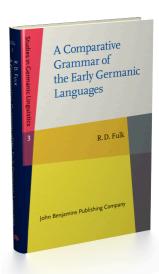# Chapter 6: Consonants

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A Comparative Grammar of the Early Germanic Languages
R.D. Fulk
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Consonants

6.1 The Proto-Indo-European consonants

The following represents a fairly standard reconstruction of the PIE consonant system as laid out in current handbooks:

$$
\begin{array}{lllll}
p & t & \hat{k} & k & k^w \\
(b) & d & \hat{g} & g & g^w \\
bh & dh & \hat{g}h & gh & gh^w \\
 & m & n & l & r \\
 & & h_1 & h_2 & h_3 \\
 & & & \underset{\cdot}{i} & \underset{\cdot}{u}
\end{array}
$$

The consonant /b/ is marginal, as it probably did not occur at all in initial position in PIE. Among the oral stops, a phonemic distinction is to be drawn between plain voiced stops /b, d, $\hat{g}$, g, g^w/ and their aspirated equivalents /bh, dh, $\hat{g}h$, gh, gh^w/.[1] Also to be distinguished are palatals /$\hat{k}$, $\hat{g}$, $\hat{g}h$/, velars /k, g, gh/, and labiovelars /k^w, g^w, gh^w/: although generally this tripartite distinction is reduced to, at most, a bipartite one in the IE languages,[2] the three series are recoverable because in some languages the palatal and velar varieties are collapsed into one category (the so-called *centum*-group, to which Gmc. belongs—named after the Latin reflex of PIE *$\hat{k}m̥tóm$ 'hundred') and in others the velars and labiovelars (the *satem*-group, named after Avestan *satəm* 'hundred'). The distinction between the two groups was once thought to demarcate an important historical division of PIE into two language families, though now it is plain that although the isogloss does probably represent some shared developments among IE languages, to a great extent the distinction is a matter of convergent developments in related but discrete languages.[3]

The reconstructions *i̯* and *u̯* are generally in allophonic relation to *i* and *u*, but see Mayrhofer in Kuryłowicz *et al*. 1986–2015: I, 160–1, 168 for evidence of phonemic *i*. The voiced aspirates /bh, dh, $\hat{g}h$, gh, gh^w/ are not attested as such in any IE language, though the murmured consonants *bh*, *dh*, etc. of Indic, which reflect them (and probably represent their actual PIE value), are transcribed similarly. On the laryngeal consonants /h_1, h_2, h_3/, see §3.1.

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1. A separate series of voiceless aspirates /ph, th, $\hat{k}h$, kh, kh^w/ was at one time a common assumption to explain the voiceless murmured consonants of Indic, as well as certain Armenian phenomena, but these are now standardly regarded as (in origin) allophones of the voiced aspirates. The glottalic theory (see below) has prompted some to return to the earlier view (e.g. Joseph 1985, Gramkrelidze & Ivanov 1995; see also Szemerényi 1996: §§6.7.1.4–7), but cf. Kuryłowicz 1956: 375–82, showing that nearly all of the relevant evidence is due to secondary developments. The issue is of no real relevance to Gmc. grammar.

2. Melchert (1987, 1989: 23–32), however, has shown that separate reflexes of /$\hat{k}$, k, k^w/ are discernible in Luvian, and perhaps of /$\hat{g}$, g, g^w/ in Lycian.

3. So, for example, Tocharian, in Central Asia, belongs (probably) with the majority of European languages in this respect, even though it is the easternmost of the IE languages, whereas Balto-Slavic is grouped with the Indo-Iranian languages. The *centum*-group includes the westernmost IE languages, including Hellenic, Italic, Celtic, and Germanic, whereas the *satem*-group includes Indo-Iranian and Balto-Slavic, and probably Armenian and Albanian, though the facts are disputed.

6.2   The glottalic theory

Jakobson (1958; so earlier Walde 1897: 468) pointed out the typological improbability of the reconstruction of the PIE consonant system outlined in §6.1. One problem is the rarity of *b* in PIE reconstructions, a peculiarity for which there is no straightforward explanation, whereas languages lacking *p* (such as Proto-Celtic) are well attested (as remarked by Pedersen 1951: 10–11).[1] It is also typologically odd to reconstruct a language with voiced aspirates but not voiceless. Accordingly, it was proposed by Gamkrelidze & Ivanov (1973; 1995) and Hopper (1973) that these peculiarities can be explained if instead of the voiced series *b*, *d*, *g*, etc., there is reconstructed a voiceless series of glottalized stops (i.e., ejectives) *p'*, *t'*, *k'*, etc.[2] The remaining series (*p*, *t*, *k*, etc., and *bh*, *dh*, *gh*, etc.) may then be reconstructed either as voiced and voiceless series with aspiration in free variation (i.e. *p(h)*, *t(h)*, *k(h)*, etc., and *b(h)*, *d(h)*, *g(h)*, etc., respectively), or (according to Hopper) simply as *p*, *t*, *k*, etc., and *b*, *d*, *g*, etc.). This reconstruction is also offered in explanation of the peculiarity of PIE root structure that roots consisting of two plain voiced stops under the older reconstruction are prohibited, e.g. †*bed*-, †*deg*-, etc. The prohibition can be attributed to the well-attested phenomenon of avoidance of successive ejectives in languages that have such.

Although the glottalic theory enjoyed no small degree of support at one time, it is not now generally accepted in IE studies. One problem is that ejectives such as those reconstructed are not found in any historical IE language but Ossetic (a language of Iran), where they are instead to be attributed to the influence of neighboring Caucasian languages. The chief implication of the glottalic theory for Germanic linguistics is that it permits Germanic (along with Armenian) to be regarded not as a highly innovative branch in its consonantism but as an exceptionally conservative one, whereas the IE languages usually regarded as hewing closest to the PIE consonant system, especially Sanskrit and Greek, turn out to do nothing of the sort. That Germanic should have remained so conservative while the European languages in closest proximity to it in prehistoric times all altered the inherited obstruents in similar ways is difficult to credit. And yet although the glottalic theory is not now widely supported, there is a considerable degree of concurrence that the reconstruction of PIE obstruents represented in §6.1 is implausible and awaits replacement by a creditable reconstruction.[3] Nonetheless, it need not be the case that such an alternative reconstruction is what must be assumed for the latest stages of PIE, since it is of course possible that the typological peculiarities of PIE mentioned above are the consequence of an earlier obstruent system that had already changed before any of the extant IE families had developed individuating characteristics. That is to say, it is not a given that any IE language should directly reflect that earlier state of affairs rather than a later-developed obstruent system similar to that arrived at (in §6.1) by the comparative method. The supposition that Germanic is an especially archaic branch of IE is at all events unsupported by its verb system, which appears to be a simplification of that reconstructed for late PIE (§12.9), showing no marked resemblance to the Hittite verb system.[4]

Prior to the glottalic theory, there were attempts to address the improbability of the reconstructed PIE consonant inventory by assuming that the voiced aspirates were actually fricatives: so Walde 1897, Prokosch 1918–19, 1939: §18, Peeters 1971. Other solutions are surveyed by Huld (1986).

1.   Although there is disagreement in the literature, Szemerényi (1996: §6.7.1.8 & n. 1; so also Polomé 1994: 33 n. 24) remarks that the distribution of *b* word internally is normal, and this is typologically odd, given its absence from initial position—certainly a problem not solved by the glottalic theory. Melchert (1994: 93) offers examples of medial PIE *b* reflected in Anatolian. For possible explanations for the non-occurrence of initial *b*, see Ringe 2017: 19.

2.   In ejectives, closure and release of the oral and glottal points of closure are simultaneous, producing the sensation of a click.

3.   See, e.g., Salmons 1993 and Beckwith 2007. See also the papers in Vennemann 1989.

4.   For a comparison of the Anatolian and late PIE verb systems, see Clackson 2007: 129–51.

6.3   Laryngeal consonants in Germanic

At the time when the study of PIE laryngeal consonants was still in the process of gaining the status of orthodoxy (see §3.1), a variety of studies suggested that laryngeals might have been preserved relatively late into the PGmc. period. The only proposal for the influence of laryngeal consonants in specifically Gmc. developments that is now widely credited pertains to the Verschärfung (though even this analysis is hardly secure), and the commonest view of the matter now is that it is not laryngeals but the hiatus left by the early loss of laryngeals that is responsible for this gemination of glides: see §6.10. (On the derivation of *ē₂* from a laryngeal source, see §3.5; Polomé 1988: 384–401; 1994: 21–4.) Some other proposals regarding laryngeal consonants are these:

(a) In certain environments a laryngeal may be reflected as a velar consonant (Austin 1946, Lehmann 1952: 47–52, Cowgill 1965 *passim*, Connolly 1977: 351–2, Ringe 2017: 86–8, but cf. Polomé 1988: 401–4, *idem* 1994: 23–4, Voyles 1989b: 41–2 (with further references), Fulk 1993b: 341–2, Kortlandt 1997), as in OIcel. *nǫkkvi*, OE *naca* 'boat' (cf. Lat. *nāvis* < *neh_2u-); OIcel. *kvikr*, OHG *quec* 'alive' (but Go. **qius, qiwa-*; cf. Skt. *jīváḥ* < *$g^w ih_3u$-); and OHG *zeihhur*, OE *tācor* 'brother-in-law' (cf. Skt. *dēvár-*, Gk. δᾱήρ, PIE stem *dh_2iuer-).

(b) The reflex of PIE *ə* (i.e., *Ḥ* in laryngeal notation) did not always develop to Gmc. *a* or, in unstressed syllables, Ø. For discussion, see §5.5 *ad fin.*

(c) Certain preterites in *-r-* in OHG, OE, and OIcel. have been assigned a laryngeal cause (Lehmann 1952: 56–61; *idem* 1954; Connolly 1983), e.g. OHG *ki-screrot* to *scrōtan* 'cut', OE *leort* to *lǣtan* 'let', and OIcel. *snera* to *snúa* 'turn'; cf. §12.20. Cf. van Coetsem 1956: 68; Müller 2007: 157–8.

(d) The seemingly sporadic change of PGmc. **i* to *e*, as in PIE **slibro-* > OE *slipor*, OHG *sleffar* 'slippery', has been claimed to take place only in the presence of a laryngeal: see Connolly 1977, 1999; cf. Polomé 1988: 386–9, Voyles 1989b: 38–41, *idem* 1999.

(e) Lühr (1976) and Ritter (1984) argue that the gemination of certain sonorant consonants other than glides may be due to laryngeals, e.g. OS *thimm* 'dark' (cf. Skt. *támisra-* 'dark night') and Go. OHG OE *spinnan* 'spin' (cf. Lith. *pinù, pìnti*

'braid'). See also Seebold 1970: 290 and Eichman 1973 on Go. *kunnan*, *kann* and cognates.

(f) It has been argued that certain exceptions to Verner's law (§6.6) are to be explained by the preservation of laryngeal consonants into Proto-Germanic: see Connolly 1980.

(g) Hansen (2015) argues that PIE initial *h_2i- and *h_2u- may yield Gmc. *ai*- and *au*-.

6.4   Grimm's law

The oral stop consonants of PIE underwent a systematic change of manner of articulation commonly known as the First Consonant Shift, as described under the terms of Grimm's law.[1] Though many qualifications are necessary (on which see §6.5), in broad outline it may be said that the PIE stops developed as follows in PGmc.:

PIE						PGmc.									
p	t	$\hat{k}$	k	k^w	→	p	t	k	k^w	→	f	þ	x	x^w
b	d	$\hat{g}$	g	g^w	→	b	d	g	g^w	→	p	t	k	k^w
bh	dh	$\hat{g}h$	gh	gh^w	→	bh	dh	gh	gh^w	→	ƀ	ð	ʒ	$ʒ^w$

That is to say, the voiceless stops became voiceless fricatives, the voiced stops were devoiced, and the aspirated voiced stops became voiced fricatives. (The middle step shows the coalescence of the PIE palatal stops with the plain velars: see §6.1.)[2] There is thus (roughly) no change in place of articulation, and of voicing only in the series of PIE voiced unaspirated stops. The PGmc. results are displayed with the characters usually employed in the reconstruction of PGmc. words; as with the PIE consonants, the likeliest phonetic values are not always ascertainable. For example, *þ* was certainly a voiceless fricative, but it could have been either dental or alveolar (probably not post-alveolar); the series *x*, *k*, *ʒ* is called velar, but palatal or uvular articulation, at least under some circumstances, cannot be ruled out; and *f*, though the character connotes labiodentalality, was likelier bilabial [ɸ].[3] The PIE labiovelars remained unitary phonemes after the shift (PGmc. *x^w*, *k^w*, *$ʒ^w$*), though later they became diphonemic: see §§6.5 *ad fin.*, 6.11 for discussion. Examples of these changes are as follows:

PIE *p* > PGmc. *f*: PIE *por- > Go. OE OS OHG *faran*, OIcel. *fara* 'go' (cf. Gk. πορεύω, Lat. *portō* 'convey'); PIE *pŏd-/ped- > Go. *fōtus*, OIcel. *fótr*, OE OS *fōt*, OHG *fuoz* 'foot' (cf. Skt. *pā̆t*, *pă̄d*-, Gk. πούς, ποδ-, Lat. *ped*-); PIE *népōt- > OIcel. *nefi* 'kinsman', OE *nefa* 'nephew, grandson', OS *neƀo* 'nephew, grandson', OHG *nevo* 'nephew, kinsman' (cf. Skt. *nápāt* 'offspring, son, grandson', Lat. *nepōs*); PIE *ĥlep- > Go. *hlifan* 'steal' (cf. Gk. κλέπτω, Lat. *clepō* 'steal'); PIE *apo 'from, away' > Go. OIcel. OS *af* (cf. Skt. *ápa*, Gk. ἄπο, ἀπό).

PIE *t* > PGmc. *þ*: PIE *tong- > Go. *þagkjan* 'think', OIcel. *þekkja* 'recognize', OE *þencan*, OS *thenkian*, OHG *denken* 'think' (cf. Lat. *tongeō* 'know'); PIE *treị- > Go. *þrija* (nom. neut.), OIcel. *þrír*, OE *þrīe*, OS *thria*, OHG *drī* 'three' (Skt. *tráyaḥ*, Gk. τρεῖς, Lat. *trēs*); PIE *mn̥t- > Go. *munþs*, OIcel. *munnr*, *muðr*, OE *mūð*, OS *mūđ*, OHG *mund* 'mouth' (cf. Lat. *mentum* 'chin'); PIE *ụert- > Go. *waírþan*, OIcel. *verða*, OE *weorðan*, OS *werđan*, OHG *werdan* 'become' (cf. Skt. *vártati*, Lat. *vertō* 'turn').

PIE *ĥ* > PGmc. *x*: PIE *ĥm̥tóm > Go. OE OS *hund*, OHG *hunt* 'hundred' (Skt. *śatám*, Lat. *centum*); PIE *ĥlutós with lengthening in PGmc. *xlūðaz > OE OFris. OS *hlūd*, OHG *lūt* 'loud' (cf. Skt. *śrutáḥ*, Gk. κλυτός 'heard of, renowned'); PIE *déĥm̥t >

Go. *taíhun*, OIcel. *tíu*, OE *tíen*, OS *tehan*, OHG *zehan* 'ten' (Skt. *dáśa*, Gk. δέκα); PIE *peĥu-* > Go. *faíhu*, OIcel. *fé*, OE *feoh*, OS *fehu*, OHG *fehu*, *fihu* 'herded animal' (Skt. *páśu-*, Lat. *pecū*).

PIE *k* > PGmc. *x*: PIE *kap-ōl-* in OE *hafola* 'head' (Skt. *kapā́la-*); PIE *kar-* in Go. *hardus*, OIcel. *harðr*, OE *heard*, OS *hard*, OHG *hart* 'hard' (cf. Skt. *karkara-* 'hard'); PIE *keh₂-ro-* in Go. *hōrs* 'adulterer', OE *hōre* 'whore', etc. (cf. Latv. *kãrs* 'desirous', Lat. *cārus* 'dear'); PIE *u̯eiḱ-* in Go. *weihan* 'fight' (cf. Lith. *veikiù*, *veĩkti* 'work', Lat. *vincō* 'conquer'); PIE *leu̯k-* in Go. *liuhaþ*, OE *lēoht*, OS OHG *lioht* 'light' (noun; cf. Skt. *rōká-*, Lat. *lūx*).

PIE *kʷ* > PGmc. *xʷ*: PIE *kʷoter-/kʷeter-* > Go. *hvaþar*, OIcel. *hvaðarr*, OE *hwæder*, OS *hweðar*, OHG *wedar* 'which of two' (cf. Skt. *katará-*, Gk. πότερος); PIE *kʷod* > Go. *hva*, OIcel. *hvat*, OE *hwæt*, OS *hwat*, OHG *(h)waz* 'what' (cf. Skt. *kád*, Lat. *quod*); PIE *sekʷ-* in Go. *saíhvan*, OIcel. *sjá*, OE *sēon*, OS OHG *sehan* 'see' (cf. Lat. *sequor*, Gk. ἕπομαι 'follow'); PIE *lei̯kʷ-* in Go. *leihvan*, OIcel. *ljá*, OE *lēon*, OS OHG *līhan* 'lend' (cf. Gk. λείπω, Lat. *re-linquō* 'leave').

PIE *b* > PGmc. *p*:[4] PIE *bend-n-* in OIcel. *pinni*, OE OS *pinn* 'pin', OHG *pfin* 'nail' (cf. OIr. *benn* 'prong, horn' < *bn̥-no-* or *bend-no-* and Welsh *bannog* 'horned'); PIE *bu-s-* in OIcel. *posi*, OE *pusa*, *posa*, OHG *pfoso* 'bag' (cf. Gk. βύω 'stuff full' < *βύσω); PIE *dheu̯b-* in Go. *diups*, OIcel. *djúpr*, OE *dēop*, OS *diop*, OHG *tiof* 'deep' (cf. weak grade in Lith. *dubùs*, OIr. *domain*, Welsh *dwfn* (*dhub-ni-)); PIE *slēb-* in Go. *slēpan*, OE *slǣpan*, OS *slāpan*, OHG *slāfan* (cf. Lith. (Samogitian) *slãbnas* and OCS *slabъ* 'weak').

PIE *d* > PGmc. *t*: PIE *deiĝ-* in Go. *ga-teihan*, OIcel. *tjá* 'tell, show', OE *tēon*, OS *tīhan*, OHG *zīhan* 'accuse' (cf. Gk. δείκνῡμι 'show', Lat. *dīcō* 'say'); PIE *d̯uo-i̯-* in Go. masc. *twái*, OIcel. *tveir*, OE fem. *twā*, etc. 'two' (cf. *d(u)u̯ó* in Skt. *dvā́*, Homeric Gk. δύω, Lat. *duo*); PIE *sed-* in Go. *sitan*, OIcel. *sitja*, OE *sittan*, OS *sittian*, OHG *sizzen* 'sit' (cf. Skt. *sad-*, Lat. *sedeō*); PIE *med-* in Go. *mitan*, OIcel. *meta*, OE OS *metan*, OHG *mezzan* 'measure, assess' (cf. Gk. μέδομαι, Lat. *meditor* 'consider').

PIE *ĝ* > PGmc. *k*: PIE *ĝneu̯-* in Go. *kniu*, OE *cnēo(w)*, OS OHG *kneo*, *knio* 'knee' (cf. PIE *ĝonu-* in Skt. *jā́nu*, Gk. γόνυ); PIE *ĝn̥h₃-* in Go. OHG *kunnan*, OIcel. *kunna*, OE *cunnan* 'know' (cf. Skt. *jānāti* knows' < *ĝn̥h₃-neh₂-ti*, and PIE *ĝneh₃-* in Lat. *nōscō*); PIE *h₂eĝros* > Go. *akrs*, OIcel. *akr*, OE *æcer*, OS *akkar*, OHG *akar*, *ackar* 'field' (cf. Skt. *ájraḥ*, Gk. ἀγρός); PIE *roĝ-* in Go. *uf-rakjan* 'stretch', OIcel. *rekja* 'spread out', OE *reccan* 'stretch' (cf. *ŕ̥jyati* 'stretches', Lat. *rogō* 'request' (< *'stretch out the hand')).

PIE *g* > PGmc. *k*: PIE *gal-* in OIcel. *kalla*, OE *ceallian* 'call', OHG *kallōn* 'chatter' (cf. Welsh *galw* 'call', and *gal-gal-* in OCS *glagolati* 'speak'); PIE *gloi̯-* in OE *clǣg*, MLG *klei* 'clay' (cf. Russian глина (*glina*) 'clay', Gk. γλοία 'glue'); PIE *h₂eu̯g-* in Go. *áukan*, OIcel. *auka*, OE *ēacian*, OS *ōkian*, OHG *ouhhōn* 'increase' (cf. Lith. *áugu*, *áugti* 'grow', Lat. *augeō* 'increase'); PIE *tog-* in OIcel. *þak*, OE *þæc*, OHG *dah* 'thatch, roof' (cf. *(s)teg-* in Skt. *sthagayati* 'covers', Gk. (σ)τέγος 'roof').

PIE *gʷ* > PGmc. *kʷ* (> *kw*): PIE *gʷem-/gʷe m-* in Go. *qiman*, OIcel. *koma*, OE *cuman*, OS *kuman*, OHG *queman*, *coman* 'come' (cf. Gk. βαίνω 'go' (< *gʷm̥i̯ō), Lat. *veniō* 'come'); PIE *gʷen-* in Go. *qinō*, OE *cwene*, OS OHG *quena* 'woman' (cf. OIr. *ben*, OCS *žena*); PIE *nogʷ-* in Go. *naqaþs*, OIcel. *nøkkviðr*, OE *nacod*, OHG *nackut*, *nachut* 'naked' (cf. Skt. *nagnáḥ*, Lith. *núogas*); PIE *h₁regʷ-* in Go. *riqis* 'darkness', OIcel. *røk(k)r*, *røkkr* 'twilight' (cf. Skt. *rájanī-* 'night', Gk. ἔρεβος 'underworld'); PIE *h₁engʷ-* in OIcel. *økkr* 'lump, tumor' and *økkvinn* 'thick, clodded' (cf. Gk. ἀδήν 'gland'

(< *h̥n̥gʷēn), Lat. *inguen* 'groin'). It cannot be determined whether k^w was already indistinguishable from kw in PGmc., but even though Ulfilas uses a single character, ⟨u⟩ (q), to represent the reflex of PIE g^w, this could be in imitation of Latin ⟨q⟩. The generally preferred derivation of the Go. dual pronoun *igqis* is from *iŋk- with analogical addition of *w*, borrowed from pl. *izwis* (§8.3), demanding the assumption that Go. *q* was indistinguishable from /kw/. Certainly, the labial feature of PIE labiovelars is not infrequently reflected as a separate segment in West and North Gmc., as in OE *cwicu* 'alive' < Pre-PGmc. *kʷikwaz; probably also OIcel. *sǫng* 'sang' < *saŋgu < PGmc. *saŋgʷ(e), and certainly *nøkkviðr* 'naked' (as above; cf. Go. *naqaþs*).

PIE *bh* > PGmc. *ƀ* (but *b* in initial position probably already in PGmc.): PIE *bher- in Go. *baíran*, OIcel. *bera*, OE OS OHG *beran* 'bear' (cf. Skt. *bhárati*, Lat. *ferō*); PIE *bhuh₂- (possibly; cf. §3.4 n. 5) in Go. *bauan*, OIcel. *búa*, OE OHG *būan* 'dwell' (cf. Skt. *bhávati* 'becomes', Gk. *φύω* 'produce'); PIE *leubh- in Go. *liufs*, OIcel. *ljúfr*, OE *lēof*, OS *liof*, OHG *liob* 'dear' (cf. Skt. *lúbhyati* 'yearns', Lat. *libet*, older *lubet* 'pleases'); PIE *gerbh- in OE *ceorfan*, OHG *kerban* 'carve' (cf. Gk. *γράφω* < *gr̥bh-).

PIE *dh* > PGmc. *ð* (but probably *d* initially already in PGmc.): PIE *dhr̥s- in Go. *ga-daúrsan*, OE *durran*, *dear*, OHG *-turran*, *gi-tar* 'dare' (cf. Skt. *dhr̥ṣnóti* 'is bold', Gk. (Lesbos) *θέρσος* 'bravery'); PIE *dhur- in OIcel. *dyrr* 'doorway', Go. *daúr*, OE *dor*, OS *dor*, *dur*, OHG *tor* 'door' (cf. Gk. (Homeric) *θύρᾱ*, Lith. acc. pl. *durìs*); PIE *medhios > Go. *midjis*, OIcel. *miðr*, OE *midd*, OS *middi*, OHG *mitti* 'in the middle' (cf. Skt. *mádhyaḥ*, Lat. *medius*); PIE *medhu(-) in OIcel. *mjǫðr* OE *meodu* 'mead' (cf. Skt. *mádhu* 'sweet drink', Gk. *μέθυ* 'wine').

PIE *ĝh* > PGmc. *ʒ*: PIE *ĝhans- > OIcel. *gás*, OE *gōs*, OS *gās*, *gōs*, OHG *gans* 'goose' (cf. Skt. *haṁsáḥ* 'goose, swan', Gk. *χήν* 'goose'); PIE *ĝhaiso- in OIcel. *geirr*, OE *gār*, OS OHG *gēr* 'spear' (cf. Skt. *héṣas-* 'missile', Gk. *χαῖος* 'shepherd's staff'); PIE *weĝh- in Go. *ga-wigan* 'stir', OIcel. *vega* 'lift', OE OS OHG *wegan* 'move, carry' (cf. Skt. *váhati* 'goes', Lat. *vehō* 'convey'); PIE *loiĝh- in Go. *bi-láigōn* 'lick' (cf. Gk. *λείχω*, reduced grade in Skt. *lihati*).

PIE *gh* > PGmc. *ʒ*: PIE *ghostis > Go. *gasts*, OIcel. *gestr*, OE *giest*, OS OHG *gast* 'guest, stranger' (cf. Lat. *hostis* 'enemy', OCS *gostь* 'guest'); PIE *ghleu- in OIcel. *glý*, OE *glēo* 'joy' (cf. Gk. *χλεύη* 'jest', Old Lith. *gláudoti* 'jest'); PIE *legh- in Go. *ligan*, OIcel. *liggja*, OE *licgan*, OS *liggian*, OHG *liggen* 'lie' (cf. Gk. *λέχος* 'bed', OCS *ležati* 'lie', OIr. *lige* 'bed, grave'); PIE *(s)teigh- in Go. *steigan*, OIcel. *stíga*, OE OS OHG *stīgan* 'climb, ascend' (cf. Gk. *στείχω*, OIr. *tíagu* 'go', reduced grade in Skt. *stighnōti* 'ascends').

PIE *ghʷ*. There is no scholarly agreement about the development of gh^w in Gmc., except that it is plainly delabialized before *u*: PIE *ghʷ* > PGmc. *ʒ* before *u*, as in PIE *ghʷn̥-ti-s (as in Skt. *hatíḥ* 'blow') > PGmc. *ʒunþ- > OIcel. *guðr* (and later, analogical *gunnr*), OE *gūð*, OS *gūðea*, OHG *gund-* 'war'. Otherwise, examples are too sparse and etymologies too insecure to afford certainty. It is the argument of Seebold (1967, 1980) that initial *ghʷ* otherwise produces Gmc. *b*, for example in PIE *ghʷr̥-n-w- > Go. OS OHG *brinnan*, OIcel. *brenna*, OE *beornan* 'burn (intrans.)' (cf. Skt. *ghr̥nóti* 'burns'; but see the criticisms of Polomé 1994: 20–1). This argument appears to have persuaded few (so Ringe 2017: 127–33 and Hartmann 2013);[5] the literature in opposition is surveyed by Polomé (1987a). PGmc. *warm-* (OIcel. *varmr*, OE *wearm*, OS OHG *warm* 'warm') seems to be paralleled by Gk. *θερμός*, Lat. *formus*, OPruss. *gorme*, but Seebold (1967: 108–9) is not alone in supposing that it should be tied to Hittite *war-* 'burn'. Seebold's

other conclusions (1967) may be summarized as follows: (a) Postvocalic *ghʷ* appears before liquids and nasals as *w*. Examples: PIE **neghʷ-r-* > OIcel. *nýra*, OHG *nioro* 'kidney' (cf. Gk. pl. νεφροί, Lat. (Praenestine) *nefrōnēs*); PIE **h₂eghʷ-n-* > PGmc. **aun-* > OE *ēanian* 'yean' (cf. Gk. ἀμνός, Lat. *agnus* 'lamb'). (b) Intervocalic *ghʷ* > PGmc. *ʒʷ*, developing further to *w* after *e* or *ai*, otherwise to *ʒ*. Examples: PIE **(s)noiǵhʷ-* > PGmc. **snaiw-* in Go. *snáiws*, OIcel. *snjór*, *snær*, OE *snāw*, OHG *sneo* 'snow' (cf. Lat. weak grade *niveus* 'snowy', nasalized *ninguit* 'it snows', Gk. (Homeric) νείφει 'it snows'); possibly PIE **h₂oghʷ-i-* > PGmc. **aʒi-* in OS *egi-thassa*, OHG *egi-dehsa* 'lizard' (cf. Gk. ὄφις, Skt. *áhi-* 'snake'). (c) PIE *ghw* and *ǵhw* appear to have developed the same way as *ghʷ*, though the evidence is scant. A possible example is OE *wēðe*, OS *wōði* 'pleasant' < **ǵhwōtjo-* (Seebold 1967: 110). Kortlandt (1997) argues that labiovelars became labial obstruents before or after a sonorant consonant. Johnsen (2011) finds that PGmc. *ʒʷ* develops to *w* before *i*, but *ʒ* before *j*. For a tabulation of opinions from 1896 to recent times, see Hartmann 2013: 1–2.

1.   The IE and Gmc. correspondences were described by Jacob Grimm in letters to Karl Lachmann of 25 Nov. 1820 and (in detail) 1 April 1821, and a full exposition published in 1822 in the second edition of Vol. 1 of his *Deutsche Grammatik*. Building on the work of earlier observers, Rasmus Rask, in his *Undersögelse om det gamle nordiske eller islandske sprogs oprindelse* (1818), had previously worked out the correspondences with Latin and Greek consonants later systematized and described by Grimm as a shift. Grimm acknowledged his debt to Rask in the preface to the first volume of the first edition of his *Deutsche Grammatik*. For a succinct discussion of the relations between Rask's and Grimm's analyses, see Prokosch 1939: §15, observing that Rask's observations could in no sense be termed a law.

2.   Although it seems likely, it cannot be proved that this coalescence occurred before rather than after the shift; the chronology has left no distinctive trace in the Gmc. languages.

3.   This may be judged from its source in PIE *p*, from the use of ⟨p⟩ to represent it in OIcel. before *t*, as in *eptir* 'after', probably also the change of *n* to *m* in Go. OHG *fimf*, OIcel. *fimm* 'five', and from the parallel sound *ƀ*, for the bilabiality of which there is evidence in OE until the ninth century (§6.6), though certainly OE *f* was labiodental before that.

4.   As remarked above (§6.1), it is dubitable whether there was any word-initial *b* in PIE. The forms provided here are accepted by Pokorny (1959–69). Their relative obscurity inspires little confidence.

5.   However, Normier (1977: 185) supposes that PIE *ghʷ always* results in Gmc. *b*.

6.5   Exceptions to Grimm's law

The commonest exceptions to Grimm's law are governed by Verner's law, on which see §6.6.

   It should be noted that already in the Pre-PGmc. period a voiced stop, whether aspirated or not, was devoiced before *t* or *s*, with loss of aspiration, where relevant. Thus, for example, **gt*, **ght* > **kt*, and **gs*, **ghs* > **ks*. The change can be seen in, e.g., Lat. perf. *nūpsī*, pp. *nūptus* to *nūbō* 'wed' (PIE **(s)neṵbh-*); Skt. loc. pl. *pat-sú* beside loc. sg. *pad-í* 'on foot'; and Lat. perf. *junxī*, pp. *junctus* to *jungō* 'join' (PIE **i̯u-n-g-*). A sequence **tt* thus produced developed to PGmc. **ss*, on which see §6.8. In the other clusters, the voiceless first consonant became a fricative in PGmc., as was normal under Grimm's law, but not the second. Examples: Go. *ga-skafts* 'creation' (cf. *skapjan* 'create'); OHG *gift* 'gift' beside *geban* 'give'; OE *weft* 'weft' beside *wefan* 'weave' (cf. Skt. *ubhnā́ti* 'ties together'); OE *wæfs* (also *wæsp*, *wæps*) 'wasp' (PIE **u̯obhs-*; cf. Lith. *vapsvà* 'wasp', Avestan *vawžaka-* 'scorpion'); Go. pret. *waúrhta* to *waúrkjan* 'work,

make'; Go. *maíhstus* 'dung' beside OIcel. *míga* 'urinate' (PIE *$meig̑h$-, as in Skt. *mḗhati* 'urinates').

Grimm's law fails to apply to a PIE voiceless stop preceded by *s*. Examples: PIE *$spr̥-n$- in OIcel. *sporna* 'spurn, tread on', OE *spurnan, spornan*, OS OHG *spurnan* (cf. Skt. *spr̥ṇṓti* 'averts', full grade in Lat. *spernō* 'reject'); PIE root *$stḫ$- in Go. OE OS *standan*, OIcel. *standa*, OHG *stantan* 'stand' (cf. Lat. *stō* 'stand', Skt. *sthitáḥ* 'standing'); PIE *$ghostis$ > Go. *gasts* (as above, §6.4); PIE superlative formation *-*is*-*to*-*s* in Go. *-ists*, etc. (cf. Gk. *-ιστος*); PIE *$sk̑iḫ_2$- (?) in Go. *skeinan*, OIcel. *skína*, OE *scīnan*, OS OHG *skīnan* 'shine' (cf. Gk. σκιᾱ́, Tocharian B *skiyo* 'shadow', and cf. Skt. *chāyā́* 'brilliance'); PIE suffix *-*sk̑o*- in, e.g., *$pr̥k̑-sk̑o$- > PGmc. *$fur(x)sk$- in OHG *forsca* 'question' = Skt. *pr̥cchā́*; PIE *$skabh$- in Go. OS OHG *skaban*, OIcel. *skafa*, OE *sc(e)afan* 'shave' (cf. Lat. *scabō* 'shave', Latvian *skabrs* 'sharp'); PIE *$pisk$- in Go. *fisks*, OIcel. *fiskr*, OE OHG *fisc*, OS *fisk* 'fish' (cf. Lat. *piscis*, full grade in OIr. *īasc*, gen. *ēisc*); there are no examples of PIE sk^w in Gmc.

Similarly, when PIE *p* or a velar consonant ($k̑, k, k^w$) shifted to a fricative under Grimm's law, a following voiceless stop (only *t* occurs) failed to undergo the usual change, and the labiovelar lost its labiality. Examples: PIE *$kap-tó-s$ > Go. *-hafts*, OIcel. *haptr*, OE *hæft*, OS OHG *haft* 'captive' (= Lat. *captus*, OIr. *cacht*); PIE *$ok̑tŏ̄(u)$ > Go. *ahtáu*, OIcel. *átta*, OE *eahta*, OS OHG *ahto* '8' (cf. Skt. *aṣṭáu*, Gk. ὀκτώ); PIE *$slak-t$- in OIcel. *sláttr* 'mowing', OE *slieht* 'blow', OS *man-slahta* 'murder', OHG *slachta* 'massacre' (cf. Go. *slahan* 'strike', Middle Irish *slacc* 'sword'); PIE *nok^w-t- > Go. *nahts*, OIcel. *nátt*, OE *neaht, niht*, OS OHG *naht* 'night' (cf. Lat. *nox*, acc. *noctem* 'night', OIr. *i-nnocht* 'tonight', Skt. *naktam* 'by night', Hittite *neku*-).

The PIE voiced aspirates *bh, dh, g̑h, gh, gh^w* are reflected as voiced stops rather than fricatives after a nasal consonant. Examples are the following: PIE *$h_2m̥bhí$ > OE *ymb* 'about' (= Skt. *abhí*, Gk. ἀμφί); PIE *$g̑ombh$- in OIcel. *kambr*, OE *camb*, OHG *kamb* 'comb' (cf. Skt. *jámbhaḥ*, Gk. γόμφος 'tooth'); PIE *$bhendh$- in Go. OE OS *bindan*, OIcel. *binda*, OHG *bintan* 'bind' (cf. Avestan *bandayaiti* 'binds', with PIE *$bhn̥dh$- in Skt. *badhnā́ti* 'binds');[1] PIE *$bhlendh$- in Go. *blinds*, OIcel. *blindr*, OE OS *blind*, OHG *blint* 'blind' (cf. Lith. *blendžiù, blę̃sti* 'sleep', Latv. *blendu* 'see poorly'); PIE *$dn̥g̑h$- in Go. *tuggō*, OIcel. OS *tunga*, OE *tunge*, OHG *zunga* 'tongue' (cf. Old Lat. *dingua*, Lat. *lingua*, OIr. *teng*; Skt. *jihvā́* and Avestan *hizvā* 'tongue' attest to PIE *g̑h* in the word, though the onset of each is unetymological); PIE *$h_2eng̑h$- in Go. *aggwus*, OIcel. *ǫngr, øngr*, OE *enge*, OS OHG *engi* 'narrow' (cf. Gk. ἄγχω, Lat. *angō* 'press tight'); PIE *$g̑hongh$- in Go. *gagg*, OIcel. *gangr*, OE OS OHG *gang* 'going, way' (cf. *$g̑hengh$- in Skt. *jáṅghā* 'shin', Lith. *žengiù, žeñgti* 'stride'); PIE *$dlh_2-n̥-gh$- in Go. *laggs*, OIcel. *langr*, OE OS OHG *lang* 'long' (cf. Lat. *longus*, Middle Persian *drang*); PIE *$sengh^w$- in Go *siggwan*, OIcel. *syngva*, OE OS OHG *singan* 'sing' (cf. *$songh^w$- in Gk. ὀμφή 'divine voice, prophecy', Middle Welsh *de(h)ongl* 'explain'); PIE *$ln̥gh^w$- in OE *lungor*, OS *lungar* 'quick, strong', OHG *lungar* 'eager, fast' (= Gk. ἐλαφρός 'light, quick'; cf. non-nasalized Lat. *levis* 'light' < *$legh^w$-).

The PIE voiced aspirates *bh, dh* are nowhere reflected as fricatives in initial position, only as stops. Examples: PIE *$bherḪg̑$- in Go. *baírhts*, OIcel. *bjartr*, OE *beorht*, OS OHG *beraht* 'bright' (cf. Skt. *bhrājatē* 'shines'); PIE *$bhrăter$- in Go. *brōþar*, OIcel. *bróðir*, OE *brōþor*, OS *brōðar*, OHG *bruoder* 'brother' (cf. Skt. *bhrā́tar*-); PIE *$dhr̥s$- in Go. *ga-daúrsan*, OE *durran, dear* 'dare' (cf. Skt. *dhr̥ṣ-ṇṓ-ti* 'dares'); PIE *$dhun$- in OIcel. *dynr*, OE *dyne*, OHG *tuni* 'din' (cf. *$dhu̯en$- in Skt. *dhvánati* 'sounds'). By contrast, PIE initial *g̑h, gh* must have developed to fricatives and remained as such

in PGmc., given forms like OE *giefan* (with initial /j/; cf. ME *yiven*), OFris. *ieva*, NLG *jewen*, Dutch *geven* /ɣe:və(n)/ 'give' < *ʒeƀana^n, though there is an initial stop in Icel. *gefa*, NHG *geben*; Go. *giban* is ambiguous. Possibly *lð > ld* already in PGmc., since it is nowhere verifiably reflected as *lð*, and *lð* that arose by syncope in PNorse developed somewhat differently (§6.14). There was no change of *ð* after *r* in PGmc., however: cf. OIcel. pp. *orðinn* 'become' < *wurðanaz*.

On the development of PGmc. consonants in gemination, see §§6.8–9.

It has sometimes been supposed that PIE labiovelars become plain velars before back vowels in PGmc.[2] This is unlikely, given forms like Go. *hƀōpan* 'boast', *hƀōta* 'threat, reprimand', *ga-qumƀs* 'gathering', OE *hwōsan* 'cough', *hwōstan* 'cough' *cwēme* 'pleasing' (< PGmc. *kʷōmi-). There are nonetheless adjustments to labiovelars both in the PGmc. period and afterward according to environment. (a) Before the application of Grimm's law, PIE *kʷ* became *p* (> Gmc. *f*) when it appeared in the same root as another labial consonant. Examples: PIE *kʷetu̯ōr- > Go. *fidwōr* '4' (cf. Skt. *catvā́raḥ*, Lat. *quattuor*);[3] PIE *pénkʷe > Go. OHG *fimf*, OIcel. *fimm*, OE OS *fīf* '5' (cf. Skt. *páñca*, Gk. *πέντε*, Lat. *quinque*); PIE *u̯l̥kʷos > Go. *wulfs*, OIcel. *úlfr*, OE OS *wulf*, OHG *wolf* 'wolf' (cf. Skt. *vŕ̥kaḥ*, Lat. *lupus*, Lith. *vil̃kas*).[4] (b) Although PIE *kʷ* and *gʷ* are reflected as labiovelar *hʷ*, *q* in Gothic, the orthography suggesting preservation of their status as unit phonemes (but cf. Wagner 2006 and §6.4 *supra*), there is no labialized *g* in Gothic, so that PGmc. *ʒʷ* perhaps should be assumed to have developed to *ʒ* or *w* (§6.4) already in PGmc.[5]

1.   Under Grassmann's law, the first of two voiced aspirates in a PIE root is deaspirated in Sanskrit, as also in Greek.

2.   It has been claimed (e.g. by Streitberg 1896: §117) that this occurs also before IE *o* in PGmc., but that is hardly possible in view of forms like OIcel. *hvatr* 'keen', *hvalr* 'whale', and Go. *hƀaþō* 'spume' and *saíhƀan* 'see'. The delabialization in Go. OS OHG *hals*, OIcel. *háls*, OE *heals* 'neck' < *kʷolsos antedates PGmc.: see Solmsen 1897: 547. There is delabialization in the Go. suffix *-(u)h* 'but, and' (cf. Lat. *-que*); the usual assumption is that the change is limited to final position under low stress, which would also explain the failure of *u* to develop to *aú* before *h* in this form. But Mottausch (2001) argues cogently that the distribution of the variants *-h* and *-uh*, the latter occurring only after a consonant other than a liquid, is best explained on the assumption that the variants are purely phonological developments of PIE *-kʷe*.

3.   This sound change was first posited by Kluge (1886: 560). Alternatively, *f-* in Gmc. '4' could be by analogy to '5' (so Prokosch 1939: §99a, Voyles 1987: 492; first proposed by Zupitza 1896: 7). Bennett (1969) attributes such changes to contamination or borrowing from Celtic. Ringe (2017: 140–1) reserves judgment on the validity of the supposed sound change. Stiles (1985–6: 6.85) cites exceptions to the rule (e.g. Go. *qiman* 'come'), but he sensibly observes that since the change is not phonologically random but always involves the change of a labiovelar to a labial, it is probably a genuine, if somewhat opportunistic, phonological change.

4.   Sen (2000) argues rather that PIE *kʷ* became *p* before *e* in Pre-PGmc., explaining Go. *wulfs* as reflecting a stem *wl̥p-* that arose in the vocative (though this word can hardly have been used commonly in direct address).

5.   On exceptions to Grimm's law, and to the High German Consonant Shift (§6.21), see further the exchange among N. Davidsen-Nielsen, H.F. Nielsen, and J.E. Rasmussen in *Acta Linguistica Hafniensia* 16.45–56 (1976), 17.86–97 (1982), 18.201–19 (1983).

6.6   Verner's law

The most notable exception to Grimm's law is the appearance of PGmc. voiced fricatives where voiceless ones might have been expected, for example *ð* for *þ* in Go. OS *fadar*, OIcel. *faðir*, OE *fæder*, OHG *fater* 'father' (cf. Skt. *pitár-*, Gk. *πατήρ*, Lat. *pater*).

The first to publish the correct explanation was Karl Verner (1877):[1] when the immediately preceding syllable peak did not bear the PIE accent, a PIE voiceless stop (*p*, *t*, *k*, *k*ʷ, assuming prior coalescence of palatals and velars) between voiced sounds is reflected as a voiced fricative (PGmc. *ƀ*, *ð*, *ʒ*, *ʒ*ʷ) rather than a voiceless one.[2] These voiced fricatives thus fell together with the PGmc. reflexes of PIE aspirated voiced stops and developed in precisely the same way. In addition, under the same conditions *s* was voiced to *z*, which, outside of Gothic, developed, where preserved, to *r* by rhotacism, a development with parallels in Latin, e.g. gen. *generis* 'kind' < *ǵenh₁-es-*. The evidence for this analysis is plainest in strong verbs, which (outside of Gothic) continue to show paradigm alternations on this basis, whereas paradigm alternations due to the change were mostly eliminated in other grammatical categories before the literary period. And among strong verbs the evidence is plainest in the first three classes, in which the attested Gmc. alternations are paralleled by the accentuation of verbs in Sanskrit. That is to say, in Sanskrit normally the accent falls on the root in the perfect sg. (the PIE perfect being the chief source of the Gmc. pret.) but on the inflection in the dual and plural, and also in perfect participles. The accent in pres. forms is more various, but root accent is common. Accordingly, in at least the first three classes of Gmc. strong verbs there is to be found no voicing under Verner's law in the present stem (including the inf. and pres. part.) and the pret. sg. ind. (hence in the first two principal parts),[3] whereas there is voicing in the pret. pl., the pret. sj., and the pass. participle (the latter two principal parts). Comparison may be drawn between the alternation of accent seen in Skt. 3 sg. pres. ind. *várt-ati* 'turns', 3 sg. perf. ind. *va-várt-a*, 1 pl. *va-vr̥t-imá*, perf. pass. part. *vart-āná-* and the corresponding forms of OS *snīđan* 'cut', *kiosan* 'choose', and *tiohan* 'draw':

Pres. 3 sg.	*snīđiđ*	*kiusiđ*	*tiuhiđ*
Pret. 3 sg.	*snēđ*	*kios*	*tioh*
Pret. pl.	*snidun*	*kurun*	*tugun*
Pp.	*gi-snidan*	*gi-koran*	*gi-togan*

Due to the general voicing of fricatives between voiced sounds outside of Gothic (§§6.14, 6.16), along with limitations imposed by use of the Latin alphabet, alternation of *f* and *ƀ* is not demonstrable in the same fashion. However, the reflexes of the two sounds are to an extent distinguished as *f* and *b* in the earliest OE texts, though whether the distinction was by then one of voicing or of labiodental vs. bilabial articulation is contested (see Brunner 1965: §191 Anm. 1, with references). Neither is the alternation of *x*ʷ and *ʒ*ʷ directly observable in verbs, due to later developments of these sounds (§6.4), but it may be inferred from, e.g., OE inf. *sēon* (< *seohan* < *sex*ʷana*ⁿ*) 'see', pret. 3 sg. *seah* : WS pret. pl. *sāwon* (< *sǣwun* < *sēʒ*ʷun(þ)*), pp. *sewen* (< *seʒ*ʷan-*), but Anglian pret. pl. *sēgon*, pp. *segen*.[4] In NGmc. only the alternation of *s* and *r* is observable (as in OIcel. *kjósa* 'choose' : pret. 3 pl. *kuru*, *køru*), but that between *x* (which was lost when not word-initial) and *ʒ* may be inferred (as in pret. 3 sg. *sló* 'struck' : pl. *slógu*). Further alternations may be inferred after *n* or *l* in two verbs: pret. 3 sg. *fann* 'found' (< *fanþ*) : pl. *fundu*; pret. 3 sg. *olli* 'caused' (*wulþē*) : pp. *valdinn*. Verner's law failed to apply to fricatives in voiceless consonant clusters (*sp*, *st*, *sk*, *ss*, *ft*, *fs*, *xs*, *xt*).

In Gothic, alternations under Verner's law have been eliminated almost entirely by substitution of the voiceless alternant for the voiced, though in words in which there was little or no alternation the voiced consonant remains, as in *fadar* 'father' < PIE *ph₂ter-* and gen. sg. *riqizis* 'darkness' < *h₁rég*ʷes-* (but nom. *riqis* due to final fortition,

§6.12).[5] Variants may be observed, however, in related forms, e.g. *fahēþs* 'gladness' beside *faginōn* 'be glad'; *hūhrus* 'hunger' beside *huggrjan* 'be hungry'; *filhan* 'conceal' beside *fulgins* 'hidden' (adj., originally pp.); *jūhiza* 'younger' (< *$juŋx$-iz-, §4.1) beside *juggs* 'young'. The only words in which paradigm allomorphy persists are the pret.-pres. verbs **þaúrban* 'need' (1 sg. pres. *þarf*, pl. *þaúrbum*) and **áigan* 'have' (1 & 3 sg. *áih* 7× beside *áig* 1×; pres. part. *áigands* 5× beside *áihands* 1×). Given that the voiced variant occurs in words in which there would have been little or no alternation, naturally it is the standard view that Verner's law was once regular in EGmc., but its effects were eliminated in Gothic on an analogical basis, though it has also been argued that Gothic reflects a stage of PGmc. in which the variants had not yet developed fully.[6] It should be recognized that the elimination of the effects of Verner's law in Gothic is by no means exceptionless. It is not plain, for instance, why Gothic has *hazjan* but *nasjan*; Liberman (2010: 409–18, with discussion and references) suggests sentence stress as the cause.

Alternations like those in strong verb paradigms were termed *grammatischer Wechsel*, purportedly by Jacob Grimm, and certainly by Adolf Holzmann (1870: 171, 229, 342), apparently with *grammatisch* in the sense of Greek γράμμα 'letter of the alphabet', so that the original meaning of the phrase was 'alternation of letters' rather than 'grammatical alternation' (so, e.g., Lechner 2008–9: 6). But grammatical alternation is also observable on a comparative rather than a paradigmatic basis. A number of Gothic words show generalization of a stem with root accent, whereas the other Gmc. languages show the reverse generalization: such are Go. *dáuþs* 'dead' (< **dáuþa*-), but OE *dēad*, OS *dōd*, OHG *tōt* (**dauðá*-); Go. *alþeis* 'old', but OE *eald*, OS *ald*, OHG *alt*;[7] Go. *ga-nōhs* 'enough' but OE *ge-nōg*-, OS *gi-nōg*, OHG *gi-nuog*; Go. *áusō* 'ear', but OIcel. *eyra*, OE *ēare*, OS OHG *ōra*. Neuter *a*-stems afford a number of examples of differentiated leveling, due to accent shift in the nom./acc. plural (collective: §7.3), e.g. OIcel. *gler* 'glass' but OE *glæs*, OS OHG *glas*; OE OS *blōd*, OHG *bluot* 'blood' but Go. gen. sg. *blōþis*. Alternations are also frequently in evidence when a PIE verb root forms more than one Gmc. present type, e.g. Go. class I (orig. with nasal infix?) *weihan*, OHG *wīhan* 'fight' (= Lat. *vincō*?) : OIcel. class V *vega* 'fight'; Go. strong verb with weak pres. *hafjan* 'raise' (= Lat. *capiō* 'take') : weak verb *haban* 'have'; Go. strong *leihvan*, OIcel. *ljá*, OE *lēon*, OS OHG *līhan* 'lend' : OIcel. weak *leiga* 'hire'; Go. strong (intrans.) *fra-waírþan* : weak (trans.) *fra-wardjan* 'spoil'; OHG strong *gi-fehan* 'rejoice' : weak *feginōn*; Go. class V (with *n*-suffix) *fraíhnan* 'ask' : OHG weak class 3 *fragēn*; OHG class I *zīhan* 'accuse' : weak class 2 *zeigōn* 'show'. There is thus a fairly regular correspondence between strong verbs and causatives to the same root (with suffixal accent: §12.3), as with OE *ge-nesan* 'survive' : *nerian* 'save'; OS *līðan* 'go' : *lēdian* 'lead'; OHG *hāhan* 'hang' (< **xaŋxana^n*, intrans.) : *hengen* (trans.); OE *rīsan* 'rise' : *rǣran* 'raise' (< **raizijana^n*). Similarly, verbs and related nouns may give evidence of alternations, e.g. OE *staðol* 'foundation' : *standan* 'stand'; OE *lēosan* 'lose' : *lyre* 'loss'; Go. *fāhan* 'take' : OIcel. *fengr* 'booty'. Such correspondences are especially notable between strong verbs and deverbal fem. abstract nouns in PIE **-ā́* (as with Gk. τροπή 'turn' (noun) : τρέπω (verb)), as with OE *līðan* 'go' : *lād* 'course' (< **laiðō*); Go. pret.-pres. *láis* 'know how' : OE *lār* 'instruction, lore' (< **laizō*); Go. *þreihan* 'press upon' (< **þriŋxana^n*) : OIcel. *þrong* 'crowd'. For a succinct catalogue of grammatical classes in which Verner's law should have applied in PGmc., see Ringe 2017: 244–8, highlighting causative verbs of weak class 1 (PIE suffix **-éi̯e/o-*), e.g. OE *lǣran* 'teach' < **laizijana^n*; weak inchoative verbs (with PIE accent on suffix **-néh₂-* or the inflection), e.g. OE *liornian* 'learn' < **liznō-*; masc. *n*-stem agentives with weak grade of the root,

e.g. OE *heretoga* 'military general' < *-tuʒô* (cf. *tēon* 'lead' < *téuxanª*); some *a*-stem neuters expressing action or result, e.g. OE *gehror* 'destruction' < *-xruzaª* (cf. *hrēosan* 'fall'); and *ō*-stems of similar meaning (cf. OE *lād* : *līðan* above).

The formulation of Verner's law given above—voicing took place when the immediately preceding syllable peak did not bear the PIE accent—precludes voicing of initial fricatives if the domain of the rule is the word. There is one apparent exception, however: almost certainly the unstressed prefix *ʒa-* is cognate with Lat. *co(n)-*, demanding the assumption of voicing; the meaning 'with' is inferrable from correspondences like Go. *ga-máins* 'common' (cf. Lat. *com-mūnis*), *ga-qiman* 'assemble' (cf. Lat. *con-veniō*), *ga-haftjan* 'join' (cf. Lat. *con-cipiō*), and *ga-juka* 'companion' (cf. Lat. *con-jugō*);[8] compare also, without voicing, Franconian OHG (*Lex Salica*) *ham-* in Latinized *ham-ēdii* 'co-swearer' and *hamallus* 'assembly co-member'. Other prefixes show no such voicing, e.g. Go. *faír-, faúra-, fra-, þaírh-*.

On Verner's law see further Rooth 1974, with full bibliography, and subsequently Collinge 1985: 203–16 and Liberman 2010; also Moulton 1954, Milroy 1982, Mańczak 1990, 1999, B.R. Page 1998, Schaffner 2001, Mottausch 2011.

1.   Eduard Sievers perceived the correct explanation earlier and wrote to Wilhelm Braune about it in 1874. Although Sievers was too gracious ever to have mentioned the letter, the relevant portion was later published by Osthoff (1886: 13 n. 2).

2.   Comparison is frequently drawn to the regularity in English that intervocalic *x* is voiced as /gz/ when the accent follows, as in *exist*, *exert*, *examine*. The parallel is imprecise, since either /ks/ or /gz/ may appear in many words when the accent precedes, as in *exit*, *exile*, but cf. *exercise*, *execute*, with /ks/ only. Comparison may be drawn as well to the opposition *absolve* : *absolute*, and to the Middle English voicing of fricatives in unstressed words, e.g. *of* : *off*. See Liberman 2010: 408. Voicing under Verner's law is a type of lenition: voicing requires less effort between voiced sounds, since the vibrations of the vocal folds are continuous rather than interrupted. It is unsurprising that a variety of lenition should be restricted to positions of low accentual salience, but such need not be the case: voicing under Verner's law is only a limited variety of a more general change that applied later in the Gmc. languages, the voicing of all nongeminate fricatives between voiced sounds.

3.   Voicing would not originally have affected the pret. 2 sg. ind., where it is not found in NGmc., but WGmc. has adopted for the 2 sg. the same stem found in the plural: see §12.25.

4.   OFris. has pret. pl. *sēgon*, pp. *sēn*, indicating that WS and Anglian have extended paradigm variants in opposed directions.

5.   To Go. *aqizi* 'axe' cf. OIcel. *øx*, *ǫx*, OE (Mercian) *æces*, OS *acus*, OHG *achus*. PIE patterns of accentuation in *s*-stems (and thus alternations under Verner's law) are a matter of controversy: see §7.37.

6.   The latter is the view of Prokosch (1912, 1939: §20) and Hirt (1931–4: I, §91 Anm. 2, §93). Suzuki (1994) discusses the literature and attributes the removal of the voicing effects to final fortition (unpersuasively). On the law in Gothic, see Wood 1895, Haraldur Bernharðsson 2001, Woodhouse 2003, with references.

7.   In words like 'old' the evidence of OHG is crucial, since medial *-lþ-* changed to -ld- in NSGmc. (§6.17), as with OE OS *gold* 'gold' but OIcel. *gull*, OHG *gold* (not †*golt*), Go. dat. sg. *gulþa*.

8.   See esp. Bennett 1968.

6.7   The chronology and dating of Grimm's and Verner's laws

Grimm's law specifies a type of sound change known as a chain shift, whereby a change in value in one sound or set of sounds precipitates a change or series of changes in another sound or set. Two types of chain shifts have been posited, push chains and drag chains.[1] In a push chain, a phoneme or set of phonemes is said to change in such a way as to impinge upon the domain of another, causing the latter to change in value. For ex-

ample, given two phonemes /t/ and /d/, if the former begins to take on voicing as a quality it may result in a change of the latter (e.g. fricativization) in order to maintain the phonemic distinction: /t/ may thus become /d/, and the original /d/ may become /ð/.[2] In a drag chain, one phoneme develops a new value and another changes to fill the gap supposedly left by the other. For example, if /d/ becomes a fricative /ð/, /t/ may be voiced to /d/. Grimm's law has been analyzed as a push chain by Kretschmer 1932: 274, Luick 1914–40: §618.4, Noske 2012; as a drag chain by (it would appear) Grimm 1848: 393 (see also Hirt 1931–4: I, §§52–5, Prokosch 1939: §16), Kiparsky 1971. Given the reconstruction of PIE obstruents represented above (§6.1), the two analyses are not equally probable. If a push chain is assumed, the change of PIE *b*, *d*, *g*, *g*ʷ (assuming prior neutralization of the *ĝ* : *g* opposition) to voiceless stops would have prompted the change of the voiceless stops *p*, *t*, *k*, *k*ʷ to fricatives. Reasons might then be devised for the change of the voiced aspirates *bh*, *dh*, *gh*, *gh*ʷ to fricatives (and, in some environments, stops), but such a change could not be ascribed to any direct push-chain effect. If a drag chain is assumed, the fricativization of PIE *p*, *t*, *k*, *k*ʷ would have invited the devoicing of PIE *b*, *d*, *g*, *g*ʷ, which in turn would have permitted the development of *bh*, *dh*, *gh*, *gh*ʷ to either stops or fricatives (depending on environment), the distinction having no phonemic significance within the new PGmc. system of obstruents. The latter analysis thus makes of Grimm's law a genuine chain shift as regards all the affected sounds, whereas the former does not. Moreover, the push chain model would appear to demand spontaneous devoicing of the PIE voiced stops, even though this would represent, improbably enough, a variety of unconditioned fortition. Yet this reveals little, since the Gmc. shift in consonant values almost certainly was not as simple as either model suggests (see n. 2), and the precise values of the PIE obstruents involved cannot be determined.[3]

It should be observed that whereas a push chain demands simultaneous shifting of all affected phonemes, a drag chain allows the relevant shifts to have occurred over perhaps a considerable period of time. This suggests a possible source of dating evidence. Yet as Prokosch (1939: §17) remarks,

> The only concrete arguments consist in loan words and proper names, but the dating of the former is generally uncertain, and the possibility of sound substitution exists in both types of words. E.g., names like *Cimbri*, *Teutones*, with L[at]. *c t* for Germanic spirants, do not indicate that the consonant shift had not yet taken place at the time of the Cimbrian migration; rather, these consonants are either Roman or Celtic substitutions.[4]

Yet Prokosch's own idea (so, earlier, e.g., Hirt 1931–4: I, §65) that borrowings like Go. *Krēks* (Lat. *Graecus*) and Go. *páida* 'coat' (Gk. *βαίτη*) show devoicing to have occurred late in the shift faces similar objections.[5] Even so, estimates of the date of the shift, which rely on evidence such as this, vary widely, from the second millennium BCE (so Kluge 1913: §33 Anm. 1) to the end of the first century BCE (so Euler & Badenheuer 2009: 64–73). The commonest view is that the shift is to be dated to the first millennium BCE, perhaps toward its middle.[6]

Given the reconstruction of the PIE consonants represented above (§6.1), Grimm's law should be assumed to antecede Verner's law, hence, e.g., PIE *t* > PGmc. *þ* > *ð*, as otherwise the unlikely sequence of development would be PIE *t* > *dh* > *ð*. Alternative arguments mostly depend upon one or another version of the glottalic theory (§6.2),[7] and although it must be conceded that the phonological motivation for Grimm's law is hard to discern under the standard reconstruction of the PIE obstruent inventory,

no version of the glottalic theory yet proposed is cogent enough, nor is the the problem exigent enough, to compel credence. Verner's law is further to be dated prior to the PGmc. accent shift (§2.2).[8,9]

1. Or, regrettably, 'pull chains'. The two types are not equally credited in the literature: "Drag chains are supported by a good deal of empirical evidence, in terms of observable sequences of events. No such empirical support seems to exist for push chains" (Hock 1986: §8.4). There is, however, good evidence that the Great Vowel Shift of English unfolded in push-chain fashion: see Lass 1999: 74–7.

2. It may seem absurd to suppose that /t/ would spontaneously change to /d/ in all environments, given that phonemic systems are sets of structured oppositions. Rather, since voicing of stops is a common sort of lenition, it may be supposed that in such a development /t/ is voiced in leniting environments, and conditions in the system of consonants are such as to prompt the opposed phoneme /d/ to undergo development to a fricative in order to prevent loss of phonemic contrast in just those same environments, resulting eventually in its change to a fricative in other environments. Likewise, the idea of a sound leaving a gap to be filled in a drag chain is difficult to reconcile with the insight that phonemes are sets of sounds defined by their opposition to other sets rather than sounds delimited on an absolute basis. Chain shifts cannot be the seemingly simple, straightforward developments described here, since they involve changes not in simple sounds but in systems of sounds, i.e. phonemes comprising perhaps numerous allophones. They thus are not likely to represent wholesale, uniform shifting of all allophonic values but piecemeal redistribution of allophones. But specifics of this kind in a change as historically remote as the First Sound Shift are irrecoverable. On the mechanisms of the First (and, in some cases, Second, §6.21) Sound Shift, in which aspiration is generally thought to have played a crucial role, see further Fourquet 1948, Schrodt 1989, Draye 1990a, Lauttamus 1992, Paddock 1996–7, Goblirsch 2005: 18–101, *idem* 2015, with further references.

3. See the remarks in §6.4. As an illustration of the difference that precise specification makes, note that Prokosch's analysis (1939: §16), derived from Grimm's, relies upon the supposition that the PIE voiced aspirates were actually fricatives—though it is implausible that such should have developed to murmured stops in Indic.

4. Prokosch's remarks here effectively undermine the arguments of Euler & Badenheuer (2009: 13, 66–7) and Euler (2013: 50) for a late dating of the change of voiceless stops to fricatives. Cf. Mottausch 2015: 285, objecting that if these names contained unshifted consonants, the First Sound Shift would have to be dated improbably late.

5. It is possible that PGmc. had no voiced stops in initial or intervocalic position, only voiced fricatives, and thus, voiceless stops were adopted as nearest equivalents. See further Kluge 1913: §33, Hirt 1931–4: I, §65.

6. Much 1893: 63 dates the change to the third century BCE, Bethge 1900: 176 to the period 1000–400 BCE, and Meyer 1901: 126 and Kossinna 1936 to about the year 400 BCE. Polomé (1994: 9–11) discusses the evidence of Germanic names in Latin and Greek sources and concludes that they shed no reliable light on the date of the shift.

7. See, e.g., Ramat 1981: 37–40, Vennemann 1984b: 21; Kortlandt 1988: 5–6; Gamkrelidze 1990; Koivulehto & Vennemann 1996 (cf. Liberman 2010: 401–2); Noske 2012; see also below on Kluge's law, §6.9. Glottalic approaches to the First Sound Shift have also met with much criticism: see, e.g., Draye 1986, Merlingen 1986 (advocating implosives rather than ejectives; cf. Woodhouse 1997), Moulton 1986, Penzl 1986b, Sanjosé Messing 1986, von Stechow 1986, Meid 1987, Voyles 1989a, Marchand 1991.

8. See Polomé 1987b: 219–20, with refs. On alternatives to this analysis, see §2.2 n. 2; also Vykypěl 2001.

9.   Ringe (2017: 125, 234) would date Verner's law after the PGmc. loss of final non-high vowels on the basis of its failure to apply in Go. OHG *uns* < *unswé*. But it is difficult to believe that the loss of final vowels did not postdate the change of the PIE pitch accent to the Gmc. stress accent, and regardless of the nature of the PGmc. accent at the time Verner's law applied (see §6.6), it is hard to countenance the supposition that a final syllable bearing the accent would have been lost.

6.8   Geminates in Proto-Germanic

In general, geminate consonants were rare in PIE, arising only on a morphological basis when a suffix began with the same consonant that ended the preceding morpheme.

Geminates that arose this way appear usually to have been simplified, for example 2 sg. pres. ind. *h_1es-si 'are' > *esi > Skt. ási, Gk. εἶ.

An exception is -tt-, which arose by the addition of a t-suffix to a form ending in t or d. The resulting tt is usually said to have developed to t^st (or $t^þt$) in PIE. It is reflected as tt in Skt., ts > ss in Celtic, st in most other IE languages (including Avestan), but ss in Latin and Gmc., and in Gmc. it is degeminated to s after a long vowel, a diphthong, or a consonant. Examples: PIE *mit-to- > *mit^sto- 'mis-' in Go. missa-, OIcel. OE OS mis-, OHG missa-, missi- (OIr. mí-, mis(s)-; cf. OHG mīdan 'avoid' < *mīþan- < *$mei̯t$-on-); PIE *u̯id-tó-s (> *u̯it^stós) 'seen' in Skt. vittáḥ, Gk. ἄ-ιστος, Lat. vīsus (with analogical lengthening), OE OS wiss, OHG gi-wissi 'certain' (cf. the degemination in OE wīse, OHG wīsa 'manner' < *u̯eid-to-); PIE *sed-t- in Skt. sattáḥ 'seated', Lat. sessiō 'session', OIcel. OE sess 'seat'. Forms that arose early in PGmc. are treated similarly, e.g., to the pret.-pres. verb Go. wáit 'knows' (etc.), pret. Go. OS OHG wissa, OIcel. vissa, OE wisse (beside wiste, with analogical re-addition of the dental suffix). Naturally, as the last example shows, irregularities created by this change are frequently removed on the basis of analogy, e.g., beside OIcel. hlass 'cart-load' (cf. hlaða 'lade' < PIE *klh_2-tó-), OE hlæst, OHG (h)last, with re-addition of the abstract-forming suffix seen in OE forst, frost 'frost' (cf. frēosan 'freeze') and cost 'choice' (cf. cēosan 'choose').[1] Similarly, PIE *ts yields Gmc. s(s), as in Greek and Latin. Examples: PIE *-bhudh- + -s- > PGmc. *-buts- > -bus- in Go. ana-busns 'command' (cf. ana-biudan 'command' and -sn- in ga-rēhsns 'appointed time' beside rahnjan 'count'); PIE *h_1rudh- + -s- > PGmc. *rutsman- > OHG rosomo 'rust' (cf. Gk. ἔρευθος, Lat. rubor 'redness').

There is a tendency in Gmc. for assimilation to occur in consonant groups containing a sonorant consonant, giving rise to new geminate sonorants ll, nn, mm, and perhaps rr:

Gmc. ll. Notably, *-ln- yields -ll-, as in PIE *$pl̥h_1$-nó- > PGmc. *ful-n- > Go. fulls, OIcel. fullr (etc.) 'full' (cf. Skt. pr̥náti 'fills', with infixed n, Lat. plēnus 'full'); PIE *$pelh_2$-n- > PGmc. *fel-n- > Go. -fill (in þrūtsfill 'leprosy'), OIcel. fjall, OE fell (etc.) 'hide' (cf. *$pelh_2$- > Gk. πέλας 'hide'); PIE *$h_2u̯l̥h_2$-n-eh_2 > PGmc. *wul-n- > Go. wulla, OE wull (etc.) 'wool' (cf. Skt. ū́rṇā, Lat. lāna 'wool'). Likewise, PGmc. *-ðl- probably yields -ll-, and when *-ðl- is the result of Verner's law, -ll- may be in variation with -þl- (Sievers 1895): PGmc. *staðlaz > OE steall (etc.) 'position' : *staþulaz > OE staðol (etc.) 'foundation'; PGmc. *waðlō- > OE weallian, OHG wallōn 'wander' : *waþ(u)l- in OE waðol 'wandering', OHG wadal 'migration'. Perhaps also there is a change of PGmc. *-zl- to -ll- (Kluge 1882: 521–5; cf. *-zn-, *-zm- below): PGmc. *knuzlijana^n > OIcel. knylla 'beat', OE cnyllan 'toll', MHG knüllen 'beat' : *knusjana^n > OE cnyssan, OHG knussen 'strike'; PGmc. *xruz-l- > OIcel. hrolla 'shudder' : *xreusana^n > OIcel. hrjósa 'shudder'.

Gmc. nn. PIE *-nu̯- develops to Gmc. -nn-, as in PGmc. *þunw- > OIcel. þunnr, but ja-stems OE þynne, OHG dunni 'thin' (cf. Lat. tenuis, with full grade); PGmc. *manw- > Go. manna, OE OS OHG man(n) 'person' (cf. Skt. mánu- 'person'). Verbs with an n-infix are a notable source: PGmc. *brinwana^n > Go. OS OHG brinnan, OIcel. brinna, OE beornan, birnan 'burn' (cf. Lat. ferveō 'boil, seethe', without infix); PGmc. *rinwana^n > Go. OE OS OHG rinnan 'run' (cf. Skt. r̥ṇóti, r̥ṇváti 'moves'). Go. kunnan, OIcel. kunna, etc. 'know' perhaps shows a geminate as the result of infixation of n in a stem already containing n, assuming PIE *$ĝn̥$-n-h_1- (so Pokorny 1959–69: I, 376; cf. §6.3 supra). PGmc. *-zn- also develops to -nn-, though never in Gothic: PGmc. *razna^n

'house' > Go. *razn*, OIcel. *rann*, OE *arn*; PGmc. **twiznaz* > OIcel. *tvinnr*, *tvennr*, OE *twinn* 'twofold, twin' (cf. Lat. *bīnī* < **du̯isnoi̯*); perhaps the PGmc. suffix **-asnō-*, **-aznō-*, as in Go. *hláiwasnōs* 'graves', *arƕazna* 'arrow', if this is reflected in OE *byrgen(n)* 'grave'; probably **lizn-* is a WGmc. innovation in OE *leornian*, OFris. *lerna*, *lirna*, OS *līnon*, OHG *lirnēn*, *lernēn* 'learn'. NWGmc. *-nn-* can also result from the loss of an intervening consonant, as in OHG *zannēn* 'bare one's teeth' (< **tanþ-n-*; cf. *zand* 'tooth') and OE *sinnan* 'mind, heed', OHG *fir-sinnan* 'recover one's senses' < **sinþ-n-* (cf. Lat. *sentiō* 'perceive').

Gmc. *mm*. The securest source of *-mm-* is PGmc. **-zm-*, as in Go. dat. sg. *þamma* (cf. Skt. *tásmāi*) and Go. *im* 'am' < **imm(i)* < PIE **h₁es-mi*.[2] Probably **-mz-* had the same result, as in OS *thimm* < **þimz-* (cf. Lith. *tamsùs* 'dark'). There is assimilation of **-nm-* to *-mm-* in OE *hamm*, OHG *hamma* 'ham' (cf. PIE **kneh₂-m-* in Gk. κνήμη 'shank', OIr. *cnáim* 'bone'). Possibly PIE **-bm-* develops to Gmc. *-mm-*, as in OIcel. *dammr* 'dam', Go. *faúr-dammjan* 'dam up' (cf. OIcel. *dapi* 'puddle' (nickname), OHG *tapfar* 'heavy', OCS *debelъ* 'thick': Schröder 1898: 66).

Gmc. *rr*. Geminate *-rr-* is found in all the early Gmc. languages, including Go. (*qaírrus* 'gentle', *andstaúrran* 'murmur against', *faírra* 'far off'), but there is no consensus about its source. To judge by some doublets, **-rn-* is a source: compare OE *steorra*, OS OHG *sterro* : Go. *staírnō*, OIcel. *stjarna*, OHG *sterno* 'star'; also Go. *fairra*, OHG *ferro* 'far off': Go. *faírneis*, OHG *firni* 'old'. It may be that *-rr-* arose under Kluge's law (see below), yet the exceptions are so much more numerous than examples of *-rr-* (Go. *þaúrnus* 'thorn', *barn* 'child' *gaírnjan* 'desire', *kaúrn* 'grain', *haúrn* 'horn', etc.) that suspicions about this explanation are natural.

On the gemination of glides due to the Verschärfung, see §6.10.

1. Kögel (1880: 196) argues that such instances of *st* for expected *ss* result from placement of the PIE accent on the preceding vowel, though this can hardly be proved, and the phonological motivation is difficult to discern. See Kluge 1886: 150, and for an exhaustive treatment of the subject, Görtzen 1998. Krahe & Meid (1969: III, §128.2) prefer to see an opposition like OIcel. *hlass* : OE *hlæst* as due to an original difference in suffixation, though they admit the possibility of analogical readdition of the *t*-suffix. Ringe (2017: 247–8) suggests a separate sound change of PGmc. dental + *t* to *st*. Other instances of *-tt-* that arose in Gmc. (§6.9) remain as such. See the lengthy discussion in Hill 2003: 78–217.

2. The idea of Hirt (1931–4: I, §75.4) that **-sm-* might also have produced *-mm-* is contradicted by OE *bōs(u)m*, OFris. *bōs(e)m*, OS *bōsom*, OHG *buosum* 'bosom' < **bōsmaz*, OE *þrosm* 'vapor', *besma* 'broom', etc., though, to be sure, these could be WGmc. innovations. Certainly, **-ms-* did not yield *-mm-*: cf. Dutch *dijzig* 'cloudy, dark' < **þimsiʒa-* : OS *thimm* < **þimz-*.

6.9   Geminate obstruents and Kluge's law

In addition to the geminate resonants (and *ss*) discussed above, geminate obstruents are well attested in all the early Gmc. languages except for Gothic, where examples are few and almost certainly not derived directly from PIE: aside from personal names in historical records, the instances are just *sakkus* 'sack' (of Semitic origin, probably borrowed from Greek, though elsewhere in Gmc. borrowed from Lat. *saccus*: see the *OED*), *smakka* 'fig' (surely a loan; cf. OCS *smokva*), *atta* 'father' (a hypocorism, probably borrowed (Gk. ἄττα, Lat. *atta*); cf. the derivative *Attila*), and *skatts* 'money' (OE *sceatt*, NHG *Schatz*; a concept not native to the early Gmc. economy,[1] and so most likely borrowed, though the source is unknown: see Orel 2003: 336, and cf. OCS *skotъ* 'herded animal').[2] It is thus difficult to disagree with the assessment of Prokosch (1939:

§31a): "there is no Gothic evidence for the Gmc. lengthening of stops."[3] Voiceless geminate stops are not uncommon in the other Gmc. languages, and Kluge (1884) explains the majority of them as due to assimilation of a following *n* contained in an accented nasal suffix, as in these examples of *n*-stem nouns[4] and verbs assumed originally to have borne a nasal suffix *-néh₂- (as in Skt. *gr̥bhṇā́ti* 'seizes' < *ghr̥bh-néh₂-ti*: see §12.3):[5]

> OIcel. *ruppa*, MLG *roppen*, OHG *ropfōn* 'pluck' < PIE *rup-néh₂-, as in Lat.
>   *rumpō* 'break'
> OE *læppa* 'lappet, piece, lobe', OFris. *lappa*, OS *lappo* 'cloth, rag' < PIE *lob-
>   néh₂- (cf. Gk. λοβός 'lobe')
> ME *lappen* 'lap' (verb) < PIE *labh-néh₂-, as in Lat. *lambō* 'lick' (cf. Gk.
>   λαφύσσω 'devour' < *labh-)
> OE *cnotta* 'knot' < PIE *gnu-t-néh₂-; cf. OHG *knodo* 'knob' < PGmc. *knuþan-;
>   also Lith. *gniutúoti* 'squeeze, clutch'
> OHG *krazzōn* 'scratch' < PIE *grod-néh₂-; cf. OIcel. *krota* 'engrave' < *gr̥d-
> Possibly OE *hættian* 'scalp' < PIE *kh₂dh-néh₂-; cf. OE *hōd* 'hood'
> Possibly OE *fricc(e)a* 'herald', *jan*-stem reformed from PIE *preḱ-néh₂-; cf. Go.
>   *fraíhnan* 'ask'
> OE *þaccian* 'pat' < PIE *tag-néh₂-; cf. Lat. *tangō* 'touch'
> OS *likkon* 'lick' < PIE *liĝh-néh₂-, as in Gk. λιχνεύω, Lat. *lingō* 'lick'

By contrast, when the accent precedes the PIE obstruent there is no assimilation. Probable examples, given their *e*-grade vocalism, are OIcel. *regn* 'rain', *svefn* 'sleep', OE *þegn* 'thegn'. Although much analogical disruption must be assumed, Kluge's findings also provide a means of accounting for the coöccurrence of the stems *oþ- and *upp- (the latter, strikingly, unreflected in Gothic) in certain forms derived from prepositions, e.g. OS adv. *oþan(a)*, *uppan*, OHG *obana*, *ūffana* 'above' (cf. Gk. ὑπό 'under'), due ultimately to variation in the ablative suffix *-an- (Kroonen 2011: 82–92). As the examples above illustrate, *tt arising in this fashion did not develop to Gmc. *ss, as PIE *tt did (§6.8).

   It will be noted that the etymologies of these words with geminate oral stops are not nearly as secure as those of some of the geminate sonorant consonants examined above. Accordingly, scholarly opinions about the validity of Kluge's explanation diverge widely: e.g., Prokosch calls it "the standard view" (1939: §22), whereas Ringe says that the idea is "doubtful at best" (2006a: 115; cf. Ringe 2017: 136–40, rejecting it altogether). The commonest explanation for such geminates is that they are expressive in origin (so, e.g., Trautmann 1906, Fagan 1989), and indeed, geminates are very common in hypocorisms (e.g. OE *Cēol(l)a* for *Cēol*(-mund, -noþ, etc.) and *Ēad(d)a* for *Ēad*(-red, -weard, etc.)) and in intensive and iterative verbs, e.g. OHG *tocchōn* 'exert oneself', *brocchōn* 'crumble', *zwecchōn* 'seize, pluck' (cf. *zwigōn* 'pluck'), etc. Of expressive origin appear to be diminutives in reference to animals, e.g. OE *ticcen*, OHG *zicchī*, *zikkīn* 'kid' (cf. OHG *ziga* 'goat') and OIcel. *krabbi*, OE *crabba*, MLG *krabbe* 'crab' (cf. OHG *crebiz*). But the categories in which an ablauting *n*-suffix most commonly appears, *n*-stem nouns and certain weak verbs, are also the categories in which expressivity might most be expected to have played a role, since hypocorisms are generally *n*-stems, and weak verbs in general are commonly intensive or iterative.[6] Much then depends upon examples in which expressivity must be excluded as an explanation, such as the doublet OS *oþan(a)*, *uppan* 'above', which are infrequent and resistant to explanation on a purely phonological basis, since much analogical change must be assumed. Still, the expressive basis for gemination in many *n*-stem nouns and

weak verbs is difficult to perceive (e.g. OE *cnotta* 'knot' and *læppa* 'lobe'; Lühr 1988 collects examples), and in view of such instances, the degree to which NWGmc. forms with geminate obstruents are to be found in *n*-stem nouns and in verbs (presumably) with *n*-suffix, as predicted by Kluge, is impressive. Thus, although Kluge's account demands much conjecture, it cannot justly be called improbable, and in fact in some instances it does seem the most plausible explanation.

Yet even if Kluge's account is admitted, significant problems remain. Given the reconstruction of the PIE obstruents represented above (§6.1), it is difficult to see why the voiced aspirates should have been devoiced only when geminated. To explain this it has been proposed that Kluge's law applied before the devoicing of voiced stops under Grimm's law (so already Kluge 1884: 172 and, e.g., Prokosch 1939: §22, Lühr 1980: 259, Scheungraber 2014: 133, assuming that devoicing of the PIE voiced stops was the final development in the consonant shift, and the other changes under Grimm's law preceded the application of Kluge's law), and thus, for example, there was the development PIE **ghn* after unaccented vowel > **gg* (Kluge's law)[7] > **kk* (Grimm's law). It was pointed out above (§6.7) that the devoicing of PIE voiced stops under a push chain analysis of Grimm's law is difficult to account for; the same must be said of voiced geminates in either a push chain or a drag chain. The identical treatment under Kluge's law of PGmc. voiced fricatives whether derived from PIE voiced aspirates or from voiceless stops (i.e., under Verner's law) has been taken as evidence that Verner's law antecedes both Kluge's and Grimm's laws (so Kortlandt 1991), though this requires an alternative reconstruction of the PGmc. consonant inventory in line with the glottalic theory (§6.2). Dating Kluge's law to PGmc. also means that the effects of the law should be evident in Gothic. But it was pointed out above that geminate obstruents are exceedingly few in Gothic and are found probably only in borrowed words and in names; moreover, although some counterexamples to the law in Gothic are likely to show root accent, in others this is not so plain, e.g. *aúhns* 'oven' (cf. Gk. *ἰπνός* 'oven', and see Orel 2003: 433, Casaretto 2004: 325–6).

If Kluge's law is to be credited, it should be assumed that when a geminate arose after a long vowel or a diphthong, it was degeminated. This, after all, is what happened to geminates that arose by other means, e.g. Go. *un-weis* 'unlearned', OE OS OHG *wīs* 'wise' < **u̯eid-to-* and OHG pret. *muosa* 'must' < **mōssa* < PGmc. **mōt-t-*. This assumption allows it to be explained why certain Gmc. voiceless stops correspond to the reflexes of PIE voiced aspirates (rather than non-aspirates) or voiceless stops in other IE languages. Kluge's examples (1884: 182–4) include Go. *ƕeits*, OIcel. *hvítr* (etc.) 'white', as if from PIE **ĥu̯eit-nó-* (cf. Skt. *śvētá-*, *śvítna-*, *śvitnyá-* 'white'); others proposed include OE *tǣcan* 'teach' beside Go. *táiknjan*, OIcel. *teikna*, OE *tǣcnan*, OHG *zeihinen* 'show' (cf. Gk. *δείκνῡμι* 'show') and OE *scēap*, OS *skāp*, OHG *scāf* 'sheep' (cf. PGmc. **skaƀ-* in Go. OHG *skaban*, OIcel. *skafa* (etc.) 'shave, shear'). Some of these examples, however, demand the assumption that Kluge's law applied in PGmc., with later elimination of its effects in Gothic.

Voiced geminates in Gmc. are less frequent, e.g. OE *frogga* 'frog', *docga* 'dog', *sceacga* 'rough hair'; Kluge (1884: 176–7) explains them as having arisen on an analogical basis, by contamination of stems in alternation like **knaƀa-* ~ **knappa-*.

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1. See Tacitus, *Germania* v, xv.

2. Kroonen (2011: 80–2) adds hypocoristic personal names found outside of Bible Gothic: *Ibba*, *Faffo*, *Mammo*, *Oppa*, *Riggo*, *Wacca*.

3.   Marchand (1957c) offers cogent arguments against assigning this change to the PGmc. period. For attempts to establish that Kluge's law is a PGmc. phenomenon and that the geminates it produced were later mostly eliminated in Gothic, or simply not represented in the Gothic Bible, see Kroonen 2011: 110–12, Scheungraber 2014: 139–42.

4.   Kluge's assumption is that in the *n*-stems gemination would have occurred in the weakest cases, i.e. those with zero grade of the *-en-* suffix (gen. sg., acc. pl. (?), and gen. pl. in PIE, though traces of zero grade in the suffix in Gmc. are found only in the gen. pl.: §§7.30–1). For bibliography, see Lühr 1988, Kroonen 2011.

5.   Lühr (1988) classifies the verbs not as nasal presents but as factitives based on verbal adjectives in PIE *-no-*; see also West 1990. The nouns are surveyed by Kroonen (2011), the verbs by Scheungraber (2014: 129–58, 277–82), the latter of whom (170–2, with refs. to earlier literature) concludes that derivation from verbal adjectives is untenable, and only derivation from verbs with nasal suffix may be credited.

6.   For a glottalic approach to expressive gemination, see Hopper 1990.

7.   Note that on this reasoning it must be assumed that PIE *gh* developed to PGmc. *g* (rather than *ȝ*) not just after *n* but also before it, though Kluge (1884: 175) would have the stop articulation develop after the rise of the geminates. For counterarguments to Kluge's ordering of Grimm's and Verner's laws, see Ringe & Taylor 2014: 512–14.

6.10   The Verschärfung

The Germanic languages show reflexes of what would appear to have been geminate glides */jj, ww/ after a short vowel in some words in which extra-Germanic cognates show non-geminates, e.g. OHG *zweiio* 'of two' beside Skt. *dváyōḥ*. In North Germanic the geminates developed to ⟨ggj, ggv⟩, respectively, and in Gothic to ⟨ddj, ggw⟩, as in ON *tveggja*, Go. *twaddjē* 'of two' < *twajj-*. Further examples:[1]

>   **With */jj/:**
>
>   Go. *daddjan*, Old Swedish *dæggia* 'suckle'; cf. Skt. *dháyati* 'sucks'.
>   OIcel. *Frigg* (name of deity), OHG *Frīja*; cf. Skt. *priyá-* 'loved one'.
>   Go. *-waddjus*, OIcel. *veggr*, OE *wāg*, *wǣg* 'wall'; cf. Skt. *váyati* 'weaves'.
>
>   **With */ww/:**
>
>   OIcel. *byggja*, *byggva* 'settle'; cf. Skt. *bhávati* 'becomes'
>   Go. *glaggwō* 'meticulously', OIcel. *glǫggr*, *gløggr*, OE *glēaw*, OS *glau*, OHG
>   *glauwēr* 'clear-sighted'; cf. OIr. *glúair* (< *ĝhleu̯-ri-*) 'clear, bright'.
>   OIcel. *hǫggva*, OE *hēawan*, OS *hauwan*, OHG *houwan* 'hew'; cf. Lith. *káuju*,
>   *kóviau*, *káuti* 'hit'

The two processes, of gemination in Germanic and of the development of obstruents in North and East Germanic, are both referred to indifferently as 'the Verschärfung'; the older term 'Holtzmann's law' (after Holtzmann 1835: 862, 1836, 1870: 29, 42–3, 109) is now rarely encountered. In what follows, the gemination will be examined first, then the development of obstruents.

   1.   The gemination appears not to have affected every intervocalic glide after a stressed vowel: to OIcel. *Frigg* (name) cf. Go. *frijōn* 'love', and to *hǫggva* cf. Go. *hawi* 'hay'; cf. also the class of words like OS *treo* 'tree', dat. *trewe* in West Germanic (OIcel. *tré*). Three chief kinds of explanations for the gemination have been offered: (a) accentual; (b) laryngeal; (c) morphological.[2] No explanation has yet been generally agreed upon, but the laryngeal account currently enjoys the most favor. All explanations face the difficulty that secure etymologies for the relevant words are not numerous.

(a) Early attempts at explanation, influenced by the explanatory success of Verner's law, appealed to the position of the PIE accent, as Holtzmann himself had supposed. Most such attempts argued that the change was conditioned by a following accented syllable (Bechtel 1885; Trautmann 1906, 1925; Mikkola 1924; Hirt 1931–4: 1.113), though Kluge (1879: 127–30, 1913) argued for a preceding accent. Uncertainty about the place of the accent, combined with the failure of any alternation in regard to the gemination in Go. strong verbs like *bliggwan*, *blaggw*, *bluggwum*, *bluggwans*, in which the place of the accent ought to have varied, eventually brought scholars to reject such explanations.[3] Subsequent attempts to relate the phenomenon to the Germanic and/or the PIE accent have been sporadic and have not won acceptance.[4]

(b) H.L. Smith (1941) was the first to relate the gemination to PIE laryngeal consonants, and the idea has subsequently evolved in several different directions. The precise role of any laryngeal involved is a matter of disagreement: some, with Smith (and see esp. Lehmann 1952: 63 and Davis & Iverson 1996b), see it as lengthening an adjacent glide due to assimilation of the laryngeal (a change which Lindeman 1964 would date to the PIE period; cf. Beekes 1972), whereas others see the laryngeal as leaving a hiatus upon its disappearance, to be filled in Germanic by a homorganic glide.[5] A particular disagreement concerns whether the laryngeal must follow the glide (so Jasanoff 1978a) or precede it (so Polomé 1949, 1959, 1970),[6] or whether either arrangement is allowable (so in part Lehmann 1952: 36–46). This particular uncertainty has occasioned some heavy criticism of laryngeal approaches (see esp. Beekes 1972), a situation that Jasanoff (1978a, supported by Rasmussen 1990) aims to set right by assuming that laryngeal plus glide could undergo metathesis. While Jasanoff's seems the best laryngeal analysis, its chief demerit is that it requires a great deal of analogical interference in order for the phonological rule to apply regularly, especially in regard to the metathetic process and the formation of stems in *-uww-*, as in OIcel. pp. *brugginn* 'brewed'. Moreover, the word with the plainest etymology, OIcel. *tveggja*, proves an ill match with any laryngeal hypothesis: Jasanoff (1978a: 83–4, in reliance upon Lühr 1976: 73) would derive it from a PIE gen. dual *$d\mu oi$-$Ho\mu$ (not his notation), but Rasmussen (1990: 436–7) points out that the ending *-$Ho\mu$ is locative rather than genitive. For counterarguments to laryngeal explanations, see van Coetsem 1949, Zgusta 1955: 198–201, Beekes 1972, Voyles 1989b: 23–32, Polomé 1994: 21–4.

(c) A morphological solution is proposed by Kuryłowicz (1967, Kuryłowicz *et al.* 1968–2015: 2.329–33), whereby a form like *CuwV-*, conceived as a reduced grade of *CewV-* under Edgerton's formulation of Sievers' law (§5.8) or as due to loss of a laryngeal consonant in *CuHV-*, was given an analogically induced new full grade *CeuwV-*. Another morphological explanation[7] ascribes the gemination to paradigm regularization, whereby an alternation between diphthongal forms like masc. nom. *twai*, dat. *twaimiz* and non-diphthongal gen. *twajōn* resulted in the extension of the diphthong in the former to the latter, giving *twaijōn*. This process is paralleled at a later date in OE nouns with diphthongal stems, where alternation between nom. *þeu > þēo* 'servant' with gen. *þewas > *þewes* resulted in extension of the diphthong of the former to the latter and of the *w* of the latter to the former, giving nom. *þēow*, gen. *þēowes*. This accounts well for verbs with Verschärfung, given original alternations like inf. *brewanaⁿ* 'brew' beside 1 & 3 sg. pret. *brau*, but it is more speculative as an explanation for some nouns, such as OIcel. *hǫgg* 'blow' and OE *trēow*, which must be regarded as analogical to related verbs or as due to change of inflectional class. An advantage of morphological solutions is that the Verschärfung appears to be too irregular to be the

result of phonological change. A more concrete advantage is that since "the dismantling of geminates is a very unusual change (apparently violating the Obligatory Countour Principle)" (Ringe & Taylor 2014: 65–6), it seems more plausible to suppose that WGmc. reflects the original situation, with a dipthong before a glide (i.e., the Verschärfung is not the result of gemination), and East and North Gmc. have innovated, turning a sequence like *-aij- into *-ajj-. That WGmc. did not undergo the same change is perhaps not unrelated to the facts of WGmc. consonant gemination (§6.15).

It should be noted that a number of forms with */jj/ can be explained as due to suffixation, e.g. weak Go. *daddjan* 'suckle' < *dai-j-ana^n and OIcel. *Frigg* < *frij-jō* < *frī-jō*: see Voyles 1989b, Rasmussen 1990. This lends support to the just-remarked evidence that the WGmc. situation is more original.

2. The second stage of the Verschärfung, represented by the rise of obstruents in North and East Germanic, has occasioned controversy about both (a) the phonetic values of the new obstruents and (b) the motivation for the change:

(a) It is debated whether Go. *-ddj-* and OIcel. *-ggj-* might represent the same sequence of sounds (presumably involving a palatal stop), a matter that is related to the question whether the second phase of the Verschärfung comprises independent developments in East and North Germanic (the usual assumption: see, e.g., Cathey 1970, Markey 1988b: 322, H.P. Petersen 2002) or a change that took place either before the separation of the two branches (so Davis & Iverson 1996b) or at a stage of greater proximity between the two (see Suzuki 1991b). These two sequences of sounds are usually assumed to represent a (geminate) stop followed by a glide (see, e.g., Y. Tanaka 1970), though Hammerich (1955: 178) argues that at least originally the fortition of [jː] resulted in [ʤ], somewhat as Latin [j] developed to Italian [ʤ], regardless of what Go. *-ddj-* and OIcel. *-ggj-* might actually represent. As for Gothic *-ggw-*, it has been debated whether *-gg-* here might not represent [ŋg], as elsewhere (so Marchand 1959: 442, 1973: 56–7, Bennett 1964, Snædal 2011; but see Brosman 1971 for counterevidence), though it is usually assumed to represent [gː] in products of the Verschärfung.

(b) As for the motivation for the East and North Germanic developments, Polomé (1949) argues that the sound(s) represented by ⟨gg⟩ developed when the accent inherited from PIE was on the following vowel, as with Verner's law. Rasmussen (1989; see also Rowe 2003) posits a PGmc. development of [jj] and [ww] to [jɣj] and [wɣw], with subsequent loss of the fricative in West Germanic; and indeed, several analyses posit a fricative at least at an intermediate stage. Davis & Iverson (1996b) instead suppose that at the time it was lost, the laryngeal left its place to be filled by a glide, and at the same time its feature [consonantal] spread to the preceding glide, producing a stop. The West Germanic languages suggest instead that stop articulation is not to be traced to Proto-Germanic, as do some early Germanic loan-words in Finnish and the word **niuwila** in runes on the fifth-century Næsbjærg bracteate (see, e.g., Marchand 1973: 87, Koivulehto 1977).

1.   For an assemblage of 42 possible examples, see Rasmussen 1990: 436–41. Most commentators, however, work with far fewer examples: e.g., Kuryłowicz (1967: 448–9) accepts no more than 18. Collinge 1985: 93–101 offers a good, concise summary of the scholarship.

2.   A fourth variety of explanation, that the gemination is expressive in nature (Meillet 1922: 78), has, not surprisingly, met with no support; cf. Jasanoff 1978a: 77.

3.   Accentual explanations were rejected by Paul 1879–80: 7.165, Streitberg, Michels, & Jellinek 1936: 323–6, and Lehmann 1952: 39.

4.   See van Coetsem 1949, Y. Tanaka 1970. Some of the laryngeal explanations referred to under (b) also invoke accentual support.

5.   So Jasanoff 1978a, Polomé 1988: 404–5, Suzuki 1991b; see also Cathey 1970: 57, and see Müller 2007: 91–2 for discussion. Whether loss of the laryngeal without automatic lengthening of the glide would produce an impossible syllable structure (see Davis & Iverson 1996b) is debatable, as it may be assumed that the vowel plus glide sequence of PIE produced a Gmc. diphthong before the loss of the laryngeal.

6.   This raises the problem that the sequence *-*VHR*- is commonly thought to be reflected as -*V̄R*- in Germanic. Analyses of this kind thus usually appeal to the placement of the accent to distinguish forms with and without Verschärfung.

7.   See Fulk 1993b. A somewhat different analysis of a few forms as due to paradigm regularization is offered by Voyles (1989b: 27–8).

6.11   Further consonant changes common to all the Germanic languages

PGmc. *-*m-ð*- > -*nd*-, as in PIE *$\hat{k}$m̥tóm* 'hundred' > PGmc. *$xumða^n$* > Go. OE OS *hund*, OHG *hunt*; Go. OIcel. OE *sund* 'swimming' (cf. OE *swimman*); PGmc. *skam-ðō* 'disgrace' > Go. *skanda*, OE *sc(e)and*, OHG *scanta* (cf. Go. *skaman* 'be ashamed').

   With the devoicing of PIE voiced stops under Grimm's law, an immediately preceding *z* was devoiced to *s*, as in OE OHG *nest* < PIE *ni-*zd-os* (> Lat. *nīdus* 'nest', with zero grade of the PIE root *sed*- 'sit') and Go. *asts*, OHG *ast* 'bough' = Gk. ὄζος, Armenian *ost* 'bough' < PIE *h_3e-*zd-os* (again from *sed*-). Before the reflex of a PIE voiced aspirated stop, however, PGmc. *z* remained, developing for the most part to *r* outside of Gothic (§6.6), as in *kuzdh*- > Go. *huzd*, OE OS *hord*, OHG *hort* 'hoard'; *mizdhó*- > Go. *mizdō*, OE *meord* (but also *mēd*, with *ē₂* (§3.5))[1] 'reward' (cf. Avestan *mīžda*-, OCS *mьzda* 'reward', Gk. μισθός 'recompense'); *$mozgh^w$*- 'marrow' > OIcel. *mergr*, OE *mearh*, OS OHG *marg* (cf. Avestan *mazga*-, OCS *mozgъ*).

   PGmc. *w* was lost (and *k^w* delabialized, if it had not already developed to *kw* in PGmc., §§6.5 *ad fin.*, 6.11) before *u*, as in Go. *niun* '9' < *niwun* < PIE *$né\mathring{u}n$* (cf. Skt. *náva*, Lat. *novem*), PGmc. *$swum$-ð-*a^n* > OIcel. OE *sund* 'swimming' and *k^wumana^n* > OIcel. *koma*, OE *cuman*, OS *kuman* 'come'. An exception is when *w* is initial, as in Go. *wulla* 'wool'. But *w* could be restored to reduce paradigm allomorphy, e.g. Go. pret. *swultun* (inf. *swiltan* 'die'), pret. *qumun* (inf. *qiman* 'come'), OE pp. *swungen* beside *sungen* (inf. *swingan* 'beat').

   PGmc. antevocalic *x* may have become *h* in initial position already in PGmc. (so, e.g., Ringe 2006a: 215; otherwise Ringe 2017: 244), since it is nowhere reflected as [x].[2] However, initial *x^w*- is unlikely to have become *h^w*- in PGmc., given its fortition to [kv] in Modern Icelandic and Faroese, and given medieval Scottish and northern English spellings like *quh*-, *qhw*-, *chu*-, and similar, usually interpreted as representing [xw]. On the PGmc. loss of *ŋ* before *x*, with compensatory lengthening of the preceding vowel, see §4.1.

   All PIE final consonants after an unstressed vowel in a word of more than one syllable were lost in PGmc. except for *s/z* and *r*. Examples of obstruent loss are thus limited to dental consonants, since no other obstruents but *s* occurred finally in PIE polysyllables. The loss may be illustrated in Gothic: PIE *$bhidh$-*n̥t* > *bidun* 'awaited' (3 pl. pret. ind.); opt. *$bhei̯dh$-o-*ih_1-*t* > *beidái* (3 sg. pres. sj.; cf. 2 sg. -o-*ih_1-*s* > -*áis*); PIE abl. *$k^woteré\hat{d}$* > *hʋadrē* 'whither'; PIE *nepōt*- > OE *nefa*, OS *nebo*, OHG *nefo* 'nephew, grandson' (cf. Skt. *nápāt* 'descendant'). For examples of the treatment of final *s/z* and *r*, see §5.2, and see below, §6.16, on *s/z* in West Germanic.[3] A final nasal consonant

was also lost in PGmc., with nasalization of the preceding vowel, which in some cases resulted in different treatment of the resulting nasalized and non-nasalized vowels: see, e.g., §4.8. Before their loss, however, all final nasal consonants became *n*, as shown by instances in which a final particle was added, leading to preservation of *n*, as in acc. sg. masc. Go. *þana*, OE *þone* 'the, that' < PIE **tom* (as in Skt. *tám*, to *sá*, Lat. *is-tum*) plus particle *-a* < PGmc. **-ō^n*. The loss of a final nasal consonant is attested in a variety of morphological categories, including the acc. sg. of all genders, nom. sg. neuter, gen. pl. of all genders, nom. sg. of *n*-stems, and the 1 sg. pres. and pret. sj. of verbs.

As for monosyllables, a final nasal in a monosyllable was lost only after a long vowel: to Go. *hſan*, OS *hwan* 'when' (= Lat. *cum*, Old Lat. *quom*) cf. acc. sg. fem. Go. *þō*, OIcel. *þá*, OE *þā* 'the, this' (= Skt. *tā́m*, Gk. τήν). An oral dental consonant was also preserved at the end of a monosyllable, at least after a short vowel, as in Go. OIcel. OS *at*, OE *æt*, OHG *az* 'at' (cf. Lat. *ad*) and OIcel. *hvat*, OE *hwæt*, OS *hwat*, OHG *(h)waz* 'what' (cf. Lat. *quod*; but cf. Go. *hſa*, on which see §8.13). It cannot in fact be said with assurance that any final consonant was lost in monosyllables, except *n* after a long vowel. Yet Go. *swa* 'so, thus' and its Gmc. cognates are perhaps to be derived from **su̯ṓd* (Orel 2003: 398): cf. Old Lat. *suad* 'thus'.

Insertion of a transitional consonant between certain sounds may ease articulation, and the process may be instigated by changes in the articulation of PIE sounds due to substrate influence (§1.5). PIE **sr*, when not affected by Verner's law, develops to Gmc. *str*, as in some other IE languages, including the Slavic branch. Examples: PIE **sroụm-* > OIcel. *straumr*, OE *strēam*, OS *strōm*, OHG *stroum* 'stream' (cf. Gk. ῥεῦμα 'stream', OIr. *srúaim* 'river'); OE *Ēastron* 'Easter' (cf. Lith. *aušrà* 'dawn', Skt. *usrá-* 'matutinal'); possibly Go. *swistar*, OIcel. *systir*, etc. 'sister' (cf. Skt. *svásar-*, weak stem *svasr-*, Lat. *sōror*; see Ringe & Taylor 2014: 515). Similarly, **mr* may develop to *mbr*, as in Go. *timbrjan* (beside more usual *timrjan*), OIcel. *timbra*, OE *timbran*, OS *timbrian*, OHG *zimberen* 'build' (cf. Gk. δέμω 'build').[4] The reason for the appearance of *s* and *f* in forms with the PGmc. suffix **-þ-*, as in Go. *ansts*, OE *ēst* 'favor', (cf. OE *unnan* 'grant'), OHG *kunst* 'art' (cf. *kunnan* 'know'), *kumft* 'arrival', *numft* 'robbery', is not plain (see Hirt 1931–4: I, §77), but it is probably not due to insertion of a transitional consonant.[5]

In the cluster *mn*, the first consonant tends to lose its nasality by dissimilation, though the results are hardly regular, and the reverse change (of *ƀn* to *mn*) is well attested in NWGmc.[6] Fairly secure examples include the Go. suffix *-ubni* ~ *-ufni* (e.g. *witubni* 'knowledge', *wundubni* 'wound'; on the alternation, see §6.12; but to *fastubni* '(observance of) fast' cf. OE *fæstenn*, OS *fastunnia*), comparable to Lat. *-umnia* in *calumnia* (and see further Kluge 1926: §150); OE *heofon*, OS *heƀan* 'heaven' (cf. Go. *himins*, OIcel. *himinn* and the alternative stem in *l* by heteroclisis, OFris. *himel*, *himul*, OS OHG *himil*).

There was probably loss of *j* between unstressed vowels (except between *i* and a back vowel: cf. Runic **holtijaz**), as this assumption best explains the development of weak verbs of classes 2 and 3: see §12.43 and n. 2, §12.47. A fairly convincing example (in an unstressed word) is PIE loc. **aịeri* (cf. Avestan *ayarə* 'day') > PGmc. **a(j)iri)* > Go. *áir* 'early'. Guðrún Þórhallsdóttir (1993) finds that this change affects *j* even after stressed vowels, as in PIE **aịes-* 'bronze' > PGmc. **a(j)iz-* > Go. *áiz* (1×, for expected **áis*, §6.12), OIcel. *eir*, OE *ār*, OS OHG *ēr*; cf. §6.10 on the Verschärfung.

1.   Similar loss of *z*, with compensatory lengthening, can be seen in OE *twīn* 'linen' (cf. NHG *Zwirn*), OS *līnon* 'learn' (cf. OE *liornian, leornian*), Middle Dutch *hēde* 'hards of flax' (cf. OE *heorde*), and possibly OE *hād-*, if it has the meaning 'hair' in *hād-swǣpe* 'bridesmaid' (cf. OIcel. *haddr* 'woman's hair' < **hazðaz*, §6.12 *infra*, and see Holthausen 1974: 143). The alternative results have not been adequately explained; presumably it is the result of paradigm alternation. For further examples, see Ringe & Taylor 2014: 84–5.

2.   It is notable that whereas in names in Latin and Greek sources Gmc. initial /x/ is usually represented by Lat. *C, Ch*, or *H*, Gk. *K* or *X*, as early as the third century there appear forms with vocalic initials, e.g. *Asdingi*, Ἄστιγγοι, the name of the Vandalic royal dynasty, Lat. *Hasdingi*, ON *Haddingjar*, OE *Heardingas* (Polomé 1994: 10–11). Ringe (2017: 244) mentions, as evidence for the preservation of initial [x], Frankish names transcribed with *Ch-* and borrowings into French like *flank* 'flank' < Franconian **xlank-*.

3.   An exception to the retention of final *z* is in reflexes of PGmc. **-omiz*, appearing in the dat. pl. of *a*-stems (and the 1 sg. pres. ind. of verbs) as Go. *-am* (but Runic **-umʀ**: see §7.8 *ad fin.*).

4.   Compare the similar, later developments in PDE *thimble, bramble, thunder*, etc. (OE *þȳmel, brēmel* (rarely *brembel*), *þunor*). See further Osthoff in Osthoff & Brugmann 1878–1910: V, 125.

5.   It may be that interdental *þ* was assimilated to the place of articulation of the preceding consonant, and the suffix (in the form *t* after a fricatve) re-added.

6.   E.g. OIcel. *nafn* 'name' : Go. *namō* and OIcel. *safna, samna* 'collect' : *saman* 'together'; the etymologies of OE *stefn, stemn* 'voice' (Go. *stibna*), *hrafn, hramn* 'raven', and *efn, emn* 'even' (Go. *ibns*) are rather insecure, though the last is a fairly probable example.

6.12   Consonant changes in Gothic

There is devoicing of Go. final fricatives (final fortition, *Auslaut(s)verhärtung*), as well as of fricatives before final *s*. Examples: pret. *gaf* (inf. *giban* 'give'), *hláifs* 'loaf' (gen. *hláibis*), pret. *baþ* (inf. *bidjan* 'pray'), *gōþs* 'good' (gen. *gōdis*), *riqis* 'darkness' (gen. *riqizis*). Presumably the same change affected *g*, but it is not expressed in the orthography, no doubt because *g* and *h* contrasted in all other environments, whereas other pairs of voiced and voiceless fricatives did not contrast consistently: cf. *mag* 'can', *baúrgs* 'city' (not †*mah*, †*baúrhs*). On the basis of non-alternation in forms like pret. *-swarb* (inf. **-swaírban* 'wipe'), *halbs* 'half', *waúrd* 'word', *alds* 'age' it may be inferred that voiced fricatives (other than *z*) had become stops after liquid consonants (*r, l*) in Gothic, as they had in PGmc. after nasals (but cf. 2 sg. *þarft*, inf. **þaúrban* 'need').

Voicing dissimilation affects Go. fricatives in such wise that a suffixal fricative is voiced if the last preceding consonant is voiceless, but devoiced if that preceding consonant is voiced, in a development known as Thurneysen's law. Thus, there is voicing of the bilabial fricative in *fastubni* '(observance of) fast', *witubni* 'knowledge', but not in *wundufni* 'wound', *waldufni* 'dominion'. The alternation is most plainly observable in the suffixes *-ubni/ufni, -ōdus/ōþus, -uzi/usi, -zna/sna, -ida/iþa*, and the *s*-stem suffix *-iz/is-*, but many exceptions are to be found: see Collinge 1985: 183–91 for literature and discussion, and more recently Suzuki 1992, Woodhouse 1998b.

Final *s* might come to follow *s* as a result of syncope, in which event the geminate was simplified, as in *waírs* 'worse' < **wirss* < **wirsiz*. Likewise, after *r*, final *s* was lost after a light syllable, as in *waír* 'man' and *anþar* 'other' (cf. *swērs* 'honored'), though in adjectives it was restored analogically after a stressed vowel to differentiate genders, as in *ga-faúrs* 'well-behaved'.

Alternations due to Verner's law were eliminated in Gothic: see §6.6. On the apparent gemination of *j, w*, and on the change *jj, ww > ddj, ggw*, see §6.10.

6.13   Gothic *þl-*

There are a number of words in Gothic with root-initial *þl-*: for a list, see Salmons & Iverson 1993: 88 or Davis & Iverson 1994: 155–6. The plainest case is *þliuhan* 'flee', the Gmc. cognates of which all have root-initial *fl-*, as with OIcel. *flýja*, OE *flēon*, OFris. *fliā*, OS OHG *fliohan*. Not all instances of *fl-* in other Gmc. languages, however, correspond to Go. *þl-*: e.g., to OE *flōd* 'flood' cf. Go. *flōdus*. It has sometimes been maintained that in forms with *þl-*, this must be the original cluster,[1] and indeed, the change of /θl/ to /fl/ is considerably more natural than the reverse (Kjellmer 1995; cf. M.J. Jones 2002). But some of the relevant words have fairly secure extra-Germanic cognates in PIE **pl-*, the plainest case again being Go. *þliuhan*: cf. Gk. πλέω < **pleu̯ō* 'swim', Lat. *pluit* 'rains', etc.[2] Since the Gothic forms in *þl-* are restricted to a limited number of texts, Davis & Iverson (1994, 1996a; cf. Woodhouse 1995, 1998a, Nilsson 1996: 53–5) argue that the change of /θl/ to /fl/ is a dialectal development.[3] To the contrary, Salmons & Iverson (1993) make the case that the alternation between the two clusters is due to lexical diffusion. Woodhouse (2000) interestingly observes that in the forms with Go. *þl-* the following vowel reflects PIE *e*-grade or reduced grade, whereas *o*-grade is found with *fl-*: examples are *þlaúhs* 'flight' (cf. OIcel. *flugr*) < **plukós* : *flahta* 'lock of hair' (cf. Lat. *plectō*) < **plok̂-t-*. The claim, however, that the consonant alternation is conditioned by ablaut faces some unresolved difficulties, in part of a chronological nature.[4]

1. See, e.g., Kieckers 1960: 48, Hirt 1931–4: I, 82, Woodhouse 1995, 1998a; cf. Davis & Iverson 1996a.

2. See Zupitza 1896: 131, Nordmeyer 1935, Prokosch 1939: §29d, M.J. Jones 2002.

3. Similarly, earlier, Nordmeyer 1935. Cf. Marchand 1956: 149–50.

4. Cf. the argument of Matzel (1962) that the change is due to the combined influence of *-l-* and stem-final *h*, *hs*, or *q*.

6.14   Consonant changes in Proto-Norse

Before the end of the PNorse period, PGmc. *z* must no longer have been simply the voiced equivalent of *s*, as otherwise it should be expected to have been devoiced to *s* word finally (as explained below). It is most commonly transcribed as Runic **R**. Eventually it developed to *r*, but in Runic it is generally distinguished from *r* (rune ᚱ) by the use of a separate rune (ᛣ); the two, however, apparently had fallen together at least in some environments in East Norse, given the hypercorrection in **AfᵃtR** (Istaby stone, Sweden, 1st half of the 7th cent.; cf. Go. *aftra* 'back, again').[1] The sound must have been palatal, given that it could produce umlaut in a preceding vowel (§4.7).[2] Before *z* could develop to *r*, it was assimilated to a following *ð* or *n*, as in OIcel. *gaddr* 'goad' (Go. *gazds*, but OE *gād*: see §6.11 n. 1) and *rann* (Go. *razn*). When *R* came into contact with another consonant due to syncope, it could be assimilated to it: thus, always with *s*, as in *lauss* 'loose' < **laus-R* < **lausaz*; after *l* or *n*, except when it ended a light, stressed syllable, as in *heill* 'whole' < **hail-R*, *lítill* 'little' < **lītil-R*, *fallinn* 'fallen' < **fallin-R*, but *dalr* 'valley', *vanr* 'usual'. But *-r* is frequently restored after *nn*, as in *þunnr* 'thin'.

   In initial position, PGmc. ȝ became a stop, probably at an early date, as in OIcel. *gull* 'gold', *gefa* 'give', *gjalda* 'repay'. So also *ƀ* and *ð* if this change had not occurred already in PGmc. (§6.5).

Initial *j* was lost categorically, as in **jēraⁿ > ár* 'year', **juŋgaz > ungr* 'young', a change that can be dated on the basis of the use of the rune ᛡ, which originally represented *j*, to represent a vowel (A), the earliest instance being on the Vallentuna dice (ca. 600: see H.F. Nielsen 2000: 256–7). Otherwise, *j* is preserved only when syllable-initial (i.e., after a light syllable) or after a velar obstruent: to *selja* 'deliver', nom. pl. *niðjar* 'kinsmen', *sœkja* 'seek', *þykkja* 'seem' cf. *deila* 'distribute' (Go. *dáiljan*), *senda* 'send' (Go. *sandjan*). There was also loss of *j* before all front vowels, including those resulting from front umlaut, except for *æ*. Initial *w* was lost before rounded vowels (but not *ǫ* or *ó*, developed from *a* and *á*), even when *r* intervened, as in *ormr* 'serpent' (Go. *waúrms*), *óðr* 'mad' (Go. *wōds*, 1×, for expected **wōþs*: §6.12), *yrkja* 'make' (Go. *waúrkjan*), *œpa* 'shout' (Go. *wōpjan*), *róta* 'disarrange' (OE *wrōtan*); the loss of *w* before other instances of initial *r* is later, as shown by the alliteration in some early verse. Internal *w* was lost under similar conditions, as in *sœtr* 'sweet' (cf. OE *swōt*), *hósti* 'cough' (OE *hwōsta*). Medial *w* was also lost after a heavy syllable unless preceded by a velar consonant, as in *benda* 'betoken' (Go. *bandwjan*), *ótta* 'early morning' (Go. *ūhtwō*), but *syngva* 'sing', *sǫkkva* 'sink'. There was also loss of *w* before *u*, as in *bǫð* 'battle' < **baðu* < **baðwō* (gen. *bǫðvar*, *wō*-stem), a change that may belong to Proto-NWGmc. (see §6.16). On the date of the loss of *j* and *w*, see Isakson 2000.

Medially, voiceless fricatives other than *s* were lenited wherever this was not prevented by an adjacent voiceless consonant. For *f* and *þ* this meant voicing, as in PGmc. **wulfaz > úlfr* 'wolf' (where <f> = ƀ, but still **wul(a)f-** in Runic), **brōþer- > bróðir* 'brother', and **werþanaⁿ > verða* 'become'.[3] For *x*, lenition meant a change to *h*, which was subsequently lost, though the sound is usually preserved in Runic, with loss securely attested only in **wurte**, **wortaa**, **worte** (East and West Norse, ca. 500–550) < **worxtē* 'made'.[4] Loss of final *h* is not in evidence until late in the tenth century; cf. **þōh* (> OIcel. *þó*) 'though' (Go. *þáuh*), borrowed into OE (> ME *þōȝ*). Vowels were lengthened before *xt* (§4.9), which developed to *tt* at about the end of the PNorse period. Examples: *átta* '8' (Go. *ahtáu*), *máttr* 'might' (Go. *mahts*), *réttr* 'straight' (Go. *raíhts*), *sótt* 'sickness' (Go. *saúhts*).

Medially and finally there was voicing assimilation in consonant clusters, as in nom./acc. sg. neut. *ljúft* 'dear' (with [f]; cf. nom. sg. masc. *ljúfr*, with a voiced labial), *víðka* 'widen' (with [θ]; cf. *víðr* 'wide', with [ð]), pret. *œpði* 'shouted' (with [θ], from **wōpiðē*, later *œpti*), and gen. sg. *dags* 'day' (with [x]; cf. *dagr*, with [ɣ]). The voiceless fricatives so produced frequently become stops, especially next to another fricative, by dissimilation, as in pret. *fýsti* 'urged' < **fȳs-þi* < **funsiðē(þ)*, and in gen. sg. *e(i)nskis* 'no, none' < **eins-ʒi-s*. But fricatives in clusters with uniform place of articulation become stops (excluding *s*, which has no corresponding stop in Gmc.), at least after a stressed vowel, as in *motti* 'moth' (OE *moþþe*), pret. *gladdi* 'gladdened' < **ʒlað-ið-ē(þ)* and nom./acc. sg. neut. *glatt* 'glad' < **glað-t*. In addition, after a heavy syllable, *lð* that arose by syncope developed to *ld*, as in pret. *deildi* 'distributed' < **dail-iðē(þ)* and *fylldi* 'filled' < **full-iðē(þ)*; but *ð* remained until about 1300 after a light syllable, as in *malði* 'ground' and *valði* 'chose'; compare *halda* 'hold', *falda* 'fold', with PGmc. **-lð-* (§6.5). In addition, there was loss of *ð* before *n* and sometimes *r*, as in *beina* 'assist' (related to *beiða* 'request'), *Skáney* 'Skåne' (OE *Scedenig*), nom. masc. *fjórir* '4' < **fjǫðrir* (and cf. the change to *ʒ* between back vowels in neut. *fjǫgur* < **feuður* < PNorse **feðuru*, likewise in Old Norwegian *laugur-dagr* 'Saturday' ('bath-day'), with *laugur-* < *lauður-* (cf. OE *lēaðor* 'soap', PDE *lather*).

There is total assimilation to the sonorant consonant in the clusters *nþ*, *lþ*, *ðl*:[5] *finna* 'find' (Go. *finþan*), *sannr* 'true' (with analogical re-addition of *-r*; cf. OE *sōþ* < **sanþaz*), *hollr* 'gracious' (again with *-r* by analogy; cf. Go. *hulþs*), *ellri* 'older' (Go. *alþiza*), *á milli*, earlier *á miðli* 'in the middle'. By most accounts, internally, *nn* produced by this means, or of any other source, changed to *ð* before *r*, as in acc. pl. masc. *aðra* 'other' < **annran(n)* (Go. *anþarans*) and *maðr* 'person' (dat. sg. *manni*; cf. OE *man(n)*), though Hale & Reiss (2008: 238–43) argue for an analogical explanation. Geminates also result when a velar obstruent stands between a stressed short vowel and *j*, as in *leggja* 'lay' (Go. *lagjan*), gen. sg. *bekkjar* 'brook' (cf. OHG *bah*); but analogy has much disrupted the original distribution, so that geminate *-gg-* and nongeminate *-k-* are commonly generalized (cf. *liggr* beside *ligr* 'lies', *lykja* 'shut in', *rekja* 'spread out', *vekja* 'wake up', etc.).[6] There is also gemination of *k* between a short vowel and *w*, as in *slǫkkva* 'extinguish' (< PGmc. **slakwjana*[n]), *røk(k)r*, *rǫkkr* 'darkness' (Go. *riqis*), and *nøkkviðr* 'naked' (OE *nacod*). Postconsonantal geminates are simplified, as in *fagr* 'beautiful' < **fagr-r*, and *jarl* 'earl' < **jarl-l*.

The sequence *n* + voiceless stop became a voiceless geminate stop, and if the preceding vowel was *i*, it was lowered to *e*. Examples: *kleppr* 'lump' (cf. Old Swedish *klimper*), *spretta* 'cause to spring' (cf. MHG *sprinzen*), *drekka* 'drink' (cf. OE *drincan*).

A final obstruent after a stressed vowel was devoiced. Thus, pret. **gaƀ* 'gave' produces Runic **gAf** (cf. 1 sg. pres. **gibu**). Voiced stops appeared only after nasals and in gemination (except that *d* occurred after *l*: see above), and after devoicing, a preceding nasal was assimilated to the final stop (as above), hence imp. **bind* 'bind', **gang* 'go', **geald* 'repay' > **bint*, **gank*, **gealt* > *bitt*, *gakk*, *gjalt*, and pret. **band*, **ging*, **gald* > *batt*, *gekk*, *galt*. Such preterites are generally well preserved, but relative uniformity of the stem in the present paradigm induced analogical imperatives like *bind*, *gang*, *gjald*. The assimilation of a nasal to a following voiceless stop also occurred internally, as in *kappi* 'champion' (cf. OE *cempa*), *spretta* 'spring' (MHG *sprinzen* 'break forth'; on the lowering of *i* to *e*, see above), *þekkja* 'know' (Go. *þagkjan*).

There is widespread loss of final *n*, as in *halda* 'hold' (Go. *haldan*), acc. pl. *gesti* 'guests' < **gastinn* < **ʒastinz*; also when a vowel following in PNorse was lost, provided the preceding vowel was not short, as in pl. *augu* 'eyes' (Go. *áugōna*), 3 pl. sj. *bindi* (Go. *bindáina*), but acc. sg. masc. *gōðan* (Go. *gōdana*), *innan* 'from within' (Go. *innana*), with similar developments in unstressed words, e.g. *í* 'in' (Go. *in*), *frá* 'from' (Go. *fram*), *á* 'on' (Go. *ana*).

On the loss of internal nasal consonants, with compensatory lengthening of the preceding vowel, see §4.9. On the development of *jj* and *ww*, see §6.10. The handbooks (see §1.14) provide more detailed information about these and other changes.

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1.   But see the cautionary remarks of H.F. Nielsen (2000: 257–8). Antonsen (1975: 17) regards East Norse **hideʀ-** and **hAidʀ-** (cf. OIcel. *heiðr* 'clear') as further examples of this confusion, but given the coöccurrence of OE *hādr-* and *hǣdr-*, this is likelier to be in origin an *s*-stem (the usual analysis of the Runic forms, e.g. that of Krause 1971: §98): see Brunner 1965: §288 Anm.

2.   Heusler (1967: §144) proposes that its articulation involved approach of the back of the tongue to the hard palate, accompanied by vibration of the tongue tip, whereas *r* was supradental. Painter & Dery (2014, with refs.), on the basis of an acoustic experiment, would identify the sound as [z] at the time of umlaut.

3.   The earliest examples of the confusion of *þ* and *ð* are in Runic inscriptions of the 8th cent., **uiþʀ** 'against' and **uþin** (OIcel. *Óðinn*): see H.F. Nielsen 2000: 258–9.

4.   Possibly also **welA-** (with *ē*: Stentoften stone, Sweden, 1st half of 7th cent.), if OIcel. *véla* 'deceive' reflects **wixla-* (so Antonsen 1975: 86).

5.   Heusler (1967: §158) regards *mm* for earlier **mf* in OIcel. *fimm* '5' as a phonological development (in final position only?), even though it is unparalleled; *mf* otherwise develops to *f*, with compensatory lengthening of the preceding vowel (see §4.9 *supra*). More commonly the retention of *m* in *fimm* is regarded as due to analogy, either to *fimtán* '15' or to the ordinal (see Prokosch 1939: §99a, Noreen 1970: §298.2).

6.   Heusler (1967: §187 Anm. 1) dates this gemination after the syncope of the 7th/8th cent. in forms like **sakjaʀ* > **sekiʀ* > *sekr* 'outlaws', since such forms without gemination are required in the paradigm to explain the analogical degemination in a form like inf. *sekja*.

6.15   West Germanic consonant gemination

In the WGmc. protolanguage there was consonant doubling before sonorant consonants, though the regularity with which the change is attested varies according to the nature of the sonorant and of the geminated consonant, as well as of the length of the preceding vowel.[1] Before *j* the change regularly applies to any consonant other then *r* (including *r* < *z*) after a short vowel (and thus also not after a diphthong), though exceptions to this rule are characteristic of OHG, as discussed below.[2] This *j* is preserved in OS and generally written ⟨i⟩; in the earliest OHG records it is usually written ⟨i⟩ before *e* or *u*, but ⟨e⟩ before *a* or *o*, and it disappears in the course of the 9th century. Elsewhere in WGmc. it is lost after heavy syllables and thus can appear only after *r*, which failed to geminate before it. Gemination is regular before *j*, infrequent before *r*, *l*, rare before *w*, *m*. For a detailed survey, see Simmler 1974. Examples of gemination before *j* are the following:

> OE *scieppan*, OS *skeppian*, OHG *scepfen* : Go. *skapjan*, OIcel. *skepja* 'create'
> OE *sibb*, OS *sibbia*, OHG *sipp(e)a* : Go. *sibja* 'relationship'
> OE *settan*, OS *settian*, OHG *sezzen* : Go. *satjan*, OIcel. *setja* 'set'
> OE *biddan*, OS *biddian*, OHG *bitten* : Go. *bidjan*, OIcel. *biðja* 'bid, request'
> OE *sæcc*, OHG *secka* : Go. *sakjō* 'strife'
> OE *lecgan*, OS *leggian*, OHG *leggen* : Go. *lagjan*, OIcel. *leggja* (§6.14) 'lay'
> OE *fremman*, OS *fremmian*, OHG *fremmen* : OIcel. *fremja* 'further, promote'
> OE *wennan*, OS *gi-wennian*, OHG *gi-wennen* : OIcel. *venja* 'accustom'
> OE *sellan*, OS *gi-sellian*, OHG *sellen* : Go. *saljan*, OIcel. *selja* 'hand over'

But *r* (< PGmc. *r*, *z*) remains ungeminated, with preservation of *j* (or its reflex)[3] after the light syllable, as in OE OS *ferian*, OHG *ferien* (but also *ferren*: see below), Go. *farjan*, OIcel. *ferja* 'travel, transport' and OE OS *nerian*, OHG *nerien* (also *nerren*), Go. *nasjan* 'save'. Examples of gemination before *r*, *l* include the following:

> OE *snot(t)or*, OHG *snottar*[4] : Go. *snutrs*, OIcel. *snotr* 'wise'
> OFris. *ekker*, OS *akkar*, OHG *ackar* (but OE *æcer*) : Go. *akrs*, OIcel. *akr* 'field'
> OE (Northumbrian) *æhher* (but WS *ēar*, OS *ahar*, OHG *ehir*) : Go. *ahs*, OIcel. *ax*
>   'ear (of grain)'
> OE (Northumbrian) *tæher* (= *tæhher*, but WS *tēar*, OHG *tahar*) : Go. *tagr*, OIcel.
>   *tár* 'tear'
> OE *æppel*, OS *appul*, OHG *apful* : Crimean Go. *apel* 'apple'

Before *r*, *l* the change is restricted to voiceless stops, except that *x* may be geminated in Northumbrian. The OE forms without gemination are best explained as originating in the nom. sg., on the assumption that gemination took place only when a vowel followed the sonorant consonant; hence, e.g., PGmc. nom. sg. **akraz* > WGmc. **akr*, with later nuclearization of -*r* (§5.6), but WGmc. dat. sg. **akr-ǣ* > **akkrǣ*, with generalization of the former stem in OE, of the latter elsewhere.[5]

Gemination is caused by *w* only in the clusters *kw*, *hw*, i.e. clusters derived from PGmc. labiovelars, and the evidence derives almost exclusively from OHG, as in OHG *nackot* 'naked' (cf. Go. *naqaþs*, OE *nacod*, MLG *naket*), OHG *acchus*, OS *accus* 'axe' (beside OHG *achus*, OS *acus* = Mercian OE *æces*), and rare OHG *sehhan* beside *sehan* 'see' (Go. *saíhvan*).[6] Gemination before *m* occurs in LWS *māþþm* beside *māþm* 'treasure' (Go. *máiþms*). Thus, gemination before *w* and *m* is probably not to be ascribed to WGmc. as a whole, though Simmler 1974: 329–41 accepts the former as WGmc., not the latter.

Exceptions to the general pattern of WGmc. gemination are to be found in OHG. First, forms with geminate *rr* appear, chiefly in Alemannic, but also in Franconian, e.g. *ferro* 'ferryman', dat. pl. *herrun* 'hosts', *gi-burren* 'supervene' beside *ferio*, *heriun*, *gi-burien*. There are good reasons to believe that this change is peculiar to OHG, i.e. that it is not a WGmc. change later eliminated elsewhere.[7]

Second, OHG geminates are to be found after long vowels and diphthongs, almost exclusively in Upper German.[8] Examples: *teillen* beside *teilen*, OE *dǣlan*, OS *dēlian*, Go. *dáiljan*, OIcel. *deila* 'distribute'; OHG *auckan* beside *ougen*, OE *īewan*, *ēawan*, OS *ōgian*, Go. *áugjan*, OIcel. *eygja* 'show'; OHG gen. *ke-rāttes* beside nom. *gi-rāti*, OE *rǣde*, OS *gi-rādi*, OIcel. *rǣði* 'advice, management, reading' (< *(gi-)rēðija^n*).[9] Such forms disappear from the later language, leaving only nongeminates after long vowels. At one time there was a fairly broad consensus that gemination applied after long vowels and diphthongs throughout WGmc., but that everywhere but in Upper German, degemination subsequently applied to geminates so produced: so, e.g., Prokosch 1939: §30, Krahe & Meid 1969: I, §84, culminating in the exhaustive study of Simmler (1974), who found sufficient evidence outside of Upper German to convince him that the change was general in WGmc. Now there is much greater diversity of opinion: see Braune 2004a: §96 Anm. 1 for references. A notable difficulty is that in accordance with Sievers' law, *j* should have been nuclearized to *ij* after a heavy syllable and thus incapable of inducing gemination, and *ij* cannot have been denuclearized in the WGmc. protolanguage, given the evidence of OE forms like *gydene* 'goddess', without gemination (§2.5). A further difficulty stems from the observation that gemination does occur after a long vowel outside of OHG, but it is securely and widely attested only before *r* or *l* (probably with shortening of the vowel): cf. OE *hluttor* beside *hlūtor*, OS OHG *hluttar* 'pure, clear' (beside (later) OHG *(h)lūtar*; cf. Go. *hlūtrs*); OE *lyttel* beside *lȳtel*, OS *luttil*, OHG *luzzil* 'little' (cf. Go. *leitils*, OIcel. *lítill*). The question arises why geminates should have been so thoroughly eliminated outside of Upper German in stems with original *j*, but not in these stems. It seems likelier that geminates after long vowels are found before *r*, *l* because, unlike *j*, these sonorants were not nuclearized under Sievers' law. It may be assumed, then, that in a form like WGmc. *xlūtr* the vowel was shortened in the closed syllable, whereas in gen. *xlūtras* the syllable boundary fell between the vowel and consonant, and the tautosyllabic stem *xlūt-* was then extended from the nom. to elsewhere in the paradigm.[10] Such a development was not possible before *j*, since, e.g., PGmc. *rēðijaz* > WGmc. *rǣðī*. It should be mentioned, as well, that there appears to have been gemination after a long vowel in two OE weak verbs lacking original *-i-* in the preterite (§12.37), *recc(e)an* 'care' (pret. *rōhte*) and *læcc(e)an* 'seize' (pret. *lāhte*, *lǣhte*), and the result was not later degemination but vowel shortening. One significant factor that set the pattern for OHG geminates after long vowels was probably the High German consonant shift (§6.21), which converted some etymological non-

geminates to geminates after long vowels, e.g. *slāf(f)an* 'sleep', *heiz(z)an* 'call', dat. pl. *boohhum*, *buochum* 'books'.

It has long been recognized that gemination must have been motivated by syllable division (so, e.g., Prokosch 1939: §30), and most modern accounts, beginning with Murray & Vennemann 1983, explain the patterns of change as governed by syllable contact laws, i.e. by a hierarchy of consonant sonority or, conversely, strength (see §2.4), regulating syllabification. Such accounts serve well to explain some aspects of gemination, such as why only voiceless stops were geminated before *r*, *l* in WGmc., given that voiceless stops are the least sonorous consonants. They are less persuasive at explaining other aspects of the change, such as why *r* is not usually geminated, especially in view of the gemination of *w*, which is more sonorous than *r* on most sonority scales reconstructed for WGmc. For discussion of this last problem, with extensive references to the literature, see Suzuki 1989, Hall 2004.

Gemination before *j* antedated the Second Sound Shift (§6.21), as shown by forms like OHG *setzen* 'set' (OS *settian*) and *skepfen* 'create' (OS *skeppian*): cf. *ezzan* 'eat', *slāf(f)an* 'sleep' (OS *etan*, *slāpan*). Such gemination is attested in Runic **kunni** (= OE *cynn*) on one of the Weser rune-bones, certainly West Germanic and to be dated probably to the fourth or fifth century (see Antonsen 2002: 315–28; also Findell 2012: 343, 481–3, with references). Some would date the change to as early as 200 CE, though H.F. Nielsen (2000: 243, 373, with refs.) favors a date in the fourth century.

1.   The literature on gemination is extensive. For references to earlier studies, see Simmler 1974. Subsequent work includes Guinet 1981, Murray 1986, 1998, Seynnaeve 1987, Wagner 1989, Draye 1990b, Ham 1997–8, Denton 1998, Goblirsch 1999, Callender 2007.

2.   A further exception, or seeming exception, is that the PGmc. sequence *-awj- is reflected without a geminate in NSGmc., e.g. OE *hīeg*, OS *hōi* 'hay' < *hauj-; cf. the gemination in OHG *houwi*. On this problem see §4.10 & n. 1.

3.   Unmistakable signs of nuclearization of *j* appear in WS, in spellings like *generige* (see Hogg & Fulk 2011: §6.80), with similar developments in OS (Holthausen 1921: §171). On the fricativization of *j* after *r* in OHG, see n. 7 *infra*.

4.   Note that OHG *-tr-* does not undergo the High German Consonant Shift (§6.21).

5.   Krahe & Meid (1969: I, §85) suppose rather that OE *æcer* resulted when *-r developed to *-er before gemination could take place; but this is unlikely, given that many postconsonantal final sonorants must be treated as still nonsyllabic in OE poetic meter (see §5.6), and thus *æcer* cannot be a very old form.

6.   The form OE *hweohhol* 'wheel' is not infrequently cited in the handbooks, though a search for such a form produced no results. A. Campbell (1977: §408) cites *hweohhol* in evidence of OE gemination (before *w*? *l*? the stem is PIE *$k^w ek^w lo$-; cf. weak grade in Gk. κύκλος 'circle'), but Brunner (1965: §228) cites it as an example of the LWS gemination seen in, e.g., gen. sg. *miccles* beside *micles* 'large'; cf. not infrequent OE *(-)hweohle(s)*.

7.   It seems likely that *j* had become a voiced fricative after OHG *r*, seeing as words like *nerian* 'save' are never spelt †*nerean*, though in 9th-cent. texts *-ean* is a common spelling for *-jan* after other consonants; and spellings like *nergen* are especially frequent. Likewise, though postconsonantal *j* is still preserved in early texts, as attested by spellings like *willeo* 'volition' and *gisellio* 'companion', there are no spellings like †*nerrian*, with *i* after geminate *rr*. See Braune 2004a: §118 Anm. 3. This development perhaps sheds light on problematic OE *hergian* 'harry' < *$xarjōjana^n$: see Hogg & Fulk 2011: §6.118 n. 2.

8.   Colin J. Grant kindly provided the projections from his paper 'The interaction of Sievers' Law and West Germanic Gemination in Upper German', 22nd Germanic Linguistics Annual Conference, University of Iceland, Reykjavík, 20 May 2016, from which the following discussion has benefited. Among other matters, Grant specifically discusses the obstacle that Sievers' law presents to the assumption of general WGmc. gemination after long vowels.

9.   Apparently, gemination could also apply to UG consonants after a nasal consonant, leading to doublets like MHG *swinken ~ swingen* 'swing' and High Alemannic *länten ~ länden* 'land': see Scheungraber 2013.

10. A detailed argument along these lines, to the effect that OE orthographic geminates are primarily an indication of syllabification rather than consonant length, is offered in Fulk 1998b, including a discussion of vowel shortening before geminates.

6.16   Other consonant changes in the West Germanic protolanguage

PGmc. *ð* developed to WGmc. *d*. Examples: OE *fæder*, OS *fadar*, OHG *fater* : OIcel. *faðir* 'father'; OE *bēodan*, OS *biodan*, OHG *biotan* : OIcel. *bjóða* 'bid, ask'; OE OS *bīdan*, OHG *bītan* : OIcel. *bíða* 'wait'.

It was once a common view that both *s* and *z* when final were lost in WGmc. (or that final *s* developed to *z* in WGmc. and was then lost), and even now this analysis has not been entirely abandoned.[1] Under this hypothesis, apparent exceptions to the loss of *-s* can be explained in various fashion: e.g., OE nom. pl. *dagas* 'days' (= Go. *dagōs*, OIcel. *dagar*) is often thought to reflect PGmc. *daʒōsiz*, or similar,[2] and so it may be supposed that the WGmc. loss of final *-s* antedated the loss of *-iz* in this form. Other exceptions are not so easily explained.[3] The prevailing view, however, has always been that in WGmc. *-s* was preserved and *-z* was lost.[4] An exception to the rule is that *-z* is retained and develops to *-r* in light monosyllables in OHG and OLF (in the latter of which, e.g., *wī* coöccurs with *wir* 'we').[5] Given the coöccurrence of forms in the same inflectional classes with root and suffix accent in PIE (cf., e.g., Gk. *ἵππος* 'horse' beside *ποταμός* 'river'), there must have been extensive variance between final *-s* and *-z* in PGmc. in words otherwise inflected identically. It appears that *-z* was more commonly the variant that was generalized, with notable exceptions, though the evidence of Gothic is ambiguous. Leveling of one or the other variant in an inflectional class, however, must not have been completed in PGmc., or even in the WGmc. protolanguage, to judge by the divergent developments seen in, e.g., OHG nom. pl. *tagā* (= OIcel. *dagar* < *daʒōz*) and OE *dagas*, OS *dagos*, *-as* < *daʒōs*; likewise in OE 2 sg. sj. *fare* (= OIcel. *farir* < *faraiz*) and OS *fares*, OHG *farēs* < *farais*.

In all the WGmc. languages, as in North Gmc., there was lenition of medial fricatives wherever it was not prevented by an adjacent voiceless consonant.[6] Lenition amounts to voicing of *f*, *þ*, *s*, but *x* is lenited to *h* (if, in fact, the change of *x* to *h* is part of the same sound change, which seems most probable). The change does not apply to geminates, e.g. OE *siþþan* 'after(ward)' < *sīþ-þon* and *læssa* 'less' < PGmc. *lais-iz-ð^n*, with voiceless geminates. This change must not be dated to the NWGmc. period, and it must postdate the WGmc. change of PGmc. *ð* to *d*, since *þ* lenited to *ð* does not become *d*. It is best regarded as a change that took place in each of the WGmc. languages, since, for example, *x* appears not to have been lenited in forms like OE *slieht* 'stroke' < *sleaxiþu* < *slæxiþu* < *slax-iþō*, in which syncope apparently follows front umlaut, which in turn must follow the specifically OE change of breaking of *æ* to *ea* (but see the discussion of problems related to verbs in §§12.38, 12.43). Moreover, the usual assumption is that *x* had not yet been lenited when breaking occurred (§4.13), yet the results of breaking in OE and OFris. are not identical.

Although *w* was lost before *u* in PGmc. (§6.11), the sequence *-wu-* could arise again, and in such instances *w* was again lost, though it could be restored analogically to reduce paradigm allomorphy. Examples are OE *fēa* 'few' < *fau* < *fawu* < *fawō*,

beadu 'battle' < *badwu < *baðwō, and dat. pl. *smerum* 'grease' (Lorica Glosses) beside analogical *smeorwum*. This change may have occurred in Proto-NWGmc. (see §6.14). Note that although postconsonantal *j* is for the most part lost in the WGmc. languages (§6.15), *w* was preserved in the WGmc. protolanguage even after heavy syllables when followed by a vowel, as in OE gen. sg. *lǣswe* 'pasture'. An exception is that *w* is lost after a heavy syllable when it follows a velar consonant, as in OE OS OHG *singan* 'sing' (cf. Go. *siggwan*, OIcel. *syngva*, and see §1.8 n. 2). Moreover, after the Proto-WGmc. period, postconsonantal *w* appears to have been lost in OS and OHG after a heavy syllable, as there are no heavy-stemmed consonant-final *wa*- or *wō*-stems in these languages. On this and some other environments in which *w* was lost, the grammars cited in §§1.15–20 should be consulted.

1.   Such is the view of Braune (1876: 156), Hirt (1894: 527–8), Streitberg (1896: §214), Walde (1900: 130), van Helten (1902: 534), Prokosch (1939: §49d), and Bammesberger (1986a: 47–8). Boutkan (1995b: 43–51), with references to earlier, similar views (e.g. Meillet 1922: 82), argues that PIE final *s* always yielded PGmc. *z*, regardless of the place of the accent. Some forms that lend strong support to his position, because they are hard to explain as analogical, are OE *sū* 'sow', *cū* 'cow', and *mā* 'more'. See further Mańczak 1996.

2.   So Hirt 1894: 528, but see §7.8.

3.   Boutkan (1995b: 46) identifies six such exceptional endings in WGmc.: (1) OS consonant stem gs. *-as*, *-es*; (2) pres. sj. 2 sg. OS *-es*, OHG *-ēs*; (3) pret. sj. 2 sg. OS *-is*, OHG *-īs*; (4) *o*-stem nom. pl. OE *-as*, OS *-os*; (5) OHG 1 pl. *-mēs*; weak pret. 2 sg. OE OS *-des*, OHG *-tōs*.

4.   First to express this view was perhaps Paul (1879–80: VI, 550). Representative are the views of Luick (1914–40: §629), Krahe & Meid (1969: I, §§115–16), and Ringe (in Ringe & Taylor 2014: 43–4). On the date of this loss, see above, §5.6 n. 6.

5.   H.F. Nielsen (2000: 249; so earlier Luick 1914–40: §629.1) assumes loss of *-z* in unstressed monosyllables but retention in stressed, and that OHG has generalized the latter variant, the other WGmc. languages the former. Ringe (in Ringe & Taylor 2014: 86) rejects this idea because of the loss of **-z* in stressed monosyllables like OE *mā* 'more' < *maiz and *cū* 'cow' (cf. OIcel. *kýr*). He thus argues that final *z* was lost categorically in WGmc., except that it is preserved in monosyllables in the southern part of the WGmc. *Sprachraum*, and he offers explanations for the apparent OHG exceptions. OS (like OHG) shows retention in *mēr* 'more', perhaps under OHG influence.

6.   For discussion and a review of the literature, see Goblirsch 2005: 83–96.

6.17   Consonant changes in North Sea Germanic and Anglo-Frisian

Medial NSGmc. **-lþ-* changes to *-ld-*, which is later extended to final position. Examples: OE OFris. OS *gold* : Go. *gulþ*, OIcel. *gull*, OHG *gold* (< *ʒulþ, §6.22) 'gold'; OE OFris. *wilde*, OS *wildi* : Go. *wilþeis*, OIcel. *villr*, OHG *wildi* 'wild'; OE OFris. OS *hold* : Go. *hulþs*, OIcel. *hollr*, OHG *hold* 'gracious, loyal'. A few forms with final *-lþ* are still to be found in early OE, e.g. *Balth-* (in names: 'bold'), *-felth* (in place-names: 'field': see Brunner 1965: §201 Anm. 2, misconstrued in Braune 2004a: §162 Anm. 1).

NSGmc. *n* is lost before a voiceless fricative, with compensatory lengthening (and nasalization) of the preceding vowel, as in OE *mūð*, OS *mūđ* (beside *mund*) : Go. *munþs*, OIcel. *munnr*, *muðr*, OHG *mund* 'mouth'. See §4.11 for further examples.

In NSGmc. and neighboring dialects there is metathesis of **-sl-* to *-ls-* between unstressed vowels, as with OE dat. sg. *Ēad-gilse* (name: 'wealth-hostage') < **-ʒīslǣ*; cf. OIcel. *Gísli* (name). See de Vaan 2012.

It cannot be determined for certain whether palatalization of velars by front vowels occurred in the Anglo-Frisian protolanguage or independently in English and Frisian, but it is not unlikely that it did occur early (see Fulk 1998a: 145–8, with refs.).

It may in fact have taken place in the Ingvaeonic protolanguage, given certain OS spellings (§6.20). If so, it must be assumed that the subsequent change of affrication (or 'assibilation': §§6.18–19), which is found in OE and OFris. but not OS, did not affect all palatal stops, or that some palatal stops reverted to velars before affrication could occur. The fricative *ʒ* was palatalized initially before a front vowel, medially before (not after) a front vowel, and in the syllable coda after one. This palatalized *ʒ* eventually became *j* or the off-glide of a front diphthong. Examples: OE *gieldan*, OFris. *ielda* 'pay'; OE *gēotan*, OFris. *iāta* 'pour'; OE *hyge*, OFris. *hei* 'thought' (cf. OS *hugi*); OE *dæg*, OFris. *dei* 'day'; OE *bregdan*, OFris. *breida* 'pull'; but OE *sīgan*, OFris. pres. *sīga* 'sink', with the velar sound. As a result, OE shows paradigm alternation, e.g. *hālig*, *hālge* holy' with the palatal sound and *hālgu(m)* with the velar. Unless palatalization is dated later than the Anglo-Frisian period, it must be assumed that Frisian has almost entirely eliminated such alternations (cf. OFris. *hēlich*, *hēlega*), an exception being *ielda* : pp. *gulden*. As for the velar stops, it is impossible to be certain that they were palatalized unless they were later affricated, and affricates are not distributed identically in the two languages: see §§6.18–19, and see further van der Rhee 1977.

　　In a fashion complementary to the voicing of fricatives between voiced sounds in the WGmc. languages, there was fortition (devoicing) of final fricatives in the Ingvaeonic languages. Examples are pret. OE *geaf*, OFris. *ief*, OS *gaf* 'gave' < *ʒaƀ*; OE *burh*, *burg*, OS *burg*, *burch* 'fortress',[1] OFris. *berch*, dat. *berge* 'mountain'. This change probably occurred independently in OE, OFris., and OS, given that *b* is still used finally in early OE texts to represent the reflex of PGmc. *ƀ*, whereas PGmc. *f* is represented by *f*, e.g. *ob* 'from', *salb* 'ointment' : *wulf* 'wolf', *fīf* 'five' (see Brunner 1965: §191, and cf. A. Campbell 1977: §446). It is possible, however, that the distinction marks an opposition between bilabial and labiodental articulation rather than a voicing difference (so, e.g., Luick 1914–40: §651.2). But since the use of *h* for etymological *ʒ* is at first rare and then increases over the course of the OE period (A. Campbell 1977: §446), final devoicing is probably a convergent development in the Ingvaeonic languages.

1.   Such OE and OS spellings with *g* (which are the norm in OS) rather than *(c)h* are due to the influence of inflected forms, e.g. OE OS *burga*. Note that PGmc. *z* and *ð* had already changed to *r* and *d*, so that devoicing did not apply.

6.18   Consonant changes in Old English

The palatal variety of *ʒ* merged with *j* by ca. 950 at the latest (see Minkova 2003: 113–20). Certain palatal varieties of *k* and *g* likewise became the affricates /tʃ/, usually spelt ⟨c⟩, and /dʒ/, usually spelt ⟨cg⟩, or simply ⟨g⟩ after *n*, assuredly by ca. 1000, but not all the palatal stops assumed above (§6.17) to have arisen in Anglo-Frisian were affricated in OE. Palatalized *k* is always affricated initially, as in *ceald* 'cold', *ceorl* 'churl', *cirice* 'church'. There was no palatalized *g* in initial position, since PGmc. *ʒ* was still a fricative initially at the time of palatalization, the velar variety becoming a stop in WS probably ca. 950. Medially before vowels and finally, palatal stops were affricated only after *ĭ* (but not before a back vowel) or when the preceding vowel had undergone front umlaut, meaning that the stop had earlier been followed by *ĭ* or *j*.[1] Note that the palatal stop *g* occurred only after a nasal consonant or in gemination. Examples: *dīc* 'ditch, dike' (but not in dat. pl. *dīcum*), *finc* 'finch', *wyrc(e)an* 'work' < *wurkijan�*, dat. pl. *bencum* 'benches' < *baŋkijum*; *leng* 'longer' < *laŋg-iz*, *ecg* 'edge' < *aggju* < *aʒjō*,

meng(e)an 'mix' < **maŋgijana^n*. There must then have been reversion to velarity in the remaining sounds assumed in §6.17 to have been palatalized in Anglo-Frisian, e.g. *bæc* 'back', gen. sg. *freces* 'bold'. Certainly there was reversion when syncope rendered the palatal sound anteconsonantal, as in *sēcþ* 'seeks' (but with an affricate in inf. *sēcan*; cf. PDE *seek* : *beseech*), gen. sg. *micles* 'large' (but with an affricate in *micel* < **mikilaz*). As for PGmc. **sk*, this developed eventually to /ʃ/ (perhaps [ʃː] intervocalically) even in many non-palatal environments. It is preserved as /sk/ only medially before a back vowel or finally after one, as in dat. pl. *Deniscum* 'Danish' and *tūsc* 'tusk, tooth'; otherwise it is palatal, as in *Denisc*, *sculan* 'shall' (but /sk/ in *scōl* 'school', borrowed from Lat.), *scop* 'poet'.

The sound *h*, the lenition of *x*, was lost between voiced sounds in OE, as in *sēon* 'see' < **seohan* and gen. sg. *mēares* (beside nom. *mearh* 'horse'), the latter, gen. form with compensatory lengthening. For further examples and discussion of the resulting changes in proximate vowels, see §4.13. This change has significant consequences in some morphological categories, especially verbs: see §12.21. Although this loss likewise occurred in OFris., it cannot plausibly be dated to the Anglo-Frisian period

Whereas WGmc. gemination before *r*, *l*, affected only voiceless stops, the change was extended to other obstruents in OE. Above were mentioned *æhher* and *māþþm* (§6.15); OE *d* (the only voiced stop that could occur between a vowel and *r*, *l*) was also affected, as in *ætgæd(d)re* 'together', probably with vowel shortening in *næddre* 'adder' beside *nǣdre* (OS *nādra*), *widdra* 'wider' beside *wīdra*. The motivation for gemination in some such forms with an etymologically long vowel is obscure, since words like *nǣdre* and *wīdra* were never uninflected, and thus the gemination cannot be explained the way that WGmc. gemination in OE *hluttor*, *lyttel* was explained above (§6.15). Perhaps the paradigm alternation *hlūtor* ~ *hluttr-*, with later mixture of stems, leading to forms like *hluttor* and reintroduced *hlūtr-*, gave rise to analogical alternations in similar stems. In OE there also arose new geminates due to the creation of new clusters of stop plus liquid due to late syncope, hence *bet(t)re* 'better' (Go. *batiza*), gen. sg. *mic(c)les* 'large' (Go. nom. *mikils*).

A number of other OE consonant changes, such as metathesis (esp. of *r*; see Nakao 1986), epenthesis (see B.R. Page 1997), deletion in clusters, and simplification of geminates between unstressed vowels, are less regular, may be dialectically restricted, and have fewer consequences for morphology. The handbooks cited in §1.16 may be consulted for details.

1.   As the phrase "had earlier been" implies, the assumption here is that affrication took place late, long after the loss of such umlauting segments in many environments, and therefore palatals other than those eventually affricated had reverted to velars by the time of affrication.

6.19   Consonant changes in Old Frisian

The affricates derived from the palatal varieties of Anglo-Frisian *k*, *g* are *ts*, *dz*, respectively. The distribution of affricates in OFris. and OE is similar but not identical: compare OFris. *kāp* 'purchase' (from Lat. *caupō* 'shopkeeper'), *tsiurke* 'church' (< WGmc. **kirikô^n*, ultimately from Gk. κυριακόν) : OE *cēap*, *cirice*, the last two with only affricates. Almost certainly, then, affrication took place independently in the two languages, though palatalization may still be assumed for the Anglo-Frisian period, with subsequent, minor changes in the distribution of palatals. Most affricates in OFris.

correspond to OE affricates, e.g. OFris. *tsiāk* 'cheek' (OE *cēace*), *sprētse* 'speech' (OE *sprēce*), *sedza* 'say' (OE *secgan*), *mendza* 'mix' (OE *meng(e)an*). Unlike in OE, PGmc. *sk remains as such in all positions, e.g. *skeft* 'shaft' (OE *sceaft*), *fisk* 'fish' (OE *fisc*), *flāsk* 'flesh' (OE *flǣsc*).

As in OE, there is lenition and later loss of *x* between voiced sounds in OFris., with resulting contraction of neighboring vowels (§4.14).

Final *-n* was usually lost, as in *lidza* 'lie', *dwā* 'do', nom. pl. *tunga* 'tongue', *hwona* 'whence', *binna* 'inside'. It is retained in cardinal numbers, e.g. *ēn*, *ān* 'one', *si(u)gun* 'seven' and at the end of a weak-inflected initial constituent of a compound, e.g. *Sunnandei* 'Sunday'.

As in OE, there is metathesis of *r* with a short vowel, with movement in either direction, e.g. *gers* 'grass' (Go. *gras*), *bren* 'child' (beside *bern*; OE *bearn*).

6.20   Consonant changes in Old Saxon

Voiced stops are devoiced in syllable-final position (and thus also word-finally), as shown by occasional spellings like *dump* beside *dumb* 'dumb'; so also *giwalt* 'control', *punt* 'pound', *thinclīk* 'parliamentary'.

As in OE, there is loss of *h* between voiced sounds, but *h* may still be retained in early texts, e.g. acc. sg. masc. *hōhan* in the *Heliand*, later *hoan*.

Spelling evidence also indicates that velar consonants were palatalized before front vowels. The sequence *ke* is not seldom written *kie*, as in *kiennian* 'know', *gi-hwilīkies* 'any', *kiēsur* 'emperor'. Likewise, palatalization of initial *ʒ* is indicated in *ieldan* 'pay' and *ie-givan* 'given', by the occasional representation of the prefix *gi-* as *i-*, and by infrequent medial loss before *i*, as in *gein* beside *gegin* 'against' and *eislīk* beside *egislīk* 'terrible'. Compare also inverted spellings like *giungaro* beside *iungaro* 'disciple'. It is generally assumed that initial velar *ʒ* has become a stop in OS.

6.21   The High German Consonant Shift

The most salient aspect of the OHG consonant system is a shift in the value of stops as extensive as the shift under Grimm's law; the High German shift is thus often referred to as the Second Sound Shift. The second shift, however, is less unconditioned than the first appears to have been, its results varying by position in the word, by geminate or nongeminate status of the consonant, and by dialect. The general pattern is that a PGmc. voiceless stop is reflected as an affricate before a vowel, i.e. initially, after a medial sonorant consonant, or when geminate (either medially or finally); otherwise it is reflected as a fricative, i.e. after a vowel medially or finally. Or to put this in reverse fashion, a PGmc. voiceless stop is usually reflected as a fricative after a vowel (medially or finally), though it is reflected as an affricate initially, after a medial sonorant consonant, or in gemination. The shift of the voiceless stops at its greatest extent may be tabulated as in Figure 6. Here *pf*, *ph* represents an affricate /pf/. In initial position, *z* represents an affricate /ts/, which is also the shifted value medially or finally of the geminate *tt* and of *t* after a sonorant consonant; otherwise, in medial or final position the shifted value of *t*, spelt *z(z)*, represents a voiceless fricative, the value of which is not precisely determinable.[1] Initial, medial, and final *ch*, *kh* represents an affricate /kx/ or /kh/, which is also

Position	p	pp	t	tt	k	kk
Initial	pf, ph		z		ch, kh	
Medial	f, ff	pf, ph	z, zz	zz, tz	h, hh, ch	cch
Final	f	pf, ph	z	z, tz	h	ch

Fig. 6. The High German shift of voiceless stops at its greatest extent.

the value of the shifted geminate and of *k* after a sonorant consonant; otherwise, in medial or final position the shifted value of *k* is /x(ː)/. The nongeminate voiceless stops are shifted to geminate voiceless fricatives in non-initial position; and the geminate is regularly degeminated finally and before consonants. After long vowels, degemination is much less regular, becoming more uniform over time. There is no shift after a fricative *s, f, h*, e.g. *sprehhan* 'speak', *haspil* 'reel', *scama* 'shame', *miscen* 'mix', *stein* 'stone', *ist* 'is', *naht* 'night', *luft* 'air'. Likewise, PGmc. *t* remains unshifted in the consonant cluster *tr*, as in *trūēn* 'believe', and medially *t* is geminated before *r* (§6.15), as in *snottar* 'wise' (Go. *snutrs*).

The results of the shift of voiceless stops, as well as of the other changes discussed below, are most extensive in the southernmost part of Upper Germany, with decreasing incidence to the north. The change of medial and final *p, t, k* to the fricatives *f(f), z(z), h(h)* is common to all dialects, as is the affrication of *t* to *z* (/ts/).[2] The affrication of *p(p)* to *pf* is found only in UG and East Franconian, except that it occurs in Rhine Franconian after a liquid, e.g. *helpfan* 'help', *werpfan* 'cast', later *helfan, werfen*. The shift of *k(k)* to an affricate occurred only in UG; the affricate *(c)ch, kh* occurs today only in the south of Switzerland and Austria (with simplification to a fricative as far north as Freiburg), though it appears to have been used throughout the UG area in OHG times. Examples:

p(p): As affricate: OHG *pfenning* 'penny' (but Middle Franconian *penning*), *skepfen* 'create' (*skeppen*), *helpfan* 'help' (> *helfan*, but Middle Franconian *helpan*), *chapf* 'height', to which cf. OS *penning, skeppian, helpan*, OE *cæppe* 'cap'. As fricative: OHG *slāf(f)an* 'sleep', *skif* 'ship' : OS *slāpan, skip*.

t(t): As affricate: OHG *ziohan* 'draw', *setzen* 'set', *herza* 'heart', *holz* 'wood' : OS *tiohan, settian, herta, holt*. As fricative: OHG *ezzan* 'eat', *hwaz* 'what' : OS *etan, hwat*.

k(k): As affricate: OHG *khorn, chorn* 'grain' (UG; CG *korn*), *wec(c)hen* 'waken' (UG; CG *wecken*), *t(h)enchen, denchen* 'think' (UG; CG *t(h)enken, denken*), *star(a)ch* 'strong' : OS *korn, wekkian, thenkian, stark*. As fricative: OHG *mahhōn* 'make', *ih* 'I' : OS *makon, ik*.

As elsewhere in WGmc., PGmc. *ð* became (at first) OHG *d*; in addition, the other voiced fricatives, *ƀ, ʒ*, became stops *b, g* in all positions.[3] These stops *b, d, g* could then shift to *p, t, k*, but to a different extent in different dialects. The stop *d* is shifted to *t* in all dialects except Middle and Rhine Franconian, as in *dohter* 'daughter', *bidden* 'bid', *biodan* 'offer', otherwise OHG *tohter, bitten, biotan*. The stops *b* and *g*, on the other hand, are frequently written *p, k* in UG, especially initially, and particularly in Bavarian, but starting in the 9th cent. in Alemannic and in the 10th in Bavarian they start to be written *b, g* except where geminated, though the older spellings are still to be found, as well, as late as the 16th century. Early UG forms thus include *peran* 'bear', *kepan* 'give', *stīcan* 'ascend', *sippa* 'kinship', *(h)rucki* 'back', later *beran, geban, stīgan, sippa, rucki*. The usual assumption, then, is that in Upper German there was no voicing contrast in

obstruents, only contrasts of length and of manner of articulation (stop : fricacate; see Kraehenmann 2003: 61–7). The handbooks cited in §1.20 should be consulted
for details, and for discussion of what the phonological significance of these UG orthographic changes might be.

The results of the High German shift were mapped in the 19th cent. and played a
significant role in the differentiation of NHG dialects represented in Figure 7. The isoglosses plotted there have plainly shifted some since OHG times (see §1.20), but for the
most part the modern diatopic distribution of the results of the shift appears to be congruous with the OHG and (much more secure) MHG evidence. Line A in the figure represents the *Benrather Linie* (named after a village that is now a district of Düsseldorf),
marking the northernmost limit of the shift (*machen* : *maken*); line B represents the
Speyerer Linie (named after the city of Speyer; sometimes also called the Main line,
after the river), marking the border between Upper and Central German (*Apfel* : *Appel*).

Several aspects of the shift have generated considerable controversy, especially
the shift of the voiceless stops. The commonest assumption (as proposed by Braune
1874b: 49–50) is that the shift began with aspiration of voiceless stops, with subsequent
conversion of aspirates to affricates, which then after vowels were simplified to fricatives, hence, e.g., *p > pʰ > pf (> ff)*. Alternative views are summarized concisely by
Braune (2004a: §90 Anmm. 2–3). The date of the shift's origin and the manner of its
spread, two closely related issues, are matters of greater controversy. The view of the
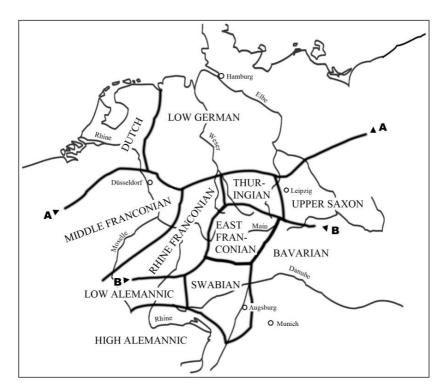

*Fig. 7. New High German Dialects. Line A represents the Benrath line, differentiating High
and Low German; line B represents the Speyer line, distinguishing Upper and Central German. See also §1.20.*

majority, again established by Braune (1874b), is that the shift originated in UG, in the area where its effects are most extensive, and as it spread northward it gradually affected fewer sounds. The pattern of spread would thus be like that for the change of *þ* to *d*, which can be traced over the course of the OHG period (§6.22). Yet it has also been argued that the change spread from north to south, or from the west; or that the shift was polygenetic in origin, arising in more than one related dialect (the *Entfaltungstheorie*, originating with Höfler 1955–56); or that the change initially produced the same results in all OHG dialects, but that there was a creeping 'creolization' of CG dialects under NSGmc. influence (so Vennemann 1987a: 48–53, and elsewhere); or that it originated in a Gallo-Romance substrate (Lange 2003, Schrijver 2011). See Goblirsch 2005: 137–81 for summary, discussion, and bibliography pertaining to these issues, and subsequently Callender 2012, 2017. The shift has been dated as early as the 1st cent. BCE, but the majority view is that it occurred in the 6–8th centuries CE; for a summary of views, see Vennemann 1994a. Vennemann (e.g. 1984b) has also argued in various publications that the shift can best be explained on the basis of the glottalic theory (§6.2), advocating very early dating and a centuries-long process of adaptivity and sound substitutions to account for application of the shift to Lat. loans, e.g. *Zürich*, from Lat. *Turicum*.[4] For a thorough review of scholarship on all aspects of the shift, see Schwerdt 2000.

1.   This sound is distinguished in spelling from the reflex of PGmc. *s* until late in the MHG period. The latter was probably postalveolar, given that it has become /ʃ/ initially before a consonant, and given that OHG texts from Freising represent Slovene /ʃ, ʒ/ as ⟨s⟩ and /s, z/ as ⟨z⟩ (Braune 1874a). In that event, perhaps *z* was simply [s], reduced from [ts]. For discussion and references, see Penzl 1986a: 38–9. Although ⟨z(z)⟩ may usually stand for either the fricative or the affricate, in *Isidor* the sounds are distinguished, the affricate being represented by ⟨z⟩ (⟨tz⟩ when geminated), the fricative by ⟨zss⟩ (⟨zs⟩ when final). Likewise, in some manuscripts the affricate is represented by ⟨c⟩ (Braune 2004a: §157). And of course the fricative and the affricate are distinguishable on the basis of modern reflexes.

2.   But Middle Franconian preserves final stops in the words *dat*, *it*, *wat*, the inflection *-et*, and (in part) *up*.

3.   An exception is Middle Franconian, where the development of *ƀ* agrees with that in OS: except initially, after *m*, and in gemination, where it had already developed to *b*, it remained *ƀ* except when devoiced (i.e., next to a voiceless sound or finally); hence *gevan* 'give', pret. *gaf*, otherwise CG *geban*, *gab*.

4.   Vennemann's position has met with much criticism: see Braune 2004a: §90 Anm. 6 for bibliography. A supporter is L.C. Smith (1996); an opponent is Schwerdt 2000: 177–89; see further Schwerdt 2002.

6.22   Other consonant changes in Old High German

As noted in §6.21, unlike in Ingvaeonic, PGmc. *ƀ* and *ʒ* become stops *b* and *g* in all positions in OHG, except in Middle Franconian, and in UG these are commonly represented as ⟨p⟩ and ⟨k, c⟩.

The reflex of PGmc. *þ* is usually spelt ⟨d⟩ (also ⟨th, dh⟩) already in the earliest Bavarian texts, and the gradual spread of the change east- and northward is traceable in the OHG records, appearing finally in Middle Franconian in the 11th century. In this last dialect, then, it fell together with *d* from PGmc. *ð*, which was not shifted to *t* in Middle Franconian, as in UG and East Franconian, and variably in Rhine and South Rhine Franconian. Presumably, *þ* passed through the stage *ð* in the process of becoming OHG *d*, and this is apparently what relatively infrequent spellings with *dh* represent. Examples: *dorn* 'thorn' (Go. *þaúrnus*), *bruoder* 'brother' (Go. *brōþar*), *ander* 'other' (Go. *anþar*), *tōd* 'death' (Go. *dáuþs*). When geminate, however, *þþ* (like *dd*, §6.21) becomes *tt*, as in *smitta* 'smithy' (OE *smiþþe*).

Devoicing of final voiced stops (final fortition, *Auslaut(s)verhärtung*) is frequently in evidence in Franconian, especially in *Isidor* and Tatian, rarely in Otfrid; yet it is hardly universal, and *d* from PGmc. *þ* is always written *d*. Due to the development of the voiced stops in UG, the extent of devoicing cannot be reliably gauged.

Notker evinces a pattern of voicing alternations in initial stops under sandhi conditions, a pattern known as *Notkers Anlaut(s)gesetz* 'Notker's law of initials'. He uses ⟨b, d⟩ (the latter from *þ*) and ⟨g⟩ to represent stops when the preceding word ends in a vowel or a sonorant *r*, *l*, *m*, *n*; otherwise he writes ⟨p, t, k⟩, i.e. either when the preceding word ends in an obstruent (etymologically either voiced or voiceless), or at the start of a sentence. OHG *t* derived from PGmc. *d* does not participate in the alternation. The usual explanation is that OHG *b*, *d*, *g* are voiceless lenes, and writing ⟨p, t, k⟩ (usually representing voiceless fortes) expresses neutralization of the contrast between lenis and fortis stops after an obstruent. It naturally follows that OHG *t* (< *d*), a fortis, would show no alternation. For discussion of this and alternative views, with a bibliographical overview, see B.R. Page 2013; also Luxner 2015.

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