ga-dēþs*, OIcel. *dáð*, OHG *tāt* 'deed'; PIE **ĝhē-* in Homeric Gk. *κι-χήμεναι* (inf.) 'come to', Lat. *hērēs* 'heir', OE OS OHG *gān*, Crimean Go. *geen* 'go'; PIE **mē-* in Gk. *μῆτις* 'discernment', Lat. *mētior* 'measure', Go. *mēl*, OIcel. *mál*, OHG *māl* 'time'.

PIE *ō*, Gmc. *ō*: PIE **bhlō-* in Lat. *flōreō* 'bloom', OE *blōwan*, OS *blōjan*, OHG *bluojen, bluowen* 'bloom'; PIE **du̯ō(-)* 'two' in Skt. *dvá́*, Homeric Gk. *δύω*, Go. *twōs* (fem.); PIE **dhō-* 'put' in Gk. *θωμός* 'heap', Lat. *ab-dōmen* 'abdomen' (*'part put in hiding'), Go. *dōms* 'discernment', OIcel. *dómr*, OE OFris. OS *dōm*, OHG *tuom* 'judgment'; PIE *ĝnō-* in Gk. *γνωτός* 'kinsman', Middle Welsh *gnawd* 'relative', Go. **knōþs* (dat. *knōdái*) 'tribe, extraction', OHG *knōt, knuot* 'extraction', OE *cnōsl* 'family, kin'.

PIE *ī*, Gmc. *ī*: PIE **dī-t-* in Armenian *ti* 'age', OIcel. *tíð*, OE OS *tīd*, OHG *zīt* 'time'; PIE **līg-* in Lith. *lýg, lýgus* 'like', Go. *ga-leiks*, OIcel. *(g)líkr*, OE *ge-līc*, OS *gi-līk*, OHG *gi-līh* 'like'; PIE **stī-* in Lith. *styrstù, stỹrti* 'stiffen', Icelandic *stírur* 'stiffness in the eyes upon waking', East Fris. *stīr* 'stiff', NHG *stier* 'fixed'; PIE **su̯ī-* in Gk. *σῑγή* 'silence', OE *swīgian*, OHG *swīgēn* 'be silent'.

PIE *ū*, Gmc. *ū*: PIE **bhuh$_2$-* >**bhū-* in Skt. *ábhūt* = Gk. *ἔφῡ* 'was', OIcel. *búa*, OE *būan* 'reside' (but cf. §3.4 n. 5); PIE **bhrū-* 'brow' in Skt. *bhrúḥ*, Gr. *ὀφρῦς*, OIcel. *brún*, OE *brū*; PIE **bhrūg-* in Lat. *frūctus* 'enjoyment', Go. *brūkjan*, OE *brūcan*, OS *brūkan*, OHG *brūhhan* 'enjoy'; PIE **ghrū-* in Lith. *grū́dau*, *grū́džiu* 'pound, crush (grain)', OE *grūt* 'groats', MHG *grūz* 'grit, cereal grains'; PIE **mūs* 'mouse' > Skt. *mū́ṣ-*, Gk. *μῦς*, Lat. *mūs*, OIcel. *mús*, OE OS OHG *mūs*.

PIE *n̥̄* (yielding Skt. *ā*, Gk. *νᾱ* Lat. *nā*) > PGmc. *un*: PIE **ĝn̥̄h$_3$-tó-s* > **ĝn̥̄tós* 'known' in Lith. *pa-žìntas*, Go. *kunþs*, OHG *kund*, OE *cūþ*; PIE **ĝn̥̄h$_2$-tó-s* > **ĝn̥̄tós* in Skt. *jātáḥ*, Lat. *nātus* < *gnātus* 'born', OE *heofon-cund* 'celestial', OIcel. *ás-kunnr* 'related to the gods'.

PIE *m̥̄* > Gmc. *um*: PIE **dhm̥̄h$_1$-* > **dhm̥̄-* in Skt. *dhmā-táḥ* 'blown' (beside *dhami-táḥ* < **dh$_e$mh$_1$-tós*), OIcel. *dý* 'quagmire' < PGmc. **dumxjan* < PIE **dhm̥̄h$_1$kio̯n*, likewise in NHG *dumpf* 'dull'; also, to PIE **gleh$_1$bh-* ~ **glh$_1$bh-* in Lith. *glėbiu*, *glėbti* 'embrace' beside *glabóti* 'preserve', cf. nasalized **glm̥̄h$_1$bh-* > **glm̥̄bh-* in OE pret. pl. *clumbon* 'climb'.

PIE *r̥̄* (yielding Skt. *īr* or *ūr*, Gk. *ρω*, Lat. *rā*) > PGmc. *ur*: PIE **ĝr̥̄h$_1$n-* > **ĝr̥̄n-* in Skt. *jūrṇa-ḥ*, *jīrna-ḥ* 'brittle', Lat. *grānum*, Go. *kaúrn*, OIcel. OHG *korn* 'grain' (PGmc. **kurna^n*).

PIE *l̥̄* (yielding Skt. *īr* or *ūr*, Gk. *λω*, Lat. *lā*) > Gmc. *ul*: PIE **h$_2$u̯l̥̄h$_2$-n-eh$_2$* > **wl̥̄nā* 'wool' in Skt. *ū́rṇā*, Lat. *lāna* (< **wlānā*), Go. *wulla*; PIE **pl̥̄h$_1$-nó-* > **pl̥̄nó-* in Skt. *pūrṇa-*, Lat. *plēnus*, OIr. *lán*, Lith. *pìlnas*, Go. *fulls* (< **fuln-*) 'full'; PIE **dl̥̄h$_2$ghó-* > **dl̥̄ghó-* in Skt. *dīrghá-* 'long', Go. *tulgus* 'fast, firm' (< *'long, lasting'), OS *tulgo* 'very', OE *tulge* 'firmly'; PIE **ml̥̄h$_3$dh-* > **ml̥̄dh-* in Skt. *mūrdhán-* 'head', Gk. *βλωθρός* 'high-growing (of trees)' (< **μλωθρός*), OE *molda* 'top of the head' (< **muldō*).

On the basis of early borrowings from Latin it can be determined that PGmc. *ē* and *ō* were open vowels, i.e. /ɛː/ and /ɔː/ (if not /æː/ and /ɒː/), not /eː/ and /oː/, e.g. OE *clīroc* 'cleric' (Lat. *clēricus*) and Go. *Rūmōneis* 'Romans' (Lat. *Rōmāni*), showing that Latin mid vowels were borrowed as high vowels. The latter form also shows that Lat. *ā* was borrowed as *ō* (and cf. OHG *Tuonouwa* 'Danube', from Celtic **Dānovios*), or that PIE *ā* had not yet developed to PGmc. *ō* at the time of borrowing.[2] Presumably, then, after the latter change Latin *ā* could be borrowed as an unrounded vowel, as in OE *næp*

'turnip' (Lat. *nāpus*) and *mǣg(wlite)* 'image' (Lat. *imāgō*; cf. *ā* in later OE borrowings, e.g. *pāl* 'pole', from Lat. *pālus*).[3] The rise of *ē₂* (/eː/, §3.5) thus filled a gap in the PGmc. vowel inventory, though it also produced an asymmetry, with no corresponding back vowel /oː/.

1. This vowel is sometimes reconstructed as PGmc. *ǣ* (though for some this is merely a notational convention, and it is assumed to represent the PIE sound unchanged, e.g. Wright 1954: §43), although this requires that it revert to *ē* in Gothic, where in fact it appears to have been a close rather than an open sound (see Braune 2004b: §6 & Anm. 1). It may nonetheless have been an open *ē* in PGmc., i.e. [ɛː]: see Bremer 1886: 5–6. It is commonly represented as *ē₁*, to distinguish it from the vowel discussed in §3.5 (*ē₂*).

2. The latter is the view of Polomé (1987b: 200, *idem* 1994: 6–7), who would thus date the change of *ā* to *ō* after Germanic peoples reached the upper Danube in the second century BCE. *Silva Bācenis* in Caesar may also be relevant.

3. See Kluge 1913: §§14–16, Antonsen 1975: 3–4.

3.4 The diphthongs in early Germanic

Out of PIE combinations of tautosyllabic vowel plus glide (*i̯* or *u̯*) there developed diphthongs in the IE languages, including Germanic, and perhaps already in late PIE. Most of the changes affecting these diphthongs in PGmc. are paralleled by the regular changes in simple vowels, so that *oi̯* and *ou̯* become *ai* and *au*, respectively, as do *H̥i̯* and *H̥u̯*: compare the development of *o* and *H̥* to *a* (§3.2). In addition, PGmc. *ei* developed to *ī*, on which see §4.4 & n. 4. With the possible exception of *ēi* from PIE *ēi̯*, as well as *ōu* from PIE *ōu̯* (but not from *āu̯*), the long diphthongs were shortened in Proto-Germanic and then underwent the same developments as the originally short diphthongs. Although undeniable examples are few, PGmc. *ēi*, on the other hand, is commonly assumed to have lost its off-glide, producing a sound conventionally represented as *ē₂*, on which see §3.5. If that is the case, in parallel fashion, PIE *ōu̯* likewise developed to PGmc. *ō* rather than *au*, though this view is less widely credited.[1] The development of PIE *ōi̯* in Gmc. stressed syllables cannot be determined conclusively, but system symmetry suggests that it should have become Gmc. *ai*.[2] Examples:

PIE *ai̯* > PGmc. *ai* (giving OIcel. OHG *ei*, OS *ē*, OE *ā*, PDE *o*): PIE **h₂ei̯gʰ-* > **aigʰ-* in Gk. *αἶσχος* 'disgrace' (< **aigʰ-s-kos*), Go. *áiwiski*, OE *ǣwisc* 'disgrace'; PIE **ghai̯do-* in Lat. *haedus* 'kid, young goat', Go. *gáits*, OIcel. *geit*, OHG *geiz*, OS *gēt*, OE *gāt* 'goat'.

PIE *au̯* > PGmc. *au* (giving OE *ēa*): PIE **sau̯s-* in Skt. *śoṣa-* (assimilated from *soṣa-*) 'dessication', Homeric Gk. *αὗος* 'dry', OE *sēar* > PDE *sere*; PIE **kau̯nos* in Latvian *kàuns* 'disgrace', Go. *háuns*, OE *hēan* 'abject'; PIE **(h₂)mau̯r-* in Gk. *(ἀ)μαυρόω* 'darken, obscure', OIcel. *meyrr* 'rotten'.

PIE *ei̯* > PGmc. *ī*: PIE **steigh-* in Gk. *στείχω* 'walk, go', Go. *steigan*, OIcel. *stíga*, OHG OS OE *stīgan* 'climb'; PIE **leikʷ-* in Gk. *λείπω* 'leave', Go. *leihʋan*, OHG OS *līhan* 'lend'.

PIE *eu̯* > PGmc. *eu* (giving Go. *iu*, OIcel. *jó*, OHG OS *io* OE *ēo*), except before *i* or *j* in the next syllable (§4.4): PIE **bheu̯dh-* in Gk. *πεύθομαι* 'enquire', Skt. *bṓdhati* 'is awake, learns', Go. *ana-biudan* 'order', OIcel. *bjóða*, OHG *biotan*, OS *biodan*, OE *bēodan* 'offer'; PIE **ĝeu̯s-* in Gk. *γεύω* 'give a taste of', Go. *kiusan*, OIcel. *kjósa*, OHG OS *kiosan*, OE *cēosan* 'choose'.

PIE *oi̯* > PGmc. *ai* (giving OIcel. OHG *ei*, OS *ē*, OE *ā*): PIE **u̯oi̯de* 'knows' > Skt. *véda*, Gk. *οἶδε*, Go. *wáit*, OIcel. *veit*, OHG *weiz*, OS *wēt*, OE *wāt*; PIE **oi̯nos* 'one' > Old Lat. *oinos* (> Lat. *ūnus*), Go. *áins*, OIcel. *einn*, OHG *ein*, OS *ēn*, OE *ān*.

PIE *ou̯* (giving Lat. *ū*) > PGmc. *au* (giving OHG OS *ō*, OE *ēa*): PIE **h₁rou̯dhos* 'red' > Lat. *rūfus*, Go. *ráuþs*, OIcel. *rauðr*, OHG *rōt*, OS *rōd*, OE *rēad*; PIE **rou̯p-* in Skt. *rōpayati* 'produces pain, breaks off', Lith. pl. *raupaĩ* 'measles, pockmarks', Serbian *rȕpa* 'hole', OIcel. *rauf* 'hole'.

PIE *H̥i̯* > PGmc. *ai* (giving OIcel. OHG *ei*, OS *ē*, OE *ā*, PDE *o*): PIE **ĥ̥₁-i̯-n-* > **ĥain-* in Avestan *saēni-* 'point', OIcel. *hein* 'whetstone', PDE *hone* (< OE *hān* 'stone'; full-grade **ĥoh₁-* > **ĥō-* in Skt. *śāṇaḥ* 'whetstone' = Gk. *κῶνος* 'cylinder, pine cone'); PIE **kh₁i̯d-* > **kaid-* in Go. *háitan*, OIcel. *heita*, OHG *heizan*, OS *hētan*, OE *hātan* 'command' (aorist present: §12.18).

PIE *H̥u̯* > PGmc. *au* (giving OE *ēa*): PIE **bhlh̥₁u̯-* > **bhlau-* in Gk. *φλαῦρος*, *φαῦλος* (both dissimilated from **φλαῦλος*) 'worthless, poor, common', Go. *bláuþjan* 'make void', OIcel. *blauðr* 'weak, cowardly', OE *blēað* 'timid' (cf. PIE full-grade **bhleh₁u̯-* > **bhlēw-* in OE *un-blēoh* 'fearless'); PIE **bhh̥₂u̯-d-* > **bhaud-* in OE pp. *bēaten* 'beaten' (cf. full-grade PIE **bheh₂u̯d-* > **bhāud-* in inf. *bēatan*).[3]

PIE *āi̯* > PGmc. *ai* (giving OHG *ei*, OS *ē*, OFris. *ā*/*ē*, OE *ā*): PIE **deh₂i̯u̯ers* > **dāi̯u̯ēr* 'brother-in-law' in Skt. *dēvár-*, Lat. *lēvir* (with Sabine *l-*), OHG *zeihhur*, OE *tācor* (with intrusive Gmc. *k*: see Fulk 1993: 341–2 for a possible explanation); PIE **seh₂i̯-* > **sāi-* (or perhaps weak-grade **sai-*) in Go *sáir*, OHG OS OFris. *sēr* (with OHG *ei* > *ē* before *r*, §4.17), OE *sār* 'pain'; PIE **keh₂i̯-* > **kāi-* in Skt. *kētú-* 'optical phenomenon', Go. *háidus* 'manner', OHG *heit*, OE *hād* 'form'.

PIE *āu̯* > PGmc. *au* (giving OHG *ō*, OE *ēa*): PIE **keh₂u̯-* > **kāu-* in Lith. *káuju*, *kóviau*, *káuti* 'strike', with Verschärfung (§6.10) in OIcel. *hǫggva*, OHG *houwan*, OE *hēawan* (PDE *hew*); PIE **keh₂u̯lā* > **kāu̯lā* in Gk. *κήλη* 'rupture, hernia' (cf. *βουβωνο-κήλη* 'hydrocele'), OIcel. *haull*, OE *hēala*, OHG *hōla* 'hydrocele'; PIE **leh₂u̯-* > **lāu̯-* in Skt. *lṓtam*, *lṓtram* 'spoils', Doric Gk. *λᾱίᾱ*, Ionic *ληΐη* 'spoils', Go. *láun*, OIcel. np. *laun*, OHG *lōn*, OE *lēan* 'recompense'; PIE **neh₂u̯-s-* > **nāu̯s-* in Skt. *nā́uḥ*, Homeric Gk. *νηῦς* 'ship', OIcel. *naust* 'boat-shed'.

PIE *ēi̯* > PGmc. *ē₂* (giving OHG *ia*, *ie*, *ea*): The following examples are insecure (see §3.5): PIE lengthened-grade **ĥēi-r-* in Go. OS OE *hēr*, OIcel. *hér*, OHG *hiar* (cf. PIE reduced grade **ĥi-* in Lat. *cis* 'on this side of', Go. *hidrē*, OE *hider* > PDE *hither*);[4] PIE lengthened-grade **u̯ēi̯-l-* in OIcel. *vél* 'artifice', OE *Wēlund*, OHG *Wialant* (name of a mythological craftsman; cf. full-grade PIE **u̯ei̯-l-* in OE *wīl* > PDE *wile*); PIE lengthened grade **stēigh-* > PGmc. *stē₂ʒ-* in OHG *stiaga* > NHG *Stiege* 'stair' (cf. PIE full-grade **steigh-* > PGmc. **stīʒ-* in Go. *steigan* 'climb', as above).

PIE *ēu̯* > PGmc. *eu*: PIE **bhleh₁u̯-* > **bhlēu̯-* in OE *un-blēoh* 'fearless' (as above); PIE **(h₁)eh₁u̯dh-* > **ēu̯dh-* in OIcel. *júgr* 'udder' (cf. reduced grade in Skt. *ū́dhar* 'udder'); PIE **ghreh₁u̯-no-* > **ghrēu̯-no-* in OIcel. *grjón* 'groats' (cf. reduced-grade PIE **ghrh̥₁u̯-* > **ghrau̯-* in Gk. *χράω* 'scratch, graze, wound slightly'); PIE **ĝheh₁u̯-m-* > **ĝhēu̯m-* in OHG *giumo* (beside *guomo*: see below under PIE *ōu̯*) 'palate'.

PIE *ōi̯*: No indisputable example in a Gmc. stressed syllable is in evidence.

PIE *ōu̯* > PGmc. *ō*:[5] PIE **ĝhohu̯-m-* > **ʒōum-* in OE *gōma* 'inside of mouth', OHG *guomo* 'palate' (cf. reduced grade in Gk. *χαυλι-όδοντ-* 'with projecting teeth'); PIE **gʷohu̯dh-* > **gʷōu̯dh-* in MHG *kōt* (beside *quāt*, *kāt*), NHG *Kot* 'excrement' (cf. reduced-grade PIE **gʷh̥u̯dh-* > **gʷaudh-* in OE *cwēad*, OFris. *quād* 'dung').

On the shortening of PIE long vowels before a sonorant consonant in a closed syllable (another possible diphthongal shortening), see §4.2.

1. OIcel. neuter nom./acc. *tvau* 'two' has often been thought equivalent to Skt. *dvắu*, thus indicating development of PIE *ōu* to Gmc. *au* rather than *ō* (so, e.g., Prokosch 1939: 104); but the connection is doubtful: see Brugmann & Delbrück 1897–1916: II, 2.10.

2. The usual example of PIE *ōi* > Gmc. *ai* is OIcel. *fleiri* 'more', compared to Lat. *plūs* 'more' < **plōis*, in comparison to Old Lat. superl. *ploerume* (so, e.g., Hirt 1931–4: I, 35). But Lat. *plūs* is to be derived instead from Old Lat. *plous*, and superl. *ploerume* is more likely of analogical origin: see Pokorny (1959–69: I, 800), who more plausibly reconstructs reduced-grade **plh̥₁-i̯s-* (not his notation) underlying *fleiri* (since PGmc. *ai* > OIcel. *ei*). Aside from the Latin forms, there is no evidence for *o*-vocalism among the IE cognates.

3. This is on the assumption that there should be full grade in the infinitive and reduced grade in the past participle, as in other verb classes. But an aorist present is possible: cf. Go. *háitan*, above.

4. Cf. Ringe 1984, deriving PGmc. **xēr* from a lengthened form of **xir* (cf. Go. *hiri* 'come here!').

5. A special development of PGmc. **-ōww-* is usually assumed, chiefly to account for OIcel. *búa* 'dwell' (cf. *byggja* 'settle', with *j*-suffix) and Gmc. cognates: see, e.g., Seebold 1970: 124–8.

3.5 The sources of $\bar{e}_2$

In addition to the reflex of PIE **ē* (represented as $\bar{e}_1$), there arose within Gmc. another *ē* sound, generally referred to as $\bar{e}_2$, which develops to *ea*, *ia*, *ie* in OHG.[1] In Gothic it occurs only in *hēr* 'here', *fēra* 'region, side' (= OHG *fiara*), *mēsa* 'table', and *Krēks* 'Greek', of which the second is etymologically obscure and the last two borrowings from Late Latin. This $\bar{e}_2$ fell together with PIE *ē* in Gothic but not in the other Gmc. languages, where it remained as *ē* (> OHG *ia*, etc.), as opposed to NGmc. *ā*, WGmc. *ǣ* or *ā* (§4.6) < PIE *ē*, as in Go. OE OS *hēr*, OIcel. *hér*, OHG *hēr*, *hear*, *hiar*, *hier* 'here',[2] with $\bar{e}_2$, as opposed to $\bar{e}_1$ in Go. *lētan*, OIcel. *láta*, OE *lǣtan*, OS *lātan*, OHG *lāzan* 'let'. The literature on $\bar{e}_2$ is extensive, and often speculative.[3] Although attempts have been made to identify a unitary source, it appears that $\bar{e}_2$ must be regarded as the product of polygenesis:[4]

(a) Jellinek (1891b) was the first to derive $\bar{e}_2$ from PIE **ēi* (or **eHi̯* in laryngeal terms: see §3.1). Reliable examples are scarce, e.g. OHG *stiaga* 'stair' < PIE **stēi̯ghā*, and OE *cēn*, OHG *kien-* 'torch' < PIE **ĝēi̯-n-*. Especially because unambiguous examples of $\bar{e}_2$ from PIE *ēi* are few, it seems suspicious that so little of the evidence is to be found outside of OHG.

(b) $\bar{e}_2$ occurs in Latin borrowings, especially into OHG, after the earliest period of borrowing (Polomé 1988: 385–6), as in Lat. *thēca* 'cover' borrowed as OHG *ziahha* 'pillow case'; Lat. *prēsbyter* borrowed as OHG *priester* 'priest'; Lat. *bēta* 'beet' borrowed as OE *bēte*, OHG *biaza*; Lat. *Graecus* borrowed as Go. *Krēks*, OE pl. *Crēcas* 'Greeks'.

(c) The commonest environment for $\bar{e}_2$ is in the preterite of formerly reduplicating verbs in North and West Germanic, as in OIcel. *hét*, OHG *hiaz*, OE OS *hēt* 'was called' and OIcel. *lét*, OHG *liaz*, OE OS *lēt* 'let'. Although there is considerable controversy regarding the origin of the preterite vocalism in such verbs (see §12.20), most observers regard it in one way or another as the product of the contraction of the reduplicative vowel /e/ with the root vowel of the verb. For explanations involving laryngeal consonants, see Lehmann 1952: 66–73,

Connolly 1979, 1999, and cf. Polomé 1988: 384–401, Voyles 1989b, 1999, Müller 2007: 159.

(d) Miscellaneous sources of $\bar{e}_2$ include lengthening and lowering of *i* upon loss of a following anteconsonantal *z* (a sound that arose in PIE in those rare instances in which *s* came to stand before a voiced stop), the securest example being OE *mēd*, OS *mēda*, OHG *miata* 'reward' beside Go. *mizdō*, OE *meord* 'reward' < PIE **mizdhó-* in Gk. *μισθός* 'wages', OCS *mьzda*, 'reward', Skt. *mīḍhá-* 'prize'. If the OHG demonstrative *dē*, *die* corresponds to Go. *þái* (see §8.10), *ai* may be supposed to have developed to $\bar{e}_2$ in NWGmc. unstressed syllables and then to have been extended to stressed forms of the demonstrative (so Karstien 1921: 53).

(e) Influential has been the hypothesis of van Coetsem (1956, 1970: 55–8, 1997) that at least some instances of $\bar{e}_2$ are to be derived from PIE $e\underline{i}$ before a low vowel in the next syllable. This could account for alternations like OHG *stiaga* 'path' ~ *stīgan* 'ascend'. See also Knapp 1974, van Loon 1986.

1. To explain how the two *ē*-sounds failed to coalesce it is sometimes assumed that PIE $\bar{e}$ became PGmc. $\bar{æ}$. This is also a step in the direction of $\bar{a}$, the NGmc. and, in part, WGmc. reflex of PIE $\bar{e}$, but this assumption requires that $\bar{æ}$ have reverted to $\bar{e}$ in Gothic, and at all events there are other possible values for the PGmc. reflex of PIE $\bar{e}$. The representation $\bar{e}_1$ is preferred here for its relative abstractness. See §3.3 n. 2.

2. There also occur OS OFris. *hīr*. The derivation of this word is disputed. It is plainly related to Lat. *cis* 'on this side', but $\bar{e}_2$ has been derived from **ēi* (Jellinek: see below) and by lengthening and lowering of *i* (Ringe 1984). The latter explanation seems more probable in view of parallel forms, e.g. Go. *þar* 'there', *hvar* 'where?'. For references, see Orel 2003: 172, and cf. Jörundur Hilmarsson 1991. For further possible sources, see Hirt 1931–4: I §29.4.

3. In addition to works devoted specifically to the development of the reduplicated preterites in NWGmc. (references in §12.20), see Sievers 1892: 238–57, Holthausen 1891, van Helten 1896: 438–45, *idem* 1908, Lehmann 1952: 66–73, Grønvik 1998b: 91–5.

4. See esp. Polomé 1988: 384–401; van Coetsem 1997; Kortlandt 2006a; for the earlier literature, see Streitberg 1896: §79, Hirt 1931–4: I, §29.4.

3.6 Ablaut in Proto-Germanic

Whereas PIE ablaut alternations (§3.1) were not extensively maintained in most IE languages, ablaut came to play an important grammatical role in Gmc., where it differentiates the stems used to form the principal parts of strong verbs, and thus it serves as an indicator of tense and/or number, or participial function. Unsurprisingly, then, ablaut alternations are most plainly observable in strong verbs: see §12.11 for an overview of the relevant alternations in this grammatical category. Ablaut alternations are evident, however, in other grammatical contexts, as well. One fairly regular correspondence is between strong verb stems with PIE *e* and derivatives, either verbal or nominal, with PIE *o*. Weak verbs of class 1 provide many examples, e.g. Go. strong *ga-nisan* 'be saved' beside weak *nasjan* 'save', strong *sigqan* 'sink' (intrans.) beside weak *sagqjan* (trans.), strong *af-leiþan* 'depart' beside OE weak *lǣdan* 'lead' < **laiðjan* < **laiþjána*^{n}. Similarly, beside strong verb stems with *e*-grade there occur fem. abstract nouns with *o*-grade, e.g. Go. *bi-leiban* 'remain' beside *láiba* 'remnant', OE *stelan* 'steal' beside *stalu* 'theft', OIcel. *ríða* 'ride' < **rīðana*^{n} beside *reið* 'course' < **raiðō*. Strong verb stems with *e*-grade often have *i*-stem derivatives with weak grade, e.g. Go. *qiman* 'come' beside *qums* 'advent', OE *strīcan* 'stroke' beside Go. *striks* 'stroke', OE *brecan* 'break'

beside *bryce* 'breach' < **brukiz*.[1] Many less regular alternations are also discoverable, e.g. Go. *liufs* 'dear' < **leuƀ-* : *ga-láubjan* 'believe' (*o*-grade) : *lubō* 'love' (weak grade); Go. *bindan* 'bind' : *bandi* 'band' : *ga-bundi* 'bond'; OIcel. *bera* 'bear' : *barn* 'child' : *burðr* 'birth'; OE *setl* 'seat' : *ge-sæt* 'act of sitting' < **-sata*^{n} : *nest* 'nest' < PIE **ni-zd-o-* (zero grade) : *sæt* 'lurking place' < PGmc. **sētō* (lengthened grade); OIcel. *grǫf* 'pit' < **ɣraƀō* : *gróf* 'pit'; OE *hlæd* 'burden' < PIE **klh̥₂-tó-* (cf. *hladan* 'lade') : *hlōð* 'band' < **xlōƀ-* < PIE **kléh₂-t-*.

Ablaut is also evident in derivational suffixes. The reflex of PIE **-on-* must originally have alternated with **-en-* in the paradigm of OE *morgen* beside umlauted *mergen* 'morning';[2] likewise in *n*-stems, e.g. Go. acc. sg. *hanan* 'cock' < **xananu*^{n} : gen. *hanins* < **xaninaz* or **xaniniz* (cf. Gk. *ποιμέν-* 'shepherd' : *δαίμον-* 'divinity'). Although there is analogical redistribution of the PIE variants **-es-* ~ **-os-* in Gmc. *s*-stems, variation remained and is attested by alternative stems in the paradigm with and without umlaut in WGmc., e.g. OE (Northumbrian) nom./acc. sg. *dǣg*, pl. *dōgor* 'day', OHG nom./acc. sg. *lamb*, pl. *lembir* 'lamb'. Quantitative alternations are also detectable, as in *r*-stem nouns, e.g. Go. *brōƀar* < **bhrāter-* : dat. *brōƀr* < **bhrātri*; and in the diminutive suffix **-ing-* : **-ung-* (< **-enko-* : **-n̥ko-*), as in OE *cyning* : OIcel. *konungr* 'king'. As for inflectional suffixes, with the resegementation of stems and inflections in PGmc. (§7.1), the theme vowel was incorporated into the inflections, and its ablaut alternations became unrecognizable as such.

For literature on the development of PIE ablaut in Gmc., see Kilbury 1975, Born 1980, Stedje 1987, Lewickij 1996. For an overview of ablaut patterns in PGmc., see Ringe 2017: 253–60.

1. The form **brukiz* (rather than the expected **burkiz* < **bhr̥ǵ-*) probably shows metathesis by analogy to **brekan-*: see §12.31 n. 3.

2. It is necessary to assume lowering of *u* to *o* in **murɣanaz* and subsequent extension of *o* throughout the paradigm, as otherwise the regular development of **murɣin-* would be OE *myrgen* (which does occur twice, in compounded words). Cf. Ringe & Taylor 2014: 18–20, attributing the alternation of **-in-* and **-an-* to a NWGmc. phonological change.

3.7 Summary tables of Indo-European vowel developments

For comparative purposes it may be useful to summarize in tabular form the main developments of PIE syllabic segments in various IE languages. These tables are generalizations, with many exceptions under given conditions, for which the grammars cited in §1.2 n. 1 should be consulted, or grammars of the individual IE languages.

PIE	PGmc.	Skt.	Gk.	Lat.	Lith.	OCS	OIr.
e	e, i	a	ε	e	e	e	e, i
o	a	a	o	o[1]	a	o	o, u
a	a	a	α	a	a	o	a
i	i	i	ι	i	i	ь	i, e
u	u	u	υ	u	u	ъ	u, o
ē	ē$_1$	ā	η	ē	ė	ě	í
ō	ō	ā	ω	ō	uo	a	á
ā	ō	ā	η[2]	ā	ō	a	á
ī	ī	ī	ῑ	ī	y	i	í
ū	ū	ū	ῡ	ū	ū	y	ú
e$_i$	ī	ē	ει	ī	ie, ei	i	é, ia

PIE	PGmc.	Skt.	Gk.	Lat.	Lith.	OCS	OIr.
e̯u̯	eu, iu	ō	ευ	ū	au	u	ó, ua
o̯i̯	ai	ē	οι	ū, oe	ie, ai	ě	ái, ói, oe, ae
o̯u̯	au	ō	ου	ū	au	u	ó, ua
a̯i̯	ai	ē	αι	ae	ie, ai	ě	ái, ói, oe, ae
a̯u̯	au	ō	αυ	au	au	u	ó, ua
h̥₁	a	i	α	a	a	o	a
h̥₂	a	i	α	a	a	o	a
h̥₃	a	i	α	a	a	o	a
r̥	ur	r̥	αρ, ρα	or	ir	rĭ, rŭ[3]	ri, ar
l̥	ul	r̥	αλ, λα	ol, ul	il	lĭ, lŭ[3]	li, al
n̥	un	a	α	en	im	ę < im	am, em
m̥	um	a	α	em	in	ę < in	an, en
r̥̄	ur	īr, ūr	ρᾱ	rā	ir	rĭ, rŭ[3]	ri, ar
l̥̄	ul	īr, ūr	λᾱ	lā	il	lĭ, lŭ[3]	li, al
n̥̄	un	ā	νᾱ	nā	im	ę < im	am, em
m̥̄	um	ā	μᾱ	mā	in	ę < in	an, en

As noted above (§3.1), some studies assume three reflexes in Greek for the three syllabic laryngeals (ε, α, o), on the basis of forms like the past participles *θετός* 'placed' and *δοτός* 'given', but more commonly the vowel quality of such is regarded as the result of analogy to full-grade forms (cf. *τίθημι* 'place', *δίδωμι* 'give'): so, e.g., Lindeman 1987: 101–2 and Szemerényi 1996: §4.1.11. On the long diphthongs in Gmc., see §3.4.

Figure 4 summarizes graphically the development of the PIE vowels in PGmc. stressed syllables. Here consonantal laryngeal consonants are treated as if already lost in PIE.

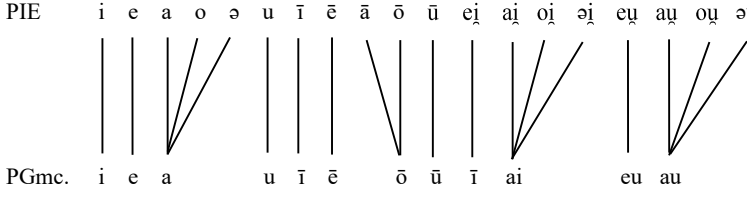


Fig. 4. Reflexes of Proto-Indo-European vowels in Proto-Germanic.

1. But Old Lat. *ol* > Lat. *ul*.

2. Doric and Aeolic *ᾱ*.

3. The spellings *rĭ*, *rŭ*, *lĭ*, *lŭ* (transliterations of *рь*, *ръ*, *ль*, *лъ*) stand for syllabic sonorants, palatalized and nonpalatalized.