PROTO-INDO-EUROPEAN PHONOLOGY

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To

EDGAR H. STURTEVANT

PREFACE

Marked advances in the study of Indo-European phonology have resulted when new data were discovered and linguistic methodology refined. The initial investigations in IE studies at the beginning of the nineteenth century were due to the discovery of new materials, chiefly Sanskrit; the great series of improvements after 1870 to the application of more rigorous techniques of analysis. In the past twenty-five years further refinements in method have been achieved, chiefly in structural linguistics. Moreover, new data have been provided by Hittite, and by reexamination of phonological phenomena which have hitherto been disregarded or left unexplained. Yet there have been few comprehensive attempts to revise our description of IE phonology. In this monograph I suggest a reformulation of PIE phonology based on an examination of such new data according to the principles of structural linguistics.

My dependence on the standard works in IE grammar, those of Brugmann, Hirt, Meillet, the etymological dictionaries of Feist, Walde, Boisacq, the grammars for individual dialects such as those of Braune for Old High German, Noreen for Old Icelandic, will be obvious even when not specifically mentioned. Attempts to reformulate phonological problems in IE and the dialects without a knowledge of previous scholarship are useless; a list of all the materials consulted, however, would be unduly cumbersome.

René Derolez, George Lane, Alf Sommerfelt, and Edgar H. Sturtevant have read parts of the manuscript, Ruth Lehmann and W. F. Twaddell the entire manuscript; to them and to linguists who have commented on sections of the text which were read before the Linguistic Society of America I am indebted for many suggestions. A part of the monograph was written during the summer of 1948 while I held a Fellowship from the American Council of Learned Societies at the Linguistic Institute. Publication has been made possible by a grant from the University of Texas Research Council.

WINFRED P. LEHMANN

Austin, Texas
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CP: Classical Philology. Chicago.

EI: see Kurylowicz.

Eng. St.: Englische Studien. Heilbronn.

Gdr.: see Brugmann.

GGN: Göttingsche gelehrte Nachrichten.

HH: see Sommer.

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IG: see Hirt.

IHL: see Sturtevant.

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PROTO-INDO-EUROPEAN PHONOLOGY

1. INTRODUCTION

1.1. RECONSTRUCTION OF THE PIE CONSONANTS IN THE 19TH CENTURY. The descriptions of PIE phonology found in our handbooks date in great part from the nineteenth century. When we maintain these descriptions we accept the foundations on which they are based. At present our data have been increased by Hittite, and our linguistic methodology refined. In this monograph I shall examine the new data and some well-known but unexplained data in accordance with current linguistic methodology and propose a revised description of PIE phonology.

The phonology of PIE was first described and greatly developed in the course of the nineteenth century. Grimm, Rask, and Bopp did not even attempt to reconstruct the language from which the dialects developed, assuming it to be much like Skt. Schleicher, trying to escape such undue emphasis on Skt., reconstructed PIE on the basis of all the dialects. Indo-Europeanists have followed him in this practice and modern reconstructions of the language differ from Skt. even more than did Schleicher's. In developing the means to avoid patterning PIE on Skt. Schleicher introduced an erroneous evaluation of a reconstructed language; he considered it sufficiently like attested languages, e.g. Gk., Lat., so that one could write fables in it. This notion and the nineteenth century emphasis on phonetics led Indo-Europeanists to deal primarily with the sounds of IE, not their patterning. Thus the chief contributions of nineteenth century Indo-Europeanists were in determining the phonetic system of PIE. Only a few concerned themselves with its phonemic structure. Today this study rather than the phonetic description of PIE needs further development.

The earliest agreement in the description of PIE was on the consonants. After some debatable points were cleared up in the sixties and seventies of the nineteenth century, the consonants were pretty well established as we today reconstruct them. Since then the consonants [p b ph bh t d th dh k g kh gh ḱ ǵ ḱh ǵh kʷ gʷ kʷh gʷh s z m n ṇ ŋ r l w y] have been generally assumed, and often also four spirants [þ þh ð ðh]. The consonants over whose description there has been most dispute are [bh dh gh ǵh gʷh]; they are usually described as aspirated stops, but occasionally as spirants.

The chief difficulties removed between 1860 and 1880 were those solved in the formulations known as Grassmann's Law, Verner's Law, and the Law of Palatals.

1.1a. Grassmann[1] in 1863 demonstrated that in Ind.-Ir. and Greek the first of two aspirates beginning successive syllables or a syllable that ends in an aspirate lost its aspiration: e.g. Skt. *dadhâti*, Gk. *τίθητι* 'places', from PIE *dhe-dhē-*; Skt. *bandh-* 'bind', Gk. *πενθερός* 'step-father', but Mod. Eng. *bind*, from PIE *bhendh-*. The deaspiration occurred independently in the two dialects. After Grassmann's discovery the PIE aspirates could be reconstructed from

[1] Ueber die Aspiraten und ihr gleichzeitiges Vorhandensein im An- und Auslaut der Wurzeln, KZ 12.81–138.

reflexes in Ind.-Ir. and Gk. as well as from Gmc. and, less easily, some of the other dialects.

1.1b. Verner[2] in 1877 demonstrated that in Gmc., voiced spirants developed from voiceless spirants if the preceding syllable did not have the chief word accent: e.g. Goth. *frawaírþan* 'spoil', *frawardjan* 'ruin' from PIE *wert-* (compare Skt. *vártate*, *vartáyati*); OHG *ziohan* 'pull', pret. part. *gizogan*, from PIE *deuk-*. After Verner's discovery the PIE voiceless stops and voiced aspirates could be distinguished even with the evidence in Gmc.

1.1c. About the time of Verner's discovery a number of linguists[3] independently demonstrated that in PInd.-Ir. velar consonants were palatalized before *i ī y e ē*: e.g. Skt. *ugrá* 'strong', *ójīya* 'stronger'; *cakára* 'I have made' from PIE *kekora*. After the origin of these Ind.-Ir. palatals was demonstrated, the group of PIE consonants was even more clearly defined.

1.1d. The difficulties that remained involved only a small proportion of the vocabulary; chief of these were the status of the voiceless aspirates, that of the four spirants [þ þh ð ðh], and the relationship between velars, labio-velars, and palatals in PIE. Evidence for reconstructing PIE with voiceless aspirates and spirants other than *s* was drawn primarily from Ind.-Ir. and Gk.; the materials could be variously interpreted, and no interpretation has yet been widely accepted. The problem of the relationship between velars, labio-velars, and palatals is one of analysis. Evidence for the three groups of sounds can be found in the dialects. Interpretation of the evidence has varied with the methods employed in analyzing the data; if the data are analyzed phonetically, three groups of sounds must be assumed; if they are analyzed phonemically, one may set up two groups.

1.1e. With the solution of the chief problems in the PIE group of consonants went the assumption that the PIE accent was a variable pitch accent like that of Vedic Sanskrit. Verner demonstrated that if one assumed that the PIE (Vedic) accent had survived into PGmc., one could account for the development of voiced from voiceless spirants.

1.1f. We may note incidentally that Gmc., with all of its changes from PIE, has been involved in the clarification of many of the important problems of IE phonology; PGmc. maintained the PIE accentual system and consonantal system much longer than did IE dialects like Italic and Celtic, and even in some respects than Gk. For the apparently great number of changes described in Grimm's Law involved little change in the PIE consonant system. The PIE three-stop system was maintained in Gmc.; PIE *p b bh* > PGmc. *f p b*, PIE *t d dh* > PGmc. *þ t ð*, PIE *k g gh* (*kʷ gʷ gʷh*) > PGmc. *χ k ʒ* (*χw kw ʒw*). In other dialects the PIE system was broken down; in Celtic a two-stop consonant

[2] Eine Ausnahme der ersten Lautverschiebung, KZ 23. 97–130. Grimm and the other Germanists before Verner assumed that PIE /p t k/ had become PGmc. *f θ χ* but they did not account for the apparently aberrant development of some /p t k/ to PGmc. *b d ʒ*. By correlating such *b d ʒ* with the position of the PIE word accent Verner showed that they were not aberrant but followed a definite pattern.

[3] See a summary like that in H. Hirt, Indogermanische Grammatik 2.20-1 (Heidelberg, 1921). A great number of articles were written about the subject, most of which agree in their results.

system developed, e.g. PIE *p b bh* > PCelt. *p b*. A two-stop system developed also in Slavic and Baltic. Moreover from the evidence we have about the time of the Gmc. accent change we may assume that Gmc. maintained a variable pitch accent like that of PIE until the fourth century B.C.; at this time the Italic and Celtic dialects had an initial stress accent, Gk. a fixed pitch accent. Consequently PGmc. must be considered one of the most conservative IE dialects; investigation of PGmc. may therefore yield important information for a solution of some of the remaining phonological problems of PIE.

1.2. RECONSTRUCTION OF THE VOWELS. After the formulation of the Law of Palatals it was clear that the European dialects had maintained the PIE vowel system better than Ind.-Ir. For the palatals had developed before front vowels, such as the reflex of /e/, but not /o/ or /a/. From forms like Skt. 3d sg. pres. *hánti* 'he strikes', PIE *g^{w}hen-* (as opposed to the 3d pl. pres. *ghnánti*, PIE *g^{w}hn-*), and 3d sg. perf. *jaghā́na*, PIE *g^{w}heg^{w}ho-*, it was apparent that until the Law of Palatals was in effect Skt. too had maintained the difference between PIE *e* and *o*. Before this discovery it was assumed that the PIE form should be patterned on Skt.: e.g. the Skt. 1st sg. perf. *cakā́ra* 'I have made' was taken as the most conservative form, and the PIE 1st sg. perf. was reconstructed with the same vowel in the three syllables; now it is reconstructed with three vowels. And the Gk. (European) vowels *e a o ē ā ō* rather than the Ind.-Ir. *a* and *ā* were assumed for PIE.

We may note that in the solution of phonological problems two difficulties were often solved when a new phonetic relationship was recognized[4]; Verner settled the problem of the PIE accent while showing the interrelationships of the PGmc. voiced and voiceless spirants; Collitz and others established the conservatism of the Gk. vocalic system when they showed the interrelationships of the Ind.-Ir. palatals and velars. Similarly, Kurylowicz' demonstration that Hittite *ḫ* corresponded to hypothetical laryngeal consonants led to a clarification of the PIE ablaut relationships while settling the problem of the origin of Hittite *ḫ*. Brugmann's suggestion of IE vocalic *n* completed the data on the vowels; it led to the assumption of vocalic *r l m* as well as *n*.[5] The only additional PIE sounds that have been suggested are the laryngeal consonants, which were first proposed by Saussure.

1.3. FORMULATIONS OF THE VOCALIC SYSTEM. Two types of formulation of the PIE vocalic system have since been made from these data. Hirt's may be cited

[4] J. Whatmough, The Development of the Indo-European labiovelars with special reference to the dialects of ancient Italy, Mélanges Linguistiques offerts a M. Holger Pedersen 45–56 (Copenhagen, 1937), discusses at greater length the use, and necessity, of such argumentation in linguistics.

[5] Brugmann's discovery was published in G. Curtius' Studien zur griechischen und lateinischen Grammatik 9.297ff. and 361ff. (Leipzig, 1877). In the zero grade of roots in *en-*, for example, Skt. and Gk. have an *-a-*, as in the *to*-forms, Skt. *ha-tá*, Gk. *φα-τός* from PIE /g^{w}hen-/; the normal grade is found in Skt. *hánti* 'he kills', Gk. *θείνω* 'I kill'. Comparing these with the *to*-forms Skt. *i-tá*, Gk. *ἰ-τός* and Skt. *é-ti* 'he goes', Gk. *εἶ-μι* 'I go', one can assume for *en* a weakened form [n̥], of which the reflex in Skt. and Gk. is *a*, as for *ey* a weakened form [i]. Such a weakened form is also found in the second syllable of the word for 'ten': Skt. *daśa*, Gk. *δέκα*, Lat. *decem*, Goth. *taíhun*. H. Osthoff PBB 3.52 assumed syllabic *r* from the Skt. dat. pl. *pitŕ̥bhyas* as opposed to the dat. sg. *pitré*.

as an example of one of them. His system included: *e o a ē ō ā*; the diphthongs *ei oi ai eu ou au ēi ōi āi ēu ōu āu*; *i u, ī ū*, which he derives from unaccented diphthongal or bisyllabic formations; the reduced vowels *ə ɪ ɔ*, and the syllabic liquids and nasals *r̥ l̥ m̥ n̥*.[6] Brugmann's system differs in including *r̄ l̄ m̄ n̄*, and excluding *ɪ ɔ*.[7] These systems are today maintained widely; Sturtevant in IHL describes his system as following 'as closely as possible the one that was assumed by Brugmann and that underlies most of the current work on IE comparative grammar.'[8]

1.3a. In 1878 Saussure had already analyzed the PIE vocalic system quite differently on a structural basis.[9] His system includes two vowels, *e* and *o*, and eight sonants, *i u n m r l A Q*. The sonants entered into various diphthongal combinations, *ei eu en*, etc., and from *eA* developed *Ā*, from *eQ, Q̄*. None of the standard handbooks has adopted his system without modification; Meillet, perhaps, has remained closest to it.[10] In addition to the consonants *p t k kʷ b d g gʷ bh dh gh gʷh s*, Meillet assumes: the vowels *e a o ē ā ō*; *ə*, which he says really is a sonant; a reduced vowel °; the sonants *y w r l m n*, which may be vocalic, the second element of diphthongs beginning with *e o* or *a*, and long when followed originally by *ə*. Meillet's system is inferior to Saussure's in that phonetic criteria outweigh functional criteria. To be sure Meillet has remained closer to Saussure than did Brugmann, who adopted Saussure's *r̄ l̄ m̄ n̄*, but as phonetic not as structural units. With the ambiguous position of *ə* in his system, Meillet too wavers between a phonetic and a phonemic basis of classification.

1.3b. All of the vocalic systems proposed, except Saussure's, are very complex in spite of Hirt's preliminary assertion that the vocalic system of PIE is relatively simple. Among the problems are:

A. the relationship of *e a o* and *y w r l m n*; should five vowels, *e a o i u*, be assumed, a series of diphthongs *ey ew er el em en*, etc. or even long diphthongs?

B. what was the position of long vowels, *ē ā ō*, in the system; should one assume beside them one unaccented vowel, *ə*, or three? Is a further unaccented vowel to be assumed beside the PIE short vowels, *e a o*?

C. should long *r̄ l̄ m̄ n̄* be assumed for PIE?

The answer to these problems depends largely on the assumptions made by

[6] This system is given in IG 2.101. In Hirt's Die Hauptprobleme der Indogermanischen Sprachenwissenschaft, herausgegeben und bearbeitet v. H. Arntz (Halle, 1939), *ə* is listed as the only weak vowel, and the following vowels are added: *r̄ l̄ m̄ n̄ r̥r l̥l m̥m n̥n*. IG 2.103, Hirt had said: 'Es fehlen ganz die *r̄, l̄, m̄, n̄*, und es ist auch keine Möglichkeit vorhanden, sie irgendwie anzusetzen. Die Lautverbindungen *r̥r, l̥l, m̥m, n̥n*, die zu den merkwürdigsten indogermanischen Irrformen geführt haben, sind hoffentlich ebenfalls beseitigt.' I assume that the posthumous publication mistakenly printed a rejected version; the chaotic state of the manuscript Hirt left is indicated in the preface.

[7] Gdr. I.92-3. Brugmann also posits the diphthongs *əi* and *əu*, the palatal and velar nasals as vowels, and aspirated and unaspirated forms of *s* and *z*.

[8] E. H. Sturtevant, The Indo-Hittite Laryngeals 90-1 (Baltimore, 1942) (IHL). Sturtevant does not list diphthongs as unit phonemes, but fails to mention their place in his system.

[9] Ferdinand de Saussure, Mémoire sur le système primitif des voyelles dans les langues indo-européennes (Leipzig, 1879).

[10] A. Meillet, Introduction à l'étude comparative des langues indo-européennes[8] 98-126 (Paris, 1937).

the linguist. While Hirt admits that an analysis of the PIE vowels must be at least partially based on their systematic interrelationships, he bases his system primarily on phonetic criteria, and consequently he does not arrive at a phonemic analysis of PIE.

1.3c. Another difficulty with the systems sketched is that they do not account for various developments in the individual dialects. Among these are: the development of Gmc. lengthened *y* and *w*; the origin of Gmc. *ē*²; the development of IE *y-* to Gk. *ζ* and *῾*. No satisfactory explanation of these and other difficulties has been made on the basis of the PIE phonological systems hitherto proposed. It may be mentioned here that many of the problems in the development of PIE to the various dialects are found in words for which laryngeals have been suggested for IE.

1.4. METHODOLOGICAL DIFFERENCES BETWEEN 19TH CENTURY AND CURRENT LINGUISTIC THEORY. Besides these external difficulties there is a fundamental theoretical difference between the linguistic elements used currently in linguistic study and those used by Brugmann and Hirt. The linguistic elements of Brugmann are based on phonetic criteria (Gdr. I.49), but those currently used are based on distribution as well. When Brugmann speaks of a Sprachlaut, he does not of course mean 'sound' in the narrow sense; he is following the lead of Sievers in choosing this term rather than the term 'Sprachelement' to refer to a class of sounds; [t] though articulated finally without an explosion would nonetheless be the same Sprachlaut as [t] articulated initially with an explosion. Still Brugmann's Sprachlaut differs from the phoneme used currently in linguistic study. To Brugmann an [ŋ], though found only before velars in PIE, was a different Sprachlaut from [n], though this was never found there. By modern linguistic theory PIE [n] and [ŋ] are classed in one phoneme.

1.4a. Current linguistic theory therefore demands a different analysis of PIE from Brugmann's. Adoption of a different analysis does not entail a rejection of Brugmann's facts. The data on which we construct PIE are unfortunately little more ample than Brugmann's. But if we reconstruct PIE with Brugmann's criteria, we compel contemporary linguists to devise their own phonemic system of PIE from an essentially phonetic system, or worse we give rise to misunderstandings. Moreover unsolved phonological problems will remain without hope of solution until we construct a phonemic system of PIE.

Current linguistics distinguishes sharply between speech and language, between sounds and phonemes. When reading Brugmann I feel that he was interested in reconstructing the IE speech. Later Indo-Europeanists were attempting to reconstruct the IE language, as is clear from such occasional statements on methodology as the following. In his IG Hirt had said:[11] 'It really doesn't matter what was spoken in PIE; what matters are the ablaut relationships.' Specht, KZ 59.98 (1932) explained that his transcription *r̥ l̥* was merely a convenient formula and was not meant to suggest the PIE pronunciation. But even these Indo-Europeanists failed to observe the rigorous distinction between phonetic and phonemic analysis that we should now demand.

[11] IG 2.92: 'Denn es kommt wirklich nicht darauf an, was im Indogermanischen gesprochen worden ist, sondern es kommt auf die Ablautsverhältnisse an.'

1.4b. Therefore in our study today of the PIE phonological system we are faced with two fundamental and interrelated problems.

A. We must reexamine in accordance with current phonemic theory the data known to Brugmann and his successors.

B. These data have been augmented by material found in the Anatolian languages, especially Hittite. The attempts to account for this new material, to relate it to the data derived in the nineteenth century from the IE dialects, are known under the name of the laryngeal theory. The laryngeal theory demands further investigation, especially with regard to certain dialects such as Gmc.

1.4c. Compilations of the data on the PIE phonological system assembled in the nineteenth century and the beginning of the twentieth may be found in the standard works of Brugmann, Hirt, and Walde. No such extensive compendia have yet been made in connection with the laryngeal theory. But surveys of work published may be found in IHL, BHL, and SSP;[12] a resurvey here would therefore be superfluous.

Although evidence for the laryngeal theory in some IE dialects has yet to be investigated and although some suggestions made in connection with this theory have not been widely accepted, there is fundamental agreement on some of its propositions. These will be examined in chapter 3.

1.4d. Before examining these propositions, I shall suggest a phonemic system for the data drawn from the IE dialects other than Hittite. The system will be only provisional; it will hardly stand unmodified after the conclusions drawn from Hittite are added to those drawn from the IE dialects. But to make proper use of the Hittite data we have to systematize our other facts in terms of current linguistic theory. After systematizing them, I shall correlate with them the accepted propositions of the laryngeal theory, and then examine phonological problems with the provisional system. Finally we may be able to arrive at a phonological system taking as full account as possible of all of the data and systematizing them in terms of structural principles.

[12] H. Hendriksen, Untersuchungen über die Bedeutung des Hethitischen für die Laryngaltheorie, Det Kgl. Danske Videnskabernes Selskab, Historisk-filologiske Meddelelser 27.2 (Copenhagen, 1941). For a history of the theory see 4–11 (BHL). G. M. Messing, Selected Studies in Indo-European Phonology, Harvard Studies in Classical Philology 56–7. 161–232 (Cambridge, 1947) (SSP).

2. THE PHONOLOGICAL SYSTEM OF PIE

2.1. CRITERIA FOR DESCRIBING THE PIE PHONOLOGICAL SYSTEM. Indo-Europeanists agree in general on the description and distribution of the PIE sounds; these data are well-established. In formulating their phonemic systems from these data all Indo-Europeanists have used to a certain extent distribution of sounds as well as phonetic analysis. But up to the present they have relied more heavily on the latter, on phonetic rather than on structural criteria.

For a reconstructed language like PIE, whose dialects provide us with considerable phonological data, structural criteria can provide an adequate phonemic system; the description of the allophones of these phonemes, however, may be less exact than that of allophones of a language recorded from living speakers. Since we have no documents for PIE or for some of the IE dialects, such as PGmc., we have a better idea of the structural relationships of IE phonemes than of their phonetic relationships. For example, all Indo-Europeanists assume a series of PIE obstruents, usually written *bh dh gh*, that contrast with *p t k* and *b d g*. But they differ in their phonetic interpretation of this series; some assume that they were stops, others that they were spirants. From a structural point of view the phonetic interpretation is of secondary importance.

The following advantages are apparent in a system constructed with the aid of functional criteria.

A. The phonemes assumed by means of functional criteria do not overlap. Brugmann, using phonetic criteria, found it difficult to distinguish between the classification of IE consonants and vowels, to find, for example, the principle of demarcation between PIE [w] [u] and [e].

B. The position of all members of the system, e.g. /s r m/ is unambiguous.

C. Our only information about PIE sounds is inferential; but we can establish the relationship of these sounds without knowing their exact phonetic description. For example, *t* may have been dental, alveolar, etc.; if we consider *t* a phoneme contrasting on the one hand with *p* and *k*, and on the other hand with *d* and *dh*, an exact phonetic description may be dispensed with.

D. A system derived through such analysis will fulfill a wholly different function of classification by giving us a means to define PIE, to determine the relative chronology of changes in its phonological system, and the relation of the PIE phonological system to that of the IE dialects.

2.1a. The criterion used here for determining the class to which a phoneme belongs is its use as syllabic. We then arrive at three classes of phonemes: 1. those which may not function as syllabics will be called obstruents; 2. those which may function only as syllabics, vowels; 3. those which function both as syllabics and as non-syllabics, resonants.

The following phonemic system may then be assumed for PIE, apart from laryngeals or reflexes of laryngeals:[1]

[1] The standard handbooks, e.g. Meillet's Introduction 82-126, give examples of these phonemes in various environments.

The laryngeals will be discussed in chapter 3. Discussions of the laryngeal theory vary

Obstruents:	p	t	k	k^w
	b bh	d dh	g gh	g^w g^wh
		s		
Vowels:	e ē a ā o ō ₒ ɪ ū			
Resonants:	y w l r m n			

2.1b. This system differs from Brugmann's system primarily in not including schwa, diphthongs, aspirated voiceless stops, or palatal stops. The unaccented vowels are central to the laryngeal theory, and will be treated later. The assumed diphthongs, and the resonants, will be discussed in this chapter. The problem of aspirated voiceless stops will be discussed in chapter 11. The problem of the back stops in PIE will not be discussed in detail since it is not central to this book. Brugmann of course assumes three series, palatals, velars, and labio-velars. Any attempt to assume two series, as well as to account for developments in all dialects from three PIE series, is confronted with numerous exceptions. One must accept the most plausible system, and assume it was disturbed by analogical changes. I accept Meillet's. (Cf. Introduction 91–5.) Meillet, pointing out that the velars are found especially before *a*, *r*, at the end of roots especially after *u*, and after *s*, assumes that in other positions, that is in the neighborhood of sounds with fronted articulation, the PIE velars were palatalized in the *satem* dialects. Kurylowicz, EI 1–26, on the other hand, assumes palatals and velars for PIE, and further that labio-velars are innovations in the *centum* dialects, resulting from a falling together of palatals and velars plus *u̯* with velars before front vowels. In view of Meillet's more weighty linguistic arguments, such as his demonstration that the *satem* dialects form a central, innovating area, and have continued to undergo palatalization, I find his hypothesis more convincing than that of Kurylowicz.

2.1c. In the stage of PIE for which this phonemic system is assumed accent was not phonemic. The system had free pitch accent like that in Vedic. Most words had a syllable with high pitch; exceptions are enclitics, and verb-forms in some positions of the sentence.

At an earlier stage of PIE this pitch accent had been phonemic; during the period with phonemic pitch accent occurred the sound change of [e] to [o].

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widely in the symbols used to represent laryngeals; Sturtevant lists the various symbols, IHL 22-3. Each system of transcription has its drawbacks, as does the current system of transcription used for PIE. I use, with modifications, the symbols found most widely in American publications. As cover symbol for laryngeals I use *X*. As cover symbol for the *a*-colored laryngeals I use *A*. For the laryngeals I use four symbols: *ʔ h x γ*. *h* is the only one of these different from the symbols in IHL; Sturtevant there uses *ʔ*, but in later publications *h*.

IE forms are sometimes discussed below in terms of their structure, and cover symbols are used for other classes of phonemes: *C* for obstruent, *R* for resonant, *e* for vowel. CeRX thus refers to a structure consisting of obstruent, vowel, resonant, laryngeal. When further analysis is necessary, members of the various classes of phonemes will be used, see for example, **2.2.**

This stage of PIE with phonemic pitch accent was preceded by a stage with stress accent. During an early stage of pre-IE, stress accent had been phonemic, and then occurred the sound change of [e] to [e] and [e·]. These shifts in stress are assumed from the ablaut interchanges found in the various IE dialects. Hirt and other Indo-Europeanists assumed them; yet they never indicated that accent, both stress and pitch, might be part of a linguistic system, but be non-phonemic; as a result the apparent vagaries of IE, the shifts from stress accent to pitch accent and back to stress accent, seemed embarassing in their waywardness. Today we find no difficulty in accepting a language with stress and pitch accent, of which either, or neither, may be phonemic. Presumably the various stages of IE had both pitch and stress accent simultaneously; in one period stress accent was phonemic, in another pitch accent, in another neither. These earlier stages of IE will be discussed below. The system assumed here is that of the stage of IE immediately before the division into dialects.

2.1d. Because of our lack of IE records it is difficult to determine the allophones of the various phonemes. From our evidence we have been able to deduce little allophonic variation of the obstruents other than /s/, and in position of articulation of the resonants other than /n/. /s/ had a voiced allophone when it stood before voiced obstruents, Av. *mižd̥əm*, Goth. *mizdō* 'reward', a voiceless allophone elsewhere, Av. *asti*, Goth. *ist* 'is'. /n/ had palatal and velar allophones when it stood before palatals and velars, Lat. *quīnque*, Skt. *páñca* 'five', a dental allophone elsewhere, Lat. *ferunt*, Skt. *bháranti* 'they bear'.

None of the IE dialects contains evidence to contradict the assumption of a voiced allophone of /s/. Other, less general, developments in the IE dialects, especially of PIE clusters, may also give evidence of PIE allophonic variation. Thus, apparently an excrescent spirant developed in the combination, dental stop plus dental stop; e.g. Skt. *vittá*, Av. *vistō* 'known', Gk. *ἄιστος* 'unseen', OIrish *ro-fess* 'known', OHG *giwiss* 'certain' from PIE /wyttos/ [witstos]. In some dialects the excrescent spirant fell into the /s/ phoneme, in others it remained subphonemic.

2.1e. There are further general combinatory changes of obstruents in PIE. Voiceless obstruents became voiced before voiced obstruents; voiced obstruents became voiceless before voiceless obstruents. Before the Skt. instrumental pl. ending *-bhis*, the final voiceless stop of *vāc-* 'voice' is voiced, *vāgbhís*; before the locative pl. ending *-su*, the final voiced stop of *pād-* 'foot' is unvoiced, *patsú*.

Aspiration was a feature of an obstruent phoneme or of a cluster of obstruent phonemes. If one of a cluster of obstruent phonemes was an aspirate, the entire cluster was aspirated, and the last obstruent of the cluster was the member of the cluster marked with aspiration. Moreover any such cluster became voiced. The Skt. instrumental pl. of *yudh-* 'fighter' is *yudbhís*; the *to*-participle of *labh-* 'seize' is *labdha*.

2.1f. Other combinatory or cluster phenomena have not been so accurately described. Another combination giving evidence for an excrescent spirant is that of dentals and velars, e.g. Gk. *χθών* 'earth', Skt. *kṣám*, Hitt. *te-kán*. But the

circumstances under which such spirantization takes place have not yet been determined; for not all combinations of dental and velar show such spirantization.[2] Nor have the other possible PIE clusters been amply studied. When aberrant developments were found in some dialects, especially in Ind.-Ir. and Gk., the methodological principle adopted by former Indo-Europeanists was that of assuming another PIE phoneme. Because of the difficulties in words like Skt. *kṣám*, four new phonemes were assumed. To account for Gk. *ζυγόν* 'yoke' as opposed to *ὅς* 'who', another spirant phoneme was assumed. At least fourteen, and as many as thirty-six diphthongal phonemes were assumed for PIE. Some of these phonemes, e.g. the spirant /j/, are no longer generally accepted. But all Indo-Europeanists assume a series of diphthongal phonemes; and the four spirants /þ þh ð ðh/ are also generally assumed.

The PIE vowels give us little evidence to assume wide allophonic variation, with the possible exception of /o/, although with so few vowel phonemes there was latitude for such variation. Further study of vowels and obstruents may lead us to assume more allophonic variation, which rather than more phonemes may account for some of the aberrant developments in the dialects.

The resonants, however, show marked variation; it is here that the greatest unsolved problems have until recently remained in IE historical phonology.

2.2. THE ALLOPHONIC VARIATION OF THE RESONANTS; NO DIPHTHONGS IN PIE. Edgerton has analyzed the allophonic variation of the resonants and found a consistent pattern of positional variants for them. Choice of positional variant in PIE was determined by preceding and following phoneme, group of phonemes, or pause.[3] Each resonant phoneme is composed of three allophones, one consonantal, one vocalic, and one vowel followed by consonant, e.g. /w/ [w u uw], /r/ [r ṛ ṛr], /n/ [n ṇ ṇn], etc. When resonants are found between vowels, their allophone is consonantal, e.g. [bherō] 'I bear'. Between consonants, it is vocalic, e.g. [bhṛto-] 'borne'. Between consonant and vowel the allophone is consonantal if the preceding syllable is short, e.g. RV *tuvi-grá* < PIE [-gʷro-], and vowel followed by consonant if the preceding syllable is long, AV *girati* < PIE [gʷṛreti]. The allophonic patterns are more complex when resonants are contiguous; Edgerton has worked out the following patterns. (The symbol t stands for any obstruent, y for the consonantal form of any resonant, i for the vocalic form of any resonant, k for a second obstruent, w and u for a second resonant, a for any vowel, ă for any short vowel, ā for any long vowel, and | for pause.)

one resonant	tit	| it	ti |			
	aya	| ya	ay |			
	ayt					
	ătya		but	ktiya, ātiya		| tiya

[2] Benveniste examines the words for which such spirants are assumed in Le problème du þ indo-européen, BSL 38.139-47 (1937), and offers no solution. For that proposed by L. L. Hammerich, Laryngeal Before Sonant, Det Kgl. Danske Videnskabernes Selskab, Historisk-filologiske Meddelelser 31.3 (Copenhagen, 1948) there is no evidence.

[3] The Indo-European Semivowels, Language 19.83-124 (1943); on pages 108-9 he summarizes his findings in formulae similar to those given here.

two resonants	ăywa	but	āyuwa		
	ătyut	ătyu |	but	ātiyut	ātiyu |
				ktiyut	ktiyu |
				| tiyut	| tiyu |
	| yut				
	ayut	ayu |			
	| tiwa	ātiwa	ktiwa		
	ătyuwa				
either	yuwa or possibly iwa; pattern uncertain				
three resonants	ăywit	ăywi |	ăywiya		

Of the conclusions about the phonological interrelationships of the PIE phonemes which may be drawn from these patterns, one of interest here is that | (pause) is equal to a consonant; when, however, it precedes a resonant, it is equal to a consonant preceded by a vowel.

2.2a. Although the allophones of the resonants have now been determined, the relation of the resonants to the PIE vowels has not been clearly analyzed. When standing between vowels and obstruents, and occasionally when standing between vowels and vowels, they are designated as the second element of diphthongs. Thus for PIE is assumed a series of diphthongs composed of the vowels *e a o ē ā ō*, and sometimes *ə*, followed by the resonants.

It is difficult to find discussions supporting such an analysis. More common are statements like the following of Schrijnen:[4] 'with the discovery of the IE vowels went that of the IE diphthongs.' He then assumes diphthongs with *i* and *u*, e.g. *ei ai oi əi eu au ou əu*. Meillet objects to such a restriction, and assumes diphthongs for *y w r l m n* with *e a o*, setting up thirty-six diphthongs for PIE.

Yet no evidence has been adduced to support such a fundamental assumption in drawing up the PIE phonemic system. For the reasons given below I assume that the PIE phonemic system did not include diphthongs at all.

2.2b. The word 'diphthong' is used from two points of view, the phonetic and the phonemic. Jones defines it phonetically as 'an independent vowel glide not containing either a "peak" or a "valley" of prominence.'[5] Our methods of arriving at phonetic descriptions of PIE phonemes are deductive; we can only determine them in general. Still we expect such forms to follow the same patterns as forms determined from written texts, or from oral communication.

Diphthongs usually undergo a different development from that of their components. None of the six MHG diphthongs developed in the same way as its components; *ei* developed to Mod. Germ. *ai*, *ie to ī*, but *e* and *i* remained; *ou* developed to *au*, *uo* to *u*, but *o* and *u* remained; *öu* developed to *eu*, *üe* to *ü*, but *ö*, *e* and *u* remained. If PIE had a series of diphthongs we should expect at least some of them to undergo a development different from that of their components. But in almost all of the various IE dialects the components of the so-

[4] J. Schrijnen, Einführung in das Studium der Indogermanischen Sprachwissenschaft, translated into German by W. Fischer, 251 (Heidelberg, 1921): 'Mit der Entdeckung der indogermanischen Vokale ging die der indogermanischen Diphthonge Hand in Hand.'

[5] D. Jones, An Outline of English Phonetics[6] 57 (New York, 1940).

called diphthongs develop to the same phonemes as do the components in other environments; e.g. PIE /a/ and /o/ became PGmc. /a/, PIE [i] became PGmc. /i/, PIE [ai] and [oi] became PGmc. /ai/; PIE /e a o/ became Skt. /a/, PIE /n/ became Skt. /n/, PIE /en an on/ became Skt. /an/, etc. If the two phonemes had combined in PIE to form a diphthong such parallel patterns of development would be remarkable.

We also expect of diphthongal phonemes that they remain in various phonetic environments; e.g. the German diphthong /ai/ is found before consonant, *Bein* 'leg', before vowel, *Eier* 'eggs', and finally, *Ei* 'egg'. The so-called PIE diphthongs did not remain constant in various environments; e.g. Skt. *jáyāmi* 'I win', *jeṣyā́mi* 'I shall win'; *agnáyas* 'fires', *agnés* 'of fire'; *śátravas* 'enemies', *śátros* 'of the enemy'.

2.2c. But, since PIE is somewhat difficult to deal with phonetically, it is necessary to analyze the *ai*, *au*, etc. combinations phonemically. Phonemically we might define a diphthong as a combination of two (or more) phonemes, of which one is usually vocalic, the other(s) semi-vocalic; such combinations contrast minimally with unit syllabic phonemes.

One of our sources of evidence for determining the phonological contrasts of PIE syllabics is ablaut. Ablaut changes are variations of vowel phonemes in one morpheme which are found in all of the IE dialects and therefore are of IE origin. In any given morpheme we find an interchange of vowels that is parallel with vowel interchange in other morphemes; /bher-/ compounded with /-tó-/ becomes /bhrtó-/, /ghew-/ compounded with /-tó-/ becomes /ghwt-ó/, etc. By determining from the forms found in several dialects such variation in a given word, we can establish PIE phonemic contrasts of the time when ablaut first developed. Wide-spread ablaut patterns are illustrated by:

/bheydh-/	/bhoydh-/	/bhydh-/
/bhewg-/	/bhowg-/	/bhwg-/
/terp-/	/torp-/	/trp-/
/g^{w}em-/	/g^{w}om-/	/g^{w}m-/

From such patterns we note that the PIE phonemic system had contrasts between /y/ : /ey/, /y/ : /oy/, /ey/ : /oy/, etc. It might appear from such, apparently minimal, contrasts that /ey/ and /oy/ are phonemic units of the same order as /y/ [i], and therefore diphthongs. But if we use ablaut variations as a criterion to determine phonemes, we must also take into account ablauting forms in which the resonant precedes the vowel. Although these are not so wide-spread as the above-listed patterns, we find evidence for such patterns as:

/yek-/	/yok-/	/yk-/
/wek-/	/wok-/	/wk-/
/trep-/	/trop-/	/trp-/

We can draw two possible conclusions about the phonemic status of /ey/, /oy/, etc. Either we must assume 72 diphthongal phonemes; for /ye/ etc. like

/ey/ etc. contrasts with /y/ [i]. Or we must construct our PIE phonemic system without diphthongal phonemes. Few Indo-Europeanists go to the extreme of assuming 72 diphthongs; Kent, who hesitantly does (S of L 33), suggests that combinations like /ye/ must 'in a wider sense' be called diphthongs.

In my opinion the IE ablaut changes provide evidence against the assumption of diphthongal phonemes. If a diphthongal phoneme /ew/ is assumed, phonemic analysis of PIE roots like /dhews-/ 'spray, scatter like dust' is difficult; for from it are made forms like Skt. *dhvaṅsáyati* 'scatter' (from PIE /dhwos-/) as well as forms like MHG *tœsen* 'scatter' (from PIE /dhows-/). If we assumed that PIE [eu̯] was a diphthong, we would have to assume two roots. If we assume that PIE [eu̯] was a cluster of /e/ plus /w/, the variation in the PIE morpheme /dhews-/ and in other morphemes with so-called Schwebeablaut is no problem.

2.2d. Moreover, the question whether the combinations of vowel plus resonant were phonemic units might be tested by their historical developments. PIE /ghew-/ 'pour' is a so-called diphthongal root. The Skt. reduplicated present *juhóti* shows regular development of /ew/, as does the Gk. aorist ἔχευα. The Gk. present, however, is χέω. In χέω the /w/ was treated as an intervocalic /w/, e.g. βίος 'life' from PIE *gʷīwos*. If we assume an IE diphthongal phoneme for /ghew-/, we must assume it only before consonants; that is to say, PIE [eu̯t] varied with PIE [ewet]. Such problems are avoided if one assumes PIE clusters, e.g. /ew/ rather than diphthongal phonemes, e.g. /eu̯/. PIE /ew ow en on/ in morphemes such as /ghew-/ are parallel to PIE /ew ow en on/ in other contexts. The /en/ and /on/ of the PIE root /men-/ is of the same phonemic order as the /en : on/ in the PIE word for 'knee'. I conclude that a PIE diphthongal phoneme /on/ is not present in the etyma of Gk. γόνυ 'knee' or μέμονα 'I remember'.

It is noteworthy for setting up the relative chronology of the development of diphthongs in PIE and its dialects that the Gk. pre-vocalic *eu* in ἔχευ[σ]α is maintained while the PIE pre-vocalic *ew* in /ghewō/ is modified. In Gk. *eu* was a diphthong; it was maintained in forms like ἔχευα, where it had been 'protected' by *s*, even after *-s-* was lost.

2.2e. Sanskrit provides another illustration. Although PIE /ey/ and /oy/ fall together in Skt. *e*, we know from comparison with other dialects, and absence of secondary palatalization in Skt., that the perfect singular originally contained an *o*-vowel. We should expect *e* from /oy/ in the perfect 3d sg. of roots with a supposed PIE /ey/ diphthong, as we find it in Skt. *bibhéda*, from PIE /bheyd-/. The perfect made from the Skt. reflex of PIE /key-/, however, contrasts markedly with *bibhéda*. If /oy/ had been a PIE diphthong, we should expect Skt. **cikéa*; the form, however, is *cikā́ya*. The /o/ here has developed as elsewhere before *w y l m n r* in open syllables where diphthongs have never been assumed, e.g. Gk. γόνυ, Skt. *jā́nu* 'knee', etc. The same development may be noted in the following 3d sg. perf. forms: *dudrā́va, susrā́va, babhā́ra*, etc. PIE /oy/, /ow/, /or/, etc. cannot be considered phonemic units when we find them parallel in development with /-o-y-/, /-o-w-/, /-o-r-/, etc.

I conclude that PIE had no diphthongs, but rather clusters of vowel and resonant, of resonant and vowel. Although this conclusion could not be derived from

arguments based on the resulting simplification of the PIE ablaut system, it can be tested by its effect on analysis of ablaut and other PIE phonological phenomena.

2.3. THE STRUCTURE OF THE PIE ROOT, AND THE ORIGIN OF THE ABLAUT VARIATIONS. If we assume that the phonemic system obtaining during the development of ablaut contained no diphthongs, we find that ablaut has its origin in two sound changes. Only one vowel was affected by these changes; this vowel may be written *e*. *e* was found in various phonemic environments. It was preceded and followed by obstruents, e.g. /pet-/ 'fly'; it was preceded by an obstruent and followed by a resonant, e.g. /ghew-/ 'pour'; it was preceded and followed by a resonant, e.g. /wey-/ 'weave', etc. Many of these environments were such that later combinatory changes obscured the original general sound changes. But on the whole the ablaut changes are obviously parallel regardless of environment. In spite of the form of the root we find /e/ in the indicative present singular forms of athematic verbs, /o/ in the perfect singular, etc. Before a given suffix we find a consistent treatment of roots: before /-tó-/ we find -, before /-os-/ we find /e/, before /-éyo-/ we find /o/, etc.

If we assume clusters of vowel plus resonant rather than diphthongs, we find complete parallelism between:

y-clusters	/bheydh-/	/bhoydh-/	/bhydh-/	
	/yeg-/	/yog-/	/yg-/	
w-clusters	/ghew-/	/ghow-/	/ghw-/	
	/wek^{w}-/	/wok^{w}-/	/wk^{w}-/	
r-clusters	/bher-/	/bhor-/	/bhr-/	
	/prek-/	/prok-/	/prk-/	as well as

l-clusters, m-clusters, n-clusters, and roots that did not contain resonants, such as /pet-/, /pot-/, /pt-/.

The phonemic relation between these clusters which originally were quite parallel was later obscured by phonetic changes. If we had no forms from related dialects we might refuse to admit an original parallelism between Skt. *bandh-*, *bandh-*, *badh-* and Gk. *πενθ-*, *πονθ-*, *παθ-*, Skt. *bodh-*, *bodh-*, *budh-* and Goth. *biud-*, *bauþ-*, *bud-*. Just so we should find it difficult to recognize the parallelism of modern German *biegen*, *bog*, *gebogen* and *binden*, *band*, *gebunden* if we did not have forms from other Gmc. dialects, such as Gothic *biugan*, *baug*, *bugans* and *bindan*, *band*, *bundans*.

2.3a. The ablaut of the roots given above is the result of the two following sound changes:

1. /e/ when unaccented (not having chief stress accent) became reduced or was lost; the loss was accompanied by lengthening of the preceding vowel if this vowel was accented. The two processes may be written in the following formulae:

1.a. /e/ unaccented became /$_{e}$/ or -;

1.b. /e/ under accent remained; in the pattern /éte/ > /ét-/ > /ét/, /e/ was lengthened.

2. /e/ (/ē/) became /o/ (/ō/) under pitch accent, if /e/ (/ē/) lost the chief pitch accent, and received a secondary accent.

I conclude that in both changes the pattern of sound change is so consistent because the vowel affected had not entered into diphthongal combinations with any surrounding resonants.

2.3b. This conclusion is supported by the ablaut of roots with long vowels, or PIE /a/. The pattern of change here resembles the pattern of change in roots in /e/. For example, in forms where we expect /e/, we see for /dhē-/ a PIE /ē/, Gk. pres. *τίθημι*, Skt. *dá-dhā-mi*; where we espect /$_e$/ or /-/, we find a PIE reduced vowel or zero, Gk. *θετός*, Skt. *hitá*, Skt. *dadhmás*. In the verb 'give' we find similar patterns: Gk. *δίδωμι*, Skt. *dá-dā-mi*; Skt. *á-di-ta*, Gk. *ἔδοτο*; Skt. *devá-tta*. For ablaut in a root with PIE /a/, see Gk. *αἴθω* 'burn', *ἰθαρός* 'pure'. From the complete parallelism with other roots, it has been assumed that 'original' long vowels resulted from contraction of /e/ with laryngeal, most 'original' /a/ vowels from /e/ modified by a preceding laryngeal. (Cf. Chapter 3.) Such roots had undergone the same ablaut changes as had roots in which /e/ is preserved. If we reconstruct the roots as they were before the sound changes occurred which obscured the original structure, we assume for the above roots /dhe?- deγ- Aed-/. These are parallel with such roots as /dher- dem- wed-/. That all PIE ablaut relations fall under the two formulations given above is illustrated in the following chart.

	/e/	1. a. /$_e$/ /-/	1. b. /ē/	2. /o/
e	Goth. sitan 'sit'	nists 'nest'	sētum 'we sat'	sat 'he sat'
ey	Goth. in-weitan 'pay homage'	Gk. *ἴδμεν* 'we know'	Lith. véidas 'face'	Gk. *οἶδα* 'I know'
ew	Goth.kiusan 'choose'	kusum 'we chose'		káusjan 'taste'
er	Gk. *δέρκομαι* 'I see'	*ἔδρακον* 'I saw'		*δέδορκα* 'I saw'
el	OIrish melim 'grind'	mlīth d.s. 'grinding'		MLG mol 'dust'
em	Lat. semel 'once'	Gk. *(σ)μία* 'one'		Gk. *ὁμός* 'same'
en	Gk. *πένθος* 'grief'	*ἔπαθον* 'suffered'		*πέπονθα* 'suffered'
e?	Skt. dádhāmi 'I place'	hitá, dadhmás 'put', 'we place'		OHG tuon 'do'
eA	Gk. *ἵστᾱμι* 'stand'	*στατός* 'standing'		

eγ	Gk. δῶρον 'gift'	δοτός, 'given'	Skt. (devá-)tta 'god-given'	
Ae	Gk. ἀπολαύω 'enjoy'	Lat. lucrum 'gain'	Dor. Gk. λᾶία 'booty'	
re	Lat. precēs 'prayer'	Skt. pṛcháti 'demand'	Goth. frēhum 'we asked'	Lat. procas 'wooer'
-ter- suffix	Gk. πατέρα 'father'	πατρός 'of a father'	πατήρ 'father'	ἀπάτορα 'fatherless'

2.3c. Various attempts have been made to check the validity of these phonetic changes by reconstructing the PIE forms in which they occurred. The greatest difficulty with such attempts has been the lack of forms which can be reconstructed from our attested forms for that stage of IE in which the ablaut changes occurred. PIE /bhérety/ can be assumed on the basis of Skt. *bhárati* 'carries', Gk. *φέρει*, Lat. *fert*, Goth. *baíriþ*, etc. But this form must be subsequent to the period of the IE ablaut changes. For the first ablaut change would have permitted only one /e/; in the second ablaut change, one /e/ would probably have become [o] and later /o/. Because early forms are lacking we must rely on forms derived on the basis of our reconstructions and linguistic analysis.

2.3d. Two types of structures have been posited for the time of the ablaut changes, bases and roots.

Hirt dealt primarily with bases. For him bases were the simplest possible PIE accented words. Since Hirt considered nouns older elements of the language than verbs, he constructed bases on the pattern of nouns. His monosyllabic heavy bases were constructed on the pattern of root nouns, e.g., *dhē-* 'place', Skt. *apa-dhā́* 'shutting up', the bisyllabic heavy bases on the pattern of the *ā*-nouns like Gk. *σκιᾱ́* 'shade'. Assuming that the structure of these words was already established at the time of the ablaut changes, Hirt constructed with their help his ablaut theories, and assumed similar forms even when there is no evidence in any of the IE dialects for the base in question. (IG 2.103–7.)

Obviously there is only theoretical evidence for most of Hirt's bases. Nonetheless Hirt considered 'bases' less theoretical than the IE roots with which most Indo-Europeanists deal. Yet 'roots' as well as 'bases' may be useful in analyzing earlier stages of PIE.

2.3e. The usefulness of the term 'root' is somewhat reduced because various linguists hold various theories of the IE root. In general, the term 'root' is used for that part of IE words to which are added suffixes, determinatives, prefixes and endings. Roots then are morphemes found, with phonetic variation, throughout the forms of one paradigm (a paradigm in word-inflection and word-formation). Obviously roots are theoretical units arrived at by linguistic analysis, and we have no evidence, like Hirt's for his bases, that at any stage of pre-IE, roots were words. There is a further distinction between roots and bases in that roots are generally conceived of as verbal elements.

With varying assumptions varying roots will be posited. If, as often, roots are

arrived at by subtraction, if they are assumed to be those portions of the IE word which are left after prefixes, suffixes, determinatives, and endings are removed, one finds roots very diversified in form and of little help as a check for ablaut theories; some are simple, e.g. *wep-* (WP 1.256), others complex, e.g. *spyēw-* (WP 2.683). Even Indo-Europeanists who like Walde assume such diversified roots assume various limitations for the structure of IE roots.

1. A root cannot consist of a voiceless stop and a voiced aspirated stop; /bhet-/ and /tebh-/ are impossible.

2. A root cannot begin and end with a voiced stop; /beg-/ is impossible.

3. A root cannot contain two successive resonants; /teyw-/ is impossible. If there seems to be such a root, e.g. /moyn-/ in Lat. *commūnis* < *commoinis*, the root must be /moy-/ and /n/ must be part of the suffix. (Introduction 157.)

Continuing such attempts to discover a definite structure for the IE root, Indo-Europeanists have delimited still further the shapes possible for roots. The theory that seems to account most fully for the evidence found in Hittite and IE records is that of Benveniste. We obviously cannot expect to set up for all PIE reconstructions roots reducible to the mathematical formulae that his theory provides. Some irregular shapes Benveniste calls nominal rather than verbal. But if any group of well-attested forms which are not nominal in origin, such as the Gmc. seventh class verbs, fails to fit Benveniste's theory, these must be considered secondary.

2.3f. Benveniste assumes that all verbal roots, when accented, are composed of three phonemes, e.g. /teg ter wer Aer dheX XeX/.

Roots may be modified by means of suffixes, determinatives (which Benveniste calls enlargements) or infixes. Suffixes are distinguished from determinatives in having ablauting forms; determinatives have fixed and consonantic forms. But any modifications must be made in well-defined patterns. The accented root may receive only determinatives, not suffixes; when suffixes are added, the root is not accented.

Every verbal root may then have two extended forms:

I		II	
/pér-k-/	Lith. *peršù* 'woo'	/pr-ék-/	Lat. *precor* 'ask'
/tér-A-/	Hitt. *tar-aḫ-zi* 'controls'	/tr-éA-/	Lat. *intrāre* 'enter'.

When verbal, form I may undergo no further expansion; form II may be further expanded by means of a determinative. From the root /pel-/ a form I /pél-ʔ-/ and a form II /pl-éʔ-/ may be made; form II may be further expanded, as in /pl-eʔ-dh-/ Gk. πλήθω 'fill', but /pel-ʔ-dh-/ is impossible.

Roots expanded with a nasal infix are like form II plus determinative. Thus Skt. *vṛnóti*, from /wr-n-éw-/, (form I /wér-w-/ form II /wr-ew-/) may be compared with Gk. πλήθω.

The theory then consists of five statements. (Orig. 170–1.)

1. The IE root is monosyllabic, composed of the fundamental vowel /e/ between two different consonants.

2. In this constant scheme: consonant plus vowel plus consonant, the consonants can be of any order, provided they are different; but the presence of both a voiceless stop and an aspirated voiced stop is impossible.

3. From the root are made two ablauting forms by means of suffixes:

form I, root in full grade and accented, suffix zero;

form II, root zero, suffix in full grade and accented.

4. To the suffix can be added one determinative, either after the suffix of form II, or, if /n/, inserted between the root element and suffix of form II.[6]

5. Further addition of determinatives or suffixes points to a nominal base.

This then was the form of the IE root at the time of the quantitative ablaut changes. Aberrant verb forms are either from nominal forms, e.g. Skt. *tudáti*, or they are secondary, e.g. Goth. *háitan*. One of the uses of Benveniste's theory is as a check for distinguishing between original and secondary ablaut changes. For after the phonetic changes of ablaut became phonemic and distinguished morphological categories, the contrasts were extended widely.

2.3g. To obtain a clear picture of PIE ablaut one must deal with such abstractions rather than with the reconstructions arrived at in the comparison of dialect forms. For the changes which produced ablaut, originally simple, in the early dialects resulted in the complex interchange of vowels which the handbooks call ablaut changes. Similar complication of a transparent interchange is found in the dialects; the Gmc. dialects offer a convenient illustration of how such patterns may be obscured by later developments. The ablaut relationships of the first five verb classes are transparent in our Gothic records of fifth century material. But our MHG material of the twelfth century presents a system in which these relationships have been obscured by phonetic changes.

I. Goth.	steigan 'climb' Inf.	stáig 3d sg pret.	stigum 1st pl. pret.	stigans pret. part.
MHG	stīgen	steig	stigen	gestigen
II.	giutan 'pour'	gáut	gutum	gutans
	giezen	gōz	guzen	gegozen
III.	finþan 'find'	fanþ	funþum	funþans
	finden	fand	funden	gefunden
IV.	baíran 'bear'	bar	bērum	baúrans

[6] Orig. p. 171 Benveniste concludes: 'Au suffixe peut se joindre un seul élargissement, soit ajouté après le suffixe du thème I, soit inséré entre l'élément radical et le suffixe du thème II (infixation).' In discussing the formation of roots on p. 153 he had said however: 'De là se déduit ce principe qu'*un thème à l'état I n'admet pas d'élargissement: seul l'état II en comporte.*' Since the statement on p. 153 is italicized, and is supported by the subsequent discussion, I follow it rather than the apparently contradictory statement on p. 171.

	bërn	bar	bāren	geboren
V.	giban 'give'	gaf	gēbum	gibans
	gëben	gap	gāben	gegeben

If we did not have a body of material that gives us information about sound changes of the intervening centuries, we should only with difficulty be able to deduce the simple ablaut patterns of PGmc.

2.3h. Unfortunately we have for PIE no such body of material, and the ablaut changes have of necessity been arrived at deductively and slowly. Discussions of ablaut are still often obscured by a failure to distinguish between the PIE changes and later developments of the sounds produced in these changes. The most far-reaching error of the kind is the assumption of a 'reduced grade' beside a 'zero grade.' It is quite clear that the so-called reduced grade is found only in restricted phonetic environments, that it correlates either with the position of the accent or with the phonetic surroundings. For syllables either directly following or preceding the main stress accent Hirt assumes zero grade, for syllables farther from the accent, the reduced grade. (IG 2.192–9.) Thus one of the important categories of reduced grade alternates with zero grade, depending on the accent. Another of the categories for reduced grade is the phonetic environment in which the resonants have the allophone, vowel plus resonant; Hirt calls this a translation of Sievers' Law into his terms. (IG 2.198.) Consequently reduced grade is a conditioned variant of zero grade, and from a phonemic point of view we need to deal with only one unaccented ablaut grade.

2.3i. Besides the effect of such sound changes the parallelism in ablaut was obscured even more by a development in the phonological system between PIE and the dialects, which we do not find between PGmc. and MHG, that is, a coalescence of phonological classes. PIE had at least three classes of phonemes, obstruents, resonants, vowels; the dialects only two, obstruents and vowels. Phonemic contrasts in the vocalic system when the vowels were distinct from the resonants and obstruents became quite confused when some allophones of the resonants coalesced with the vowels, others with the obstruents. In PIE a contrast between /pet ghew dher/ /pt ghw dhr/ had existed; the dialects show contrasts between /pet gheu dher/ /pt ghu dhr/. When the ablaut system first developed, /e/ could contrast only with /ē/; in the dialects /e/ has at least ten minimal contrasts.

The ablaut patterns then support the contention that there were no diphthongal phonemes in PIE.

2.4. The general principle of PIE metrics. A second result of adopting a PIE phonemic system without diphthongs is its clarification of IE metrics. In both Greek and Vedic poetry poetic rhythm is based on syllabic quantity, not patterning of accented and unaccented syllables. Both systems of prosody share so many essential features that we must derive them from an earlier common system. (Introduction 143–4.)

The verse of the Homeric poems consists of six feet, each divided into two parts, the accented and unaccented part. The accented part consists of a metrically long syllable, the unaccented part of one long syllable or two short. The unaccented part of the sixth foot, however, may be long or short.

Long syllables are of two types, those long by nature and those long by position. Syllables long by nature contain a long vowel or diphthong; long final vowels or diphthongs standing before a vowel, however, are short metrically. Syllables long by position contain a short vowel followed by two or more consonants.[7]

While the essential element in Vedic poetry is regularity in the number of syllables, the quantity of syllables also plays a role, if not as important as in the Gk. hexameter. The Vedic hymns show a great variety of poetic structure but usually have iambic rhythm. Prosodic rules similar to those cited above for Homeric verse are: 1. a vowel becomes long by position if followed by two consonants, that is, a syllable is long if it contains a short vowel followed by two consonants; 2. a vowel (long) is shortened before another, e.g. Skt. *e* from PIE [ai ei oi] and *o* from PIE [au eu ou] are short before *a*, that is, a syllable is short if it contains a long vowel followed by another vowel.

In both systems syllables with long vowel or diphthong, or with short vowel followed by consonant, are long. But if diphthongs stand before a vowel, they are short; and long vowels standing before other vowels are metrically short. These rules we may then assume for IE verse.

With the current phonemic analysis of PIE, the rules of prosody are a series of unrelated formulae. When, however, we assume that PIE 'diphthongs' and 'long vowels' were clusters of vowel and resonants or laryngeals, the general principle of IE metrics becomes obvious. CLOSED SYLLABLES WERE METRICALLY LONG, OPEN SYLLABLES WERE METRICALLY SHORT. Examples of metrically long syllables in PIE would then be /tet-t . . . tey-t . . . teX-t . . . tet|/; types of metrically short syllables would be /te-t . . . te-y . . . te-X . . . /.

With this principle it is apparent why the sixth unaccented syllable of Homeric lines could be short as well as long. For it is clear from Edgerton's studies that final pause fulfills the same function in PIE syllabification as does a consonant. (See **2.2.**) Therefore every final syllable of the line was closed, and consequently metrically long.

2.5. THE PHONEMIC SYSTEM OF PIE AND ITS USE IN FURTHER STUDY. For the reasons given above diphthongal phonemes will not be admitted in the phonemic system used as basis for further study. The system is made up of twenty-eight segmental phonemes, which are of three orders, obstruents, resonants, and vowels, plus some as yet undiscussed segmental phonemes which are laryngeals or reflexes of laryngeals. The generally accepted allophones of these phonemes, especially in clusters, have been given above. Other allophonic variation and the allophones of the laryngeals may become apparent in the course

[7] For exceptions see LaRoche, HU 1ff. Munro, Hom. Gram. 338ff., gives a concise description of Homeric prosody, Macdonnell, A Vedic Grammar for Students 436–7, of Vedic prosody.

of this investigation. Some IE phonological problems will now be examined with the help of the system. Such problems may be solved with it, and at the same time a more complete system developed.

Before these problems are examined, certain questions that have arisen in connection with the laryngeal theory must be reviewed. In chapter three the laryngeal theory will be discussed and the evidence for laryngeals in Hittite and the IE dialects will be examined. The points of agreement, and disagreement between various forms of the theory will be listed, and a preliminary answer to some of the problems raised by it will be presented.

3. THE LARYNGEAL THEORY

3.1. DEFINITION OF THE LARYNGEAL THEORY AND A SKETCH OF ITS HISTORY. The laryngeal theory is the name commonly given to an assumption made about the phonological system of an early stage of Indo-European. It is assumed that this system included a number of phonemes, usually called laryngeals, of which the various IE dialects show no direct reflexes. Evidence for laryngeals in the IE dialects can be deduced only on the basis of phonemes that are also reflexes of other PIE phonemes. In Gk. δῶρον 'gift', long *o* had developed in pre-IE from a combination of vowel and laryngeal; in φώρ 'thief', from lengthening of short vowel upon loss of the following vowel. Because the reflexes of laryngeal phonemes merged with reflexes of other PIE phonemes, the possibility that laryngeals had once been IE phonemes was recognized relatively late in the study of IE historical phonology; even then it was almost completely disregarded for fifty years.[1] Only after Kurylowicz pointed out reflexes of laryngeals in Hittite did Indo-Europeanists generally begin to accept the laryngeal theory.

In the twenty years that have elapsed since Kurylowicz suggested that the *ḫ* in Hittite *iš-ḫa-a-i* 'binds' and *ḫ*, *ḫḫ* in other words corresponds to an assumed IE laryngeal,[2] Indo-Europeanists have published a great number of works in which the theory has been examined, some seeking further evidence in Hittite, others finding evidence in the IE dialects. Such evidence was sometimes presented together with inadequately supported explanations for previously unsolved phonological developments; in some such studies the chronology of the loss of laryngeals has been inadequately treated; as a result such explanations and laryngeal theory have often been rejected.[3] With the evidence that has been assembled in favor of the theory we can hardly reject it.[4] If it is valid, we should

[1] Consonants that had disappeared in the IE dialects, leaving reflexes in lengthened vowels, were first suggested by Saussure in 1878. Möller, Eng. St. 3.157fn. (1879), connected these with Semitic consonants, and called them laryngeals. Other linguists who published statements between 1878 and 1927 upholding the laryngeal theory are Pedersen and Cuny.

[2] J. Kurylowicz, ə indoeuropéen et ḫ hittite, Symb. Gram. I.95–104. This publication is found in but few American libraries; a readily accessible review by C. Marstrander may be found in NTS 3.290-5 (1929).

[3] G. Bonfante, rev. of IHL, CP 39.51-7 (1944), rejects the theory and lists others who have.

[4] Objections are sometimes raised to explanations of IE phonological developments by means of the laryngeal theory; the reasons given for such objections are that so few examples are adduced, cf. CP 39.51-7. Such objections are invalid if one examines realistically evidence for linguistic developments which is found in a stage of that language a thousand or more years after the developments occur. In modern English the past forms *was* : *were* furnish the only surviving evidence for assuming the origin of the English past tense verb forms from IE perfect and aorist forms with a similar interchange. Without a series of similar anterior forms in Old English we would be hard pressed to establish such a statement; yet evidence for such an interchange is very common in other old Gmc. dialects.

Our evidence for propositions of the laryngeal theory is often as meager as that of modern English for the origin of the English past tense forms of irregular (strong) verbs. Indo-Europeanists who hold to the laryngeal theory have therefore varied in their interpretation of the data, and have been criticized by others for building ancient phonological structures on scanty evidence. But the anomalous forms, that the phonological systems of Brugmann

expect it to clarify some of the unsolved phonological and morphological problems of IE linguistics. We might also expect that our reconstructions of PIE will have to be revised.

With such a revision we may be able to distinguish various stages of IE. Some of the confusion caused by Hirt's presentation of IE results from his failure to make this distinction. A more accurate statement of the development of IE is probably the greatest current need in IE phonology. Such a statement can be made on the basis of the analysis of the changes in the IE vowel system, especially with the clarified form of that system which the laryngeal theory provides.

3.2. ARGUMENTS ADDUCED BY SAUSSURE AND MÖLLER FOR THE THEORY. Two different arguments were advanced for the laryngeal theory when it was first proposed. Saussure arrived at it by comparison of the PIE ablaut classes. Since the vowel interchange in Gk. *ἵστᾱμι* : *στατός* is parallel to that of *πείθω* : *ἔπιθον*, he assumed an earlier similarity in root structure and deduced that *στᾱ-* was a reflex of /steA-/. Saussure's basic assumption was that a similarity—such as the similarity between (*σ*)*ἔχω*, *λείπω*, *ἵστᾱμι* and *ἔσχον*, *ἔλιπον*, *στατός*—of phonemic variation in morphemes of a seemingly different structure pointed to anterior forms of a similar structure. Saussure's assumption has been upheld by the discovery of confirming evidence in Hittite.

The second argument was suggested by linguists who assumed a common origin for IE and Hamito-Semitic. The first of these was Möller. Shortly after Saussure proposed his theory of two lost sonants, Möller suggested various correspondences between PIE and Proto-Hamito-Semitic forms. Because the PHS phonological system contained laryngeals, Möller assumed them for Proto-Euro-Hamito-Semitic and identified them with the lost pre-IE phonemes that Saussure had postulated. The advantage of Möller's argument lay in his ability to cite earlier, though reconstructed, forms with laryngeals; the disadvantage, that the forms he cited were so far removed from the various IE developments that the interrelationships seemed nebulous.

PHS need no longer be used as a support for the laryngeal theory. Hittite, in which were found forms with orthographical evidence for reflexes of laryngeals, has replaced it as a source of forms to provide actual evidence for laryngeals.

From the first there have been points of difference between various forms of the laryngeal theory. When Saussure's basic assumption of a similarity in ablaut was rigorously applied to the various PIE developments, it was suggested, by Möller and later Cuny, that three laryngeals rather than two had to be assumed. For the ablaut relationships of *ἔχω* and *λείπω* are parallel to those of *τίθημι* as well as those of *ἵστᾱμι* and *δίδωμι*. There is still wide disagreement about the assumption of three laryngeals because of three different vowels; some Indo-Europeanists ascribe the *o* of *δοτός* to coloring by a neighboring laryngeal, others

and Hirt do not account for, though few, are found in words attested in various IE dialects. The only explanation for a linguistic form is an older form. If we are to explain the anomalous forms, we have to posit acceptable earlier forms. Proper procedure demands as complete as possible use of relevant forms found in the various IE dialects and analyzed in accordance with established linguistic principles.

explain it as an analogical vowel. (SSP 168–78.) But since the time of Möller's suggestion most Indo-Europeanists who accept the laryngeal theory find in the IE dialects evidence for the assumption of three laryngeals *A*, ?, γ, although some assume from IE evidence only two, *E* and *A*.

3.3. HITTITE EVIDENCE IN FAVOR OF THESE ARGUMENTS. The great importance of Hittite for the laryngeal theory is that it contains forms in which distinct reflexes of the laryngeals are recorded. These are found where we should expect to find them in accordance with theoretical analysis of IE phonological sequences and form categories.

Saussure had assumed earlier laryngeals from the PIE patterns given below; Hittite forms which have been cited in support of his assumptions are listed after these.

A. Long vowels that had not arisen in ablaut he assumed were due to lengthening of short vowels upon loss of laryngeals, thus *stā-* < /steA-/. (Mém. 135.)

Hittite preserves some of the uncontracted forms, in which the laryngeal had not yet been lost. Corresponding to long *a* in Latin *pāscō* is *-aḫ-* in Hittite *pa-aḫ-ša-an-zi* 'protects'; compare also Gothic *mēl* 'time', Hittite *me-e-ḫu-e-ni* 'time'.

B. The long resonants, *ī ū r̥̄ l̥̄ m̥̄ n̥̄*, which Saussure posited, developed according to him from short resonants with loss of laryngeals.

We find the reflex of a laryngeal in Hittite *pal-ḫi-i-iš* 'broad', compare Latin *plānus* 'flat'.

C. Such long resonants are found in the zero grade forms made from Skt. *seṭ*-roots (Mém. 248ff.), e.g. *bhávi-tum* 'be', *bhū-tá*; *vámi-ti*, *vān-tá*; *váni-tā*, *vā-tá*. On the basis of such forms Saussure assumed that *seṭ*-roots developed from PIE roots which ended in sonants, that is, laryngeals; Skt. *bhavi-* would point to PIE /bhewX-/, *vami-* to /wemX-/, *vani-* to /wenX-/.

In Hittite we find cognates of *seṭ*-verbs written with laryngeals. Compare with Skt. *sanóti* 'gains', pret. ptc. *sātá*, Hittite *ša-an-ḫa-an-zi* 'conquers'; with Gk. περάω 'traverse', Hittite *pár-ḫa-an-zi* 'drives'.

It might be added here that this analysis of *seṭ*-verbs showed a similarity of formation in three Skt. verb classes: (Mém. 257; BHL 17.)

7. *rinákti* < /ly-n-ek^{w}-ty/
5. *śr̥ṇóti* < /kl-n-ew-ty/
9. *punā́ti* < /pw-n-eX-ty/.

After the ninth class was analyzed on the basis of the laryngeal theory, it became clear that these three classes developed from one earlier class in which *n* was infixed. That a phonological analysis clarified a morphological relation helped to support the laryngeal theory.

D. Saussure also assumed that all IE roots had a basic vowel *e*. (Mém. 133.) Other root vowels in words such as Gk. ἄγω 'I lead', in which PIE *a* seemed to occur in a form where a basic vowel is expected, Saussure explained as derived from a laryngeal; derivation from laryngeal plus vowel later seemed more plausible, i.e. /Aeg-/ > /Aag-/ > /ag-/.

In Hittite we find numerous examples showing stage two, whereas the IE

dialects have stage three; Hittite *ḫar-ki-iš* 'white', Gk. ἀργής 'white'; Hittite *ḫa-an-ti* 'front', OHG *enti* 'front'.

After the Hittite cognates were found, the postulations of Saussure and Möller were raised to the status of explanations; for now, although the older forms were few, IE reconstructions could be supported with earlier forms rather than with phonological formulae or remote reconstructions.

3.4. THE HITTITE EVIDENCE IN FAVOR OF THE LARYNGEAL THEORY. Even though Hittite has supplied the clinching evidence for the laryngeal theory, the Hittite evidence is not without difficulty, and almost disappointing as a support for the theory. Hendriksen has listed the Hittite words in which *ḫ*, *ḫḫ* gives evidence of laryngeal, (BHL 27–33) and their number is relatively small; I have added to his list the additional words cited in IHL. The combined list is given below in five groups.

A. Words with *ḫ* initially:

1. *ḫa-an-na-a-i* 'judge' : Lat. *ā* 'from' (example of *ye* prefix; not in BHL)
2. *ḫa-an-na-aš* 'grandmother' : Lat. *anus* 'old woman'
3. *ḫa-an-ti* 'front' : OHG *enti* 'front'
4. *ḫa-a-ra-aš* 'eagle' : OHG *arn* 'eagle'
5. *ḫa-me-eš-ḫa-an* 'spring and summer' : Gk. ἀμάω 'reap' (not in BHL)
6. *ḫar-ak-zi* 'be destroyed' : OIr. *orgaim* 'destroy'
7. *ḫar-ki-iš* 'white' : Gk. ἀργής 'white'
8. *ḫar-kán-zi* 'have' : Lat. *arceō* 'enclose' (questioned in BHL)
9. *ḫar-ra-an-zi* 'break' : Gk. ἀρόω 'I plough' (doubtful in IHL, not in BHL)
10. *ḫa-aš-ši-i* 'hearth' : Lat. *āra* 'hearth' (not in IHL)
11. *ḫa-aš-ta-i* 'bone' : Skt. *ásthi* 'bone'
12. *ḫa-at-ta-an-zi* 'pierces' : Arm. *hatanem* 'I cut' (not in BHL)
13. *ḫa-at-ki* 'close' : Skt. *átka* 'mantle' (not in BHL)
(*ḫatti* : Arm. *hay* 'Armenian'; loan-word in both languages; not in BHL)
14. *ḫé-kur* 'peak' : Skt. *ágra* 'peak'
15. *ḫi-in-ik-zi* 'bows' : Gk. ὄγκος 'curve' (IHL connects the Hittite words in 15 and 16; BHL proposes the connection of Hittite 15 with the Gk. word)
16. *ḫi-en-kán* 'death' : OIrish *écen* 'necessity'
17. *ḫu-uḫ-ḫa-aš* 'grandfather' : Lat. *avus* 'grandfather' (doubtful in BHL)
18. *ḫu-uk-zi* 'charms' : Gk. ἄγνῡμι 'I break' (not in BHL)
19. *ḫu-la-a-li-az-zi* 'wraps' : Skt. *vṛṇóti* 'covers' (not in BHL)
20. *ḫu-ul-la-an-zi* 'destroys' : Gk. ἁλίσκομαι 'am captured'
21. *ḫur-na-an-zi* 'sprinkles' : Skt. *vāri* 'water' (not in BHL)
22. *ḫu-wa-ar-ta-aš* 'curse', *ú-e-ri-ya-zi* 'names' : Gk. εἴρω 'I say'
23. *ḫu-u-uš-ki-ši* 'awaits' : Lat. *aveō* 'I desire' (not in BHL)
24. *ḫu-u-wa-an-te-eš* 'winds' : Lat. *ventus* 'wind'
25. *ḫu-i-iš-zi* 'lives' : Skt. *vásati* 'dwells'
26. *ḫu-u-i-tar* 'animals' : Goth. *wáit* 'know' (not in BHL)

B. Words with *ḫ*, *ḫḫ* medially:

a. Between consonant and vowel:

1. *e-eš-ḫar* 'blood' : Skt. *ásṛk* 'blood'
2. *iš-ḫa-a-aš* 'master' : Lat. *erus* 'master'
3. *iš-ḫa-a-i* 'binds' : Skt. *syáti* 'binds'
4. *dam-me-eš-ḫa-an-zi* 'injures' : Gk. δαμάσσω 'subdue' (not in BHL)
5. *pal-ḫi-i-iš* 'broad' : Lat. *plānus* 'flat'
6. *ša-an-ḫa-an-zi* 'strives' : Skt. *sanóti* 'gains'
7. *par-ḫa-an-zi* 'hunts' : Gk. περάω 'traverse'
8. *tar-ḫu-un* 'conquers' : Skt. *trāti* 'protects' (*ti-eš-ḫa-aš* 'kept away from' : Skt. *dásyati* 'lacks'; not in IHL, doubtful in BHL)

b. Between consonant and consonant:

Only inflected forms, such as the verb forms *ša-an-aḫ-mi*, and *ša-an-aḫ-zi*, and the noun form *e-eš-ḫa-ni*. Possibly *iš-ḫu-u-wa-i* 'throws' : Skt. *iṣṇáti* 'sends'; not in IHL, doubtful in BHL

c. Between vowel and consonant:

1. *e-ḫu* 'come, go' : Skt. *yáti* 'goes' (not in BHL)
2. *e-ḫu-ra-da-iz-zi* 'stop one's ears' : Gk. οὖς 'ear' (not in BHL; Sommer, HH 43, rejects connection with οὖς)
3. *ir-ḫa-a-aš*, *ar-ḫa-an* 'boundary' : Lat. *ōra* 'boundary' (not in BHL)
4. *pa-aḫ-ša-an-zi* 'protects' : Lat. *pāscō* 'I protect'
5. *na-aḫ-za-ri-ya-az-zi* 'is afraid' : Irish *nár* 'modest'
6. *la-a-ḫu-i* 'pours' : Lat. *lavō* 'wash'
7. *me-e-ḫu-e-ni* 'time' : Goth. *mēl* 'time'
8. *pa-aḫ-ḫu-e-ni* 'fire' : Gk. πῦρ 'fire'
9. *tuḫ-ḫu-iš* 'smoke' : Gk. θύος 'incense' (doubtful in BHL)
10. *tuḫ-ḫu-uš-zi* 'takes off' : Gk. δαιδύσσασθαι 'draw away' (doubtful in IHL; not in BHL)

d. Between vowel and vowel:

1. *la-aḫ-ḫa* 'war' : Gk. λαός 'army, people' (not in BHL)
2. *ma-aḫ-ḫa-an* 'when, as, if' : Dor. Gk. μᾶν 'truly, surely' (not in BHL)
3. *pi-e-ḫu-te-iz-zi* 'leads away' : Lith. *vedù* 'lead'
4. *še-e-ḫur* 'urine' : OIcel. *súrr*, *saurr* 'semen'
5. *wa-ḫa-an-zi* 'turns' : Skt. *vāya* 'weaving'

Also the forms: *pa-aḫ-ḫu-ur* 'fire', *me-ḫur* 'time' of words already cited, and *na-aḫ-ḫa-an* 'obeisance', cf. *naḫ-* 'fear'.

6. Furthermore the verbal endings: *-ḫḫari*, *-ḫḫi*, *-ḫḫuen* are used with a great number of verbs, e.g. *da-aḫ-ḫi* 'I take', *a-ar-ḫu-un* 'I arrived', etc. The *-ḫi* ending may be compared with the *-a* of Gk. οἶδα 'I know'.
7. *-ḫḫ-* in factitive verbs and nouns, e.g. *ne-wa-aḫ-ḫu-un* 'renewed'; Lat. *novāre* 'renew'; *al-wa-an-za-aḫ-ḫa-az* 'witchcraft'.

This evidence is small, but when one compares it with the total amount of lexical evidence for a Hittite-IE relationship, it is quite remarkable.

3.4a. But the small number of words with reflexes of laryngeals is not the greatest shortcoming of our Hittite material. Hittite is written in an ortho-

graphic system which itself presents many problems. Couvreur assumed different sounds from the writing of single and double *ḫ*. (Hett. H. 188, 193, 194.) But when Hendriksen investigated the occurrences of *ḫ* : *ḫḫ*, he noted that the single writings of *ḫ*, like those of *n*, *m*, *l*, *r*, and *š* are found after *e*. (BHL 38–42.) Because of this patterning he ascribes the occurrences of *ḫ* or *ḫḫ* to the presence of the preceding vowel, rather than to a difference in laryngeals. Speiser on the other hand assumes that the voiced : voiceless distinction indicated in Hurrian is also true of Hittite; Sturtevant, following Speiser, concludes that *ḫ* is a voiced velar or post-velar spirant, the voiced counterpart of *ḫḫ*. (Speiser, Lang. 16. 319–40; see IHL 34 for Sturtevant's views, and further bibliography.) It is difficult to decide in favor of either assumption. For a decision depends on phonological criteria which have not been independently assembled. If the Hittite scribes grouped *ḫ* with *p t k*, as one of the Hittite obstruents, then they presumably were distinguishing between a voiced and a voiceless counterpart. If they grouped *ḫ* with *l r m n š*, as one of the Hittite resonants, they were scarcely making a distinction in voicing. Before we can use Hittite variation in orthography with full certainty in support of one or other forms of the laryngeal theory, this and other orthographical problems must be solved from Hittite phonological evidence. Since Hittite provides no *eḫḫ* : *eḫ* or *aḫḫ* : *aḫ* contrast, but merely an *aḫḫ* : *eḫ* contrast, it is not wholly certain that we can distinguish different laryngeals from this orthographical variation.

In reading Hittite one is struck by the variation in orthography. [*ezzi*] 'he eats' may be written *e-iz-zi-az-zi*, *e-za-az-zi*, *e-iz-az-zi*, [*uk*] 'I' may be written *ú-uk*, *ú-ga*, *ú-ug-ga*, and so on. Moreover we find variation in usage of forms. The lack of standard spellings and fluctuation in use of forms may reflect variations in usage during the period of time in which Hittite texts were written. It may also indicate dialect variation; the Hittite texts contain many Luwian forms which are marked. But apparently some dialect (or Luwian) forms were not especially marked. Sommer has pointed out that more and more Luwian forms that are not marked as Luwian are being found in the Hittite texts. (HH 18.)

Whatever may be the causes of variation, it is clear that the description of Hittite is left with many problems; before these are solved Indo-Europeanists must use Hittite material with caution.

3.4b. It has also been pointed out that Hittite has preserved reflexes of laryngeals only in certain phonetic environments. Hendriksen found, when examining the Hittite material where we should expect laryngeals internally in words, that they have been represented by *ḫ* : *ḫḫ* only before and after *r l m n y w* and *š*. (BHL 86.) We may infer that in other positions laryngeals were lost. This inference is supported by the observation of Pedersen that Hittite *t* did not become *z* before *i* if it occurred in a form that previously contained a laryngeal between the *t* and *i*, such as *ti-it-ti-an-za* < **ti-tA-iya-*, compare Gk. ἵστᾱμι, as against *tu-uz-zi-iš* 'army', compare Gothic *þiuda* 'people'. (Hitt. 87, 175.) And the Hittite forms cognate with the forms made from the root *dhē-* 'place' and *dō-* 'give' give us no evidence for assuming reflex of a laryngeal. (But cf. IHL 55.) In Hittite, vowel plus laryngeal plus consonant may have yielded

long vowel plus consonant, unless the laryngeal was restored by analogy. Since quantity of vowels is not marked in Hittite texts, cognates of *dō-* and *dhē-* would presumably not give us written evidence for laryngeals.

For these reasons with our present store of Hittite materials we are left with deductions from other IE dialects as our most secure evidence for the laryngeal theory. Hittite has served to put the theory on a firm basis; the theory must be refined from analysis of phonological developments such as ablaut in the various IE dialects.

3.5. VARIOUS APPROACHES TO THE LARYNGEAL THEORY. Various linguists differ markedly in their evaluation of the laryngeal theory. We may divide the approaches to the theory into three groups:

A. those that reject it;

B. those that superimpose it on the phonological system set up for PIE by Brugmann;

C. those that assume the laryngeal theory for a stage of IE which antedates that reconstructed by Brugmann.

A. Linguists in this group, which is continually decreasing, dismiss the Hittite evidence as inadequate and prefer to assume no laryngeals for PIE.[5] Until 1920 or even 1930 the evidence published may have been insufficient. But with the gradual increase in the number of available Hittite texts the evidence is almost incontestable. The material assembled from Hittite may not equal in sheer quantity that for the Gmc. consonant shift, but in proportion to the Hittite vocabulary with cognates in IE dialects it is quite convincing.

One may find as counter-arguments statements that the laryngeal theory has been used to explain all the difficulties left in IE phonology. Even if this were so, it would not disqualify the theory. False extensions of a theory do not alter its validity. Moreover, if the laryngeal theory explained nothing, there would be little point in holding it. It is quite obvious that the laryngeal theory demands a change of analysis of some of the most important IE form classes, such as the *set̯*-roots. Or stated differently, laryngeals were once present in a high proportion of IE words. We therefore expect some change in explanations of IE difficulties.

B. At present the greatest number of Indo-Europeanists, Benveniste, Couvreur, Cuny, Hendriksen, Kurylowicz, Messing, Pedersen, and Sommer, fall into this group;[6] they assume that Hirt's and Brugmann's phonological systems are

[5] Bonfante, CP 39.57fn., cites the Indo-Europeanists who have published statements in which they reject the theory. Allusion to linguists, however distinguished, who in the past rejected the theory hardly justifies continued rejection of it. As the evidence for it became greater, such linguists might have changed their minds, as indeed one of them did; see Language 6.149-58 and the later publications of E. H. Sturtevant, listed IHL 22.

[6] See publications listed IHL 20-1, BHL 4-11, SSP, and Sommer, HH 79. No attempt is made to refer here to all articles in which mention is made of the laryngeals; a selection of them is listed in the text. Works which do not present important new arguments for or against the theory are omitted, e.g. A. B. Keith, The relation of Hittite, Tocharian and Indo-European, Indian Historical Quarterly 14.201-23 (1938); likewise those are omitted that assume the theory in explaining IE phonological difficulties, e.g. H. Velten, The Germanic Names of the Cardinal Points, JEGP 39.443-9 (1940).

to be retained in general, but modified with respect to data that the laryngeal theory clarifies. Thus, long vocalic $\bar{r}$ is not analyzed $\bar{r}$ or *ırə*, but rather *rX*; original $\bar{a}$ is analyzed *aA*, *a* is analyzed *Aa*, and $\bar{e}i$ is analyzed $e^{?}i$. The old established orthography for reconstructions, $\bar{e}$ for $e^{?}$, etc. may, however, be maintained. (BHL 95.)

There has been much discussion between linguists of this and the next group, with forceful arguments presented on either side. (See IHL 23–6 and references there.) Most of the discussion, however, centers about the Indo-Hittite hypothesis. This hypothesis is beyond the scope of my work. For in discussing the laryngeal theory it is unnecessary to take into account all of the morphological and phonological arguments advanced in favor of the IH hypothesis. The present work is concerned only with considering those parts of the discussion which apply to the laryngeal theory.

C. Present-day linguists who retain for PIE almost exactly the phonology of Brugmann are Sturtevant, Austin, Kerns, Schwartz, and Smith. (IHL 20–1.) According to them the laryngeals disappeared in pre-IE.

They are faced with numerous problems. Some troublesome phenomena which have been explained with the help of the laryngeal theory are found restricted to one, or possibly two, dialects, for example, the Ind.-Ir. voiceless aspirated stops. These Indo-Europeanists must explain such phenomena by assuming that the change was made in PIE and the effects were lost in virtually all dialects. Thus all PIE *p t k* before voiceless laryngeals became *ph th kh*, even though we have extensive evidence for *ph th kh* only in Ind.-Ir. Although Sturtevant explains voiceless aspirated stops in this way, he considers other theories weakened if they assume a PIE development which was lost separately in each branch of PIE. (IHL 25.)

A similar explanation adds six phonemes, *hy*, *hw*, *hr*, *hl*, *hn*, *hm*, to PIE, although the evidence is taken primarily from one dialect. (IHL 76–8; 90.) Again one questions the advisability of assuming for PIE six phonemes which are lost in all dialects but one, while rejecting the assumption that four or fewer phonemes were preserved in PIE and lost in the dialects.

In the course of this work an attempt will be made to settle this problem. But even on the basis of evidence presented in this chapter, outright rejection of the laryngeal theory seems untenable.

3.6. EVIDENCE IN THE IE DIALECTS IN FAVOR OF THE LARYNGEAL THEORY. Before examining phonological problems with the help of the laryngeal theory I shall sum up the evidence for assuming laryngeals in various patterns. I list first those forms on which linguists agree, and then the more doubtful forms; I also give the reasons for such assumptions.[7]

[7] Saussure already assumed laryngeals for A B C D; to my knowledge all linguists holding the laryngeal theory accept these propositions. Kurylowicz, RO 4.196-218, and EI 33-46 suggested (E) that evidence for laryngeals may be discovered by analysis of poetry and vocalic quantity; Austin has expanded his suggestion; Sturtevant accepts it, as does Messing with reservations. Sapir, Austin, and Sturtevant accept the statement (F) that laryngeals affected 'initial' resonants in Greek; Messing rejects it. Möller, Pedersen, and Austin suggest that prothesis may indicate the presence of a former laryngeal (G); Sturtevant accepts it, Messing rejects it.

3.6A. IE *ə* is the reflex of a laryngeal.

There are various reasons for this statement.

a. In some Hittite cognates *ḫ* : *ḫḫ* corresponds to reconstructed IE *ə*.

b. With it one can explain the long suspected relation between the Skt. fifth, seventh, and ninth verb classes. For the *-i-* of *seṭ*-roots, reconstructed in IE as *ə*, developed from a laryngeal; the PIE form of *seṭ*-roots is then to be reconstructed with a final laryngeal, e.g. Skt. *pavi-* from PIE /pewX-/, not *pewā-*, *pewə-*. The Skt. fifth, seventh, and ninth classes have an *n*-infix. The seventh class is composed of verbs with an obstruent as last phoneme of the root, e.g. *rinákti* < /ly-n-ek^{w}-ty/; the fifth class with *w*, e.g. *śṛnóti* < /kl-n-ew-ty/; and the ninth class with a laryngeal, e.g. *punáti* < /pw-n-eX-ty/.

c. When one assumes that a consonantal laryngeal is to be reconstructed where formerly a vocalic schwa was assumed, some of the exceptions to an Ind.-Ir. phonological formula known as Brugmann's Law are removed. Much has been published about this formula.[8] In general Indo-Europeanists no longer accept it. Pedersen, however, has published an acceptable formulation: 'IE short *o* before *r l m n* became Ind.-Ir. *ā* in open syllables.'

The formulation may be expanded to: 'PIE short *o* before the consonantal allophones of the PIE resonants became in open syllables Ind.-Ir. *ā*.' Thus is defined the relation between Gk. *δόρυ*, Skt. *dā́ru*, Gk. *φέρομες*, Skt. *bhárāmas*, but Gk. *πόσις*, Skt. *páti*, Lat. *rota*, Skt. *rátha*.

The forms which were left unexplained even by Pedersen's formulation are clear with the laryngeal theory: such are causative stems like *janáya-*, and *a* in the perf. 1st sg. (there is fluctuation between *a* and *ā* in the later language but *a* predominates in the old language) but consistently long *ā* in the perf. 3d sg., e.g. 1st sg. *cakára*, 3d sg. *cakā́ra*. Forms like *janáya-* are from laryngeal bases; therefore pre-Ind.-Ir. *o* in these words stood in a closed syllable.

The contrast in the perfect forms can be explained by comparison with Hittite. It is assumed that the Hittite *ḫi*-conjugation is related to the IE perfect. The 1st and 3d singular endings of the *ḫi*-conjugation are *-ḫi* and *-i*; by comparison with these the pre-IE endings may be reconstructed: 1st *-Xe* and 3d as *-e*. Consequently in the 1st sg. of perfects like *cakára o* stood in a closed syllable and regularly became *a*; (later *ā* was introduced in many forms by analogy with the third singular). In the 3d sg. *o* stood in an open syllable and regularly became *ā*. The forms 1st sg. *cakára*, 3d sg. *cakā́ra* thus represent the expected development. With the laryngeal theory we can therefore explain the chief difficulties and apparent exceptions to Pedersen's revision of Brugmann's Law.

d. We may conclude from this evidence that any well-attested *seṭ*-root gives evidence of IE laryngeal. Any wide-spread formation, however, like the *seṭ*-roots may spread by analogy; *i* spread to *aniṭ*-roots especially in certain form categories. For example, in the *sya*-future, Indic shows *i* for both *seṭ* and *aniṭ*-roots; on the other hand, Avestan has no *i* in these forms. Persson suggests that

[8] Hirt, IG 2.20-1; H. Pedersen examined the evidence in the various dialects in Wie viel laute gab es im Indogermanischen?, KZ 36.74-110 (1900) and suggested the revision cited on page 87.

both are analogical developments. (Beitr. 350–3.) Hence not all Skt. *seṭ*-roots may give us incontrovertible evidence for laryngeals; on the other hand some original *seṭ*-roots may have lost their laryngeals. But in general, Skt. roots are used in such a variety of forms that we can determine which of them are *seṭ*.

Seṭ-roots are among the soundest evidence for laryngeals; but they give us information only about the last phoneme of the root.

We can most easily define *seṭ*-roots from our evidence in Skt.; *i* is clearly preserved in many formations, such as the infinitive *bhávitum*, the *s*-aorist *ásānišam*, and other forms with suffix beginning in *s* or other consonants.

e. We may also determine the presence of PIE laryngeals from the intonation in Lithuanian, Lettish, and Serbo-Croatian. Lithuanian syllables with acute accent (´ on long syllables, ` on short) point to PIE syllables with laryngeal; Lithuanian syllables with circumflex accent (~) developed from PIE syllables without laryngeal. To Lithuanian ´ and ` correspond Lettish ~ or ^, Serbo-Croatian ` ; to Lithuanian ~ correspond Lettish ` and Serbo-Croatian ^. Examples are:

Lith. *búti*, Lett. *bût*, Serbo-Cr. *bîti* 'to be'; PIE /bhewX-/ cf. Skt. *bhávitum*.

Lith. *pìlnas*, Lett. *pìlns*, Serbo-Cr. *pûn* 'full'; PIE /pelX-/ cf. Lat. *plēnus*.

Lith. acc. sg. *šìrdį*, Lett. acc.sg. *sìrdi* 'heart'; PIE /keXrd-/, Gk. *κῆρ*.

By contrast the following are examples of intonation patterns of words whose etyma did not contain laryngeals:

Lith. *paršas* 'boar', Serbo-Cr. *prâse* 'shoat'; Lat. *porcus*.

Lith. *añtras* 'the other'; Goth. *anþar*.

Lith. *liẽšti* 'lick'; Skt. *leḍhi*. (See Hirt, IG 5.151–3.)

Such intonation patterns do not give us evidence for the exact position of the laryngeal. Acute accent may result from the pattern CeRX- or CeXR-, from the so-called heavy bases or the so-called long vowels and diphthongs, for example, Lith. *sáulė* 'sun'; Gk. *ἠέλιος*. Only the presence of a laryngeal may be determined from the intonation patterns; its position must be noted from evidence in other dialects.

Moreover the acute intonation spread to verbs with circumflex intonation; this analogical spread is especially characteristic of intransitive verbs. (See Sandbach 11.) Thus Lith. *svìlti*, Lett. *svìlt* 'smoulder' developed from etyma with no evidence of laryngeal, cf. OE *swelan* 'glow'.

In terms of the laryngeal theory Hirt's heavy bases are bases ending in laryngeal. The term 'laryngeal base' is therefore preferable both to Hirt's term 'heavy base' and to the term '*seṭ*-root' which is taken over from Skt. grammar.

3.6B. The so-called 'original long IE vowels' are reflexes of short vowel followed by laryngeal; for all such long vowels we may assume earlier short vowels and laryngeal. The following evidence may be cited.

a. Cognates with IE words having long vowels are found in Hittite with vowel followed by *ḫ* : *ḫḫ*.

b. The ablaut relationships found in forms like Gk. *τίθημι*, *ἵστᾱμι*, *δίδωμι* is clarified. If one compares these with verbs like Skt. *ás-mi*, Gk. *δέρω*, one can analyze them as follows:

PIE root		PIE root	
ás-mi	es-	*τίθημι*	dhē- < dhe?-
δέρ-ω	der- 'flay'	*ἵστᾱμι*	stā- < steA-
μέν-ω	men- 'stay'	*δίδωμι*	dō- < deγ-

With the assumption of root forms /dhe?- dh?-/ some of the problems in the formation of Skt. reduplicated verbs become clear. We find, for example, 1st sg. *bíbharmi*, 1st pl. *bibhṛmás* 'bring', but *dádhāmi*, *dadhmás* 'set' and *dádāmi*, *dadmás* 'give'. Although apparently different the plural forms are quite parallel. In *bibhṛmás*, *-r-* became syllabic between two consonants; in *dadhmás* and *dadmás*, *-X-* was lost, as regularly between consonants.

c. Most of the problems connected with IE 'long semi-vowels' are clarified. When laryngeal bases with resonant before laryngeal are found in formations with accent on the suffix, the base shows a 'long semi-vowel.' Skt. *gūrtá*, Lat. *grātus*, formerly reconstructed $g^{w}\bar{r}$-*tó*-, are from /g^{w}rX-tó-/, compare Skt. *gṛṇā́ti*; Skt. *pūrṇá*, Lat. *plēnus* are from /plX-nó-/; Skt. *bhūtá* is from /bhwX-tó-/. IE 'long semi-vowels' then are similar in origin to the original long vowels.

'Long semi-vowels' may also have developed from laryngeal plus /y w r l m n/. Skt. *sthāv-ará* is an extension of /steX-/; we find alongside it the form *sthūrá*; compare also *sphāy-ate*, *sphīta*, Lat. *fēmina*, *fīlius* (from /dheXy-/), etc. This assumption is not made by some Indo-Europeanists; but those linguists who derive 'long semi-vowels' only from resonant plus laryngeal are led to assume earlier forms for which we have no evidence, such as **bhwıX-w-´*.

d. The treatment of 'original long diphthongs' points to anterior presence of a laryngeal. In Cretan Gk. *ἀϝέλιος* 'sun', short vowel plus laryngeal have contracted to a long vowel; presence of laryngeal is supported by the intonation in Lithuanian *sáulė*; in Skt. *sū́ra* 'sun' we find the expected zero grade.

From long vowels and diphthongs we can derive evidence for laryngeals medially in roots, as well as finally. Skt. *naú* 'ship' gives us evidence for /neXw-/, *dadhā́mi* for /dheX-/.

3.6C. IE *a* developed from *Aa* which in turn came from *Ae*.

The following evidence may be cited.

a. We find Hittite cognates written with *ḫa-*, for which the IE cognates do not have initial *e*, rather *a*.

b. *a-* is found in ablaut relationship with zero, e.g. Gk. *ἄ(ϝ)ησι*, Skt. *vā́ti* the Hittite cognate *ḫu-wa-an-te-eš* gives us secure evidence for initial laryngeal. If we assume a pre-IE root /Aew-/ [Aaw-] to which suffixes were added, it is clear that the alternation was *aw* : *w*. *a* < /Ae/ was preserved before *w*; with loss of the vowel /e/, *A* too was lost. Forms with similar ablaut are Lat. *aurōra*, Skt. *uṣás*, Lat. *aemulus*, *imitor*. (See also Pedersen, VGK 107.)

From original *a* we can derive evidence for laryngeals occurring initially or medially.

Since *e* and *o* may be adjacent to two of the laryngeals, we must assume other

laryngeals adjacent to full grade *a*. Furthermore, a number of IE words with initial *a* have Hittite cognates with *ḫa*, e.g. *ḫa-an-ti*, OHG *enti*, *anti*, while others have IE cognates with *a-*, e.g. Lat. *aurōra*, Hitt. *a-uš-zi*. Consequently some Indo-Europeanists assume two *a*-colored laryngeals: 1. *x*, which became *ḫ* in Hittite; 2. *h*, which is not represented in the Hittite orthography. (This point has been the subject of much dispute; see SSP 206–22.)

3.6D. The aspiration of Skt. voiceless aspirated stops developed when laryngeals were lost after original voiceless stops. This clarifies the relation between *tiṣṭhati*, Gk. *ἵσταμεν*, Lat. *sistit*, Goth. *standan*, etc.; aspiration developed in the zero-grade forms of the root /steA-/, and spread to forms with other grades. (See EI 46–53.)

From words with voiceless aspirated stops in Skt. we can assume laryngeals medially in many words.

3.6E. The quantity of vowels in Vedic Sanskrit often demands that we assume a laryngeal. For example, Vedic *abhí* normally retains its final short vowel; in some compounds, however, we find long *i*. The second member of most such compounds is from a root beginning with laryngeal. (EI 30–3.) *abhīsat* is composed of *abhí* and *Xes-*. Moreover, augmented forms of such roots with initial laryngeals often have a long augment, e.g. Skt. *āyan*, impf. 3d pl., PIE /Xey-/ 'go'.

Greek metrics gives us further evidence that laryngeals formerly were found initially in certain words. Such words beginning with λ, μ, ν make position, e.g. *νέφος*. Assumption of an initial laryngeal is supported by cognates with /en-/, from /Xen-/, in other dialects; compare Skt. *ámbhas*, Gk. *νέφος*. (Lang. 17.91–2; LaRoche, HU 49–59 gives a complete list of such words.)

Vedic metrics also demands in some passages that we read two short vowels where one long vowel is written, e.g. *yaánti* where *yā́nti* is written. Kurylowicz, EI 33–40, cites many other examples; the superlatives in *-iṣṭha-* made from roots with long final vowel, e.g. *déṣṭha* from *dā-*, must often be read with a bisyllabic *e*, that is to say, with *-aXi-*. In such passages a laryngeal formerly stood between the two short vowels, then was lost, and the vowels coalesced to a long vowel.

From these irregularities we can determine laryngeals initially, medially, and finally in words. The irregularities are rare. We may assume that they were removed as the Vedic and Homeric poems were handed down. If we find them surviving, we can look upon them as good evidence for earlier laryngeals.

3.6F. Developments of PIE initial resonants in some Gk. words give evidence of former laryngeal.

Sapir demonstrated this by clarifying the treatment of initial *r w* and *y* on the basis of the laryngeal theory. (Language 14.269–74; also Language 17.88–91 for a recapitulation of this explanation by Austin.) Sapir suggests that

PIE *we-*	became Gk. *ε-*
PIE *hwe*, *ʔwe-*, *xwe-*	became Gk. *ἑ-*, etc.

With this assumption the complicated relationship between Hitt. *hu-wa-an-da-aš*

'wind', Skt. *vâti* 'blows', Gk. *αἴνω* 'winnow', and Gk. *ἄησι* 'blows' is explained. The pre-IE initial was /xewe-/; the Hitt. and Skt. forms, and Gk. *αἴνω* are from the variant /xwe-/, Gk. *ἄησι* from /$x_e$we-/ > /we-/ > /a-/.

From such forms we can determine the presence of laryngeals initially; since in Gk., resonants in these words undergo unvoicing, Sapir ascribed the effect to voiceless laryngeals.

3.6G. Hittite apparently preserves an initial *a* in the reduced grade of roots beginning with a laryngeal; compare Lat. *est*, *sunt*; Hitt. *e-eš-zi*, *a-ša-an-zi*. Austin, following a suggestion of Möller's, assumed that Gk. and Armenian too preserved initial vowel in such words; he ascribes vocalic prothesis of many words to an earlier laryngeal, e.g. Hom. Gk. *ἐών* 'being'. Compare also Gk. *ἀνήρ* and Skt. *nára*; this assumption is strengthened by the numerous Vedic compounds in which the final vowel of the first element has been lengthened, such as *sū-nára*. Austin assumes that prothesis is found where initial ', *γ*, *x* were the laryngeals. (Lang. 17.85.)

These are various phenomena on the basis of which we can suggest laryngeals. Some of them may be found in different developments from the same word, possibly in different dialects; if so, the evidence is convincing.

Laryngeals have been assumed also for other patterns; (IHL 83 and 86–7) these, however, are found in a small number of words; moreover, since these patterns have been explained on the basis of the laryngeal theory, we must use them with caution as further evidence.

3.7. SUGGESTIONS ABOUT THE ALLOPHONES OF LARYNGEALS. We have little evidence for the phonetic description of laryngeals. Some Indo-Europeanists have preferred to deal with them as phonemic units whose allophones we cannot define without further material, except by observing their effect on neighboring phonemes. But assumptions about the pronunciation have been made from the spelling for the Hittite reflexes *ḫ*, *ḫḫ*. In the cuneiform syllabary this spelling indicates velar spirants. Moreover, an instance of spelling substitution has been noted in a Hittite text: *warnu-* and *waḫnu-*. Since this spelling is limited to one text we can hardly draw far-reaching conclusions about a similarity of articulation between *r* and *ḫ*. At best we have Hittite information about two laryngeals, for that is the maximum number for which we have Hittite reflexes.

Further evidence has been drawn from loan-words; like other inferences drawn from loan-words such material must be used with great caution. Our lack of knowledge of the sources of the Hittite vocabulary makes this source doubly precarious.

Unfortunately no source yet found has given us satisfactory material on which we can base phonetic descriptions. But by combining the various bits of evidence we can begin to make tentative suggestions.

3.8. LARYNGEALS TENTATIVELY ASSUMED FOR PIE. On the basis of the various studies in PIE phonology in connection with the laryngeal theory, it is clear that we must assume a phonemic system of PIE with laryngeals (see **3.5B**) or reflexes of laryngeals (see **3.5C**). In citing PIE reconstructions in this book I write laryngeals, before deciding from the evidence assembled in favor of either alternative.

Some phonological problems of Gmc. will now be investigated on the basis of a PIE phonemic system with laryngeals. An attempt will then be made to set up a more rigorous system, one that accounts for all of the phonological developments of PGmc.

This PIE phonemic system will also be tested in the investigation of problems from other IE dialects. After such investigations some of the following problems may be answered.

1. When were the laryngeals lost?
2. Can we set up various stages of PIE and pre-IE?
3. Do we have evidence to determine how many laryngeals were lost and what was their phonetic description?
4. What is the earliest phonemic system that we can assume for pre-IE?

4. LENGTHENED /w/ AND /y/ IN THE GMC. DIALECTS

4.1. EVIDENCE FOR LENGTHENING IN THE VARIOUS GMC. DIALECTS. The treatment of resonants is very complex in the Gmc. dialects. Of the six PIE resonants, /w/ and /y/ show the greatest variation in development and they too have been the subject of greatest discussion. Words with parallel developments in other IE dialects have Gmc. cognates which contrast markedly with each other. Intervocalic /w/ was lost in Gk. ὄις < *ὄϝις 'sheep' and κοέω < *κοϝέω 'perceive'. Cognates of ὄις are OIcel. *ár* < **awiz* and OHG *ou* 'sheep'; cognates of κοέω are OE *scēawian*, OS *skauwon*, and OHG *scauwōn* 'gaze'. A similar contrast in the development of /y/ is found in Goth. *fijaþwa* 'enmity', Skt. *piyāru* 'censuring' and OIcel. *Frigg*, the name of Odin's wife, Skt. *priyá* 'dear'. In one word the Gmc. dialects seem to preserve the single resonant attested in the other dialects, in the other they show lengthened resonants.

The developments in Gmc. of PIE /w/ and /y/ have long been accurately described.[1] After a short vowel Gmc. /w/ and /j/ in some words were lengthened before vowels. The WGmc. dialects preserved the lengthened resonants. In Gothic and NGmc. they developed into clusters written *-ggw-* and *-ddj/ggj-*. These clusters are generally interpreted as velar stop plus [w] and palatal stop plus [j]. In Gothic and NGmc. the velar stop fell together with the *g*-phoneme, and was written *-gg(w)-*, as did the palatal stop in NGmc., written *-gg(j)-*; in Gothic the palatal stop fell together with the *d*-phoneme, and was written *-dd(j)-*. Most linguists follow Braune in assuming that the cluster of sounds which developed from Gmc. *-jj-* was originally pronounced the same way in Gothic and NGmc., but that it became fronted in Gothic and retained palatal articulation in NGmc.[2]

There are accordingly three stages in the development, and these may be represented by the following formulae: 1. *-w-* plus ?; *-y-* plus ?; 2. *-ww-*, *-jj-*; 3. [gw], [d/gj]. Stage three is attested in Gothic and NGmc., stage two in the WGmc. dialects, and stage one is nowhere attested but presumably was the PIE pattern.

While the ENGmc. developments remained clearly marked, the distinction

[1] A. Holtzmann was the first Germanist to point out that the lengthened resonants are found in words whose cognates in other dialects have unlengthened resonants; see the notes to his edition of Isidor's Epistolae ad Florentinam sororem 128–30 (Karlsruhe, 1836). He called the Gmc. development 'doubling' (Verschärfung); this term is still in use; the development is also referred to as Holtzmann's Law. Streitberg, Germanisch 323–6, gives a history of the scholarship.

[2] W. Braune, Gotisches ddj und altnordisches ggj, PBB 9.545–8 (1884), compares modern Hungarian *gy*. Braune does not think that the ENGmc. spellings indicate a long stop, but rather that the letters were repeated to indicate a stop rather than a spirant. C. Marstrander, NTS 3.108 (1929), suggested on other than linguistic grounds that worship of a Gothic god *Friddja*, *Friddjōs* extended to the NGmc. area, where we find the name *Frigg*, *Friggiar*. This suggestion supports Braune's assumption of similarity in pronunciation of Gothic *ddj* and NGmc. *ggj*.

between *-w-*, *-j-* and *-ww-*, *-jj-* is less obvious in the WGmc. dialects.[3] Kögel made a detailed study of WGmc. documents and found the following orthographical evidence for a distinction.[4]

	PGmc.	OE Medial	OE Final	OS Medial	OS Final	OHG Medial	OHG Final
1	aww	ēaw	ēaw	auw, auuu, auu	au	auw, ouw	au, ou
	aw	eaw	ao, ēa	aw, auu	ao, ō, ā	aw, ouu	ao, ō
2	eww	ēow	ēow	ēuw	eu, euu	euw, iuw	iu
	ew	?	eo	?	?	?	io
3	uww			(evidence uncertain)			
	uw			(evidence uncertain)			
4	ajj	āj		aij	ai	aij	ai
	aj			ej	ē	(ē)	(ē)
5	ijj	ī		ī		ī	
	ij	eo					
6	ujj			(no evidence)			

4.2. PROPOSED EXPLANATIONS. Although the data in the Gmc. dialects were clear, no explanation for the development was attempted until Kluge in 1879 related lengthening to the IE accent.[5] He suggested that PGmc. intervocalic *w* and *j* after short vowel were lengthened when the IE accent preceded. Thus *j* was not lengthened in Goth. *saian* 'sow' (Kluge assumed this to be *sāian*) because of the preceding long vowel, nor in Goth. *niujis* 'new' because of the preceding diphthong; and because of the following accent in IE **gʷiu̯ós*, the *w* was not lengthened in Goth. *qius* 'alive'. But *-j-* and *-w-* were lengthened in Goth. *daddjan* 'suckle' and *triggws* 'faithful' which Kluge reconstructed with accent on the first syllable. Schmidt in a review[6] disposed of Kluge's explanation by analyzing differently the words which Kluge cited in favor of it, and by citing objections to it; of Kluge's four examples in favor of his theory only Goth. *iddja* remained, and exceptions like Goth. **preis* 'three', acc. *prins*, Skt. *tráyas* were unaccounted for.

Schmidt also pointed out that the cognates of OIcel. *egg*, Crim. Goth. *ada*

[3] Some linguists seem to have been unaware of the evidence in WGmc.; see R. Trautmann's comments on Mikkola, Suum cuique, KZ 53.87–90 (1925).

[4] R. Kögel, Ueber *w* und *j* im westgermanischen, PBB 9.523–44 (1884); illustrations of the spellings may be found below.

[5] F. Kluge, Beiträge zur Geschichte der Germanischen Conjugation, QF 32, (Strassburg, 1879). See 127–30, Excurs über Gotisch dd und gg.

[6] J. Schmidt, review of Kluge, Beiträge . . . , AfdA 6.117–29, esp. 127 (1880).

'egg' have an original long vowel: Gk. *ᾠόν*, Polab. *jojú*, Serb. *jáje* from PSlav. /jajé/. Accordingly *-j-* was lengthened after long vowels too; later linguists have not taken account of Schmidt's remark concerning *ᾠόν*.

Bechtel then suggested that *-w-* and *-j-* were lengthened when the IE accent followed immediately;[7] he cited more examples in favor of his theory than Kluge had. But like all linguists who relate the Gmc. developments to the IE accent, he cannot account for lengthening in strong verbs otherwise than by assuming regularization by analogy. Paul[8] had earlier cited the OIcel. verbs

hǫggua	*hió*	**hióm*	**háinn*
búa	*bió*	*bioggum*	*búinn*

to illustrate the difficulty of explanation by analogy. Nonetheless Bechtel assumed an original Goth. conjugation

**bliwan* **blau* *bluggwum* *bluggwans*

with *bliggwan blaggw* as later developments. Such regularization might be admissible in Gothic, but hardly in the Gmc. dialects which maintained grammatical change. And even if we admit it in the verb system, regularization is much more open to question for nouns and adjectives. Such a general objection is much more weighty in rejecting Bechtel's explanation than are exceptions like Goth. *ajukdupṣ* 'eternity'.

After reviewing the attempted explanations, Streitberg rejected any possibility of relation between lengthening and the IE accent. (Germanisch 323–6.) In his opinion only the Gmc. accent can be related to lengthening. But if we accept Streitberg's statement and assume a causal connection between Gmc. accent and lengthening, we cannot account for many words with single resonant after the first syllable, such as Goth. *awi-liuþ* 'thanks', nor can we explain why

[7] F. Bechtel, Ueber die urgermanische Verschärfung von j und w, GGN 1885.235–9. It might be worth noting, in view of contemporary explanations of phonological phenomena by means of the laryngeal theory, that after Verner's article in KZ 23 many developments were explained by the position of the accent. Parallels were cited from other languages to support such views. H. Zimmer, Keltische studien, KZ 32.153–240 (1891), cited on pages 218–9 a parallel Irish development of *j* to *gg* after accented vowel. F. Trautmann in a review in AfdA 35.105–9 (1911) on page 107 alluded to lengthening of *w* and *y* before the accent in Prakrit dialects which Pischel had demonstrated, KZ 35.140–50. J. J. Mikkola, Die Verschärfung der intervokalischen j und w im Gotischen und Nordischen, Streitberg Festgabe 267–71 (Leipzig, 1924) found the key to the Gmc. development in a similar development, p. 267: 'Im Ungarisch-slovenischen heisst es bíje "schlägt", aber pidjé (aus pijé) "trinkt", d. h. j ist nach einer betonten Silbe geblieben, aber vor einer betonten Silbe in d' verwandelt worden, s. Asboth, Archiv f. slav. Philologie, xxxiii, 322. Hier haben wir den Schlüssel zum Problem der sog. Verschärfung von intervokalischen j und w im Gotischen und Nordischen.' Such citing of parallels from other languages in support of either of two views indicates the secondary use which ought to be made of such analogies.

[8] H. Paul, Ausfall des *j* vor *i* und des *w* vor *u* im westgermanischen, PBB 7.160–8 (1880); in a footnote on 165 he states that Gmc. lengthening is independent of the IE accent.

w and *j* were lengthened in some words but not in others with the same accentuation, such as *triggws* and *ǽr*.

One inescapable conclusion seems clear from the many discussions of lengthening: it has no relation whatsoever to either the IE or the Gmc. accent.

Two further explanations have been offered that do not relate lengthening to accent. Brugmann suggested that lengthening is found in words which in PIE already had a combination of sounds that developed to *-ww-* and *-jj-* in Gmc.[9] He derived: Goth. *-waddjus*, OIcel. *veggr* 'wall' from **ɣoi-ɣu-* 'woven material'; OIcel. *tyggua* 'chew' from **kiuɣō* < **kiuɣō*; Goth. *triggwaba*, OIcel. *tryggr*, OHG *gi-triuwi* 'faithful' from Gmc. **treuzᵘo*, IE **drēu-qᵘó-*. It is difficult to cite cognates justifying these reconstructions; Brugmann's theory was accordingly not widely accepted. Osthoff's explanation[10] that the *-w-* and *-j-* were lengthened in forte forms and unchanged in piano forms has likewise met with little acceptance. After reviewing all of the theories Streitberg finds none of them satisfactory. (Germanisch 325.)

4.3. PROPOSED EXPLANATIONS BY MEANS OF THE LARYNGEAL THEORY. In 1941 Smith attempted a solution by means of the laryngeal theory.[11] Smith ascribes to PGmc. a series of clusters which were made up of aspiration and (long) voiceless resonants; the aspiration was a reflex of IH laryngeals. These clusters, after the operation of Verner's law, developed to PGmc. [γw] and [γj], which in turn developed to the combinations found in the Gmc. dialects.

Various objections may be offered to Smith's theory. 1. Smith cites very few forms other than those in Gmc. dialects on the basis of which we can assume IH laryngeals where his formulae require them. 2. If as Smith says the clusters [γw] and [γj] were already found in PGmc. one must explain how [γ] was lost before [w] and [j] in WGmc. with lengthening of *w* and *j*. This Smith fails to do. 3. Assumption of a relation between lengthening and IE accent brings up the difficulties cited by earlier linguists.

Sturtevant adopted Smith's theory but revised some details. (IHL 80–3.) He did not assume that *-hw-* or *-hy-* followed any short syllabic in IH or IE, nor did he restrict the development to positions immediately before the accent. Even the revision is open to various objections. 1. The phonetic development from reflex of laryngeal plus *w* and *y* to the sounds attested in the various Gmc. dialects is unclear. 2. As Sturtevant indicates, there are contradictions between Gmc. developments and the laryngeal theory; if the Gmc. short vowel before

[9] Gdr. I.1.283 and 331. W. van Helten, Germanisches. LXVII. Zur entwickelung von altgerm. jj und ww, PBB 30.240–8 (1905), cites additional words in support of Brugmann.

[10] H. Osthoff, Etymologische Parerga 1.138.

[11] H. L. Smith, Jr., The Verschärfung in Germanic, Language 17.93–8 (1941). Smith has now modified his views in some respects, and may soon publish his revised theories. A modification of Smith's theory is suggested by E. Polomé, A West Germanic Reflex of the Verschärfung, Language 25.182–9 (1949). This, with other previous theories, is reviewed by F. van Coetsem, Le renforcement des semi-voyelles intervocaliques en germanique (j/jj > jj > gotique ddj etc.), Leuvense Bijdragen 39.41–78 (1949), who prefers the explanation suggested by Brugmann and Boer. See also the subsequent article of E. Polomé, Laryngeal-theorie en Germaanse Verscherping, Handelingen der zuidnederlandse Maatschappij voor Taal- en Letterkunde en Geschiedenis 4.61–75 (1950).

hw and *hy* came from IE *ə*, IH *X* was involved in two processes: IH *ıXy* became IE *ə* plus *hy*. Consequently we have to posit two laryngeals, or a lengthened laryngeal, in IH. 3. Gmc. forms from IE words with vowel other than *ə* before *hy*, *hw* are left without explanation.

Sturtevant gives reasons for connecting the Gmc. lengthening with IH laryngeals. He finds that 1. 'in a number of cases the short vowel before the Verschärfung alternates with an IE long vowel' and that 2. 'on the other hand, a PGmc. short vowel of an initial syllable before short *j* or *w* does not alternate with an IE long vowel.' (IHL 81–2.)

Eight examples are cited in IHL in support of the theory. In two of these, Goth. *twaddjē*, OIcel. *tueggia* 'of two' and OIcel. *beggia* 'of both', lengthening is found only in the genitive. If these words contained *-hj-*, one must explain why lengthening was restricted to the genitive; no such explanation has been offered. For another example, Goth. *glaggwaba*, there is no evidence for IH laryngeal, for *glaggwaba* is of doubtful etymology. At best then five forms are left in support of the theory.

Moreover, some Gmc. words with single *w* have cognates with long vowels, e.g. Goth. *qius* 'alive', Skt. *jīvati*, Lat. *vīvō*, and OCS *živati* 'live'.

Explanation by means of the laryngeal theory became even more difficult when Austin related another Gmc. development to the lengthening of *w* and *j*.[12] A number of Gmc. words have *g* or *k* where cognates in other dialects have *w*. Austin suggested that those words with *k* < *w* developed from IH *-hw-* when the IE accent preceded; he set up the following patterns:

IE -hý- > Gmc. -ddj/ggj-
IE -hẃ- > Gmc. -ggw-
IE -'hy- > Gmc. -k-
IE -'hw- > Gmc. -k-.

Although the development of *w* to *g* or *k* had been investigated, this is the first time, to my knowledge, that it was related to lengthening of *w* and *j*. Austin supports this relation by citing a root in which both developments are found: OIcel. *hǫggua* 'hew' and OE *hæccean* 'hack'.

Austin's corollary to Smith's formulation makes explanation by means of the laryngeal theory seem very precarious; for the combined formulations are open to more objections than were Smith's:

1. We should expect in Goth. *bliggwan* grammatical change, giving us the forms: **blik* **blak* *bluggwum* *bluggwans*, as well as in the other strong verbs with lengthening. Assumption of regularization by analogy might be acceptable for Gothic, but open to serious objections for Old Saxon and other dialects which maintained grammatical change.

2. There are no words showing a development *-'hy-* > Gmc. *k*. The formula is thus difficult to justify.

3. Examination of the evidence is incomplete. None of the words in which

[12] W. M. Austin, A Corollary to the Verschärfung, Language 22.109–11 (1946).

w > *g* and only some of those in which *w* > *k* are cited. Moreover, some of the words cited for *w* > *k* have *kk*. No explanation is offered for the difference.

4. Assumption of IE -hy'- > Gmc. *-ddj/ggj-* and -hw'- > Gmc. *-ggw-* is most improbable in view of the WGmc. forms.

I conclude that the solutions proposed for lengthening and development of *w* > *k* by adducing the laryngeal theory are as unsatisfactory as those proposed by relating the accent. On the other hand, Sturtevant, and to a lesser degree Austin, have cited evidence for laryngeals in some cognates of the Gmc. words under discussion. I therefore shall examine as complete a list as possible of the words in which IE *w* and *y* were lengthened, and their cognates, in an attempt to discover possible reflexes of laryngeals. Later I shall examine words in which the four other PIE resonants occur in the neighborhood of laryngeals, and try to establish the development of these in Gmc.

The discussion will be divided into four parts:

1. lengthening of /w/ and /y/ in Gmc.;
2. *g* and *k*(*k*) from *w* in Gmc.; (Chapter 5)
3. development of *r l m n* and neighboring laryngeals in Gmc.; (Chapter 6)
4. the OHG *r*-preterites. (Chapter 7)

4.4. THE WORDS IN WHICH LENGTHENING IS FOUND. Complete lists of words in which *w* and *y* have been lengthened have been given by Kögel, Noreen, and Trautmann.[13] Other linguists have discussed the cognates outside Gmc.; their work may be located most conveniently in WP. In the following list therefore are cited only forms to illustrate the distribution of the Gmc. words and only cognates pertinent to the discussion.

The list is divided into five parts depending on the PGmc. sequence: 1. *-eww-*; 2. *-aww-*; 3. *-uww-*; 4. *-ayy-*; 5. *-iyy-*.

4.41. *-eww-*.

4.41a. The principal parts of *búa* 'dwell' in OIcel. are Inf. *búa* pret. sg. *bió*, *biugga*, *biogga* pret. pl. *bioggom*, *biuggum* pret. ptc. *búenn*. OE *būan*, OS *būan*, and OHG *būan* are regular weak verbs with only two unusual forms, OHG 3d pl. pret. ind. *biruun* and 2d sg. pret. subj. *biruwis*. (See **7.5**)

OIcel. *byggja* 'inhabit' and OE *bēon* 'be' are related verbs, both showing the regular development of PGmc. *-eww-*.

Prokosch has suggested that verbs of the seventh class are made from 'heavy bases' with reduced grade in the present and *e*-grade in the preterite. (CGG 178.) The agreement in development between OIcel. *byggja* and the preterite of *búa* support his suggestion. The principal parts of *búa* derive from PIE /bh$_e$wX-/ /bhewX-/ /bhewX-/ /bh$_e$wX-/.

Analysis as a laryngeal base is borne out by the Skt. forms such as the infinitive *bhávitum* 'be' and the pret. ptc. *bhūtá*. See **3.6Ab** and **3.6Bc**.

Another wide-spread development from /bhewX-/ is OIcel. *bygg*, d.s. *byggue*,

[13] R. Kögel, PBB 9.523–44; A. Noreen, Abriss der Urgermanischen Lautlehre 160–2 (Strassburg, 1894); R. Trautmann, Germanische Lautgesetze in ihrem sprachgeschichtlichen Verhältnis (Diss. Königsberg, 1906). Mikkola gave a selected list in Streitberg Festgabe.

OE *bēow* 'barley', OS *beuuod* 'harvest', and OE *bēor*, OHG *bior* 'beer'. Since these are PIE *s*-stems which have normal grade in the root, we have further evidence of development of *-ewu-*.

From these Gmc. forms we can derive evidence for the development in Gmc. of PIE *-ewX-*. IHL, 70, suggests *h* or *x* from forms like the Lat. imperf. tense sign *bā* and Osc. *fufans* 'they were'; but Meillet, Introduction 209, adducing Gk. *φυῆναι*, considers both *-ā-* (*eA*) and *-ē-* (*e²*) suffixes. If so, we cannot determine the laryngeal affecting the Gmc. forms.

There is such a variety of forms in Gmc. that the development cannot be explained as originating from one form and spreading by analogy.

4.41b. OE *brēowan*, OS *breuwan*, and MHG *briuwen*, and the OIcel. pret. ptc. *brugginn*, compare OS *gibreuuan* 'brewed' contain evidence for the development of *-ewu-* and *-uwu-*.

Lat. *dēfrūtum* 'cider' may have long or short *ū*; assumption of long *ū* seems supported by Thracian *βρῦτος* 'type of beer'. If so, we may assume zero grade of a laryngeal base; such an assumption would be supported by the intonation of Lith. *briáutis* 'push oneself ahead forcefully'.

For *brēowan* and cognates we have uncertain evidence of PIE *-ewX-* and *-uwX-*.

4.41c. OIcel. *hryggua* 'make sorrowful', OS *hreuuan*, pret. *hrau*, OHG *riuuuon*, pret. *hrau*, *rou* 'rue' and the OIcel. adj. *hryggr* 'sorrowful' show developments of PGmc. *-ewu-* and *-awu-*.

The Gmc. words show verbal development of an IE base which is found in nominal formations with the meaning of 'blood, bloody meat', Skt. *kravís*, Gk. *κρέ[ϝ]ας* 'raw meat'. Because of Skt. *-i-* and Gk. *-a-* I assume PIE /krewX-/. Although the related adjectives OE *hrēaw*, OHG *rouuēr*, *rō* 'raw' seem to have single *-w-*, the verbal forms in Gmc. give us evidence for the development of *-ewu-* and *-awu-*.

4.41d. Goth. *triggws*, OIcel. *tryggr*, OE *trēow*, OS *treuua* and OHG *trēow* 'true' are *u*-stem adjectives with *-ewu-*.

While they are commonly related to IE *derew(o)-* 'tree', Gk. *δόρυ* 'wood', the closest cognate semantically is Lith. *drútas* 'strong'. From this and OHG *trūēn* 'trust' I assume PIE /drewX-/; IHL, 82, suggests IH *dréuh-*.

The Gmc. adjectives give us evidence for the development of *-ewu-*.

4.41e. Goth. *bliggwan*, *blaggw*, *bluggwum*, *bluggwans* 'strike' has always been difficult for linguists who explained lengthening by means of the accent, or considered it restricted to positions after certain vowels. Yet we find evidence for lengthening in other Gmc. dialects; OHG *bliuwan*, MHG *blou*, OS *utbliuuid* 'struck'. Kögel cites NHG *geblauen*, which as well as the OHG spelling and Otfrid's use in meter, show that the *-w-* in the pret. pl. and pret. ptc. was long. It seems therefore most probable that *-w-* was lengthened in all forms. This assumption is supported by the lengthening in *briuwan*, *hriuwan*, *kiuwan* and related forms.

While *bliuwan* provides no evidence for origin of *-ww-*, I conclude from it that *-w-* was lengthened after any Gmc. short vowel.

4.41f. OIcel. *tyggia*, OE *cēowan*, and OHG *kiuwan* 'chew' show developments of *-ewu-*.

Cognates in other dialects give us little evidence for determining the IE root; from the intonation of Lith. *žiáunos* 'jawbone' we may posit a final laryngeal.

4.41g. OHG *spriu*, pl. *spriuuuer* 'chaff' shows *-eww-*.

Cognates with a *d*-extension are Lith. *spráudžiu*, *sprándsti* 'force in'; the intonation points to laryngeal, but the root has so many extensions that we can only consider /(*s*)*prewX-*/ doubtful.

4.41h. OHG *sou*, gen. *souwes*, OE *sēaw*, Icel. *söggr* 'something damp' show development of *-eww-*.

Gk. *ὗ-ει* 'it is raining', Lat. *sūgō*, OIcel. *súga* 'suck' are zero-grade forms of a laryngeal base, but outside Gmc. we have no full-grade forms with evidence for a laryngeal.

4.42.*-aww-*.

4.42a. OIcel. *dǫgg*, *dǫggvar*, OE *dēaw*, OHG *tou*, *touues* 'dew' give evidence for *-aww-*.

Cognates in other dialects, Skt. *dhavate* 'runs', Gk. *θέω* 'run', *θοός* 'rapid' give us no evidence for assuming a laryngeal in the root.

4.42b. Goth. *glaggwō*, *glaggwaba* 'careful', OIcel. *glǫggr*, *glǿggr* 'strict, clear', OE *ʒlēaw*, OS *glauuuorro*, OHG *glauwēr* 'wise' are related by WP to Irish *gluair* 'clear', but the etymology is uncertain.

4.42c. OIcel. *hnǫggua*, pret. ptc. *hnuggen* 'push' and OIcel. *hnǿggr*, OE *hnēaw*, MHG *nouwe* 'stingy, exact' show developments from *-aww-*.

From the cognates Gk. *κνό[ϝ]ος* 'noise of wheel in axle', *κνῦ́ω* 'scratch' and Lett. *knūdu*, *knūstu* 'scratch' we can derive only uncertain evidence for a laryngeal base.

4.42d. OIcel. *hǫggua*, *hió* (ONorw. *hiogga*), *hioggom*, *hǫgg(u)enn* like OE *hēawan*, OS *hauwan* and OHG *houwan* show lengthening in all forms; I assume an alternation *-aww-*, *-eww-* from *-ₑXwX-*, *-eXwX-*.

Assumption of a laryngeal is supported by the intonation of Lith. *káuju*, *káuti* 'strike'.

hǫggua and related forms then give us evidence for the development of PGmc. *-aww-* and *-eww-*.

4.42e. OIcel. *rǫgg*, *rǫggr* 'long coarse wool', Swed. *rugg* 'shaggy hair', OE *rēow* 'wild' and OHG *rouaz* 'crude' are developments of *-aww-*.

From the intonation of Lith. *ráuju*, *ráuti* 'tear out', and the vocalism of OIcel. *rýja*, *rúða* and OS *rūwi* 'rough hide' I assume a laryngeal base /rew*X-*/.

4.42f. OE *skēawian*, OS *skauwon* and OHG *scauwōn* 'gaze' are developments of *-aww-*.

From Gk. *κοέω* 'perceive' and Lat. *cavēre* 'take heed' I assume a laryngeal base /(s)kowX-/.

4.42g. OIcel. *snǿggr*, *snǫggr* 'clipped, bald, bare' show development from PGmc. *-aww-*.

Although WP derive these forms from the IE root *qen-*, Latin has a cognate *novā-cula* 'razor' from which we can determine the extensions of the root that are found in Gmc.; I assume these are *-ewX-*. A reduced grade of such a laryngeal base is found in Gk. *ξῦ́ω* 'shave'.

4.42h. OE *ðēaw*, OS *thau* 'custom', and OHG *kathau* 'discipline' show development from *-aww-*.

The Gmc. forms have no close cognates, but have been related to Lat. *tueor* 'protect, observe'. This gives us no evidence for laryngeals.

4.42i. OS *tou*, OFris. *touw*, *tow* 'rope, tool' show development from *-aww-*.

WP derive these words from IE *dewā*, that is, a laryngeal base /dewX-/, of which Skt. *dū-rá-* 'distant' shows zero grade. The Gmc. words are possibly *o*-grade forms of this root.

4.43. *-uww-*.

4.43a. Goth. *skuggwa* 'mirror', OIcel. *skugge* 'shadow', with OIcel. *skyggua* 'overshadow' are developments of *-uww-*.

From Skt. *skunāti* 'covers' I assume a laryngeal base /(*s*)*kewX-*/; OHG *skūr* 'protection' is a zero-grade form of this base.

4.44. *-ayy-*.

4.44a. OE *clæʒ* and OWFris. *clay* 'clay' indicate development from *-ajj-*.

From OIr. *glenaid* < /gly-n-eX-ty/, Welsh *glynaf* 'adhere' I assume an IE base /gleyX-/. The Gmc. nouns may be in the *o*-grade, like Lat. *glūs* < **glois* 'clay'.

4.44b. The OHG noun *screi*, *screige* 'cry', like the pret. sg. *screi* of *scrīan* 'cry' show development from *-ajj-*.

I find no evidence of a laryngeal root, other than the zero-grade forms, Gk. *κρῑγή* 'gnashing (of teeth)' and OIcel. *hrīka* 'gnash'.

4.44c. Goth. *-waddjus* and OIcel. *veggr* 'wall' show development of *-ayy-*.

From the intonation of Lith. *výti* 'turn' and the long *ā* of Skt. *vā-na-*, Lat. *viēre* 'bind, weave' I assume a laryngeal base /weyX-/.

4.44d. Crim. Goth. *ada*, OIcel. *egg*, OS gen. pl. *eiiero*, OHG dat. sg. *eiie* are developments of *-ajj-*.

The Gmc. words are related to Gk. *ᾠόν*, Lat. *ōvum* 'egg'. But the initial vowel in the Gmc. words is short, in contrast with those of the forms in other IE dialects. Before analysis by the laryngeal theory such a contrast was inexplicable. I assume that Gmc. preserved the uncontracted PIE form /oXy-es-/; the other dialects show development from the contracted form /ōy-es-/. The uncontracted form became PGmc. /aXj-es-/ > /ajj-es-/> /ejj-is-/; from this the attested forms developed.

4.44e. Goth. *daddjan*, OSwed. *deggia* 'suckle' show developments of *-ajj-*.

Skt. *dhaya* 'sucking', *dhītá* 'sucked', Gk. *θῆσθαι*, OHG *tāju*, *tāan* 'suckle' lead us to reconstruct a base /dheXy-/.

The relation of Goth. *daddjan* to this base is difficult, for the apparently closest parallel Skt. *dhāyati* 'sucks' differs strikingly in meaning. Mikkola therefore proposed a connection with Sloven. *dojíti* 'suckle'. If we accept this connection, *daddjan* gives evidence for the development of *-oXy-* to *-ajj-*.

4.44f. OHG *hei* 'dry', *gihei* 'heat' and *arheijēn* show development from *-ajj-*.

WP derive these forms from PIE *kāi-*, /keXy-/, which is found with a *t*-extension in Lith. *kaistù* 'become hot'.

4.44g. MHG *heie* 'hammer' and MLG *heien* 'strike' show development of *-ajj-*.

Cognates with *d*-extension are Skt. *khidáti* 'tears, pushes' and Lat. *caedō* 'strike'. From the aspirated stop of the Skt. form and the vocalism of the Lat.

verb I assume an unextended base /keXy-, kXey-/, from which the Gmc. forms derive.

4.44h. OIcel. *skeggia* 'ax' shows development of *-ajj-*.

From the MIr. *scian* 'knife', Welsh *ysgien* 'knife' I assume a base /(s)keXy-/; this is found with *d*-extension in Lith. *skiedžiu*, *skiesti* 'separate'.

4.44i. The inflected forms of the Gmc. words for 'two' contain many difficulties, among them the gen. pl. Goth. *twaddjē*, OIcel. *tueggia*, OE *twēʒ(e)a*, OS *tweio*, and OHG *zwei(i)o*. The genitive forms in all Gmc. dialects developed from *-ajj-*.

While the source of the Gmc. endings is unclear, it is apparent that they were closely associated with forms of Goth. *bái* 'both', of which Goth. *baddjē* and OIcel. *beggja* show lengthened *j*, again in the genitive.

From the cognates of *bái*, Gk. (ἄμ)φω, Lat. (*am*)*bō* I reconstruct PIE /bheXw/. To this and PIE /dwoXw/ the genitive was added in some way, possibly as Brugmann suggests, Gdr.2.2.10, 76–7, to a stem made with the collective; he compares Lith. *dvejų*, also a genitive. On the basis of such an uncertain set of forms we can draw no inferences about phonological developments; but I assume that *twaddjē* and *baddjē* are of the same origin, with respect to ending. The PGmc. gen. of the word for 'two' was apparently similar to the Skt. gen. du. *dváyos*, except that like the Gmc. words for 'egg' the laryngeal was preserved in Gmc., i.e. /twaXyēn, twaXyōn/.

OIcel. *þriggia* is the only form of the numeral 'three' in the Gmc. dialects with lengthening. Since the genitive forms in the other dialects, e.g. Goth. *þrijē*, seem closer to expected developments from the PIE forms, I assume analogy from OIcel. *tueggia* and *beggia*.

4.44j. OSwed. *prægge* gen. sg. *præggia* 'covering, roof' gives orthographical evidence of development from *-ajj-*.

The Gmc. words are derived with *-y-* extension from the laryngeal base found in Skt. *trā́yate* 'protects', Lat. *intrāre* 'enter'; *-ajj-* then developed from *-eXy-*.

4.45. *-iyy-*.

4.45a. OIcel. *Frigg*, the name of Odin's wife, OHG *friia*, OS *frī* 'free' show development from *-ijj-*.

The closest cognate is Skt. *priyá* 'dear'. From the related Skt. verb *prīṇáti* 'is pleased' I assume a base /preyX-/.

4.45b. Goth. *iddja*, OE *ēode* 'went', both of which point to *-ijj-*, are as perplexing as ever, even though we now have Hittite forms to assume a base *ʔyah-* (IHL 44). The Skt. forms based on a Skt. root *ay-* and those based on a root *yā-* can be derived from *ʔyah-*. But this is of little help for analysis of *iddja* and *ēode*; until we can relate the stem forms of these isolated verbs to forms of other verbs, we have no basis for determining their origin.

4.46. FORMS OF UNCERTAIN ETYMOLOGY. The following Gmc. forms which contain evidence for lengthening are too uncertain in etymology to support inferences about the origin of the lengthening: *-ww-* OSwed. *gnugga* 'scrape'; OIcel. *gugna*, *gyggwa* 'scare'; OS *leia* 'rock', OHG *leige* 'on the way'; OIcel. *styggua* 'frighten'; *-jj-* OE *cæʒ*, OEFris. *kei* 'key'; OIcel. *gnegg* 'whinny', *gneggja* 'whinny', OE *hnǣʒan*, OS *tōnēhjan* 'whinny'; OE *hwæʒ* 'whey'; OHG *hwaijōn* 'neigh', with spellings *hwaiiot*, *uueigot*.

4.5. THE CONDITIONS UNDER WHICH /w/ AND /y/ WERE LENGTHENED. If we sum up our findings, we have the following evidence:

for *eww*	<	*ewX*	3; 5 uncertain; 1 unknown
aww	< *o*, *a*, *ₑwX*		5; 1 uncertain; 3 unknown
uww	<	*uwX*	1
ajj	< *o*, *a*, *ₑyX*		2; 1 uncertain
ijj	<	*iyX*	1; 1 uncertain
ajj	< *o*, *a*, *ₑXy*		6; 2 uncertain.

'Holtzmann's Law' may then be restated as follows: PGmc. *-w-* was lengthened after any short vowel when reflex of a laryngeal followed *-w-*; PGmc. *-j-* was lengthened after *i* when reflex of a laryngeal preceded *-j-*, and after *a* when reflex of a laryngeal preceded or followed *-j-*.

On the other hand, *-w-* and *-j-* were not lengthened when there was no contiguous reflex of a laryngeal; for example, *ár* 'sheep', Gk. ὄις < /Xowis/, and Goth. *áiz* 'bronze', Skt. *áyas* 'iron' /Xayes/.

I assume that the evidence for this restatement of 'Holtzmann's Law' is so weighty that laryngeals can be assumed in pre-Gmc. forms when the Gmc. forms contain lengthened *-w-* or *-j-*. Lengthened *-j-* and *-w-* dating from PGmc. is then another development, which can be added to those in chapter 3, from which laryngeals may be assumed for the IE etyma.

5. PGMC. /g/ AND /k(k)/ CORRESPONDING TO PIE /w/

5.1. EVIDENCE FOR THE DEVELOPMENT OF PGMC. /g/ AND /k(k)/. A number of Gmc. words in which /g/ or /k(k)/ in some forms corresponds to /w/ in others have been much less frequently discussed than those in which /w/ and /y/ were lengthened. In 1888 Bugge had already given a full list of them and a phonetic description of the patterns in which the correspondence is found.[1] Handbooks have subsequently repeated his data, adding or deleting occasional examples.[2] The description given here differs somewhat from Bugge's, but his material will be discussed also.

Pre-Gmc. /w/ corresponds to PGmc. /g/ after /u/, and possibly, in two difficult words, after /i/: OIcel. *bryggia* 'pier', OHG *jugund* 'youth', OSwed. *myggia* 'mosquito', OE *sygel* 'sun', OE *sugu* 'sow', NSwed. dial. *miggel* 'snow-ball', OE *nigun* 'nine'.

Pre-Gmc. /w/ corresponds to PGmc. /k/ after /a/ and /ai/ in OE *naca* 'ship', OIcel. *skeika* 'swerve', OHG *speihhila* 'spit', OHG *zeichur* 'brother-in-law', and after /e/ in OIcel. *leka* 'leak', and to PGmc. /kk/ after /a/ and /i/ in OE *cwic* 'alive', OE *hæccean* 'hack', OE *spic* 'fat', and possibly OIcel. *stakkr* 'pole'.

5.2. PROPOSED EXPLANATIONS. Although the data have long been accurately described, only two explanations have been suggested for the development of such /g/ and /k/. Bugge ascribed it to the position of the accent; according to him *uw* became PGmc. *ug* directly before an unaccented vowel; *w* became *k* after pre-tonic *ǫ* and *ai* or *oi*. But he was already dissatisfied with his formula; for some words, e.g. OE *brūwe*, OHG *ingrūen* retain *w*; and in others, e.g. OIcel. *skugge*, Goth. *skuggwa*, *uw* became *uggw* rather than *ug*; and Goth. *dius*, *hláiw*, etc. retain *w*. As a result Bugge's suggestion gained little acceptance.

In 1946 Austin connected the development with the lengthening of *w*, explaining both with the help of the laryngeal theory. I have listed reasons why Austin's explanation seems untenable. (See **4.3.**) But Austin's attempt at explanation with the laryngeal theory seems quite plausible; for some of the instances of *w* > *g*, *k* are found in words for which other IE dialects give clear evidence of laryngeals; such are OIcel. *bryggia*, Gaulish *briva* < /bhreXw-/, OE *sygel*, Gk. ἀ̊[ϝ]έλιος < /saXw-/, OE *naca*, Gk. ναῦς < /naXw-/. Consequently I shall reexamine the Gmc. words and their cognates, analyzing them on the basis of the laryngeal theory, in an attempt to provide an explanation.

5.3. THE WORDS IN WHICH /w/ BECAME /g/.

5.3a. OIcel. *bryggia* 'pier', OE *brycg*, OS *bruggia*, and OHG *brukka*, MHG *brücke* 'bridge' contrast with OIcel. *brú* 'bridge' in having *g* for pre-Gmc. /w/.[3] From Gaulish *briva* 'bridge' we may reconstruct the PIE full grade form /bhreXwa-/. WP separate from this group the IE words for 'brow', Skt. *bhrú*,

[1] S. Bugge, Zur Altgermanischen Sprachgeschichte, Germanisch *UG* aus *UW*, PBB 13.504–15 (1888). Bugge lists cognates of the various words; the cognates listed below are taken from WP and other etymological dictionaries.

[2] W. Wilmanns, Deutsche Grammatik[3] I.155 (Strassburg, 1911); see the references there.

[3] See Wilmanns 188ff. for the lengthened *g*.

Gk. *ὀφρῦς*, OE *brū*, *brǣw*, OHG *brāwa*, etc. Such a separation is hard to justify, for the two groups are similar both in form and meaning. OE *brǣw* is a full grade form of PIE /bhreXw-/, Skt. *bhrú* a zero grade form. And the meanings of 'brow, beak, bridge' are found in OCS *brъvьno* and Gk. *ὀφρῦς*. But with or without the words for 'brow' we have forms illustrating the various ablaut grades of PIE /bhreXw-/.

Both OIcel. *bryggia* and OE *brycʒ* may be derived from PIE /bhr$_e$Xw-/. The reduced vowel /$_e$/ regularly became Gmc. *u*, as in the second syllable of OHG *zweinzug*.[4] I assume that these forms on the one hand and *brú* on the other developed from an alternation of the root before consonant or vowel of the ending, as that in Goth. *mawi* nom. sg., *máujos* gen. sg. The reflex of /bhr$_e$Xw-/ became *brug-* in a position in which /w/ remained consonantal, but *brū-* when /w/ was vocalic. The following formulas illustrate the developments:

[bhr$_e$Xw-] > [br$_e$g-] > [brug-]
[bhr$_e$X$_{\underline{u}}$-] > [brX$_{\underline{u}}$-] > [brū-].

5.3b. OE *iuʒuð*, OS *juguð*, and OHG *jugund* 'youth' have *-g-* for pre-Gmc. *w*; Goth. *junda* 'youth' shows the expected development. Extra-Gmc. cognates are: Skt. *yúvan-*, nom. sg. *yúvā*, gen. sg. *yūnas*, and Lat. *iuvenis* 'youth'. WP assume an IE root *yew-*; but this does not account for the forms with *ū*. Because of these forms we must posit a root in 'long diphthong.' Such a root was suggested by Hoffmann, who connected Av. *avi-yāo* 'grown', Gk. *αἰζηός* 'vigorous' and assumed a root *yēu-* (/yeXw-/).[5] I assume that the WGmc. forms developed from [y$_e$Xw$_{\underline{u}}$*bi-*] with secondary accent on [$_{\underline{u}}$] as may be recognized from the reflex of *-t-*; the Goth. forms developed from [y$_e$untá].

5.3c. Some of the Gmc. words for 'mosquito, midge', OSwed. *mygg*, OE *muʒʒia*, OS *muggia*, MHG *mucke*, have *g* < *w*, but OIcel. *mýn* does not show this development. The extra-Gmc. cognates, Gk. *μυῖα*, Arm. *mun*, gen. *mnoy*, like *mýn*, point to development from the zero grade; our only evidence for the full grade is a Swed. dialect form *me-hank* 'mosquito'. From this I assume a root /meXw-/. From forms like the nom. /m$_e$Xwī/ the *g*-forms were generalized, from forms like the gen. /m$_e$Xwyōs/ the *u*-forms were generalized.

5.3d. The Gothic name for the rune *s* is *sugil*; OE *syʒel* 'sun' also shows the development of *w* to *g*. From the cognates, Goth. *sauil*, Skt. *súvar*, gen. *súras*, Gk. *ἠέλιος*, Dor. Gk. *ἀέλιος*, we reconstruct PIE /saAwel-/. I assume that Goth. *sugil* developed from /s$_e$Awel-/, that Goth. *sauil* developed from the full grade.

5.3e. In no IE dialect do we find a full grade form of the word for 'pig, sow'. Gk. *ὗς*, *ὑός*, Lat. *sūs*, *suis*, Toch.B. *suwo*, OIcel. *sýr*, *sú*, OE OHG *sū* all show zero grade. By comparison with Gk. *ὀφρῦς*, OE *brū*, etc. we may assume a PIE root /seXw-/. I ascribe the variation between OE *sū* and *suʒu* to variation of *w* before following consonant or vowel, as in the words previously cited.[6]

[4] E. H. Sturtevant, The Indo-European Reduced Vowel of the *e*-Series, Language 19.293–312 (1943), discusses the development of /$_e$/ in the various IE dialects. The usual Gmc. development of /$_e$/ is *u*, except when between obstruents; furthermore some Gmc. forms have *i* and *a* for /$_e$/.

[5] BB 15.62; see also Wackernagel, Aind.Gram. I.91.

[6] Bugge also cites Norw. Swed. *sugga* 'sow' which he assumes to have *-gg-* from lengthening of *w*; I assume that the lengthened *g* here is a modern development, rather than a

5.3f. Bugge assumed development of *w* to *g* also in OIcel. *þrúga* 'oppress', OIcel *duga*, OHG *tougan* 'avail', OIcel. *hrúga* 'heap', and Goth. *hugjan* 'believe'. Bugge's etymologies, however, are not without difficulty. For *þrúga* he cited no extra-Gmc. cognates. For OIcel. *duga* he assumed development from the root found in Skt. *tavīti* 'have power', with the somewhat dubious assumption that IE *t* became Gmc. *d* because the accent lay on the third syllable; consequently I assume that the etymologies cited by WP, Gk. *τρῦω*, *τρύχω* and *τυγχάνω* are more plausible. OIcel. *hrúga*, like OIcel. *hraukr*, OE *hrēac*, Eng. *rick* seem to be developments of IE *ker-* 'turn, bend' with a suffix *-ew-* and determinatives. A number of etymologies have been suggested for *hugjan*, none of them convincing.

5.3g. The Swed. dialect word *miggel* 'snow-ball', which Noreen cites as an example of *w* > *g* is too doubtful to use as a basis for further theories. Development may be from the root of Skt. *mīvāmi* 'grow fat', as for OIcel. *mývell* 'ball'; but, as Noreen suggests (Abriss 168), *miggel* may have developed from a form of this root with velar extension.

5.3h. Although *g* is well attested in OE *niȝun*, OS *nigun* 'nine', beside Goth. *niun*, OHG *niun*, we know too little about the PIE form to draw any conclusions about the WGmc. forms. From Skt. *náva*, Lat. *novem*, Hom. Gk. **ενϝα-* in *εἶνατος*, PIE *enewen* has been reconstructed. But this fails to account for Gk. *ἐννέ[ϝ]α* and OIcel. *nío*. Since the PIE form is unclear, we can draw no conclusions about the OE and OS forms.

I conclude that we can say with reasonable assurance that *Xw* > *g* only in OHG *brukkȧ*, *jugund*, *mucke*, OE *syȝel* and *suȝu*. The *u* before *g* in all of these forms developed from the reduced vowel /$_e$/.

5.4. THE WORDS IN WHICH /w/ BECAME /k(k)/.

5.4a. OIcel. *nǫkkue*, OE *naca*, OS *naco*, and OHG *nacho* 'boat' are cognate with Skt. *naú*, acc. *nā́vam*, Lat. *nāvis*, Gk. *ναῦς* 'ship', *νηιος* 'belonging to a ship', OIcel. *naust* 'boat-house', *nór* 'boat', *nóa-tún* 'ship-town', and OHG *ver-nawun* 'boats that carry wood'.[7] From the Skt., Gk., and Lat. forms I posit PIE /naAw-/. In most IE dialects such combinations lost the laryngeal, e.g. Gk. *βοῦς* PIE /g^{w}eXws/ 'cow', or the resonant, Dor. Gk. *βῶς*; but in Skt. we commonly find forms such as *naú* without any such loss. (Gdr.I.203 fn.) I assume that OIcel. *naust* maintained the form with *au*; OIcel. *nóa-tún* the form with *ā*; and that the Gmc. forms with *k*, such as *naco*, maintained the uncontracted root /neAw-*ō*/ > /naAw-*ō*/ > /naco/.

5.4b. OIcel. *spékaldra*, OHG *speichaltra*, Goth. *spaiskuldra*, OHG *speihhila* 'spit' are from a PIE root with many developments.[8] WP posit a root *sp(h)ɟ̑eu-*,

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PGmc. one, for we have no other evidence for lengthening of *w* in this word.—Many attempts have been made to explain the long vowel of the PIE etymon; some Indo-Europeanists attempt to account for it in other ways from the one accepted here. Specht, KZ 59.281, assumes that a short *u* was lengthened; Kretschmer, Glotta 13.132, suggested origin in an interjection, supporting his view by pointing out the anomalous initial *s* in Gk. and saying that it might have been preserved by analogy with the interjection that was used to call pigs.

[7] E. G. Graff, Althochdeutscher Sprachschatz II.1014 and 1109 (Berlin, 1834–42).

[8] See WP 2.683 and Feist, Goth.Ety.Wb. under *spaiskuldra* for the wide variety of developments from this root; Benveniste's theory of the IE root is presented more fully above, **2.3f.**

spi̯ū, *spīu̯*; in terms of Benveniste's theory of the IE root one would posit a root /(s)pey-/, with form I /spey-X-/, form II /spy-eX-/, and with a determinative, /spy-eX-w-/. Most of the IE forms developed from the last form; the Lith. verb *spiáuti* from the full grade; the Skt. *ṣṭhīvati* and the Goth. *speiwan* from the zero grade /spyXw-/; the Gk. *πτύω* and the Lat. *spuere* from the zero grade /sp(y)-Xw-/. I derive the OIcel. and OHG forms given above from the *o*-grade of form I, to which the determinative *w* has spread; /spoyXw-/ became /speik-/. The Goth. noun parallels the OHG and OIcel. nouns except for the *s* after the root vowel; the only acceptable solution proposed for *s* is that it is a result of an error in writing.

5.4c. OIcel. *kuikr*, OE *cwic*, *cwicu*, OHG *quec*, *queh* 'alive', and OIcel. *kweikja* 'make alive' are cognate with Skt. *jīvá*, Lat. *vīvus*, OCS *živъ* 'alive', Gk. *βίος* 'life', *ζώω* 'live', fut. *βείομαι*. It is difficult to reconstruct a PIE root which will account for the diversity of development; WP posit *g*^{u}*ei̯*(*ō*)- and *g*^{u}*ei̯ōu*-. Because of the variety of development I assume a root similar in shape to that of /spey-/: /g^{w}ey-/, form I /g^{w}ey-X-/, form II /g^{w}y-eX-/ and with determinative /g^{w}y-eX-w-/. I assume that the Gmc. adjectives developed from the same IE form as Skt. *jīvá*, that is, /g^{w}yXw-os/. In Goth. *qius* 'alive' the laryngeal was lost; in NWGmc. the combination /-Xw-/ became /-k-/.

5.4d. OE *hæccean*, OFr. *tohakia* and NHG *hacken* 'cut, hack' seem without question to be related to OIcel. *hǫggva*, OE *hēawan*, etc.[9] Cognates in other dialects are Lat. *cūdō* < **cāudō* 'cut', Lith. *káuju*, *káuti* 'strike', OCS *kovati* 'hammer'. Hirt (Abl.102) assumed an IE root *qoi̯ā*-, Brugmann (IF 6.99) *qāu*-. I posit a root /keX-w-/, from which some forms were made with *X* determinative. Such forms are Lith. *káuti* and the Gmc. words with lengthened *w*. OE *hæccean*, on the other hand, developed from the unenlarged root /keX-w-/ > /kaX-w-/ > /hak-/. The lengthened *k* before *j* is a regular WGmc. development.

5.4e. OE *tācor* and OHG *zeichur* 'brother-in-law' are clearly related to Skt. *devṛ́*, Gk. *δάηρ*, Lat. *lēvir*, OCS *dĕverъ*, and Lith. *dieverìs* 'brother-in-law', all of which preserve evidence for *-w-*. WP posit IE *daiwer*, but with it we cannot account for some of the attested forms. Lat. *lēvir*, because of the vocalism, must be explained as a borrowing from an Italic dialect, the *ā* in the Gk. cognate as an Attic development. (Gdr.I.182.) It is much more plausible to assume PIE /deXywer/. Skt. *devṛ́* would derive from this, with *-e-* from /$_{e}$Xy/ as in *dhenú* 'cow'. In Lat. forms the /y/ would have been lost, as in *rēs* < **rēis*. The Baltic and Slavic developments are as expected.

Even from /deXywer/ the Gmc. forms are difficult to explain; in forms examined above we have found that Gmc. *k* developed from contiguous *X* and *w*. I assume that the Gmc. forms, like many of the *r* and *n* stems, show analogical leveling. The Hittite cognate of *water* is nom. sg. *wa-a-tar*, gen. *ú-e-te-na-aš*, and presumably represents the original *r*:*n* variation. In Goth. *watō*, *watins* the *n* was generalized; in OE *wæter*, OHG *wazzer*, the *r*; in all Gmc. dialects the *a* vocalism was generalized. For PIE /deXywer/ I assume a variation: I. -$_{e}$*Xyw*- > *-aiw*-;

[9] WP 1.330 derive *hæccean* from IE *keg*-, apparently because of the difficulty of *w* > *k*.

II. *-eXyw-* > *-aXw-* > *-ak-*.[10] In Gmc. the vocalism of I was generalized, but *-k-* spread throughout the paradigm.

5.4f. OIcel. *spic*, OE *spic*, OHG *speck*, Skt. *pī́van*, *pī́varī*, Gk. *πῑ́ων* 'fat' are cognate with Skt. *sphāyate* 'grows fat', *sphīta* 'successful'; from these I assume a base /speXy-/. We cannot determine whether the Gmc. root vowel developed from PIE *e* or *i*. For the *k*, however, a development similar to that suggested for the *k* in *tācor* is probable.

5.4g. OIcel. *skeika* 'swerve' is a denominative weak verb derived from the root found in Gk. *σκαι[ϝ]ός*, Lat. *scaevus* 'left'. If we relate MHG *schiec*, *schief* 'crooked' we must assume PIE /skeXyw-/; (Gdr.I.207) the Gk. and Lat. adjectives developed from the unaccented root /skₑXywos/. The nominal form from which *skeika* was made is nowhere attested in Gmc., but a development in it of /Xw/ to *k* similar to that in *tācor* may be assumed.

5.4h. Several other words have been cited to illustrate the development of Gmc. *k* from PIE *w*. Austin suggested that OIcel. *leka* 'leak, trickle', OE *leccan*, Eng. *leach* 'wet', Eng. *latch* 'moisten' were related to Lat. *lāvit* 'washed', Hitt. *la-aḫ-ḫu-un* 'pour'. From the Hitt. form we may assume a PIE base /leXw-/.

5.4i. Austin also derives OIcel. *stakkr* 'pole', OE *staca*, Eng. *stack*, *stake* from PIE *steA-* 'stand' with *w*-determinative. The etymology is plausible, but uncertain, for *steA-* is enlarged by many other determinatives. The Gmc. words can be derived from such extended forms, as they have been in the past.

5.4j. Austin also suggested that OIcel. *maka*, OE *macian* 'make', OHG *maccian* 'join, fit together', OE *ʒemæcca* 'mate', Eng. *match* were cognate with Skt. *māti* 'measure', and Hitt. *me-ḫur* 'time'. He made no mention of the standard comparison with Gk. *μαγῆναι* 'knead, paint', OCS *mazati* 'smear'; (WP 2.226–7) the Gmc. verbs are assumed to have been generalized in meaning from a term used in building to other types of construction. Since Austin finds difficulty in ascribing the phonological development in Gmc. to the laryngeal that must be assumed from *me-ḫur*, I conclude that his etymology is less plausible than that usually given.

5.4k. Some linguists have derived OSwed. *knoka*, OE *cnucel*, MHG *knoche* 'bone' from Gmc. *knōw-*, but it is more probably connected with the root found in Lith. *gniáužiu* 'clench the hand'.

5.4l. Development of *w* to *g* and *k(k)* has been suggested for several other difficult words; among these is Germ. *spucken* 'spit', of which we have no record before the year 1716. I assume that such etymologies are no longer held, and that they do not need refutation.

Of the words examined I assume that OE *naca*, OHG *speichaltra*, *quec*, OE *hæccean*, *tācor*, *spic*, OIcel. *skeika*, *leka*, and possibly *stakkr* have *k*, *kk* from PIE *Xw*. Before *k*, *kk* are found the Gmc. accented vowels *a*, *ai*, *i*, *e*.

In all of these forms I assume that the original PGmc. development of *-Xw-*

[10] Our evidence is too small to permit accurate definition of the conditions under which resonants following a vowel and laryngeal (that is, final elements of long diphthongs) are lost. Brugmann, Gdr. I.203fn., suggests that they were lost when they stood last in the syllable.—For examples of such leveled forms in Gmc. see Streitberg, UG 291–2.

was *-kk-*. The *-kk-* was preserved only in forms with preceding short vowel, *quec*, *hacken*, and *speck*; after a long syllable *kk* became *k* in accordance with a regular PGmc. development. (See CGG 70–1.) The shortening of *kk* in OE *naca* and other WGmc. forms was apparently a later development, cf. OIcel. *nǫkkue*.

5.5. THE CONDITIONS UNDER WHICH THESE DEVELOPMENTS TOOK PLACE. The development to *g* in some words, to *k(k)* in others I tentatively ascribe to a difference of laryngeals. For some IE etyma the difference is obvious; OE *naca* and cognates point to an *a*-colored laryngeal, OIcel. *bryggia* to an *e*-colored laryngeal. There is no further evidence to identify the laryngeals, for we do not consistently find cognates in Hittite; moreover, full-grade forms of some of the words involved are not attested. Of the five words with *w* > *g*, *bryggia*, *iuʒuð*, and *muʒʒia* point to an *e*-colored laryngeal, *syʒel* to an *a*-colored laryngeal, and the laryngeal of *suʒu* cannot be identified. Of the nine words with *w* > *k*, *naca*, *hæccean*, *leka*, and *staca* point to an *a*-colored laryngeal, *speichaltra* and *spic* to an *e*-colored laryngeal, and the laryngeals of *cwic*, *tācor*, and *skeika* cannot be identified. Until we have further evidence from other IE dialects to distinguish the different laryngeals, explanation of development to *g* in some words, to *k(k)* in others, because of a difference in laryngeals can only be tentatively proposed.

The material presented in this chapter is further evidence that PIE laryngeals did not contract with vowels when in the neighborhood of /w/ and /y/. The assumption found in various handbooks that PIE /eXw/ became PIE long vowel plus *w* was based on the development of PIE /eXt/ to long vowel plus obstruent, and does not hold. We have already noted that laryngeals were preserved when following PIE [w] and [y], and when standing before [y], and that a lengthened resonant resulted in Gmc. Examination of the forms cited in this chapter shows that laryngeals were also preserved when standing before [w], and that in this position /g/ or /k(k)/ resulted.

6. LARYNGEALS IN THE NEIGHBORHOOD OF GMC. /r l m n/

6.1. GMC. REFLEXES OF PIE /r l m n/ AND LARYNGEALS. The Gmc. dialects, in contrast with all other IE dialects but Armenian, do not show a distinction between the reflexes of PIE [r̥] and [r̥X], [l̥] and [l̥X], [m̥] and [m̥X], [n̥] and [n̥X], or according to Brugmann's notation, *ṛ* and *r̥̄*, *ḷ* and *l̥̄*, *m̥* and *m̥̄*, *n̥* and *n̥̄*. In Gmc. the reflexes of the vocalic allophones of PIE /r l m n/ followed by laryngeals is the same as that of these allophones when they were not followed by laryngeals; compare Skt. *jātá* 'born', Goth. *aírþa-kunds* 'born on earth, earthly' PIE [gn̥Xt-], with Skt. *matá* 'thought', Goth. *gamunds* 'memory', PIE [mn̥t-]. In terms of the laryngeal theory we should say that the laryngeal in /gnXtó-/ was lost in Gmc. without effect on the [n̥], while in most of the other dialects it was lost with lengthening of the preceding resonant.

The Gmc. development of the vocalic allophones of PIE /r l m n/ before consonant, vowel, or laryngeal is: [r̥] Gmc. *ur* (*ru*), [l̥] Gmc. *ul* (*lu*), [m̥] Gmc. *um*, [n̥] Gmc. *un*; e.g. Goth. *paúrsus*, OIcel. *þorn*, OS *thorn* 'thorn', Skt. *tr̥ṇa* 'blade of grass'. The consonantal allophones of these resonants show up regularly in Gmc. as *r l m n*; e.g. Goth. *ráuþs*, OIcel. *rauðr*, OE *rēad* 'red', Lat. *ruber*.

But we find in some words in the Gmc. dialects resonant followed by a vowel where we should expect only a consonantal resonant. In most such forms the vowel is *u*; beside *u* occur also *i* and *a*. Examples are: OE *hærfest* < **harubist* 'harvest', cf. Skt. *kr̥ṇāti* 'harms'; OHG *birihha*, cf. Lith. *béržas* 'birch'. These forms have been noted, but no explanation has been given.[1] The unexpected vowel cannot be an excrescent (svarabhakti) vowel, because it causes umlaut, as in OE *hærfest*.[2] Nor can it be a reflex of PIE /$_e$X/ (ə); for we should then expect Gmc. *a*, which in these words is rarer than *u*. A reexamination of the material is needed in an endeavor to explain why such a vowel is found in a particular group of words and to seek an explanation for its origin.

6.2. WORDS IN WHICH VOWELS ARE FOUND AFTER GMC. /r l m n/. Five examples may be cited for such a vowel after *r*: OHG *birihha*, OE *hærfest*, OE *hærðan*, OHG *hiruz*, OHG *muruwi*.

OHG *birihha*, OIcel. *bjǫrk* 'birch' is cognate with Skt. *bhūrja* 'a kind of birch', Lith. *béržas* 'birch'. The Skt. and Lith. forms give evidence for a laryngeal after /r/. WP derive these words from PIE /bherX-g-/ (*bherēg-*).

OE *hærfest* (< **harubist*) 'autumn' is from the PIE root /(s)ker-/ 'cut', from which a great number of forms have developed. Another with *p* determinative is Gk. κρώπιον 'sickle'. Although WP refuse to admit that the ρω of κρώπιον developed from /rX/, there is ample evidence for laryngeal in many forms, e.g. Skt. *kr̥ṇāti* 'harms'. I therefore assume that OE *hærfest* developed from a form of this root with laryngeal suffix.

OE *hærðan* (< **haruþjan*) 'scrotum' is from the same extended form of this root but with *t* determinative.

[1] Schmidt, Vocal. II.373 (1875); Bezzenberger, BB 17.216 fn.2 (1891); Hirt, IF 7.194 (1897) and IG 2.118 and 194; Noreen, Abriss 87; Persson, Beitr. 685 fn.

[2] BB 17.216.

OHG *hiruz*, OE *heorot*, OIcel. *hjortr* 'deer' is derived from PIE /ker-/ which has many forms with laryngeal suffix, e.g. Gk. *κέρας* 'horn'; among these are forms with *w* determinative, such as Gk. *κεραός* 'horned', Welsh *carw* 'deer'. We may therefore assume PIE /ker-$_{e}$X-w-/.

OHG *muruwi*, *marawi*, OE *mearu* 'tender' are cognate with Skt. *mūrṇá* 'crushed'; this form and the Skt. verb *mṛṇā́ti* 'crushes' give us evidence to assume a base /mer-eX-/.

Three examples may be cited for such a vowel after *l*: OHG *halam*, OE *hælfter*, OHG *skiluf*.

OHG *halam* 'blade of grass' is cognate with Gk. *κάλαμος* 'reed' and Serbo-cr. *slȁma* 'straw' which gives evidence for laryngeal; WP suggest PIE /kol$_{e}$Xmo-s/ (*ḱoləmo-s*). In OHG *halm*, OIcel. *halmr*, OE *healm* the unaccented vowel was lost.

Unaccented *u* was preserved in OE *hælfter* (< **haluftri*) long enough to cause umlaut; we have no trace of it in OHG *halfter* 'bridle'. These nouns are derived from PIE /(s)kel-/ with *p* determinative. While most developments from this root give no evidence of laryngeal suffixes, the Lith. nouns *kálpa* 'crosspiece on a sled' and *kìlpa* 'stirrup' have the intonation of a laryngeal base. Since the evidence for laryngeal is so slight, we can only hesitantly suggest that the Gmc. nouns developed from PIE /kel-X-p-/.

Although there are no words in other IE dialects corresponding to OHG *skiluf*, *skilaf* 'reed', WP suggest a derivation from the same root with *b* determinative.

The unaccented vowel of Goth. *miluks*, OHG *miluk* 'milk' is said to be similar in origin. Since the original provenience of these words is disputed, we can draw no conclusions from them. (See WP 2.298–9.)

Two examples may be cited for such a vowel after *m*: OHG *demar*, *emiz*.

OHG *demar* 'dusk' is cognate with Skt. *támisrā*, *támas* 'darkness'. On the basis of these Skt. words and Lith. *témti* 'get dark' PIE /tem-X-/ may be assumed.

OHG *emiz*, *emazzi* 'constant, busy' is cognate with Skt. *amīti* 'oppresses', Gk. *ὀμοῖτος* 'oppressing'; WP assume a PIE base /om-eX-/ (*omō-*).

Two examples may be cited for such a vowel after *n*: OHG *anut*, OS *wanum*.

OHG *anut*, OS *anad*, OIcel. *ǫnd* 'duck' are cognate with Skt. *ātí* 'a water-bird', Gk. *νῆσσα* 'duck', Lith. *ántis* 'duck'. These are developments from PIE /anXti-/.

OS *wanum*, *wanam* 'splendid' are cognate with Skt. *vānā́* 'dear'; this and Skt. *vanóti* 'loves' are from PIE /wen-/ with laryngeal suffix.

The unaccented vowels of OHG *kranuh*, *kranih*, OE *cranoc* 'crane' are said to be similar in origin. WP 1.591–3 derive these words, like Gk. *γέρηνˑ*, OS *krano*, Lith. *gérvė* and other names for the crane, from the root /ger-/ 'cry hoarsely'. Since there are no words in other dialects corresponding exactly to *kranuh*, we can base on it no conclusions for the origin of the unaccented vowel.

6.3. THE CONDITIONS UNDER WHICH THESE DEVELOPMENTS TOOK PLACE. Those examples with *u* after resonants for which we have similar cognates in other IE dialects give us evidence for development from laryngeal bases. I assume that in these Gmc. words a reduced vowel was preserved between the resonant and laryngeal; in some forms the reduced vowel regularly became *u*; in others it was lost. Then the laryngeals disappeared. We do not have much evidence for this development, for, like svarabhakti vowels, *u* (*a i*) from PIE /$_{e}$/ was lost in most

words in the various Gmc. dialects; as a matter of fact our primary evidence for them in OE is modification of the preceding vowel.

There are some Gmc. words in which we might expect developments from /$_e$/ that show no trace of them. OHG *kerno*, OIcel. *kjarni*, like Lat. *grānum* 'corn', are *no*-formations based on a laryngeal base /ger-X-/. But there is no trace of such a reduced vowel in *kerno*. It may have been lost by analogy with the zero grade form OHG, OIcel. *korn*, in which /$_e$/ would have disappeared after PIE [r̥]. OHG *stirna* 'forehead' likewise shows no trace of /$_e$/ although it is a development from a laryngeal base /sterX-/, cf. Skt. *stṛṇā́ti* 'strews'. I assume that in these words the reduced vowel was lost before the time our forms were written, as in OHG *halm* beside *halam*.

Hirt finds difficulty in explaining why the 'middle vowel' was lost without a trace in Goth. *-kunds* 'born', OHG *korn* 'grain', etc.[3] These forms, however, are quite different in formation from those in which a reflex of /$_e$/ is preserved. In *-kunds*, *korn*, etc. the resonant was vocalic. In the forms listed above the resonant was consonantal. The reduced vowel /$_e$/ and the laryngeals were preserved only after the consonantal allophones of the resonants.

I conclude that in laryngeal bases /$_e$X/ did not develop to *a* after *r l m n* as it did elsewhere in Gmc., e.g. in Goth. *staþs*, Skt. *sthíti*, Gk. στάσις 'standing'; Goth. *raþjō*, Lat. *ratiō* 'reason', *rērī* 'believe'. In laryngeal bases on the other hand /$_e$X/ was maintained after /$_e$X/ elsewhere became *a*, and /X/ was then lost; finally /$_e$/ became Gmc. /u/, occasionally /i/ or /a/.

[3] IF 7.194–5.

7. THE OLD HIGH GERMAN *r*-PRETERITES

7.1. THE FORMS ATTESTED IN OUR DOCUMENTS. In the last three chapters I have cited forms which give evidence that laryngeals or their reflexes survived into Gmc. in the neighborhood of resonants. I shall now examine Gmc. forms, some of them from roots whose forms have already been discussed, that have preserved an unexplained *r* in some rare forms.

Preterite forms with *-r-* are found in OHG for *stōzan* 'push', *scrōtan* 'cut', *bluozan* 'offer', *būan* 'dwell', a preterite participle for *spīwan* 'spit', and a preterite participle as well as preterites for *scrīan* 'cry'. The forms are: *anasteroz* 3d sg. ind., *anasterozun* 3d pl. ind. (and the later glosses *steraz*, *stiriz*, *farsterc*), *kiscrerot* 3d sg. ind., *pleruzzun* 3d pl. ind., *capleruzzi* 3d sg. subj., *biruun* 3d pl. ind., *biruuuis* 2d sg. subj., *pespiren* pret. ptc., *scrirun* 3d pl. ind., *scriri* 2d sg. subj., and *erscrirena* pret. ptc.[1] The preterite forms made from the cognates of these verbs, when not weak, follow in the other Gmc. dialects the usual patterns of strong verbs belonging to classes VII, e.g. OS *stōtan*, *steot*, *steotun*, *gistōtan* 'push', and I, e.g. OS *stīgan*, *stēg*, *stigun*, *gistigan* 'climb'. In OHG we find in addition to the *r*-preterites, regular preterite forms, some of them weak, for these verbs. From the limited number of occurrences of *r*-preterites and their restriction in these verbs to one Gmc. dialect one can infer that they either were aberrant developments from regular patterns, or survivals from IE form categories that otherwise were lost in OHG. Although few *r*-preterites are attested, they are not limited to any single monastery, author, or scribe.

7.2. PROPOSED EXPLANATIONS. Two types of explanation have been suggested for the origin of the *r*: 1. that it is a phonetic development in OHG; 2. that it has survived from a tense formation that elsewhere in OHG has been lost.

The oldest explanation falls into the first classification. Lachmann suggested in his notes to the *Nibelungenlied* that the *r* was a hiatus-breaker; his explanation has been adopted by Müllenhoff, Weinhold, Zarncke, and Flasdieck.[2] Scholars who adopt it cite in support of it forms with epenthetic *r*; Zarncke, for example, cites from the Ludwigslied *wolar*, *abur* and also some German dialect forms where *r* is found internally in words: *rueri* 'peaceful' and *strārete* 'strewed'. Loewe objected to this explanation and his arguments are still pertinent: why is *r* found only in certain forms, and why was it introduced in a diphthong where

[1] J. Schatz, Althochdeutsche Grammatik, (Göttingen, 1927) lists the forms and gives references for them on pages 282 and 294; he also lists the regular preterite forms of these verbs. For the preterite forms of *spīwan* and *scrīan* that have survived into MHG, see H. Paul and E. Gierach, Mittelhochdeutsche Grammatik[14] 117 (Halle, 1944).

[2] K. Lachmann, Zu den Nibelungen und zur Klage, 66 (Berlin, 1836); K. Müllenhoff, Angebliche aoriste oder perfecta auf r im altnordischen und hochdeutschen, ZfdA 12.397–9 (1865); K. Weinhold, Alemannische Grammatik 167 (Berlin, 1863) (on page 326 Weinhold cites Bopp's explanation for *schriren*. Bopp in his Vergleichende Grammatik[3], I.36 (Berlin, 1867), assumed a general phonetic interchange between *iw* and *ir*); F. Zarncke, Zu den reduplizierenden Verben im Germanischen, Anglia 60.241–365 (1936), especially 279ff. and the references cited.

there is no hiatus?[3] Moreover, the forms cited in support of this theory are random examples that do not belong to one category, whereas the OHG preterite forms are part of one morphological system. One may readily find examples of intrusive sounds, such as the *r* of Eastern American English, but such sounds fall into specific phonetic patterns rather than morphological ones. If an intrusive *r* was used as a hiatus-breaker in OHG, as it is in Eastern American English, we should not expect to find it established only in strong verb preterites, but also in other forms with a similar succession of vowels. Although this explanation may be the best suggested—Flasdieck, op.cit. 275, arrives at it by eliminating other suggestions—it is very weak.

In other theories, various forms, later lost, have been cited as the origin of the *r*-preterite. Osthoff, Schmidt, Loewe, and Janko consider the *r*-preterites remnants of reduplicated perfect forms; *-spiren* is derived through various intermediary forms from **spe-spu-me*.[4] Among the weaknesses of this theory is the lack of reduplicated preterite forms in OHG; there is no evidence that any OHG verb forms developed from reduplicated forms like **spespume*. Moreover the dissimilations are unusual; Loewe posits a dissimilation of **stestaute* to **stesaute* and of **spespume* to **spesume*. In the Gmc. languages *st* and *sp* are treated as units, both in sound shifts and in alliterative verse; consequently dissimilation of *sp* to *s* is as little likely as dissimilation of *b* to *p*.

Knoblauch suggested origin for *scrirun* in an *s*-aorist; his suggestion has been adopted by Schmidt, Streitberg, and Brugmann.[5] His theory is very weak for we have no other evidence that an *s*-aorist was ever found in the Gmc. languages. Proponents of this explanation must further explain the *r* of the pret. ptc.; they may assume spread by analogy in the form *erscrirena*, but we have no evidence that *r*-preterites were made from *spīwan* from which the *r* may have spread to *pespiren*.

Feist suggested that the *r*-preterites started from forms like OIcel. **rōan* : *rerō*; on the pattern of this was formed *blōzan* : **bleroz*. Michels and Karstien have adopted his view.[6] But again the objection may be raised that the forms from which *r*-preterites are said to develop are not found in OHG.

None of the theories proposed, or combinations of theories,[7] can be considered

[3] R. Loewe, Das starke präteritum des Germanischen, KZ 40.266–351 (1907). See also J. Schmidt, Die germanische flexion des verbum substantivum und das hiatusfüllende *r* im hochdeutschen, KZ 25.592–600 (1881).

[4] H. Osthoff, Zur reduplicationslehre, PBB 8.540–67 (1882); J. Schmidt, Zur Geschichte des Indogermanischen Vocalismus II.429 (Weimar, 1875); Loewe, KZ 40.343–51; J. Janko, Über germanische ē² und die sog. reduplizierenden Praeterita, IF 20.229–316 (1906–7).

[5] K. von Knoblauch, Die germanischen perfecta auf r, KZ 1.573–6 (1852); J. Schmidt, KZ 25.598–600; Streitberg, Urgermanische Grammatik 281 (Heidelberg, 1896). K. Brugmann, KVG 541, lists under 'unsichere Reste des s-Aor.' *wissun* and *scrirun*; 596–8 he connects *scrirun* with the r-formations found in Indic and Italo-Celtic; I have found no scholar who has adopted this suggestion.

[6] S. Feist, Die sogenannten reduplicierenden Verba im Germanischen, PBB 32.447–516 (1907); V. Michels, Zur deutschen Akzentgeschichte, Germania 87–8 (Halle, 1925); C. Karstien, Die reduplizierten Perfekta des Nord- und Westgermanischen 153f. (Giessen, 1921).

[7] Schmidt, KZ 25.598f and Streitberg, UG 281, explain the first class forms as aorists and the seventh class forms as perfects.

satisfactory. Karstien characterized the problem as 'ein ganz unleidliches gebiet,' but favored Feist's theory. Hirt made no choice among the various theories.[8] It is obvious that no adequate explanation has been suggested.

7.3. THE TWO GROUPS OF *r*-PRETERITES. The *r*-preterites fall into two groups according to form: those with *-eru-*, or *u*-umlaut of *-e-* to *-i-*, e.g. *pleruzzun*, *biruun*; those with *-ir-*, e.g. *scrirun*. The differences in preterite formation agree with the difference in verb classes. Preterites with *-eru-* belong to seventh class verbs, those with *-ir-* to first class verbs. It is further noteworthy that the *r*-forms are found for seventh class verbs in the singular and plural, indicative and subjunctive of the preterite, but not in the preterite participle. For first class verbs they are found only in the plural indicative and in the subjunctive of the preterite, and in the preterite participle, that is, in those forms with zero grade of the root vocalism.

7.4. THE ORIGIN OF THE PRETERITE OF 7TH CLASS VERBS IN NWGMC. The origin of the preterite formation in NWGmc. of seventh class verbs is disputed; the ablaut grades found in these preterites have been the subject of much discussion. For although these preterites follow a definite pattern, this pattern is not found in other IE dialects. Its origin must be explained from evidence found in Gmc.

Two theories have been proposed: 1. that the seventh class preterites are from reduplicated forms like those of Gothic; 2. that they and the seventh class presents developed from forms with ablaut grades different from those of the first five classes.[9] According to the second theory the preterite forms of the seventh class verbs are based on forms with an ablaut grade contrasting with that of the present, which have also acquired a contrast in meaning. In formation then, the seventh class differs from the first five classes only in its development from an ablaut pattern that was less widespread than the /e : o : $_e$/ ablaut of the first five classes. This theory accounts both for forms and for the development of meaning. According to the elaboration of the theory which Prokosch presents, the contrast in meaning between present and preterite developed in ablauting forms contrasting between punctual and durative force.[10] The strength of the first theory lies in the presence in Gothic of reduplicated preterites for seventh class verbs; its weakness lies in the impossibility of suggesting a development in accordance with sound laws from such forms to the preterite forms that occur in NWGmc. Consequently I follow the theory in which the preterite is derived from contrasting ablaut forms.

Prokosch, CGG 175ff., suggests that the verbs belonging to class VII are made primarily from diphthongal heavy bases. For the present tense he posits the reduced grade in all Gmc. dialects, for the preterite in NWGmc. the normal long *e*-grade; e.g. the present tense of OHG *stōzan* is from Gmc. *staut-* which developed from PIE *stəud-*; the preterite tense from Gmc. *stēut-*, which developed from PIE *stēud-*. Under the terms of the laryngeal theory the alternance would be stated as between /st$_e$Xwd-/ and /steXwd-/.

[8] Karstien, Redup. Perf. 153; Hirt, HU 2.143.

[9] Flasdieck, Anglia 60, reviews in detail the theories and reexamines the data.

[10] Prokosch discusses the seventh class verbs CGG 144–6, 148–9, 176–82.—It has been suggested that a similar development from aspect to tense was involved in the development of the weak preterite, Language 19.25 (1943).

7.5. EVIDENCE FOR LARYNGEALS IN COGNATES OF *r*-PRETERITES. In chapters 4 to 6 we have noted that laryngeals, or reflexes of laryngeals, survived in Gmc. dialects long enough to produce modifications of sounds. According to Prokosch's theory, at least the four seventh class verbs with *r*-preterites developed from forms with laryngeals; examination of the *r*-preterite forms may disclose the treatment of these.

OHG *stōzan*, Goth. *stáutan*, OIcel. *stauta* 'push' are cognate with Skt. *tundate*, *tudáti*, Lat. *tundō* 'push'. Although WP assume an IE root *steu-*, this is not adequate on the basis of Prokosch's analysis of seventh class verbs. WP recognize as related forms OIcel. *stúta* 'wear down', *stútr* 'worn-down horn'; the *ū* in these forms would be best explained from the zero grade of /-eXw-/. Consequently Persson's suggestion, Beitr. 714 fn.1, that *steu-* is derived from *steA-* 'stand' is very plausible. WP object to Persson's suggestion on the dubious grounds that the meaning 'push, strike' is not to be derived from that of 'stand, be stiff, stand up stiffly', but are unable to separate the developments of their two roots. Since forms from the 'two roots' overlap, I consider WP's objection weak and derive OHG *stōzan* from the PIE root /steA-/ plus /w/ and /d/ determinatives.

OHG *scrōtan* 'cut', OE *scrēadian* 'cut off', OIcel. *hrjóþa* 'peel off' are from PIE /(s)ker-/ 'cut'. Assumption of a laryngeal base is supported by Lat. *scrūtor* 'examine' and OE *scrūd* 'dress' which point to zero grade of /-eXw-/. That the root /(s)ker-/ was extended by means of laryngeals is clear from Skt. *kṛṇāti* 'harms', which is derived from PIE /kr-n-eX-/. I assume that the Gmc. verbs developed from /(s)kr-eX-/ plus /w/ and /t/ determinatives.

OHG *bluozan* 'offer', Goth. *blōtan* 'honor', OIcel. *blóta*, OE *blōtan* 'offer' are related by WP to Lat. *flāmen* 'priest', and are therefore derived from /bhleAd-/. This derivation fails to account for the usual preterite forms, OHG *plioz* and OE *blēot*. To account for them we must assume, as did Prokosch CGG 182, that the preterite was made on the analogy of second class verbs. I assume that the preterite forms developed from /bhleA(w)d-/ which contrasted with /bhleAd-/ of the present.

OHG *būan*, OIcel. *búa*, OE *būan* 'dwell' are from PIE /bhewX-/. Cognates have been listed above, **4.41a.** The forms of this verb are not parallel to other seventh class verbs in the Gmc. dialects or in the PIE etyma. The PIE root was clearly /bhew-/, usually enlarged by a laryngeal to /bhewX-/; the pattern of other seventh class verbs is /eX/ plus resonant. The present tense vowel *ū* may be from the zero grade of /ewX/ as well as /eXw/. Except for the OHG *r*-preterites and OIcel. *bió* the preterite forms are weak, e.g. OE *būde*. Prokosch, CGG 182, finds that OIcel. *bió* is the regular *e*-grade to be expected in the preterite of seventh class verbs, and concludes that this verb, although having short *e* plus *w* in the normal grade, was shifted to the seventh class by analogy. We must find the origin for OHG *biru-* in such an analogical form. Although the IE cognates of *biruun* and *biruuuis* give us no evidence for assuming an etymon /bheXw-/, the presence of seventh class preterite forms indicate that such forms were made from this root.

All *r*-preterite forms made from seventh class verbs are found where we should expect an earlier sequence /-eXw-/; in three of the verbs this sequence was followed by an obstruent of the stem, in *būan* by the endings.

r-preterite forms of the first class verbs on the other hand are found where we expect zero grade of the root vocalism, that is, *i*. Both first class verbs with *r*-preterite forms developed from roots with laryngeals.

Cognates of *spīwan* give clear evidence for laryngeal, see above **5.4b.** In OHG, *spīwan* 'spit' is a regular first class strong verb with the principal parts *spīwan, spē, spiuun, gispiuuan.*[11] Since the PIE root differs from that of other first class verbs, these forms must have been made in Gmc. by analogy with other first class verbs. I follow Collitz' suggestion, Mod. Phil. 15.103ff., that *spīwan* < **spiXwan* became a first class strong verb when PIE *ei* became Gmc. *ī*; the other forms were then made on the pattern of first class verbs. I assume that *pespiren* on the other hand developed from a verbal adjective in *-no-* which was older than these analogical forms, /spiX(w)-e-no-/.

OHG *scrīan* 'cry' is a regular first class strong verb, with, apart from the *r*-preterite, one aberrant form, the preterite singular *screi*. The vocalism of *screi* can only be explained by assuming lengthened *i*; as has been indicated above, this developed from a form with laryngeal. The long *i* of Lat. *crīmen* supports derivation from a laryngeal base. Since *scrīan* is a first class verb, not a seventh class verb, I assume PIE /(s)kreyX-/. Moreover there are only zero grade forms giving evidence of a laryngeal; normal grade forms with a sequence /eXy/ are less likely to preserve evidence of laryngeal than are forms with a sequence /eyX/. I therefore derive *scrirun* from /skryX-/.

7.6. THE CONDITIONS UNDER WHICH *r* DEVELOPED. The sequence assumed here for seventh class verbs is PIE /eXw/ [eXu], for first class verbs /yX/ [iX]. I suggest that in these sequences the laryngeals were preserved, and that their reflexes fell into the OHG *r*-phoneme.

To support such an assumption we must find evidence for the preservation of the laryngeal, and for its representation as *r* in OHG.

We have already noted that Gmc. is remarkably conservative in the treatment of laryngeals when these were contiguous to resonants. The upper dialects of OHG give further evidence of such conservatism.

In Alemannic we find the forms *āmar* rather than *jāmar* 'suffering' and *enēr* rather than *jenēr* 'that one'.[12] On the other hand the initial *j* is preserved in *jesan* 'ferment', *jetan* 'uproot', and *jehan* 'say'. While the cognates of *jetan* and *jehan* have not been determined, it is clear that *(j)enēr* is cognate with Skt. *yás*, Gk. *ὅς*, *(j)āmar* with Gk. *ἤμερος* 'tame', but *jesan* with Gk. *ζέω* 'seethe'. We may also adduce OHG *joh* 'yoke', Gk. *ζυγόν* as further evidence for suggesting a correlation between Alemannic and Greek in the treatment of 'initial *y*.' Where *j*- was dropped in Alemannic we find a rough breathing in Greek; where it has remained, we find *ζ*. Sapir[13] has demonstrated that rough breathing in such Greek words corresponds to PIE [y] preceded by voiceless laryngeal. It seems

[11] Kögel discusses the various forms, PBB 9.535ff. There is also a MHG preterite 3d sg. *spei*, but this seems to be an analogical development on the pattern of *schrei* 'cried'.

[12] E. Sievers, Grammatische Miscellen. 5. Das pronomen jener, PBB 18.407–9 (1894); see also W. Braune, Althochdeutsche Grammatik, 5th ed. by K. Helm, 96, 241 (Halle, 1936)

[13] Language 14.248–78; see **10.3b.**

plausible to assume for Alemannic too that the initial sound of *(j)āmar* and *(j)enēr* had become voiceless after a voiceless laryngeal and was then lost.

We can only tentatively suggest reasons for the representation of the reflex of laryngeals as *r* in OHG. For as yet only general phonetic descriptions have been suggested for the laryngeals. Evidence in one Hittite text points to a phonetic similarity with *r*; in this text *waḫnu-* 'turn' is confused with *warnu-* 'burn'. Götze and Pedersen have concluded that the Hittite reflex of laryngeal in *waḫnu-* was pronounced like the Hittite *r* and they suggest that *ḫ* was a weakly articulated spirant; see above **3.7.**

We may note that OHG *scorra* 'crag', *scorrēn* 'jut out' has an inexplicable double *r*. WP derive these forms from the root from which *scrōtan* developed but are unable to account for the lengthened *r*. Since it is clear from Skt. *kṛṇāti* that the base is /skerX-/, *scorra* seems to provide further evidence for the development of the reflex of laryngeal to OHG *r*.

7.7. THE HISTORY OF THE *r*-PRETERITES AFTER OHG. It is difficult to say how wide-spread was the *r*-preterite formation in Gmc. The *r*-preterites did not fit into the regular patterns of the Gmc. verb and were eventually displaced by the regular forms. In *scrīan*, *spīwan*, *scrōtan*, and *stōzan* the strong preterite forms predominated; in *būan* and *bluozan* the weak. Very few *r*-preterites survived into OHG; some of these were obscure to the later scribes and were corrected to the regular forms. By MHG times traces of the formation were almost obliterated.

8. DEVELOPMENTS OF THE PIE RESONANT SYSTEM IN GMC

8.1. ASSUMPTION OF LARYNGEALS IMPERATIVE FOR THE IE FROM WHICH GMC. DEVELOPED. From the discussions in chapters 4 to 7 it is clear that the conventionally assumed PIE phonological system is incomplete as a source for the PGmc. phonological system. Most of the PGmc. developments have been explained on the basis of the conventional PIE system. But some wide-spread PGmc. developments remain obscure. To account for these I have assumed provisionally a modification of the PIE phonological system; the essence of this modification is the assumption of one or more laryngeals. With this assumption some unexplained phonological developments in PGmc. can be explained as developments from resonants and laryngeals; no other adequate explanation for them has been advanced.

The assumption of laryngeals or reflexes of laryngeals for conventional PIE is not essential because of the developments in any one dialect. Instead of revising the conventional PIE phonological system we may assume that the form of PIE from which PGmc. developed differed from conventional PIE; it may be an older stage of PIE than that from which PGk., PInd.-Ir., etc. developed. Neither alternative can be chosen on the basis of Gmc. evidence alone. Since our present Hittite material does not provide an answer, we can suggest one only by analyzing the reflexes of the laryngeals in other IE dialects and then reconstructing the phonological structure of PIE.

The investigations in chapters 4 to 7 were undertaken from the point of view of PGmc., with the assumption that at one stage of PIE the phonological system contained laryngeals. But I have not followed the current assumptions about the development of the laryngeals in the IE dialects. Those now held have been drawn largely from only a few IE dialects, especially (Vedic) Sanskrit and Greek, and from a preliminary, and consequently incomplete, investigation of these. One such is: (IHL 66) 'Any laryngeal after a full-grade vowel and before a nonsyllabic is lost in IE with lengthening of the preceding vowel.' If one accepted this as a description of the treatment of laryngeals in that stage of PIE from which PGmc. developed, one would have to derive OHG *nacho* 'boat' from PIE **nāw-*. No explanation for such a development has been given, and I fail to see any that might be at all plausible.

8.2. GMC. DEVELOPMENTS OF PIE /w y r l m n/ IN THE NEIGHBORHOOD OF LARYNGEALS. All of the Gmc. developments investigated above are found in the neighborhood of resonants. If for the time being, disregarding the current statements of IE phonology and of the laryngeal theory, we assume for PIE six resonants, each with three allophones, and two or more laryngeals, we can sum up as follows the PGmc. developments of: A. resonants; B. resonants in the neighborhood of laryngeals.

1. The vocalic allophones of resonants:

   A. PIE [i] and [u] remain; [r̥ l̥ m̥ n̥] become PGmc. *ur, ru ul, lu um un.*

   B. PIE [i] and [u] contracted with following or preceding laryngeals before

consonant to yield PGmc. *ī* and *ū*; laryngeals were lost between [ṛ ḷ ṃ ṇ] and consonant.

2. The consonantal allophones of resonants:

A. PIE [w y r l m n] remain.

B. Reflexes of laryngeals remain in the neighborhood of the consonantal allophones of resonants, and combine with them to undergo various developments:

a. [w], with preceding reflex of some laryngeals became PGmc. *g*, with preceding reflex of other laryngeals became PGmc. *k*(*k*) when standing before vowels.

b. [w], followed by reflex of laryngeal, is lengthened with loss of laryngeal, when between vowels.

c. [y], between vowels, is lengthened when reflex of laryngeals precedes or follows, with loss of laryngeal.

d. when a laryngeal stood between post-vocalic [r l m n] and consonant, /$_e$/ was preserved between [r l m n] and the laryngeal; /$_e$/ became Gmc. *u* after the laryngeal was lost.

3. There are relatively few examples in Gmc. of the third allophone of resonants; in Gmc. it developed to two phonemes, e.g. *-ij-*. I can cite no example of this allophone followed by laryngeals.

It is clear that the Gmc. developments can be explained more simply and completely if we assume that PGmc. developed from a form of PIE for which we assume six resonants and reflexes of two or more laryngeals.

8.3. FURTHER GMC. EVIDENCE IN SUPPORT OF THE ASSUMPTION THAT REFLEXES OF LARYNGEALS SURVIVED INTO PIE IN THE NEIGHBORHOOD OF /w y r l m n/. Such a system will also help us better to explain the rather unusual developments of *w* and also *j* than would assumption of a compound reflex, e.g. *hw*, *hj*, of laryngeal and resonant in PGmc. For in Gmc. we can find patterns of phonological development similar to those of [w] and [y] in the neighborhood of laryngeals.

A pattern had been established for the interchange of velar stop and *w* in Gmc. A number of Gmc. words show an interchange of a velar stop *g* and *w* which developed from PIE labio-velars. The interchange is ascribed to the following vowel: velar stop before back vowels, resonant before front vowels; the interchange later was regularized in favor of either form. (CGG 72–4.) Examples are: Goth. *magus*, OIcel, *mǫgr*, OE *mæʒ*, OS *mago*, OHG *maga* 'boy, son'; Goth. *mawi* OIcel. *mær*, OE *meowle* 'girl, maid'; Goth. *kneiwan*; OIcel. *kníga*, OE *knīʒan*, OS OHG *knīgan* 'bow'.

This interchange of velar stop and *w* shows a twofold possible development from PGmc. *gw*. If somewhat similar clusters consisting of reflex of laryngeals and *w* had been maintained in Gmc., some of these may have developed to velar stop, others to a resonant in accordance with the pattern already established.

Lengthening caused by a following consonant is rather prominent in the Gmc. dialects though not attested in PIE. Some PGmc. *pp tt kk* are commonly ascribed to development from a sequence of single stop followed by *n*, e.g. OIcel, *lokkr*, OE *loc*(*c*), OHG *loc* 'lock, curl'; compare OIcel. *lykna* 'bend'. Furthermore,

lengthening of consonants by a following consonant that later disappeared is very wide-spread in WGmc., though rare in NGmc. and not attested in Gothic. Therefore lengthening of *j* and *w* by a following reflex of laryngeal is quite in keeping with Gmc. developments.

It might not be wholly a matter of chance that lengthened *w* and *j* were preserved only in the WGmc. dialects, where lengthened consonants were relatively common. In OHG, for example, there are relatively many lengthened *w*'s, some caused by following reflex of laryngeal, others by following *j*. These cannot be distinguished from one another, either by the orthography or by the later development. OHG *tou*, Mod. Germ. *Tau* 'dew' shows the development of lengthened *w* which was caused by reflex of laryngeal; OHG *-auuia* (in the place-name *Illin-auuia*), Mod. Germ. *Au* 'meadow', the development of lengthened *w* caused by *j*.

We have evidence attesting development in Gmc. of *u* from PIE /ₒ/. (CGG 102.)

Evidence in support of the late preservation of laryngeals in Gmc. has been cited in chapter 7.

The Gmc. developments which I have ascribed to preservation of reflexes of laryngeals are therefore in keeping with other Gmc. developments. We have further evidence pointing to the preservation in Gmc. of reflexes of laryngeals in the treatment of the so-called long vocalic resonants. This evidence, although negative, is convincing when found in support of the evidence cited above.

The Gmc. dialects, in contrast with other IE dialects such as Indo-Iranian and Greek, do not maintain the usually assumed PIE distinction between the short vocalic resonants [r̥ l̥ m̥ n̥] and the so-called long vocalic resonants [r̥̄ l̥̄ m̥̄ n̥̄]. We find the same development of *n̥* in Goth. *-kunds* 'born', compare Skt. *jātá* and Gk. *γνητός* 'born', both of which attest 'long resonant,' as of *n̥* in Goth. *gamunds* 'memory,' compare Skt. *matá* 'thought', which attests short vocalic *n̥*. In terms of the laryngeal theory we should say that the laryngeal in PIE /gnXt-/, the etymon of Goth. *-kunds*, was lost in Gmc. without effect on the resonant, while in some IE dialects it was lost but caused lengthening of the resonant. I conclude that [r̥ l̥ m̥ n̥] had not contracted with laryngeals, or reflexes of laryngeals, at the time of PGmc., that is, that reflexes of laryngeals were separate phonemes there. Unless we draw this conclusion, we have to assume that IE short vocalic [r̥ l̥ m̥ n̥] contracted with laryngeals to yield long vocalic resonants, and that these failed to maintain a distinction which was preserved throughout the rest of the Gmc. vowel system, including the vocalic resonants *ī* and *ū*.

Since chapter 7 has given us evidence that under some circumstances even reflexes of laryngeals were preserved in OHG, we have positive evidence, as well as evidence drawn from phonological developments, that in certain environments reflexes of laryngeals survived into Gmc.

We must therefore revise the phonological system that is assumed to be the source of PGmc. Since we cannot decide on the basis of PGmc. whether our reconstructions of PIE will have to be revised, or whether we will have to assume that PGmc. developed from an early stage of PIE, we must examine developments in extra-Gmc. dialects to find an answer. Before undertaking such in-

vestigations I shall test the conclusions given, by reexamining on the basis of a form of pre-Gmc. with reflexes of laryngeals one of the unsolved problems of Gmc. vowel development.

The phonemic system of this stage of Gmc. comprises four short vowels *i e a u*, four long vowels *ī ē ō ū*, three diphthongs *ai eu au*, and the consonants *f þ x ƀ ð ȝ p t k s z h r l m n w j* X_1 X_2. At least the chief allophones of these phonemes except X_1 X_2 are known; they may be assumed to be like the sounds symbolized by these letters in the notation of the International Phonetic Association; the allophones of the laryngeals will be discussed later.

9. THE ORIGIN OF PGMC. LONG CLOSE *e*

9.1. THE FORMS IN WHICH LONG CLOSE *e* IS FOUND. From the evidence in the NWGmc. dialects it is generally assumed that the PGmc. phonological system contained two long *e* phonemes, one open, the other close. The type of articulation is clear from historical developments. Open long *ē*, also written *ǣ* in handbooks, developed to *ā* in NGmc., OS, OHG, and remained as *ǣ* in OE. Close long *ē*, usually written *ē*² in handbooks, remained except in OHG where it developed to a high front falling diphthong, *ea*, *ia*, *ie*. Gothic gives no evidence that there was a distinction between the two phonemes in EGmc.; in the Anglian dialect of OE too there is no evidence of a distinction between them.[1]

The source of Gmc. long open *ē* is clearly PIE *ē*; e.g. Goth. *mana-sēþs* 'mankind', OIcel. *sáð*, *OE sǣd*, OS *sād*, OHG *sāt* 'seed', Lat. *sēmen*, OCS *sěmę* 'seed'.

The origin of Gmc. long close *ē* has been the subject of much discussion.[2] IE cognates have been found for many of the Gmc. words with *ē*², and the origin of the *ē*² in such words apparently established. But no consistent pattern of origin has been found; some *ē*²'s are assumed to have developed from PIE *ēi*, others from PIE *ē* in certain verb categories, others from PIE [iz]. The problem of the origin of *ē*² is not so much a problem of determining its origin, but rather a problem of explaining how the various combinations in these IE etyma can have developed to one phoneme in Gmc.

It would be difficult to deny the interrelationship between OE *mēd* 'reward' and Gk. *μισθός* 'wages', especially since an OE form *meord* is attested. And the likelihood of finding in Germanic and Lithuanian two unrelated verbs so similar in form and meaning as OHG *liaz*, OE *lēt* 'left, let' and Lithuanian *léidžiu* 'let' is small. The origin of Gmc. *ē*² in words of each of these is undisputed. But the development of such different sound patterns to one Gmc. vowel has found no plausible explanation.

The words in which *ē*² occurs have often been listed, and divided into groups by origin:[3]

A. nouns and adjectives in which *ē*² comes from PIE *ēi*, e.g. OHG *fiara* 'side', Skt. *sphāra* 'spread out, wide';

B. the preterite forms of seventh class verbs with presents in

PGmc. *ai*, e.g. OHG *heizan* 'call'

PGmc. *al*, *an* plus consonant, e.g. OHG *haltan* 'hold'

PGmc., *ǣ* e.g. OHG *lāzan* 'let';

C. nouns with cognates showing [iz], e.g. OE *mēd*, OHG *miata* 'reward', Av. *miždəm*, Gk. *μισθός*, OCS *mьzda* 'reward';

[1] Kossinna, in Festgabe an Karl Weinhold, 37ff. (Leipzig, 1896), tried to distinguish the Gothic reflexes of PGmc. *ē*² and *ǣ*; for a refutation see Streitberg, GE⁶ 73. Streitberg, Germanisch 368, gives a bibliography of the work on the articulation of the two long *e* sounds, including earlier studies in which *ē*² was described as a relatively open vowel.

[2] The bibliography is enormous; it has been reviewed by Streitberg, Germanisch 367–9; see also Hirt, HU 1.33–5.

[3] Streitberg, UG 65–6; Hirt, HU 1.33.

D. some pronominal forms, e.g. (Goth) *hēr*, OIcel. *hér*, OE, OS *hēr*, OHG *hiar* 'here';

E. borrowed words with Latin *ē* or *e* in the root syllable, e.g. OE *bēte*, OHG *biaza* from Lat. *bēta* 'beet', OHG *fiebar* from Lat. *febris* 'fever'.

9.2. PROPOSED EXPLANATIONS. Of the attempted explanations only that suggested in 1891 by Jellinek has been widely accepted.[4] Jellinek limited his explanation to the words of group A, deriving the $\bar{e}^2$ of these words from PIE *ēi*. He did not relate this development to that of [iz] to $\bar{e}^2$. And he did not attempt to solve the origin of the $\bar{e}^2$ in the preterites of seventh class verbs. Therefore Jellinek's suggestion, even if valid for the small number of words in group A, is at best an incomplete answer to the problem. Moreover, Jellinek did not attempt further identification of the PIE source; for his suggestion was made before the IE ablaut relationships were explored and formulated. Thus he failed to specify whether all PIE *ēi*, or only original *ēi*, /eXy/, as opposed to lengthened grade *ēi*, became $\bar{e}^2$.

Hirt proposed as objection to Jellinek's suggestion, HU 1. 34, that PIE *ēi* should have already become *ē* in PIE, and that this *ē* should have become PGmc. *ǣ*, citing as evidence Goth. *lētan*, OHG *lāzan*, Lith. *léidžiu* 'let'. Hirt's argument cannot be upheld without analyzing the origin of the forms of the seventh class verbs in NWGmc.; he assumes tacitly that the NWGmc. present ablaut grade is that found in the Lithuanian present. But his objection indicates that Jellinek's theory must be refined or abandoned. The ablaut grade from which $\bar{e}^2$ originated must be determined. This entails an analysis of the origin of the various forms of seventh class verbs; for the forms of a sub-class of seventh class verbs contain in NWGmc. *ǣ*, e.g. the inf. OE *lætan*, OHG *lāzan*, and $\bar{e}^2$, e.g. the pret. 3d sg. OE *lēt*, OHG *liaz*. Phonetically, either of these may have developed from PIE *ēi*, the reflex of which is found in Lith. *léidžiu*. Only an analysis of the structure of seventh class verbs will permit us to answer this problem.

9.3. SUBSTANTIVES WITH LONG CLOSE *e*. Jellinek had already pointed out the presence of *ī* in cognates of words with $\bar{e}^2$. We should not expect to find *ī* if $\bar{e}^2$ had developed from lengthened grade forms of PIE *ei*. For IE *ī* developed from short *i* lengthened upon loss of a laryngeal; see above **3.6B**. Moreover, normal grade forms would be much more likely than lengthened grade forms in *o* stems like *schief* 'crooked'. Morphological evidence therefore points to derivation of words with $\bar{e}^2$ from the normal grade of 'original long diphthongs,' that is, in terms of the laryngeal theory, /eXy/.

When we examine cognates in other dialects we find evidence to support this deduction. Nine substantives are generally cited in group A: OHG *fiara* 'side', MHG *kriec* 'resistance', MHG *Kriemhilt*, a personal name, MHG *schief* 'crooked', OHG *skiaro* 'clear', OHG *stiega* 'path', OHG *wiara* 'gold wire', OE *Wēland*, a personal name, OHG *ziari* 'ornamental', to which possibly the name, *Friesen*, and *wiege* 'cradle' should be added. Although the etymologies of these have necessarily been doubtful, the following have been proposed.

9.3a. Uhlenbeck connected Goth. *fēra*, OHG *fiara* 'side' with Skt. *sphāra* 'spread out, wide'; he supported his suggestion by citing a similar semantic

[4] Germanisch $\bar{e}^2$, PBB 15.297–301.

relationship between OIcel. *síða*, OHG *sīta* 'side' and OIcel. *síðr* 'long, wide'.[5] Skt. *sphāra* is related to *sphāyate* 'becomes fat', *sphīta* 'wide', *sphāti* 'big, strong'. On the basis of these we may assume PIE /(s)peXy-rē-/ as origin for the Gmc. nouns.

9.3b. The first component in MHG *Kriem-hilt* is assumed to be the designation 'masked' which was applied to Odin; it is derived from an extended form of PIE /gher-/. We find the reduced grade of this extended form in Gk. *χρῑ́ω* 'anoint' and OIcel. *gríma* 'mask'; hence we may assume PIE /ghreXy-/.

9.3c. MHG *schief* 'crooked' is derived from PIE /skeX-y-/ with *bho* suffix. Cognates with different suffixes are Gk. *σκαιός* 'left' and OIcel. *skeika* 'swerve'.

9.3d. OHG *skēri*, *skiaro* 'clear, perspicacious' is a cognate of MIrish *scian* 'knife' and OIcel. *skeggia* 'ax', cf. **4.44h,** and like them is derived from PIE /(s)keXy-/.

9.3e. OHG *stiega* 'step' is generally connected with OHG *stīgan*, Skt. *stighnoti* 'ascends' and Gk. *στείχειν* 'stride'. These cognates point to an IE root with short *e*. If, however, Lat. *vestīgium* 'trace, step' is connected with OHG *stiega*, some forms of the root may have contained a laryngeal, among these the OHG noun; but our evidence for assuming /(s)teXygh-/ is small.

9.3f. OHG *wiara* 'gold wire' and OIcel. *vēl* 'artifice', OE *Wēland*, Germ. *Wieland*, name of a mythical blacksmith, are developments from a PIE root which WP 1.223–7 assume to be /wey-/. /wey-/, like /wer-/ /weg-/, etc. is derived by them from the root /Xew-/ (*au-*), 1.16–7. Since *seṭ*-formations are made from this root, e.g. Skt. *vāna* 'weaving', and the pret. ptc. *ūta* 'woven', we must assume forms of the root with laryngeal suffix, /Xw-eX-/. I suggest that the Gmc. forms with *y* determinative were made from this form of the root, for we find reduced grade forms with *ī*, e.g. OE *wīr* 'wire', OE *wīl* 'trick'. I thus assume PIE /weX-y-/ as the base from which *wiara* and *vēl* developed.

9.3g. OHG *ziari* 'ornamental' is derived from the PIE root found in Skt. *dádīdet* 'shone'; cognates with laryngeal suffix and *w* determinative are Skt. *dyaús*, Gk. *Ζεύς*. I assume that OHG *ziari* is derived from this root with laryngeal determinative, /dey-X-/, followed by an *r* suffix.

9.3h. Of the eight substantives discussed, six have cognates which require a reconstruction /-eXy-/, one, *stiega*, may be derived from /-eXy-/, and one, *ziari*, from /-eyX-/. The origin of OHG *chrēg* 'obstinance', MHG *kriec* 'resistance' and of the name *Friesen* is quite obscure. Evidence for the $\bar{e}^2$ in *wiege* is not found until MHG times; OHG texts have the form *wiga*. Various etymologies have been suggested. Kluge, Ety. Wb. 689, connects *wiege* with the verb *wegan* and leaves the phonological relation unexplained. *wiege* has also been connected with Lith. *vizgóti* 'waver'; according to this suggestion the $\bar{e}^2$ would have developed as did that of *mēd*. We cannot therefore draw any conclusions from *kriec*, *Friesen*, and *wiege*.

In all but one of the words in group A for which we know the IE cognates, $\bar{e}^2$ developed from a sequence, PIE consonant, *eXy*, plus consonant.

[5] PBB 30.275 (1905); cf. WP 2.656–9. WP 2.40 cite other suggestions, and question Uhlenbeck's etymology on the unconvincing grounds that movable *s* is missing in the Gmc. cognates.

9.4. SEVENTH CLASS VERBS WITH LONG CLOSE *e*. The origin of the $\bar{e}^2$ in the preterite of seventh class verbs is even more difficult to establish from cognates in other dialects. For very few direct parallels in other dialects have been found. Prokosch said, CGG 151, that 'of the diphthongal roots of this class . . . there is not one that has been explained with certainty.' He does not, however, suggest why they are so perplexing. If, like Prokosch, we analyze the seventh class verbs as 'heavy bases,' we note that they have few direct parallels in other dialects because they are made from abnormal root patterns.

Almost none of the seventh class verbs are, according to Benveniste's theory of the IE root, see above **2.3**, regular developments of PIE verbal roots. In accordance with Prokosch's suggestion that the normal grade of a 'heavy base' is found in the pret. 3d sg. we should derive OIcel. *hét* from PIE /keX-y-d-/; /keX-y-/ would be a normal form 1, but it could not be further enlarged. OIcel. *hlióp* is derived from a PIE root /kel-/, with *-eX-* suffix and *w* determinative; this is a possible form 2, but in *hliōp* it is further enlarged. According to Benveniste's theory, therefore, such verbs of the seventh class are not made from PIE verbal roots; we cannot then expect them to follow the patterns attested in verbal forms of other dialects; nor is the likelihood great that we shall find cognates of the same complex structure in other dialects.

Although we find few direct correspondences of seventh class verbs in other dialects, we may for many verbs cite cognates that give evidence of laryngeals, and thus uphold Prokosch's thesis that the seventh class verbs are from laryngeal (heavy) bases.

9.4a. The following are examples of seventh class verbs with a PGmc. stem vowel *ai* in the present:

OIcel. *meita*, OHG *meizan* 'cut' are developments of the root from which Gk. *σμίλη* 'knife', OIcel. *smíð* 'artistic work', OHG *smīda* 'metal' are made. We may assume a PIE root /meX-/, enlarged in these forms by a *y* determinative. The Gmc. preterites would have developed from an extended, and according to Benveniste's theory aberrant, form of this root, /meX-y-d/.

OE *scādan*, OHG *sceidan* 'separate' are extensions of the root from which OHG *skēri* and OIcel *skeggia* are made. The preterite forms would have developed from PIE /skeX-y-t-/.

OIcel. *sueipa* 'throw', OE *swāpan*, OHG *sweifan* 'swing, sweep' are derived from PIE /(s)weX-/ enlarged by *y* and *b*. MDu. *swāien* 'sway' shows the full grade without *b* enlargement; forms with different enlargements which show zero grade are Welsh *chwil* 'whirling' and MHG *swīmen* 'move back and forth'. The preterite forms would have developed from PIE /sweX-y-b-/.

OE *tǣsan*, OHG *zeisan* 'pull apart' are developments from the PIE root /deX-/ with *y* and *s* extensions. Skt. *dā́ti* 'separates' shows full grade of the root; zero grade of the root with *y* determinative is attested in Arm. *ti* and OIcel. *tíð* 'time'. The preterite forms would have developed from PIE /deX-y-s-/.

9.4b. We find even fewer cognates for verbs of the sub-class with Gmc. *al*, *an* in the present to support the suggestion that they developed from laryngeal bases.

OE *bannan*, OHG *bannan* 'command' are derived from PIE /bheX-/; the nor-

mal grade of this root is found in Dor. Gk. *φᾱμί* 'say' and in the nouns, Lat. *fāma* 'report', OIcel. *bón* 'request'. Like Skt. *bhánati* 'speaks' the Gmc. verbs are made from this root with *n* extension. The preterite forms would have developed from PIE /bheX-n-/.

OHG *spannan* 'stretch' is derived from PIE /(s)peX-/; cognates are Av. *spā-* 'cast off', Gk. *σπάω* 'draw', and with *y* determinative OIrish *séim* < *spḗimi* 'thin'. The Gmc. preterite would have developed from PIE /speX-n-/.

Besides deductions based on morphological analysis we therefore have evidence to assume for some of the verbs with $\bar{e}^2$ in the preterite a pattern of vowel, laryngeal, resonant. Not all verbs in these groups show such a pattern; either the previous analysis has been inadequate and they must be analyzed as have been those listed above before cognates in other dialects can be found, or the pattern of such verbs as those listed above spread to verbs with similar structure, and led to the establishment of the seventh class. The bases for these deductions are necessarily weak. For it was apparently one of the characteristics of Gmc. to expand greatly the number of verbs made with more than two extensions of the root. We can only deal with this development as a Gmc. innovation and attempt to analyze it in accordance with our analysis of other PIE and PGmc. roots.

9.4c. The third sub-class of seventh class verbs, those with $\bar{æ}$ in the present, offer an additional difficulty. Verbs of this sub-class differ from those of the two sub-classes mentioned above in having a present tense vocalism that did not develop from a weak grade. It is therefore necessary to determine the source of the present tense vowel $\bar{æ}$ as well as that of the preterite.

From cognates we know that some of the verbs in this sub-class developed from roots with PIE /-eXy-/.

Gothic *lētan*, OIcel. *láta*, OE *lǣtan*, OS *lātan*, OHG *lāzan*, like Lith. *léidžiu* 'let', are from PIE /leXyd-/.

OIcel. *ráða*, OE *rǣdan*, OS *rādan*, OHG *rātan* 'advise' are assumed to have developed from PIE /reXydh-/; OHG *reitun* 'advised', attested in the OHG of Otfrid, apparently is a reflex of the normal grade, Goth. *ga-ráidjan*, OIcel. *greiða*, MHG *gereiten* 'put in order, prepare' apparently are reflexes of the reduced grade. Most cognates in other dialects have not preserved evidence of *y* in the root, e.g. Skt. *rā́dhyati*, *rādhnóti* 'is successful', OIrish *rádid* 'says'. But we have sufficient evidence to assume PIE /reXydh-/.

According to the Brugmann-Wood theory the preterite forms of these verbs developed from the normal grade *-eXy-* (*ēi*); Prokosch here departs from the theory and assumes, CGG 182, that preterites of these verbs developed by analogy with first class verbs. It seems likely that the present forms in $\bar{æ}$ also developed from PIE *-eXy-* after IE loss of the /y/. If so, the divergent developments must be reconciled.

There is adequate material to show that such sequences, (original long diphthongs), may undergo one of two developments in PIE; the final element may or may not be lost, e.g. /eXy/ may become $\bar{e}$ or $\bar{e}i$. But the material is very small for determining the conditions under which the loss of /y/ occurred. The most likely suggestion is that of Brugmann; according to him, Gdr. I.1.203 fn., the loss depended on the position of the syllable boundary. If *ēi* stood at the end of a

syllable the *i* was lost, e.g. **lēi-dō* became **lēdō*; if a consonant followed in the syllable, the *i* was maintained, e.g. in **lēid-mi*, **lēits*.

If we assume PIE /eXy/, *ēi*, for the etyma of both the present and preterite stems of the verbs in sub-class 3, the differing vocalism in Gmc. would be in accordance with Brugmann's suggestion. For the PGmc. present indicative endings began with vowels; since the stems of all verbs in this sub-class end in one consonant, the /y/ would have been lost; PIE *ē* would regularly have developed to Gmc. *ǣ*. In the preterite on the other hand all endings but the 3d sing. began with a consonant; /eXy/ would therefore have been maintained in the preterite. The contrast between pres. *lǣt-* and pret. *lē²t-* was then a regular development from PIE consonant, *eXy*, plus consonant in this and similar verbs.

I conclude that in the second group of words with *ē²*, the preterite forms of three sub-classes of seventh class verbs, *ē²* developed from *e* and laryngeal before resonants.

As in the developments described in Holtzmann's Law and other Gmc. phonological developments, reflexes of laryngeals survived in the neighborhood of resonants also in the two groups of words discussed above. When they were lost, preceding *e* was lengthened. This *ē* was relatively high, and in most Gmc. dialects contrasted with the phoneme that had developed from PIE *ē*. *ē²* is thus the product of compensatory lengthening, similar to that in Skt. *nīḍá* 'nest' from PIE [nizdo-], and *mīḍhá* 'reward' from PIE [mizdho-].

In forms with *i* following the *ē²*, the *i* was normally lost (but survived in OHG *reitun*); other resonants and obstruents were preserved after *ē²*. The loss of *i* is not remarkable; for after a long high vowel it would virtually have been absorbed. We have ample evidence that *ē²* was a very high vowel; Sievers, PBB 1.505, has pointed out that the skalds rimed it with *i*; Kögel, IF 3.285–6, cited OS and OIcel. forms written with *i*, e.g. OS *hīr* 'here' beside *hēr*. And since *i* was lost in the present in verbs like *lētan*, became the second part of a diphthong in verbs like *áikan*, and was never found in the present of verbs like *haltan*, by analogical influence from the present the *i* of the preterite would have been lost rather than maintained.

9.5. Forms with long close *e* from [iz]. While these developments then are similar, that in the words in group C appear to be quite different. Words in group C have *ē²* in some forms, the regular developments of [iz] in others. The [z] of PIE [mizdh-], cf. Gk. *μισθός*, OCS *mьzda* 'reward' is preserved in Goth. *mizdō* and regularly became *r* in the OE hapax legomenon, *meord*; OE *mēd*, OS *mēda*, OHG *miata*, however, have lost the *z* with lengthening of the preceding vowel.

In chapter 7 we have seen that in some verb forms reflexes of laryngeals were preserved in PGmc. as continuants. If *ē²* developed from *e* plus reflex of laryngeal (written *Z* below), at some time in early Gmc. there were found side by side forms with a pattern: *leZd-* and *lē²d*. Besides these there were words of the pattern: *mizd-*; the allophone of /i/ before /z/ was apparently very low, see Twaddell, Language 24.147. The allophone of the /i/ in *mizd-* was then very similar to that of *leZd*. Thus on the pattern

leZd- : *lē²d*
mizd- : x

alternate forms with *mē²d* were made. As we might expect from such an analogical development, only a few such forms were made, and beside these survived the original forms. We find only those cited above, and OE *cēn*, OHG *kien* from **keznos*, cf. Russ. *sosná* 'pine' and MLG *hēde* beside OE *heorde*, MDu. *herde* 'tow'.

9.6. LONG CLOSE *e* IN BORROWINGS AND PRONOUNS. Gmc. *ē²* accordingly developed from Gmc. *e* which was lengthened when a following consonant, usually the reflex of a laryngeal, was lost. I assume that these were the primary sources of *ē²*, and that *ē²* did not develop in the two other categories of forms, D and E, until after the phoneme was established. After a contrast had been established between *ē²* and *ǣ* —after *ē²* had been established in the Gmc. phonological system as a comparatively high front vowel—other vowels coincided with this phoneme. Chief among these were high front vowels in the accented syllable of borrowings from Latin into Gmc. Such are: OHG *biaza*, OE *bēte*, Lat. *bēta* 'beet'; OHG *mias*, VLat. *mēsa* 'table'; OHG *riemo*, Lat. *rēmus* 'oar'; OHG *ziagal*, Lat. *tēgula* 'tile'; OHG *ziahha*, Lat. *thēca* 'case'; OHG *briaf*, Lat. *breve* 'letter'; OHG *fiebar*, Lat. *febris* 'fever'; OHG *priestar*, Lat. *presbyter* (OFrench *prestre*) 'priest'; OHG *spiagal*, Lat. *speculum* 'mirror'; and the proper names, OHG *Trier*, Lat. *Trevir*, OHG *Kriach*, Lat. *Graecus*, MHG *Riez*, Lat. *Raeti*.[6] It is noteworthy that Lat. *ē* in unaccented syllables was not reproduced in borrowed words as *ē²*, e.g. OHG *munizza*, OE *mynet*, Lat. *monēta* 'coin'; Gmc. *ē²* was apparently a member only of the phonological system of accented syllables.

ē² in the last group of words is found in pronominal forms: OHG (Tatian) *thie* 'he'; OHG (*h*)*wia* 'as'; OHG *hiar*, (Goth.) *hēr*, OIcel. *hér*, OE, OS *hēr* 'here'. Although attempts have been made to explain these as regular developments, see HU 33–5, our knowledge of the vowels in the PIE etyma of these pronouns, and of the development of final syllables in Gmc., is too inexact to permit us to consider these anything but secondary developments.

9.7. EXPLANATION BY MEANS OF THE LARYNGEAL THEORY. In this chapter I have attempted to show how we may provide a plausible explanation for the origin of *ē²* with a PGmc. phonological system containing reflexes of laryngeals. Some of our deductions must be based on morphological evidence. For we cannot expect handbooks which did not accept the laryngeal theory to provide us with evidence in its favor. If, as seems likely, the seventh class verbs developed from laryngeal bases, analyses of forms in other dialects with the help of the laryngeal theory may assist us in solving some of the phonological problems of words with *ē²* and in finding cognates for seventh class verbs for which no etymologies can be cited.

The simplicity of the explanation that can be offered for the origin of *ē²* with the help of the laryngeal theory is good evidence in its favor, as are the relic forms found occasionally in our old records. OHG *reitun* is a direct reflex of the normal grade form in the preterite. And I assume that *anagelierzon*, a preterite of *lāzan* recorded in an OHG gloss, has preserved in the *r* after the reflex of *ē²* evidence

[6] The source of the borrowing of OHG *Kriach* is disputed. Sievers, PBB 18.410, assumed that it was borrowed from Greek, with Γραικός becoming **krǣikaz* becoming **krēikaz* becoming *krēkaz*. Derivation from Latin, however, seems more plausible, cf. Hirt, HU 1.33.

for a consonantal increment in the stem; survival of such an *r* as reflex of a laryngeal would agree well with the evidence presented above.

The theory of the origin of $\bar{e}^2$ presented here is further evidence of the survival of reflexes of laryngeals into PGmc. in the neighborhood of resonants. Without investigations of phonological developments in other dialects we cannot determine whether such survival is peculiar to Gmc. In an attempt to answer this question, two crucial studies will be undertaken in the next two chapters.

10.1. DEVELOPMENT OF ζ FROM PIE 'INITIAL y-'. In the IE dialects except Greek, PIE initial *y* undergoes a consistent development to a palatal resonant. In Greek there is a sharp divergence of development; some *y*'s develop to an initial aspirate, e.g. ὅς, Skt. *yás* 'who'; ἥβη 'youth', Lith. *-jėgà* 'strength'; others to a dental affricate, e.g. ζωστός, Avestan *yāsta-* 'yoked'; ζειαί 'spelt', Lith. *javaĩ* 'grain'.

Many explanations have been suggested for the development in Greek. Until Sapir discussed the problem, however, no convincing evidence to support an explanation was found in any IE dialect other than Greek, and none of the explanations was generally accepted. Indo-Europeanists who explained the divergence in Greek as a purely Greek development looked for support for their theories in linguistic methodology rather than in supporting evidence in other IE dialects. That this was of little help in providing a solution is demonstrated by two explanations, each of which assumes the alternate development as the regular one. Pedersen assumed that all IE *y-* > *gy-* > ζ except in certain phonetic environments, Schwyzer that *y-* > ' as the normal development.[1] The various theories have been discussed in so many places that I shall sketch briefly only the important theories or those that still seem to be current. They may be listed in two groups: theories that consider the development of /y-/ to ζ and ' purely Greek developments, in section 2; theories that try to explain the Greek developments from phonetic differences in PIE, in section 3.

10.2. EXPLANATIONS OF ζ < y- AS A GK. DEVELOPMENT.

10.2a. Sommer succeeded in showing how little evidence there was for parallel developments in other IE dialects; but in suggesting an explanation he was able to present only a series of formulae, rather than a comprehensive theory.[2] In one of these he, as did Sapir later, drew a parallel between the development in Greek of PIE [y-] and [w-]. Sommer assumed a parallel between [w-] and [y-] in words with intervocalic *-s-*; when *-s-* was lost, [w-] and [y-] became aspirated, e.g.

ἐαρόν from *ϝεσαρόν ζέω from *ɟέσω
ζώννῡμι from *ɟώσνυμι.

Here, however, the parallel ceases; Sommer's proposed *ϝh* became *h*, but *i̯h hi̯* became ζ, whereas *i̯* became *h*. Another formula of Sommer's was that *i̯* became ζ before *υ* as in ζυγόν and ζύμη.

10.2b. Pedersen has discussed the subject in a number of articles.[3] In IF 22 he objected to Sommer's explanation for various reasons: 1. if ζ developed

[1] H. Pedersen, Das Pronomen YMEIΣ und das Idg. J. im Griechischen, Symbolae Philologicae. O. A. Danielsson. 262–8 (Uppsala, 1932). E. Schwyzer, Griechische Grammatik I.331. (München, 1939).

[2] F. Sommer, Griechische Lautstudien 139–45. (Strassburg, 1905).

[3] See fn. 1, and KZ 36.74–110 (1900), and Die idg. semitische Hypothese und die idg. Lautlehre, IF 22.341–65 (1907–8).

from *hi̯*, we shouldn't expect it to be voiced; 2. Sommer's analogies are not convincing; 3. *ὑσμίνη* does not conform with Sommer's rules.

He himself has proposed various explanations. In KZ 36 he considered *ζ* a purely Greek development. In IF 22 he proposed an explanation by means of lost pre-IE consonants, mentioning that Möller had considered the *y* of Skt. *yaúti*, cf. Gk. *ζεύγνῡμι*, Skt. *yámati* to be *ǵ*, an IES spirant. To my knowledge this is the first attempt at explanation by means of the lost pre-IE consonants. Pedersen did not expand his suggestion, and since he later proposed a different explanation apparently abandoned it.

In his last treatment of the problem, Symb. Phil., Pedersen assumes that every PIE *y-* became *gy-* became *ζ* except under certain circumstances. Pedersen tries unconvincingly to define these; even after he has made his explanation, he finds three difficult words. Besides, he gives no convincing argument for assuming a development of *y-* to *gy-*.

10.2c. Linguists who continue to suggest that *ζ* developed in neuter nouns because of wrong syllabic division[4] have not met the arguments that 1. the article *το(δ)* would have been only one of the forms of the article found before **ιγγον* and 2. that the masculine and feminine nouns as well as the verbs would be unaccounted for.

10.2d. Schwyzer, Gr. Gr. 331, suggested that *y-* normally developed to *'*; in some words, however, it was doubled in an effort to maintain it; double *y-* may have developed to *dy-*, this to *ζ*. To uphold Schwyzer's view one would have to establish that *y-* normally became *'*. Even if this were granted, the doubling of *y-* in random words seems unlikely.

10.3. Explanation of *ζ* < y- on the basis of PIE.

10.3a. Schulze was the first Indo-Europeanist to point out clearly the difficulty of the Greek developments.[5] The theory he suggested has probably been accepted more widely than any since proposed. He assumed two different sounds for PIE, one a palatal semi-vowel that became Gk. *'*, the other a palatal spirant that became Gk. *ζ*. Other Indo-Europeanists attempted to find evidence in other dialects in support of Schulze's assumption, but with such meager results that the evidence was otherwise explained and was thus unconvincing. In Skt. there is evidence for some kind of a difference; *yastá*, compare Gk. *ζεστός*, follows the pattern of *paktá*, compare Gk. *πεπτός*, differing from that of *iṣṭá* from *yájati*, compare Gk. *ἄζεται*, Gdr. I.793-4. In the Alemannic dialects of OHG are found the forms *enēr* and *āmar* which correspond to Gk. words with initial aspirates, while *y-* is preserved in words whose cognates have *ζ*, as *joch*, Gk. *ζυγόν*, cf. **7.6.** These supports for Schulze's theory have been rejected chiefly on a quantitative basis; the material in Skt. and Gmc., though meager, supports Schulze's assumption of different initial sounds; but the evidence cited from Armenian, Albanian, Celtic, and Slavic in favor of his assumption has been otherwise explained. (See Sommer, Gr. Lt. 139-45.)

[4] Proponents cited by Schwyzer, Gr. Gram. I.330. Finck, Initial Indo-European y in Greek, TAPA 68.120–2 (1937) suggests it again.

[5] G. Schulze, Über das Verhältnis des Z zu den entsprechenden Lauten der verwandten Sprachen. (Göttingen, 1867).

10.3b. Sapir, whose theory is supported more soundly than any other both with linguistic evidence and methodological arguments, suggested a solution based on PIE phonology revised in accordance with the laryngeal theory.[6] He accounts for the Gk. developments of PIE *y-* by assuming a persistence of a reflex of laryngeals before resonants in Gk. In contrast with Möller he assumes initial laryngeals for the words that show ' in Gk. Like Sommer he draws parallels between the development of initial *w* and *y*, but ascribes the development to different reasons from those suggested by Sommer. If one of the voiceless laryngeals stood before *w-*, Sapir assumed that *w-* became aspirated. When *w-* was lost in Gk., words which had a *ŵ* cluster before a vowel were left with initial ' and vowel, e.g. **Aawelk-* > **'welk-* > **'elk-*, cf. ἕλκω; words with simple initial *w* were left with initial vowel, e.g. **ϝοιδα* > *οἶδα*. Sapir assumed a similar development of voiceless laryngeal and *y-*; voiceless laryngeal and *y-* too resulted in an aspirated cluster and ' was left after the loss of *y-*, e.g. **ʔyós* > **'yós* > *ὅς*.

Here, however, the parallelism stops. Where initial clusters of *h* plus *w* and *h* plus *y* both developed to ', initial *w* became *ϝ* and was lost, initial *y* according to Sapir became *dz*. If we are to rely as heavily on linguistic method as did Sapir and as seems necessary to suggest explanations for phenomena for which we can cite so little linguistic evidence, we should expect a more rigorous parallelism. If the simple resonant *w-* were lost initially, we should expect a similar development of simple initial *y-*. For medially *y*, like *w*, is lost in Gk.

By a convincing argument Sapir supported his assumption of an initial laryngeal before *y-* in the PIE form of *ὅς*, Skt. *yás*; connecting them with Skt. *ayám* and Lat. *ea* he reconstructed PIE **ʔeya-* as the original form from which the various pronouns developed. If we accept parallelism between *ὅς*, *yás* and the other Gk. words which show ' for PIE *y-*, it is difficult to reject Sapir's theory accounting for the development of such Gk. '.

10.3c. Sapir assumed Gk. *ζ*, e.g. *ζωστός*, as the normal development of PIE *y-*. He made this assumption because he found no cognates for words beginning with *ζ* like *ea*, *ayám* for *yás*.

He also assumed that PIE *y-* became *ζ* on the grounds that in Gk. 'voiced continuants before vowels keep their voice.' This, however, is not true of the PIE phoneme which is most similar in function and development to *y*, that is, *w*.

Moreover, when we examine the other PIE sources of Gk. we find that they are clusters: 1. *dy-* as in *Ζεύς*, cf. Skt. *dyaús*; 2. *gy-*, as in **g^{w}yē-*, *ζῆν*; 3. *zd* medially, as in [ozdos], *ὄζος*. Except in a few proper names of uncertain origin, *ζ* makes position in Homer, as do similar clusters.

10.4. WORDS IN WHICH SUCH *ζ* IS FOUND. Although Sapir has provided a convincing explanation for the development of PIE *y-* to Gk. ', for the development of PIE *y-* to *ζ*, he has simply assumed a phonetic development in Gk., supporting his suggestion by referring to a somewhat similar development in Italian. Neither the linguistic nor the methodological arguments of Sapir seem adequate for his suggestion of the origin of *ζ*. An examination of the

[6] E. Sapir, Glottalized Continuants in Navaho, Nootka, and Kwakiutl, Language 14.248–78 (1938).

Gk. words and their cognates in which ζ corresponds to *y-* of other dialects points to the necessity of assuming an initial PIE cluster, not simply *y-*.

10.4a. For Gk. ζωστός 'girt', ζώννῡμι 'gird', ζωστήρ, ζώνη 'girdle' we find cognates in Av. *yāsta-* 'girt', Lith. *júostas* 'girt', *júosti* 'gird', OCS *pojasati* 'gird', and Albanian *n-ǧeš* 'gird'. Accepting Couvreur's suggestion, Hett. Ḫ. 197-8, that Luwian *ḫi-iš-ḫi-ya-an-ti* is related to Hitt. *iš-ḫi-ya-an-ti-iš* Sturtevant has connected Gk. ζωστός with Hitt. *iš-ḫa-a-i* 'bind';[7] he also cites the Hittite related words. Sturtevant reconstructs an IH root *γyoγz-* and explains from it the various Hittite developments; we find then for this group initial voiced laryngeal plus *y*. To be sure Sturtevant suggests a voiced laryngeal because the Gk. developments differ from those that Sapir assumed for voiceless laryngeal plus *y*; but he adds that the Hittite forms would not permit assumption of a voiceless laryngeal.

We thus have evidence from Hittite that one of the words in which PIE *y-* became Gk. ζ not only began with laryngeal but that the laryngeal was voiced. I assume for the ζ of ζωστός an origin parallel to that of Ζεύς and ζῆν; the ζ of ζωστός developed from *γy-*, that of Ζεύς from *dy-*, that of ζῆν from $g^{w}y$-.

10.4b. ζωστός is the only word with ζ- for which a known native Hittite cognate has been found. ζυγόν seems to have a cognate in Hittite *i-ú-ga-an* 'yoke'. But *i-ú-ga-an* has been assumed to be a loan-word from Indic; although other linguists consider it a native Hittite word, no evidence has been supplied to overthrow the thesis that it was borrowed.[8] In view of the numerous borrowings from Indic of terms relating to horses and to horsemanship, such an explanation seems likely. Until decisive arguments to the contrary are given, *i-ú-ga-an* cannot be used to determine Hittite developments.

ζυγόν has many cognates in other IE dialects: Lat. *iugum*, Goth. *juk*, Lith *jùngas*, OCS *igo*, and verbs, Skt. *yunákti*, Lat. *iungere*, Gk. ζεύγνῡμι 'yoke'. Evidence for assuming an initial laryngeal may be found in compounds or in sandhi phenomena, such as the lengthening of Vedic final short vowels in the first member of compounds when the second member begins with a laryngeal. We find such lengthening in compounds of Skt. *yuj-*: RV 3.11.6a *abhīyújas* 'assailant' is from *abhí* and *yuj-*; in RV 5.17.3b we find a long augment in *āyukta* 'endowed with'.[9] Since such lengthening does not enable us to determine the laryngeal in question, we cannot from the Vedic evidence reconstruct the initial cluster more precisely than *Xy-*.

10.4c. There is evidence for a similar compound of *yáva* 'grain', the Skt. cognate of ζειαί 'spelt'. Related are ζείδωρος 'producing pasture', φυσίζοος 'producing grain', Lith. *javaĩ* 'grain', and Irish *eorna* 'barley'. In two poems of the RV the meter requires *sūyavasa* 'abounding in grass'; the compound is from *su-* 'good' and *yáva*. I assume that *sū* in these forms retains the lengthening that resulted when it coalesced with initial laryngeal and I therefore reconstruct */Xyew-/*.

[7] IHL 51. Hendriksen, who assumes a root *seH(i)-*, finds the *ḫ* of *iš-ḫa-a-i* and other forms difficult to explain.

[8] A. Götze, IF 42.327ff. and Couvreur, Hett Ḫ. 250 and 325. Additional references are cited in Edgar H. Sturtevant, A Hittite Glossary 184 2d ed. (Philadelphia, 1936).

[9] Arnold, Vedic Meter 126ff.

Sommer, following Peppmüller, connected with ζειά a difficult Homeric word ἠΐα, ἦα 'chaff', the gen. pl. of which is found in ε368, ἤων.[10] Boisacq calls this connection improbable, but can cite in place of it only Thumb's connection of the word with the root *ĕs-* 'throw'. The semantic relation of Thumb's etymology is troublesome, especially when we find the meaning 'flour' for some occurrences of the word. One can assume that a word meaning 'chaff' may have developed from a meaning of 'that which is thrown (away)', but if ἠΐα also means 'flour' a connection with a word for 'grain' is much more plausible. The chief difficulty in relating the two words has been that of relating them phonologically. If we follow the procedure which Sapir used to indicate the relationship between Hitt. *ḫu-u-wa-an-te-eš* 'winds', Gk. ἄησι 'blows', and ἀΐνω 'I winnow' we can arrive at a plausible explanation of the relationship between ζειά and ἠΐα. Instead of the conventional IE root *wē-* Sapir set up an IE base **xawe'-* 'to blow'. This underwent a series of ablaut modifications and changes caused by loss of phonemes which Sapir indicated as follows: (Lang. 14. 270)

1.	*xawe'-	or *xəwe'-	: *xwe'-
2.	*hawe'-	(or *həwe'-)	: *hwe'-
3.	*hawe'-	(or *həwe'-)	: *ẇe'-
4.	*hawē-	(or *həwē-)	: *ẇē-
5.	*awē-	(or *əwē-)	: *ẇē-
6.	*awē-		: *hē-.

For ζειά, ἠΐα I assume an initial *γeye- : γye-*. From the first of these developed ἠΐα; the η is a Homeric development, beside which occur also εἰαί and εἶοι. From the second developed ζειά < *ζεεα, cf. ζεί-δωρος. This further evidence which we obtain from the clarification of the relation between ζειά and ἠΐα supports the conclusion that the root must be reconstructed with initial γ-.

10.4d. ζέω 'seethe' has cognates in Skt. *yásati*, *yásyati* 'seethes', and OHG *jesan* 'foam'. The pret. ptc. in Skt. is *yastá*, compare Gk. ζεστός; from *yájati*, compare Gk. ἄζεται, however, a Skt. pret. ptc. *iṣṭá* is found. When we compare Skt. *paktá* we infer that the initial of *yaktá*, like the initial *p-* of *paktá* could not become vocalized when the *e* of most *to*-forms was lost. I assume therefore that the initial was not simple *y-* but rather a cluster of laryngeal and *y*.

10.4e. Gk. ζῦμη 'dough' has cognates in Skt. *yūs*, Lat. *jūs* 'soup', Lith. *júšė* 'poor soup' and the verbs Skt. *yuvdti yaúti* 'mixes'. The root from which these are derived is identical with that of ζεύγνῡμι; I therefore explain both initials in the same way.

10.4f. The other Gk. words with initial ζ- from *y-* have so few cognates or are so unclear in etymology that we can derive no evidence from them. ζόρξ 'deer' has a cognate only in Welsh *iwrch*. ζημία 'difficulty' and ζῆλος have been 1. related to Skt. *yavan* 'aggressor', Slav. *jarъ* 'violent' and 2. derived from IE *dy-*, cf. δίζημαι. ζητέω 'seek' has been derived from **diā-teiō*, and by other Indo-Europeanists connected with Skt. *yátati* 'attack'. ζωρός, ζέφυρος, ζαρσῦν, and ζάψ are obscure in origin.

[10] Sommer, Gr. Lt. 154. Boisacq cites other references, Ety. Wb. 316 and 307.

10.5. ORIGIN OF SUCH ζ IN /γy-/. For the five groups of words with clearly identifiable cognates in other dialects I have found evidence for initial laryngeal: for *γy-* in ζωστός; for *γy-* or *ʔy-* in ζειαί. Cognates of ζυγόν, ζύμη, and ζέω give us no information to identify the laryngeal. But because Sapir has demonstrated that initial *Hy-* (voiceless laryngeal plus *y*) became Gk. ', I assume that the *X* of ζειαί was γ, and that the unidentified laryngeals were also γ. The positive evidence from the Hittite cognates and the negative evidence from Sapir's formulation support each other.

I conclude that the ζ in these words developed from PIE *γy-*. If we assume such a cluster, we find that there was complete parallelism in the development of Gk. ζ. Initial ζ, with the possible exception of the ζ in ζείναμεν, has its origin in three PIE clusters: *dy*, *gy*, *γy*, all of which are groups of voiced obstruent plus *y*.

This conclusion has been reached from an analysis of cognates of these words in Gk. and other dialects. It may be supported by metrical evidence. In verse ζ makes position in these and in most other words. Since clusters alone make position, analysis of ζ in ζυγόν etc. as a reflex of a cluster is much more probable than the assumption that it developed from a simple phoneme.

From the difference in development of PIE laryngeal plus *y* I assume that we have evidence for the survival into PGk. of voiced and voiceless (reflex of) laryngeals. Our Gk. evidence requires that we reconstruct with initial laryngeals PIE forms which formerly were reconstructed with initial *y-*.

11. THE INDO-IRANIAN VOICELESS ASPIRATES

11.1. EVIDENCE FOR THE ORIGIN OF THE VOICELESS ASPIRATES IN VOICELESS STOP PLUS LARYNGEAL. One of the most generally accepted supports for the laryngeal theory is the analysis of the Ind.-Ir. voiceless aspirates, *ph*, *th*, *kh*, as reflexes of voiceless stop plus laryngeal. This analysis was first made by Saussure. In a paper read in 1891 he suggested that the Ind.-Ir. voiceless aspirates, *ph*, *th*, *kh*, developed from PIE voiceless non-aspirates plus laryngeals, e.g. Skt. *pṛthú* 'large' from /pltXws/ [plṭXus]. The evidence has been reexamined and enlarged by Pedersen, Kurylowicz, Messing, and Sturtevant.[1] Especially Kurylowicz has provided phonological and morphological evidence in favor of this origin of the Ind.-Ir. voiceless aspirates.

The phonological evidence is found in words with *ph*, *th*, *kh* that have cognates in which the *ph*, *th*, *kh* is followed by an 'original long vowel.' Thus Gk. ἔστην is cognate with Skt. *tíṣṭhati*; both are from a PIE root /steA/, cf. Skt. Aor. 3d sg. *ásthāt* and pret. ptc. *sthitá*. The *th* presumably spread throughout all forms of the verb from those forms in which the root vowel was lost and the laryngeal stood directly after the stop, e.g. the 3d sg. /t_e-(s)tA-e-ty/.

As morphological evidence in favor of this explanation Kurylowicz pointed out that Skt. verbs of the ninth class whose root ends in a voiceless stop have an aspirated voiceless stop, never an unaspirated stop. The PIE base of verbs in this class ended in a laryngeal, e.g. Skt. *puṇâti* < /pw-n-eX-ty/. Skt. ninth class verbs with voiceless stop are: *mathnâti* 'shakes', *grathnâti* 'ties', and *śrathnīté* 'slackens'. Moreover suffixes with aspirated stop are found alongside suffixes with non-aspirated stop and long vowel, e.g. Skt. *-tā-*, *-tha-*; see further EI 46–50.

In support of the theory that voiceless aspirates developed from clusters of stop plus a consonant which has disappeared it has been observed that voiceless aspirates alternate with voiceless stops. Thus, beside Gk. πλάθανον 'dish', Skt. *pṛthú* 'broad', we find a voiceless stop τ rather than θ in Gk. πλατύς 'broad'. If voiceless aspirates had developed from one PIE phoneme, the irregularities like Gk. πλατύς are difficult to explain; if they developed from a cluster, which in some ablauting forms was separated by a vowel, e.g. /plteXw-/ : /pltXew-/, the reason for the interchange of stop and aspirate is apparent. Another such contrast is found in Av. nom. sg. *pantā* 'way', gen. sg. *paθō*, with *t* in the strong cases, *θ* in the weak. Aspirates would have developed only in the inflected forms in which the laryngeal was contiguous with the stop; they were generalized in one set of forms, lost in another.

[1] H. Pedersen, IF 5.49–51, 56, 64, KZ 40.178, has dealt with the Slavic reflexes of these clusters; he touches on the general subject briefly in La cinquième déclinaison latine 48. J. Kurylowicz, EI 46–55 and 254–5; Messing SSP 180–4; Sturtevant, IHL 83–5, Lang. 17.1–11 The Indo-European Voiceless Aspirates. See also J. Wackernagel, Altindische Grammatik 1.118–23 (1896).

Some Indo-Europeanists assume also a *k̂h* and *kʷh*, but the evidence for these is extremely meager. Apparently they were assumed in order to fill out the system. Since we have evidence for only one velar voiceless aspirate, I write only *kh*.

Another reason for assuming the secondary development of *ph, th, kh* is their limited occurrence. *ph, th, kh* are rare in Ind.-Ir.; moreover they are restricted to certain phonetic environments; none is found before *r*. Consequently there is strong evidence that *ph, th, kh* originated in *p, t, k* plus laryngeal.

11.2. THE PROBLEM OF THE TIME OF ORIGIN. The time of origin of the voiceless aspirates, however, is disputed. Kurylowicz considered them Ind.-Ir. developments. Sturtevant, like Brugmann, Hirt, and most other Indo-Europeanists since Grassmann, ascribes them to PIE and assumes a four-fold series of PIE stops: *p ph b bh*, etc., of which *ph, th, kh* (*k^wh*), have no distinct reflexes in any dialect but Ind.-Ir.

11.2a. Kurylowicz' chief arguments are methodological. He concluded from assimilation phenomena that in PIE there was no contrast of voicing between *bh dh gh*, and *p t k*, that is, that from the point of view of voicing *bh dh gh* were as neutral as the resonants. Thus, there are no PIE roots with /bh dh gh g^{w}h/ and /p t k k^w/ in either sequence; roots like *bhet, tebh* are not found. Furthermore, noting that PIE *bh dh gh* plus voiceless stop, e.g. *t* became *bdh, ddh, gdh* in PIE or early Ind.-Ir. (Bartholomae's Law), Kurylowicz argues against the assumption of a PIE four-stop system; if PIE had had a four-stop system Kurylowicz would expect Ind.-Ir. *pth* or *pht*, etc. At the time of the Ind.-Ir. dissimilation of aspirates, however, the contrast in voicing was established, as indicated by the dissimilation of PIE /bheudh-/ to Skt. *bódh-ati*. Kurylowicz concludes that only Ind.-Ir., not PIE, had a four-stop system. This argument is not wholly convincing. For we cannot formulate the allophones of phonemes solely from combinatory or assimilatory changes. Bartholomae's Law is a description of an assimilatory change, regressive in both voicing and aspiration. Nothing in the structure of the PIE phonemic system would lead us to expect a progressive assimilation, such as *pt* or some other cluster, possibly *pth* from *bh* plus *t*. In a similar morphological structure, /wyd-/ plus /-to-/, we find progressive assimilation, with a distinctive PIE cluster (/tt/ [tst]), see **2.1d.** From this cluster we can draw no conclusions about the allophones of PIE /d/ and /t/, except those in this particular cluster. Bartholomae's Law likewise gives us only an indication of the allophones of PIE /bh/ etc. and /t/ in a particular environment.

Kurylowicz is more convincing when he advances a reason for the development of PIE /pA tA kA/ to separate phonemes only in Indo-Iranian. Only in Ind.-Ir. did an allophone of one of the other obstruents develop with which /pA tA kA/ fell together. Siebs, KZ 37.293, suggested that in Ind.-Ir. /bh dh gh/ had an unvoiced allophone after /s/, [sp‘ st‘ sk‘]; in Greek, /bh dh gh/ on the other hand became *φ θ χ* after /s/ as well as in other phonetic environments. The Ind.-Ir. phonemes /ph th kh/ resulted from the coalescence of this allophone of /bh dh gh/ and the reflex of the cluster /pA tA kA/.

11.2b. Sturtevant has supported his contention that PIE had the phonemes *ph, th, kh* by suggesting reflexes of such phonemes in other IE dialects, especially Latin, which differ from those of *bh, dh, gh* or *p, t, k*. In some dialects no such differences can be found; thus in Gmc. our evidence points to the same development for /ph th kh/ and /p t k/; in Gk. /ph th kh/ fell together with /bh dh gh/. Sturtevant has published the developments of the hypothetical IE

ph th kh in the various dialects, and has added formulae for their development in Latin. In support of these formulae he has proposed new etymologies, connecting: Lat. *hāmus* 'fish-hook' with Gk. χαμός; Lat. *congius* with Skt. *śaṅkhá* 'shell'; Lat. *radius* 'spoke' with Lat. *rota* 'wheel', Skt. *rátha* 'chariot'; Lat. *-idus* with Skt. *-átha*; Lat. *vībrāre* 'vibrate' with Skt. *vyáthate* 'trembles'; Lat. *folium* 'leaf' with Skt. *phála* 'fruit'; Lat. *lambō* 'lick' with Gk. λαφύσσω 'devour'. Other etymologies, though possibly weak, had been proposed for these Latin words.[2] But even if those proposed by Sturtevant were as convincing as the etymologies in older works, it is difficult to establish phonetic formulae for such a small group of words as those in Latin with reflexes of 'voiceless aspirates.' Furthermore it need not follow that PIE had the phonemes, *ph th kh*, even though Sturtevant's etymologies are accepted. For the Latin and Armenian developments, and Slavic *x*, may as plausibly be derived from PIE clusters of voiceless stop /p t k/ plus laryngeal as from PIE voiceless aspirated stops, *ph th kh*.

Since we find unambiguous development of stop plus laryngeal only in Ind.-Ir., it is there that we will most probably find our best evidence for assuming the time of origin of *ph, th, kh*, whether IE or Ind.-Ir.

11.3. ORIGIN OF VOICELESS ASPIRATES IN INDO-IRANIAN. A test for the time of origin is the development of *kh* before Ind.-Ir. front vowels. In Ind.-Ir., velar stop phonemes were palatalized when they stood before reflexes of PIE /y ī e ē/, as illustrated in the examples cited below. In such environments there is, however, no evidence for palatalization of Skt. *kh*; Skt. *kh* is preserved both before Skt. *y* and before *a* from PIE /e/.

We find Skt. *kh* before *y* in *khyāti* 'sees' and other forms of the root *khyā-*; the desiderative, however, is *cikhyāsita*. Here the reduplicated syllable had lost aspiration and the *k* was palatalized to *c*, presumably as a later analogical development; for the perfect *cakhyau* there is likewise palatalization of *k*, but not of *kh*. Palatalization of *g-* from PIE /g^{w}-/, however, is found in *jyāsyati*, the future of *jyā-* 'overpower'.

Before *a* from PIE /e/ we find palatalization in *járati* 'wastes away' but not in *skhalati* 'stumbles'; in Skt. *dáhati*, Av. *dažaiti* 'burns' from PIE /dheg^{w}h-/ but not in Skt. *rikháti* 'scratches'; in the causative form of Skt. *arc-* 'shine' from PIE /erk-/, *arcayati*, but not in the causative of *īṅkh-* 'swing', *īṅkháyati*.

To be sure, we find palatalization in some Av. forms cognate with Skt. *sákhi* 'friend', if not in Skt. The Av. nom. sg. is *haxa*; *x* would be the regular development of Av. *k* before consonants, cf. *xrūrəm* 'bloody', Skt. *kravís*; I assume that *x* is thus the regular reflex of *k* before laryngeals. In the oblique cases the Av. forms are secondary, e.g. in the Inst. sg. *haša*; *š* is the regular development of palatalized *k* before *y, i*, cf. Av. *vašyate*: Skt. *ucyáte*; the laryngeal was apparently lost here and the *k* then palatalized.

I conclude from the absence of palatalization of /kh/ that /kh/ was not a Skt. phoneme at the time of secondary palatalization, and consequently not a phoneme in PIE. If /kh/ had been a PIE phoneme, it like PIE /gh/ should have developed to an Ind.-Ir. unit phoneme, and like /k g gh/ should have undergone secondary palatalization in Ind.-Ir. I assume that the other voiceless

[2] Messing discussed Sturtevant's etymologies at some length in SSP 180–4.

aspirated stops too became phonemes only after the time of secondary palatalization; since secondary palatalization is later than the time of the dissimilation described in Grassmann's Law, /ph th kh/ became phonemic relatively late in the Ind.-Ir. period.

The assumption that the laryngeals survived after stops in Ind.-Ir. may be supported by irregularities in the dissimilation of aspirates. By Bartholomae's Law the second of two contiguous stops is aspirated in composition of aspirated and unaspirated stop, e.g. *viddhá* from *vidh-to-*, *buddhá* from *bhudh-to-*, etc.; this change occurred very early, presumably in PIE. If the preceding syllable began with an aspirate, this aspiration is lost, as in *buddhá*; this change occurred in PInd.-Ir. Notable exceptions are *dhattá*, the 2d pl. imper. pres. of *dhā-* 'place', and other forms of this root, see Whitney 160. I assume that the process described in Bartholomae's Law was here inhibited by the laryngeal of the root; *dhatta* is from PIE /dhe-dh$_e$X-te/; the laryngeal survived here after the change described in Bartholomae's Law, /dhe-dhX-te/ and upon its loss the cluster developed to *tt*. In roots without such laryngeal, e.g. /bheudh-/, the change described in Bartholomae's Law was not checked.

The palatalization of Skt. /k/ likewise was prevented before laryngeals. The laryngeals here functioned as in Hittite, where they had prevented palatalization of /t/, cf. Hitt. *ti-it-ti-an-za* (**3.4**).

In the other IE dialects voiceless stop plus laryngeal failed to produce distinct phonemes. Although there is great variation in development, in general we may note that: in dialects which maintained PIE /bh dh gh g^{w}h/ as aspirates, e.g. Greek, or as spirants, e.g. Latin, clusters of voiceless stop, /p t k/, plus laryngeal fell together with reflexes of PIE /bh dh gh g^{w}h/; in dialects in which the reflexes of PIE /bh dh gh g^{w}h/ are not spirants or aspirates but rather voiced stops, e.g. Baltic, clusters of /p t k k^w/ plus laryngeal fell together with reflexes of PIE /p t k k^w/. Even in the latter dialects there is evidence for a persistence of a spirant increment; in the Gmc. dialects the reflexes of PIE /p t k k^w/, whether or not followed by laryngeal, are spirants; in Slavic, the reflex of the voiceless velar stop followed by laryngeal fell together with a spirant, *x*. From these developments I conclude that /p t k k^w/ plus reflexes of laryngeals survived into the various dialects as complex aspirated clusters.

11.4. VOICELESS ASPIRATES FROM VOICELESS STOPS PLUS PIE /h/. How many of the laryngeals combined with voiceless stops in such clusters has been disputed. Kurylowicz admitted such development only for /h/, Sturtevant for any of the voiceless laryngeals.[3] Yet most of Sturtevant's examples with identifiable laryngeals have /h/; his only example for /x/ is a new etymology, Lat. *mūtāre*, Skt. *methati*. Sturtevant further suggests that the Gk. aspirated perfects owe their aspiration in part to the 1st sg. ending *-xa*, IHL 84. This suggestion has not been widely accepted, see Lang. 19.166, SSP 200–2; and in deciding that /x/ had not caused aspiration, EI 254, Kurylowicz had pointed out that before the Skt. ending *-a* from *-xa* stops are not aspirated. Sturtevant's evidence for assuming aspiration before /?/ is similarly scanty. Unless more evidence is cited in favor of the development of voiceless aspirated stops from

[3] EI 254–5; Sturtevant, IHL 83–6, Lang. 17.1–11.

/p t k/ plus any voiceless laryngeal, I follow Kurylowicz' formulation that PIE /p t k/ combined only with /h/ to yield aspirated clusters which in Ind.-Ir. became separate phonemes.[4]

I assume then that the laryngeal /h/ survived into the dialects after the PIE voiceless stops. In all dialects but Ind.-Ir. the clusters of voiceless stops plus /h/ did not become phonemes; we have, however, in the patterns of development of these clusters in other dialects some evidence for PIE clusters with aspiration. These clusters became separate phonemes only in Ind.-Ir. presumably after merging with allophones of PIE /bh dh gh/. Phonological developments in Ind.-Ir., that is, the absence of palatalization of /kh/, and the variety of development of stop plus laryngeal clusters in other dialects support the conclusion that /ph th kh/ were phonemes only in Ind.-Ir., not PIE.

[4] If we admit aspiration only by /h/ Couvreur's objection to Kurylowicz' analysis of the *b* in Skt. *píbāti* 'drinks' is invalid. Kurylowicz, EI 54–5, ascribed the voicing of *b* to the presence of a following voiced laryngeal, /γ/. Couvreur, Hett. Ḫ. 300, finding that Kurylowicz had suggested /γ/ as a voiced counterpart of /x/, expected also an aspirated voiced stop in *píbāti*. If /x/ did not aspirate preceding voiceless stops, Couvreur's objection is of course invalid.

12.1. LARYNGEALS SURVIVED INTO PIE; THEIR DISTRIBUTION AND ALLOPHONES UNCLEAR. From the analyses of the phonological developments given above it is clear that in some phonetic surroundings laryngeals survived into PIE as independent phonemes. Only on such an assumption can we explain the differing reflexes of laryngeals which are found in various dialects; PGmc. has reflexes of laryngeals in the neighborhood of /y w r l m n/ but none in the neighborhood of /p t k k^w/. On the other hand PInd.-Ir. shows only slight traces of reflexes of laryngeals in the neighborhood of resonants, but has aspirated stop phonemes that developed from stop and laryngeal. One cannot account simply for this variety of development by assuming that laryngeals were lost in pre-IE but left as reflexes compound phonemes in PIE; by such an assumption PIE *ph th kh* would have survived only in a few dialects, PIE *hw* and *wh* in another. If we were to assume for PIE compound reflexes of laryngeals we would have to draw up complicated formulae of their development in the various dialects. It is more credible to assume laryngeals as independent PIE phonemes. In some phonetic surroundings they were already lost in PIE. In the phonetic environments in which they survived into the dialects their loss or survival varies from dialect to dialect.

Although the developments investigated above have established the necessity of assuming laryngeal phonemes for PIE, they do not enable us to determine their number, whether two or more, or their allophones, whether these had laryngeal articulation, or the occurrences of these in PIE. From the contrast in development of resonants in Gk. we need only assume two pre-Gk. phonemes, one voiceless, the other voiced; the Ind.-Ir. and Gmc. developments likewise require the assumption of no more than two phonemes in any of the environments examined. Whether more than two such phonemes are to be assumed for PIE can be determined only after examination of these and whatever other developments are ascribed to laryngeals.

Examination of the reflexes of laryngeals in PIE as well as in the dialects is necessary to determine their positions of occurrence in PIE, and their allophones in PIE and pre-IE. By PIE they had been lost in various environments, e.g. /te?t-/ had become /te·t-/; whether their allophones had been modified in the environments in which they had survived must also be determined.

12.2. REFLEXES OF SHORT VOWEL PLUS LARYNGEAL IN PIE. The most general reflexes of laryngeals in PIE are the 'original long vowels' and their unstressed forms, 'schwa indogermanicum.' Most of the commonly accepted evidence in favor of the laryngeal theory is based on these reflexes, as was noted in chapter 3. All long vowels which did not arise as a result of compensatory lengthening upon loss of a following vowel, that is, Dehnstufe,[1] or possibly sporadic rhythmic laws,[2] developed from short vowels lengthened upon loss of laryngeals.

[1] See Hirt IG 2.51–76 for examples and bibliography.

[2] No evidence for an origin in laryngeal, like that of Skt. *bhū́* < /bhewX-/, has been found for the long ū in Gk. *δρῦς*, *μῦς*, Skt. *srū́* 'stream'. F. Specht, Die Flexion der n-Stämme

The reconstructions of PIE long vowels and resonants have been based on various criteria: A. on the reflexes in the dialects; B. on the ablaut relationships; C. on the parallelism in PIE morphological classes. A. Since virtually all dialects have a long vowel in an adjective for 'alive', Skt. *jīvá*, Lat. *vīvus*, OCS *živъ*, a long *ī* has been reconstructed for PIE. B. Since the ablaut relationships of Gk. *ἰτός* : *εἶμι* 'I go' parallel those of *στατός* : Dor. Gk. *ἵστᾱμι* 'I stand', for which an 'original long vowel' is assured by comparison with Skt. *sthā-*, etc., we assume an 'original long vowel' also in the PIE etymon of Gk. *φατός* : *φᾱμί* 'I say'. C. Since the PIE normal grade vowel is preserved in the present sing. of athematic verbs, e.g. Gk. *εἰμί* 'I am', an 'original long vowel' is assumed for *τίθημι* 'I place', etc.

Brugmann and Indo-Europeanists who follow him have reconstructed for PIE nine long vowels: *ā ē ō ī ū r̥̄ l̥̄ m̥̄ n̥̄*. Evidence of all three types may be adduced for the first five of these; for *r̥̄ l̥̄ m̥̄ n̥̄* there are no similar reflexes in the dialects. Other Indo-Europeanists assume clusters rather than PIE *r̥̄ l̥̄ m̥̄ n̥̄*; thus Hirt reconstructs *irə, ilə, imə, inə*. In seeking an answer to this and other problems of the PIE long vowels one must rely on ablaut theory as well as on the laryngeal theory; both Brugmann's (Saussure's) reconstruction *r̥̄* and Hirt's *irə* were arrived at by analysis of ablaut relationships. The laryngeal theory provides us with new interpretations of pre-IE phonology; it does not modify the theory of ablaut. The theory of ablaut is an attempt to state the pre-IE phonological relations for all PIE phonemes other than the obstruents. Because the laryngeal theory provides new conjectures about pre-IE vowels and continuants, some provisions of the ablaut theory will be modified. Among these are the relationships between the stressed vowels [a· e· o·], and the vowels [i· u· r̥· l̥· m̥· n̥·] and *ə* which developed in unstressed syllables. Since most of these unstressed vowels have their origin in a short vowel plus laryngeal, we must further attempt to find any possible traces of a diversity of laryngeals in their reflexes. These vowels are examined below in three groups: A. the combinations of [r̥ l̥ m̥ n̥] with laryngeals; B. [i u] plus laryngeal; C. the weakened forms of PIE /e· a· o·/.

12.3. LARYNGEALS PRESERVED IN THE DIALECTS AFTER [r̥ l̥ m̥ n̥]. There is general agreement on the reflexes of the vocalic allophones of the PIE resonants; the following chart is a composite one based on various handbooks. It gives the chief developments of resonants, when vocalic, in the various dialects. The IE reconstructions are those of Brugmann.

IE	Skt.	Gk.	Ital.	Arm.	Celt.	PGmc.	OCS	Lith.
i	i	i	i	i	i, e	i, e	ĭ(ь)	i
ī	ī	ī	ī	i	í	ī	i	y
u	u	u, ou	u	u	u, o	u, o	ŭ(ъ)	u
ū	ū	ū, ou	ū	u	ú	ū	y	ū

im Baltisch-Slavischen und Verwandtes, KZ 59.213–98 (1931–2) ascribes the long ū to lengthening in monosyllables; see Excurs II Ein indogermanisches Dehnungsgesetz.

r̥ + C	r̥	ar, ra	or, ur	ar	ri	ur, ru	rĭ, rŭ	iř, uř
+ V	ir, ur	ar	ar	ar	ar	ur	ĭr, ŭr	ir, ur
r̥̄	ĭr, ŭr	rā, rō, ara	rā, ār, ara	ar	ar/rā?	ur	rĭ, rŭ	ìr, ùr
l̥ + C		al, la	ol, ul	al	li	ul, lu	lĭ, lŭ	iĺ, uĺ
+ V	see r	al	al	al	al	ul	ĭl, ŭl	il, ul
l̥̄		lā, lō, ala	lā, āl, ala	al	al/lā?	ul	lĭ, lŭ	ìl, ùl
					Irish			
m̥ + C	a	a	em, um	am	em	um	ę	iḿ, uḿ
+ V	am	am	am, em	am	am	um	ĭm, ŭm	im, um
m̥̄	ā, ām	mā, ama	ām, mā, ama	am	am/mā?	um	ę	ìm, ùm
					Irish			
n̥ + C	a	a	en, an	an	en	un	ę	iń, uń
+ V	an	an	en, an	an	an	un	ĭn, ŭn	in, un
n̥̄	ā	nā, ana	ān, nā, ana	an	an/nā?	un	ę	ìn, ùn

Examination of the reflexes shows that the evidence for assuming PIE /i· u·/ differs from that for assuming *r̥̄ l̥̄ m̥̄ n̥̄*. The parallelism between the reflexes of PIE /i· u·/ in the dialects leaves without question the assumption of these phonemes for PIE. The four other long vocalic resonants are posited by assumption of a complete parallelism between the vocalic resonants. Ablaut relationships supply the chief evidence. The PIE etymon of Skt. *jātá*, Gk. *γνητός* 'born' stands in the same ablaut relationship to /genX-/ as does the etymon of Skt. *bhūtá*, Gk. *φῡτός* to /bhewX-/. Since the accented bases are parallel in structure, it was assumed that the unaccented forms maintain the parallelism. Because there is pretty conclusive evidence for PIE /u·/, *r̥̄* was also reconstructed as a PIE phoneme. In adopting the four phonemes, PIE *r̥̄ l̥̄ m̥̄ n̥̄*, Brugmann, though somewhat tentatively, followed Saussure, Gdr. I.417–8; it should be noted that Brugmann assumed different reflexes of these phonemes from those assumed today.

Hirt preferred reconstructions which indicated the morphological relationships of the 'long resonants.' 'Long resonants' are found primarily in the unaccented forms of laryngeal bases, e.g. Skt. *jātá* beside *jánita*, *pūr̥ṇá* beside *prāti*. Since for Hirt the laryngeal bases were characterized by a final long vowel, not a laryngeal consonant, he reconstructed PIE *gənə*, as the unstressed form of *genē-*, and as the etymon of *jātá*. (IG 2.124–48.) For without the laryngeal theory *ə* was the only possible weakened form of long vowels.

The weakness of Hirt's reconstructions lies in the difficulty of accounting for their developments. By the usual laws Hirt's *ərə*, for example, should have developed to Skt. *ari*. Since instead it developed to *īr* and *ūr*, Hirt had to set up an additional phonetic law for the treatment of *ə* in combination with *r* and other resonants; the aberrant developments here Hirt ascribed to accent. (See BHL 14-5.)

Both Hirt's and Brugmann's reconstructions are unsatisfactory, Hirt's for its disregard of phonological developments, Brugmann's for its disregard of morphological relationships. With Brugmann's formulation we cannot account

for the prevocalic forms of the supposed 'long resonants,' e.g. Gk. aor. inf. *θαν-εῖν* 'die' beside *θνητός*; in both forms the root vocalism is the same. With the assumption of PIE /nX/, however, or even Hirt's *ιnə*, one can state that the /X/ was lost before vowels. (See IG 2.144-7.)

12.3a. With the laryngeal theory we analyze the *seṭ*-roots of the Skt. grammarians as laryngeal bases, not like Hirt, as heavy bases; we write them with final laryngeal rather than with final long vowel; instead of Hirt's *genē-* we reconstruct PIE /gen?-/. The unstressed form of this base, the form from which Skt. *jātá*, Gk. *γνητός* developed, was /gn?-/ [gn̥?-]. We cannot determine from the laryngeal theory, however, whether for PIE we should assume [n̥?] or [n̥·]. Our decision must be based on the reflexes in the dialects.

Only a few dialects have reflexes pointing to PIE long [r· l· m· n·]. In Armenian, Gmc., Baltic, Slavic, and possibly Celtic[3] the laryngeals were lost with no effect on the quantity of the preceding resonant. The difference in intonation in some Baltic and Slavic dialects is sometimes ascribed to a quantitative loss. The quantity is ascribed to an earlier syllabic loss. By the laryngeal theory we need only posit one stage instead of two, and this is a syllabic loss affecting intonation. The alternative theory, the assumption of PIE *r̄ l̄ m̄ n̄*, must hold that the laryngeals were lost in PIE with increase in quantity, that is, that pre-IE /rX/ [r̥X] became *r̄*, and that this quantity was in turn lost, that is, that *r̄* became *r*; this theory is needlessly complex. Only if the evidence from the other dialects were overwhelmingly in favor of long vocalic *r̄ l̄ m̄ n̄* would we need to assume two series of phonemic changes rather than one.

The chief evidence for the assumption of long vocalic resonants is found in Skt. and Gk. The development of these reflexes becomes clear when we compare them with reflexes of the short vocalic resonants. The reflexes of the short vocalic allophone of the resonants, e.g. [r̥], are twofold in many dialects; we find one reflex before consonants, e.g. Skt. *r*, another before vowels, e.g. Skt. *ir*, *ur*. Other dialects, notably those with only one development of vocalic resonant plus laryngeal, have only one development for short vocalic resonants, e.g. Arm. and Lith. I assume that such dialects preserved the original allophonic pattern; originally the vocalic allophone of resonants was limited to preconsonantal position. After this distribution was disturbed, further allophones developed in some dialects depending on the following phonemes, e.g. in Skt. I assume that one such reflex became generalized to the exclusion of others. The way to such generalization may be indicated by Gk.; here one reflex of [r̥] before consonant is the same as that before vowel, another different. One such development may have been generalized to the complete exclusion of the other.

Before laryngeals the reflexes of PIE [r̥ l̥ m̥ n̥] parallel those elsewhere. I assume that by interchange resulting from ablaut a weakened vowel was preserved before the laryngeal in some forms, e.g. /tr$_e$X-to-/, lost in others, e.g. /trX-tó-/. We should expect the Skt. reflexes of these to be lengthened forms of *tir-* and *tr̥*; since we find only the lengthened form of *tir-*, I assume that in Skt.

[3] The reflexes of the resonants followed by laryngeal are disputed in Celtic; see IG 2.133 and Lewis-Pedersen 4–8.—A. Vaillant has discussed the Lithuanian intonation in Le problème des intonations balto-slaves, BSL 37.112–4.

the pre-vocalic form was generalized before laryngeal. In OCS, on the other hand, we find before laryngeal *trĭ-*, the pre-consonantal reflex.

12.3b. Although only one reflex of vocalic resonant plus laryngeal is usually found, I assume that we still have evidence for a twofold development of [ṛ ḷ ṃ ṇ] before laryngeals, e.g. in the reflexes in Skt. of [ṃX].. Two reflexes are found in Skt. for [ṃX], the pre-consonantal reflex in Skt. *dāsá* 'slave', the pre-vocalic reflex in *dāntá* 'tamed'. Since the minority of forms has *ā*, I assume that the pre-vocalic forms here too were being generalized. For /nX/ the preconsonantal reflex has been completely generalized.

In Gk. too we find a twofold development of [ṛ ḷ ṃ ṇ] before laryngeal, to *ρᾱ, αρα λᾱ, αλα μᾱ, αμα νᾱ, ανα*; here both reflexes are maintained for all resonants. *ρω, λω* correspond to the pattern of *ρᾱ, λᾱ*; the difference in vowel-color will be discussed below. The reflexes *αρα, αλα, αμα, ανα* have been the subject of much discussion, see Gdr. I.418-9, IG 2.136-8; Buck, CGLG 113-7; the reason for the twofold development has apparently been obscured by later changes. For we find such twofold developments in words similar in morphological structure, and presumably similar too in phonological structure at an earlier time: *ανα* in *θάνατος* 'death', *νᾱ* in *θνητός* 'dead'. Although the original distribution can only be suggested, I assume from comparison with Skt. that Gk. *ρᾱ* etc. are the lengthened reflexes of [ṛ] to be expected before consonant, *αρα* etc. the lengthened reflexes of [ṛ] to be expected before vowel. I assume that /$_e$/ was found between resonant and laryngeal in forms where the immediately following syllable was not accented, e.g. Aeol. *εστοροται*, which would have had the accent on the augment, and **ἄθανατος, *ἄδαματος*, which would have had the accent on the negative prefix, see Whitney 1283.a. /$_e$/ was lost, however, when the following syllable was accented, e.g. *θνητός, στρωτός*.

After the Gk. accent replaced the PIE accent the pattern was broken; from compounds with an accent pattern like that of **ἄθανατος* were made forms like *θάνατος* 'death'. We may see in their accentual patterns an indication that *θάνατος, δάμασις* were secondary. *θάνατος* like *πότος* 'drink', OHG *mord* 'murder' has root accent; *θνητός* 'mortal', like *ποτός* 'drunk', Skt. *mṛtá* 'dead' has suffix accent; see IG 5.220-3 for further examples. Although we do not have such doublets for all *αρα* : *ρᾱ* words, I conclude from the conformity of *θνητός, δμητός* with the expected accentual and semantic pattern that they developed from the PIE *tó*-form with suffix accent and consequent loss of /$_e$/ before laryngeal.

With the assumption that laryngeals were preserved into PIE after [ṛ ḷ ṃ ṇ] and that [ṛ ḷ ṃ ṇ] developed regularly before them, we can account for most of the developments in the dialects, e.g. Skt. *īr, ūr* beside *ir, ur, ā* beside *a, ā, ām* beside *a, am*. Gk. *μᾱ* and *νᾱ* do not show the expected developments, that is, the lengthened form of the reflex of [ṃ] and [ṇ]; I assume that they continue lengthened forms of [ṃ] and [ṇ] older than is represented by *α*, the usual Gk. reflex of these. In Italic too some of the developments are lengthened forms of the short resonant; others are reflexes of forms that elsewhere were lost.

The wide variety of development of [ṛX ḷX ṃX ṇX] in the various dialects may be ascribed to the loss of /X/ in this environment only in the individual dialects.

The diversity of development in the individual dialects such as Gk., Ital., Celt., and even Skt. may be ascribed to the small number of words with vocalic allophone of resonant before laryngeal, and the lack of morphological patterning between them. Analogical regularization is hardly to be expected between words of such different morphological categories as *παλάμη*, *σφαραγέομαι*, and *θνητός*.

We cannot explain why in some dialects laryngeals were lost everywhere without compensatory lengthening, why in others they were lost without such lengthening only before vowels. Presumably in Skt., Gk., Lat., and Celt. the laryngeals were lost before consonants at a time when they still caused compensatory lengthening, as they had after [i] and [u]. Whether this lengthening was ever found in Armenian is unknown. In Baltic and Slavic the loss of laryngeals produced a modification in intonation. On the basis of the evidence of forms cited in chapter 7 I assume that in Gmc. the loss occurred at a period when there was no longer such compensatory lengthening.

12.4. [i· u·] FROM [i u] PLUS LARYNGEAL ALREADY IN PIE. The reflexes in the dialects lead us to conclude that [iX] [uX] before consonants had contracted to [i·] [u·] already in PIE. [i·] [u·] became phonemic in PIE, presumably upon loss of the following laryngeal. I assume further that this change in phonemic status was aided by coalescence with [u·], and possibly [i·], from other sources; thus Skt. *bhū-tá* developed from [bhuX-to-], Skt. *mū́ṣ* from [mŭs] by lengthening in monosyllables.

Before vowels, however, the laryngeals were lost after [i u] without lengthening. Reflexes of such prevocalic uncontracted forms are Skt. *ábhuvat* 'became' beside *bhūtá*, gen. sg. *dhiyás* or *-dhyás* beside nom. sg. *dhī́*. (See Whitney 352.b.) The allophones *iy*, *uw* developed originally in accordance with the provisions of Sievers' Law, as formulated by Edgerton; later they were generalized, with *y* as hiatus breaker.

Besides these uncontracted forms we find in Gk. nom. sg. forms of yā-stems ending in *-ια* after consonants, but in all the other dialects in *-ī*, e.g. Gk. *πότνια* 'lady' (*πόσις* 'master') but Skt. *pátnī* 'mistress' (*páti* 'master'); Gk. *πίειρα* < **πιϝειρυα* 'fat' but Skt. *pī́varī*; Gk. *ἰδνῖα* < **ϝιδνσ-yα* but Skt. *viduṣī́*. For others see Risch 124-9, and Buck, CGLG 178-9.

We find such uncontracted forms also medially in reflexes of a few laryngeal bases: *πρίαμαι* 'buy' but Skt. *krīṇā́ti*, *μετε-κίαθον* 'marched', *διερός* 'active', *κύαμος* 'bean', and possibly *κύανος* 'steel'. Hirt, IG 2.139, lists a few more doubtful words. Derivation from the contracted forms [i·] and [u·] is highly unlikely. The Gk. forms can be more credibly explained as reflexes of PIE forms in which vocalic resonants did not contract with a following laryngeal.

Such forms then are parallel to the *αρα-* forms, as Pedersen, Cinq. 33, pointed out. As in the *αρα*-forms a vowel was preserved between the resonant and the laryngeal, presumably when the stress did not fall on the syllable immediately preceding the laryngeal. The form of the resonant in Gk. supports the assumption of such vowel survival. In *πίειρα*, for example, the allophone of /y/ must have been consonantal, an allophone which was possible here only if a vowel followed /y/. The uncontracted form of the nom. survived only in Gk.; in the

other dialects long *-ī* was generalized by analogy with the oblique cases. Gk. thus illustrated the pattern of yā-stems before contraction. We have ample evidence for assuming a feminine/collective noun ending *-h*, IHL 44. I assume that the stem is preserved in a few Homeric vocative forms, e.g. *πότνι*, which are often assumed to have an elided final vowel.

The presence in Gk. of such uncontracted forms does not contradict the assumption that /i·/ and /u·/ were phonemic in PIE. Gk. merely preserved and generalized some infrequent case forms.

12.5. [e· a· o·] ALSO PIE. THEIR UNACCENTED FORMS. For /e· a· o·/ there is no evidence of uncontracted forms. None of the dialects have reflexes of /eX/ corresponding to those in Gk. of /y_eX/ or those of /r_eX/. I assume therefore that /e?/, /eA/, and /eγ/ had already contracted in PIE; the resulting /e· a· o·/ fell together with /e· a· o·/ which had been lengthened in Dehnstufe. Hirt gives numerous examples, IG 2.36-51. The Lithuanian reflexes /ů/ and /o/ of PIE /o·/ are dialect developments and do not give us evidence for assuming two long /o·/ phonemes; see Meillet, Introduction 103–4.

The long PIE vowels then point to a gradual loss of laryngeals, varying according to phonetic environment. They were lost earliest between /e a o/ and consonant. The resulting long vowels became phonemes, falling together with the /e· a· o·/ that had developed in Dehnstufe.[4] The raising of [i·] and [u·] to phonemic status was apparently also aided by the prior presence of long [i·] and [u·]. But there were no previous long [r̥ l̥ m̥ n̥] in PIE with which the short vocalic resonants might have fallen together; after [r̥ l̥ m̥ n̥] laryngeals were lost in the individual dialects leaving the reflexes listed in the chart given **12.3.**

12.5a. Although there is general acceptance of /e· a· o·/ as PIE phonemes, the unaccented form of these is disputed. Most Indo-Europeanists assume one unaccented form, *ə*. By a less widely held theory there were three unaccented vowels corresponding to the three long vowels. Proponents of the schwa theory, *ə*, base their arguments on the presence in most dialects, and in most unstressed forms, of one reflex, *i* in the Ind-Ir. dialects, *a* elsewhere. Proponents of three unaccented vowels point to *e* and *o* which are found as reflexes of PIE unstressed vowels, especially in Gk. Proponents of the schwa theory have been unable to explain these *e* and *o* vowels except by recourse to analogy, a method which is not particularly credible for words for which no source of the analogical vowel can be discovered. On the other hand the assumption of three vowels seems unnecessarily complicated because most dialects have a uniform reflex of the three hypothetical vowels.

With the laryngeal theory this complication can be avoided. It is a statement of the ablaut theory that the unstressed vowels assumed for PIE developed

[4] Kurylowicz suggested in 1937, Mélanges de Linguistique et de Philologie offerts à Jacques van Ginneken . . . 199–206 (Paris, 1937) that *ā* and *ō* cannot be assumed for PIE because laryngeals survived into the dialects. I cannot subscribe to this suggestion. I assume that laryngeals survived into PIE in some phonetic environments and were lost in others with compensatory lengthening. The status of laryngeals in PIE may be compared with that of *r* in modern British English. In pre-modern British English *r* is attested before and after vowels; in modern British English *r* has been lost after vowels with compensatory lengthening, but its status elsewhere is unchanged.

from full vowels. Although formerly, original long vowels of various colors were assumed, it is now clear that this diversity of 'original long vowels' is a result of contraction with laryngeals. Since we do not assume three different 'original long vowel phonemes,' but rather a diversity of laryngeals, we no longer assume three different unaccented vowels, but rather one /$_e$/. Laryngeals were found in the neighborhood of /$_e$/ as well as in the neighborhood of /e/. Unless we favor the schwa theory, in place of the unstressed *e a o* we assume /$_e$/ preceded or followed by laryngeals. Under the hypothesis of pre-IE laryngeals the problem of the unstressed variants of /e· a· o·/ is resolved to the question whether or not /$_e$/ had contracted with neighboring laryngeals in PIE.

This problem can be solved only from examination of the reflexes in the dialects. The threefold reflexes in Gk. are inexplicable by the schwa theory. Yet the schwa theory has not been discarded, for the weighty evidence against it is taken primarily from one dialect. If, however, material from other dialects could be assembled that would point to PIE /$_e$X/ rather than PIE *ə*, the schwa theory would lack conviction. I shall therefore list the various forms and morphological categories in which Gk. shows vowels other than *a* for the unstressed forms of PIE /e· a· o·/ and then attempt to find similar distinct reflexes in other dialects.

12.5b. The usual forms in Gk. that are cited in favor of three unstressed vowels are *στατός*, cf. *ἵστᾱμι* 'I stand', *θετός*, cf. *τίθημι* 'I put', *δοτός*, cf. *δίδωμι* 'I give'; for others see IG 2.34-5, 119-21, Gdr. I.174-5, Introduction 154ff. Proponents of the schwa theory explain the *ε*, *α*, *ο* of the unaccented syllables as analogical vowels from those of the accented syllables. Such an explanation can apply only for words beside which are found such accented forms. These are not always attested, e.g. no long *e* is found beside *ἄνεμος* 'wind', no long *o* beside *ἀρόω* 'I plough'.

Other forms with *e* where an unaccented vowel is expected are so wide-spread that the *e* has been explained as an aberrant PIE /e/ : Gk. *γενετήρ* 'progenitor', Skt. *jánitṛ*, Osc. *Genetaí*, Welsh *cenedl*; Gk. *φέρετρον* 'barrow'; Lat. *tenebrae* 'darkness'. Brugmann even suggested that the *e* in the second syllable of *ἄνεμος* 'wind' is a reflex of PIE /e/, Gdr. I.486. Such an explanation of the *e* in these forms is possible, but not plausible; for beside all of these forms with aberrant *e*, we find forms attesting an *e*-colored laryngeal. And when an *o* rather than an *e* is found one cannot assume that this is a reflex of an original accented vowel. Thus a series of Gk. aorist forms, e.g. *ἔθορον*, cf. *θρώσκω*, is wholly inexplicable to proponents of PIE *ə*. If with the laryngeal theory these forms, as well as the 'regular' forms could be explained, the schwa theory might be abandoned. For the laryngeal theory offers a simpler explanation than the alternative possible before the development of the laryngeal theory, that is, the assumption of three unaccented vowels. This assumption, as Lommel pointed out KZ 59.195, would merely push back the problem from the dialects into PIE.

12.5c. In chapter 2 I assumed that by ablaut there was only one unaccented variant of /e/; this I have written /$_e$/. The *ə* of Indo-Europeanists who hold the schwa theory is reconstructed where /$_e$/ stood before laryngeals. According to the laryngeal theory this unaccented vowel may have been influenced or colored by a neighboring laryngeal. All proponents of the laryngeal theory admit the

possibility of such coloring for /h/ and /x/; the evidence is so extensive that further proof is unnecessary. Examples are: Lat. *stāre* from /stah-/ from /steh-/ and Lat. *status* from /st$_e$h/; Lat. *pāscō* 'feed' from /pexs-/, cf. Hitt. *pa-aḫ-ḫa-aš-mi*, and Gk. *ἄπαστος* 'without provision' from /p$_e$xs-/. On the other hand no such change is found in vowels standing beside a third laryngeal, e.g. OLat. *coēpī* 'I began' from /e?p-/, perf. ptc. *coeptus* from /$_e$?p-/. The effect of a fourth laryngeal on contiguous vowels is disputed. Some proponents of the laryngeal theory have assumed that this laryngeal, /γ/, too, changed the timbre of neighboring vowels, so that [γe] became [γo], [eγ] became [ō]. Others, e.g. Sturtevant, have assumed that /γ/ did not change the color of a neighboring /e/ or /$_e$/. Sturtevant must therefore assume that many forms of the root *dō-*, from /deγ-/ 'give', e.g. Lat. *dōnum*, Gk. *δίδωμι*, have *o*-vowels by analogy, and that the expected vowel is found in Lat. 2d sg. pres. *dās*, IHL 43. Since *δίδωμι* is parallel in formation to *εἶμι*, *τίθημι*, *ἵστᾱμι*, assumption of analogy is somewhat difficult to uphold. Analogical *ā* in the 2d sg., however, is readily understandable, as are the *a*-vowels in other forms of the root. Indo-Europeanists who hold that /γ/ changed neighboring vowels from *e* to *o*, on the other hand, must explain /γ/ found contiguous with *e* in words like Skt. *mā́ti* 'measures', Hitt. *me-ḫur* 'occasion', and cognates. In sum, we find forms which show coloring of contiguous *e*-vowels to *a*-vowels; other forms show no change of color of a neighboring laryngeal. A third group have *o*-vowels, but beside these also *e* and *a*-vowels. In all three groups there were later analogical changes. The essential point of dispute among Indo-Europeanists centers about the question of deciding which forms are regular developments, which are analogical, and of developing the simplest theory to explain the relationships.

12.5d. The commonly assumed reflex of PIE *ə* in Gk. is *α*, as in the first syllable of *πάτηρ* 'father', cf. Skt. *pitā́*. Reflexes that differ from this are found in the following categories:

A. Gk. sigmatic aorists, e.g. *ἐδάμασα*, *ἐκόρεσα*, *ὤμοσα*.

B. laryngeal bases as the first component in compounds, e.g. *γέλασμα*, *γενέτειρα*, *ὄνομα*.

C. beside uncontracted forms of unaccented laryngeal bases with *α*, e.g. Gk. *πρίαμαι*, we find two forms with *ε*, *διερός*, *δίεμαι*.

In addition we find unexpected vowel color *o* in some laryngeal bases. Such are the *o* in aorists, beside *ρω*, *λω* in other forms of the verbs. Examples are:

ἔμολον, *μέμβλωκα*, *βλώσκω* 'come'

ἔπορον, *πέπρωται* 'it has been fated'

ἔθορον, *θρώσκω* 'spring'

ἔτορον, *τρώω*, *τιτρώσκω* 'wound'

ὀλόμην, *ὄλλῡμι* 'destroy'

ἐστόρεα, *στρωτός* 'spread'.

A. For most laryngeal bases we find in the *s*-aorist a weakened form of the base ending in *α*, e.g. *ἐδάμασα* 'tamed'. (Schwyzer, Gr. Gr. 752.) For many of these there are cognates giving evidence for an *a*-colored laryngeal; cognate with *ἐδάμασα* are Lat. *domāre* and OHG *zamōn*.

Beside these, however, are found seven aorists with *ε*: *ἐκάλεσα*, *ἐκόρεσα*, *ἐλόεσα*,

ἐστόρεσα, ἤμεσα, ἤνεσα, ὤλεσα. For some of these, we have evidence of an *e*-colored laryngeal in the base: Gk. καλήτωρ beside ἐκάλεσα, Lat. *crēscō* 'grow' beside ἐκόρεσα. WP find evidence for such a base also beside ἤμεσα, 1.262-3, and ἐστόρεσα, 2.638-40. Cognates of the three other aorists give us no evidence to assume an *e*-colored laryngeal.

There are two aorists with *o*-vowel; for one of these, ὤμοσα, WP 1.178-9 assume a root *omō*; for the other, ἤροσα, they assume a root *arā-*, 1.78-9. Assumption of a final *ā*, however, is not without dispute; Persson, Beitr. 669, had assumed Gk. ἀρο- to be a reflex of the PIE form, but WP consider it analogical.

B. We also find such threefold development of vowels in the form of laryngeal bases found in word compounds. Beside the usual α found in γέλασμα 'laughter', παν-δαμάτωρ 'all-conquering one' we find ε in ἄνεμος, ὠλε-σίκαρπος, ἀρετή, ναέτωρ, γενέτειρα, βέλεμνον, and ο in ὄνομα and ἐνοσίχθων, see Specht, KZ 59.83-9. Again we find beside these, cognates pointing to a laryngeal in the base; Lat. *reor*, *rērī* 'consider' point to an *e*-colored laryngeal beside ἀρετή, Lat. *nō-men* to an *o*-colored laryngeal beside ὄνομα.

C. For the two compounds with unaccented ε, δίεμαι and διερός, WP 1.775 assume spread of ε by analogy; but again this assumption is apparently based on the supposition that only α should be found in such an environment.

D. Aorists made from laryngeal bases generally have α in the root, which here was unaccented, e.g. ἔβαλον, cf. βέλεμνα, βλῆτο; ἔθανον, cf. τέθνηκα, θάνατος, etc. Some aorist forms, however, have ο; these have been listed above. Beside most of these are found forms with long ō. Such long ō vowels, which are reflexes of resonant plus laryngeal, are also found in:

κνώδαλον 'wild animal' cf. Lith. *kándu* 'bite'
μῶλος 'exertion' cf. ἀμαλός 'weak'
βιβρώσκω 'eat' beside βορά 'food'
τετρώκοντα 'forty' beside τέτορες 'four'.

Such reflexes of resonant plus laryngeal, in which α plus resonant would be the normal development, are found also in a number of Gk. substantives: (Schwyzer 363)

ὀρθός 'straight' cf. Skt. *ūrdhvá* 'high'
ὀργή 'temper' cf. Skt. *ūrjá* 'strength'
κόρδᾱξ 'a dance' cf. Skt. *kūrdati* 'jumps'
κοῦρος < *κόρϝος 'boy' cf. Lith. *šérti* 'feed'
οὖλος 'crooked' cf. Skt. *ūrṇā*, Lat. *lāna* 'wool'
κονι-ορτός 'dust stirred up' cf. Skt. *īrṇa* 'stirred up'
κόρση 'side of head' cf. Skt. *śīrṣá* 'head'
ἀμόργη 'mush' cf. Lat. *marceō* 'be limp'.

I assume that when vowels other than *a* are found in the neighborhood of unstressed resonants that the vowel color is a result of assimilation to the articulation of a neighboring phoneme. In some forms, e.g. μόλειν, the laryngeal was lost before lengthening the reflex of the resonant; in others e.g. βλώσκω, it changed both the color and the quantity of the vowel resulting from the preceding resonant.

12.5e. Assumption of such an influence of neighboring laryngeals may be

supported by the Skt. development of [ṛ] in the neighborhood of laryngeals. [ṛx] may develop either to *ūr* or *īr*. Only *ūr* is found after labials, including *v*, cf. Wackernagel, Aind. Gr. I.28. After other consonants and initially *īr* is usually found. In some forms, however, only *ūr* is attested after consonants other than labials; Wackernagel, Aind. Gr. I.28 lists thirteen such forms. Most of these have a labial elsewhere in the base, e.g. *kūrpara*, *kūrmá*. In *kūrdati* 'leaps' which is cognate with Gk. *κόρδαξ* 'dance' there is a development of back vowels in both languages, but we have no evidence for a labial in the base. A similar correlation of back vowels is found in Gk. *ὀρθός*, Skt. *ūrdhvá* (with labial, to be sure), *ὀργή*, *ūrja*, *οὖλος*, *ū́rṇā*. Since the vowel color in Skt. of [ṛ] plus [X] was influenced by surrounding phonemes, I assume that here too the color was so determined. The only phoneme with such possible effect was the laryngeal.

I assume that in forms with preceding consonant other than labial the possible development was not fixed; [ṛX] developed either to *īr* or *ūr* in the same root, e.g. *śīrtá* and *śūrtá* from *śṛ-* 'break'. This pattern had an analogical effect also on reflexes of [ṛγ]; cognate with Gk. *κόρση* we find Skt. *śīrṣá*. But because of the presence of back vowel in Gk. and Skt. in most words with a sequence of [ṛ] plus /γ/ I assume that the resulting vowel is a back vowel because of the laryngeal.

Such influence of a neighboring laryngeal was not restricted to reflexes of PIE [ṛ]. A relatively great number of Gk. forms have been cited above to show such influence also on reflexes of /ₑ/. I thus assume for PIE rather than *ə* a sequence of unaccented vowel plus laryngeal, /ₑx ₑh ₑʔ ₑγ/. We have further evidence to support this assumption.

12.5f. Before *i*, the Ind.-Ir. reflex of these sequences, there was secondary palatalization of velars. Wackernagel, Aind. Gr. I.142, cites the isolated word *duhitṛ* 'daughter' in support of the statement that such palatalization did not spread analogically from related forms in which the velar consonant stood before /e eˑ y iˑ/. Two Vedic words, however, have an unpalatalized velar before *i*, *okivas* from *uc(i)-* 'be pleased' and *tigitá* 'sharp', cf. *téjate* 'is sharp'. On the basis of these forms Wackernagel states that *i*, when a reflex of PIE /ₑ/ plus laryngeal, cannot have had a consistent *i*-color. With the laryngeal theory we can explain the reason for such lack of consistency. We have evidence in Gk. concerning the color of the laryngeal in *okivas*, but not for that in *tigitá*. A cognate of *uc(i)-* is Gk. *ἔκηλος*, Pind. *ἔκᾱλος* and *εὔκηλος* 'in undisturbed comfort'. We may therefore assume a laryngeal of *a*-color, /wek-A-/. Thus these two forms, as well as forms like *-tiṣṭhighiṣan* 'wishing to climb' and *daghiṣyante* 'will reach' are further evidence against the assumption of a PIE phoneme *ə*. /ₑX/ were maintained as separate phonemes into Ind.-Ir. For Ind.-Ir. *i* from /ₑX/ coalesced with the Ind.-Ir. *i* phoneme after the time of secondary palatalization, but before the change of *s* to *ṣ*. Ind.-Ir. *s* became *ṣ* after this *i* as well as after *i* from PIE /y/, Gdr. I.728-30.

12.6. THE INFLUENCE OF LARYNGEALS ON NEIGHBORING ACCENTED VOWELS. If we assume on the basis of unaccented vowels PIE laryngeals of three colors, we must also describe their development in the neighborhood of stressed vowels. There is little doubt about /ʔ/ and /A/. /ʔ/ does not affect the timbre of a neigh-

boring vowel: /e/ plus /?/ yields PIE /e·/, e.g. Gk. *τίθημι*, /$_e$/ plus /?/ yields /e/, e.g. *θετός*. PIE /e/ is changed to /a/ both when standing before or after the *a*-colored laryngeals: /Ae/ becomes /a/, e.g. *ἀντί*, and /e/ was lengthened as /a·/ when the following /A/ stood before an obstruent, /eA/ became /a·/, Dor. *ἵστᾱσι*, /$_e$A/ became /a/, e.g. *στατός*. The effect of the remaining laryngeal is disputed; in some forms is found evidence for /o·/, e.g. *δίδωμι*, in others the *e*-vowel remains unchanged, e.g. Arm. *sair* 'edge' from **ke-ri*, which is from the root /keγ-/.

There are very few roots on which to base a description of the development of PIE /e/ followed by /γ/; and cognates have been found for only /do·-/ in Hittite. Such roots are:

/o·g-/ from /eγg-/ 'grow' WP 1.173
/do·-/ from /deγ-/ 'give' WP 1.814
/ko·-/ from /keγ-/ 'sharpen' WP 1.454-5
/po·-/ from /peγ-/ 'drink' WP 2.71-2
/po·-/ from /peγ-/ 'protect' WP 2.72.

The reflexes of these roots are not very wide-spread in the dialects. Only Baltic and Slavic dialects give us evidence for the accented vowel of /o·g-/: e.g. Lith. *úoga* 'berry', OCS *agoda* 'fruit'; evidence for the unaccented form is found in Gmc. and Celtic, and possibly Arm.: Goth. *akarn* 'wild fruit' and Irish *áirne* 'gland' from **agrīn̥ia* 'sloe'.

The roots /do· ko· po·/ give unambiguous evidence for assuming a development of *eγ* to *o·*; various forms from each have been cited above. The second root /po·-/, however, is not without difficulty. Reflexes are: Skt. *pāyú* 'protecting', Gk. *πῶν* 'herd', *ποιμήν* (< **πωι-*) 'shepherd', Lith. *piemuõ* 'shepherd', Arm. *hauran* 'herd', Goth. *fōdr* 'sheath'. Beside these there are attested forms of a root /pa·-/ 'pasture cattle; nourish', e.g. Lat. *pāstor* 'shepherd', OCS *pastyrь*. Indo-Europeanists have discussed variously the relationship of the two roots, cf. WP 2.73. Although the meanings are quite similar, they cannot be reconciled with the difference in phonology; it would be difficult to find a source from which *o* might have spread to Gk. *πῶν* by analogy. On the other hand the Lat. forms, e.g. *pāscō*, seem to be regular reflexes of a PIE root /pa·-/. Whether like Sturtevant, IHL 36, we derive Skt. *pâti* 'protects' from the root /pa·-/, we must assume a PIE root /po·-/ and one /pa·-/. The Hittite forms *pa-aḫ-ḫa-aš-mi*, etc. presumably are cognate with the root /pa·-/.

Although the evidence is small I assume that /γ/ changed the timbre of a contiguous vowel, but only when it coalesced with that vowel. This laryngeal, for example, is found in Hitt. *ḫi-in-ik-zi* 'assigns'; the following vowel, however, is unmodified, cf. OIr. *écen* 'necessity'. Examples given above illustrate the reflexes of /γ/ when it contracts with preceding /e/ or /$_e$/.

There is thus a marked difference between the effect of /γ/ and that of /x/ and /h/ on a neighboring vowel. /x/ and /h/ change the timbre of any neighboring vowel, /γ/ changes the timbre of a neighboring vowel only when it contracts with that vowel.

12.7. THE DEVELOPMENT OF PIE $_e$ IN THE DIALECTS. With such an analysis of the effect of laryngeals, the development of the PIE unaccented vowel, /$_e$/, becomes clear. Indo-Europeanists have attempted to give an explanation for

the development of /$_{e}$X/ (ə) to *i* in Ind.-Ir., to *a* elsewhere. We cannot of course predict the development of any phoneme, nor can we explain why it developed in any particular way. But we can attempt to understand its course of development, and this we must do in terms of the structure of the phonological system concerned.

In PIE the contrast between /e/ and /$_{e}$/ was a contrast of accented versus unaccented vowel, not one of timbre. A similar contrast existed between /e?/ and /$_{e}$?/, /eA/ and /$_{e}$A/, /eγ/ and /$_{e}$γ/.

None of the dialects has a similar contrast. In all dialects the short vowels may occur in unaccented as well as accented syllables. None of the dialects has a vowel which is restricted to unaccented syllables as was /$_{e}$/ in PIE. Theoretically then the reflex of /$_{e}$/ could coalesce with those of /e a o/ in any dialect. If it did, and no distinction was preserved between the reflexes of unstressed and stressed vowels, important distinctions would of course have been lost.

The most frequent vowel in accented syllables was /e/ and its reflexes, in PIE as well as in the dialects. It is clear that a distinction between the reflexes of PIE /e/ and the reflexes of PIE /$_{e}$/ was maintained in all dialects. The dialects which maintained a distinction of vowel timbre, the European dialects, also maintained a distinction of vowel timbre between reflexes of /e/ ann /$_{e}$/; /$_{e}$/ generally became /a/. In the only IE dialect which failed to maintain at least partially the PIE threefold distinction of vowel timbre, Ind.-Ir., the contrast between /e/ and /$_{e}$/ was preserved differently; the reflex of /$_{e}$/ fell together with a phoneme which was characteristically found only in unstressed syllables, /i/.

12.7a. By a comparison of the structural systems of PIE and the dialects we can understand the sharply divergent developments of PIE /$_{e}$/ to Ind.-Ir. *i*, to *a* in most forms in European dialects. It is only the piecemeal treatment of vowels, traditional in the study of historical linguistics, which has obscured the correlation between the development to Ind.-Ir. *i* and the shift in the structural basis of the vowel system. By comparing the structural systems we can also understand why /$_{e}$/ may appear in the dialects with any vocalic timbre, e.g. Gmc. *u* in OHG *-zug*, Gmc. *e/i* in Goth. *sitans* beside the usual reflex *a*. In the European dialects the contrast of vowel timbre replaced that of accented versus unaccented vowel, and in the shift the particular vowel timbre of unaccented syllables was not significant. When viewed in this way the consistent development of /$_{e}$/ to one vowel in any given dialect is more remarkable than are the particular reflexes in the individual dialects.

I assume that originally /$_{e}$/ had various allophones, depending on the neighboring phonemes, especially the laryngeals. The allophones of the unstressed /$_{e}$/ were probably more central than the allophones of the stressed vowels. In articulation, the allophones of /$_{e}$/ were closest to those of /a/ among the accented vowels. Since two of the laryngeals were *a*-colored, a majority of the allophones of /$_{e}$/ would have resembled /a/ in articulation. After the contrast of stressed : unstressed vowels was replaced by that of timbre even in unstressed syllables, the allophones of /$_{e}$/ fell together with those of /a/. Only in Greek, where the threefold PIE contrast of vowel timbre was maintained, do we find

some degree of retention of the varying articulation of the allophones of /e/. In those dialects in which the back vowels, /a/ and /o/, fell together, Gmc., Baltic, Slavic, the back, open allophones of /e/ exerted analogical influence on the higher allophones, and were generalized.

In Indo-Iranian, with its phonological shift in vowel system from a contrast in timbre to one of quantity, the allophones of /e/ fell together with the vocalic allophone of /y/, which occurred characteristically in unstressed syllables.

12.8. FOUR LARYNGEALS ASSUMED FOR PIE. Because of their differing effects on vowel timbre I conclude that we must posit at least three laryngeals for PIE:

? has no effect on contiguous vowels;

A changes the timbre of contiguous vowels to *a*;

γ has no effect on contiguous vowels unless it coalesces with them; it then gives them an *o* timbre.

This correlates with other evidence for laryngeals. In our Hittite records /?/ is not represented by any cuneiform symbol, /γ/ is represented by *ḫ*, *A* may or may not be represented by *ḫ*(*ḫ*). To account most simply for such orthographic variation many Indo-Europeanists have assumed two laryngeals with *a*-color. It has been further noted that the *a*-colored laryngeal which is not recorded in Hittite combines in Ind.-Ir. with a preceding voiceless stop to yield an aspirated voiceless stop. See chapter 11.

I conclude that until we have further evidence from Hittite or other Anatolian languages we can most simply account for the various reflexes of laryngeals by assuming four laryngeal phonemes in PIE.[5]

[5] Compare Sapir, Language 14.270: 'If, now, we posit an IE series *'y-*, *'w-*, *'m-*, *'n-*, *'l-*, *'r-*, a series *:y*, *:w-*, *:m-*, *:n-*, *:l-*, *:r-*, and a series *xy-*, *xw-*, *xm-*, *xn-*, *xl-*, *xr-*, we have to inquire what happened to these clusters (initially and in other positions) in each of the main branches of IE. In the end it will undoubtedly prove far more economical of effort to assume little or nothing in the way of sweeping reductions of these, to us, uncomfortable clusters and to keep our eyes open for distinctive reflexes of them in the IE dialects than to oversimplify our task by assuming radical reductions in the IE period.'

13.1. THE PIE PHONEMES. For PIE I therefore assume a phonemic system like that given in **2.1a** with slight modifications:

1. Obstruents:	p	t	k	k^w	
	b	d	g	g^w	
	b^h	d^h	g^h	g^{wh}	
		s			
2. Resonants:	m	n			
	w	r	l	y	
3. Vowels:		e	a	o	$_e$
	i·	e·	a·	o·	u·
4. Laryngeals:			x	γ	h ʔ.

With these four classes of phonemes we can account for all IE developments. The phonemic structure of PIE is clear. The allophonic variation of the phonemes, however, is left with various problems. Two such problems will be sketched briefly, one for which a phonemic but no allophonic solution is offered in terms of this phonological system, another for which both a phonemic and an allophonic solution is possible. The material pertinent for describing the allophones of the laryngeals will be presented in the next chapter.

13.2. THE PROBLEM OF THE IE 'INTERDENTAL SPIRANTS.' The first problem is the analysis of some clusters consisting of velar plus dental which Brugmann represented by velar plus interdental spirants, Gdr. I.790–3. Examples are found for the following velars; the dental element is indicated by *D*:

k + D: Gk. *κτάομαι* 'gain', Skt. *kṣáyati* 'rules'
Gk. *ἄρκτος*, Skt. *ṛkṣa*, Arm. *arǰ*, Alb. *ari*, Lat. *ursus*, Ir. *art* 'bear'

gh + D: Gk. *χθών*, Skt. *kṣám*, Lat. *humus*, Hitt. *te-kán*, Toch. *tkam*, *kem* 'earth'

g^wh + D: Gk. *φθίνω*, Skt. *kṣiṇóti* 'destroys', Toch. *ktsai-*. (MSL 18.24.)

Evidence in favor of velar-dental articulation may be drawn from the consistent representation in the various dialects by means of velar and dental reflexes; the dental reflexes are stops in Gk., Celt., Toch., and Hittite, spirants in the other dialects.

Proof that we are dealing with a cluster may be found in the consistent similarity of articulation of its members; the members are always alike in manner of articulation; we only find sequences like [kt], never [kd] or [kdh]. Moreover in some phonetic environments only one phoneme represents the cluster. Before *a* the dental element is eliminated in Gk.; compare Gk. *κτείνω* 'kill' and *καίνω*, *χθών* and *χαμαί*. Preconsonantally too the cluster is simplified in Gk.; compare *τέκτων* 'builder' and *τέχνη* 'art', *τέκμαρ* 'goal'.

The allophones in these clusters cannot be determined more closely from unusual spellings in the dialects; reflexes of the cluster are everywhere written with symbols for reflexes of PIE dentals and velar phonemes, but the order of

these varies. In Gk. the reflex of the velar usually precedes, in Hittite the reflex of the dental, in Tocharian we find both orders; in Gk. too a vase inscription gives evidence for the form Φιλοσκητ[ης] beside Φιλοκτήτης, cf. κτάομαι; and beside κτείνω we find Gort. κατα-σκευει.

Various attempts have been made to analyze the articulation of the cluster, and to find its origin. Apparently the dialect variation in representation of the dental element influenced the analysis of Brugmann; he decided that the dental member of the cluster was the aberrant one, and wrote it with symbols differing from those for the usual dentals.

Benveniste listed the older attempts at explanation, BSL 38. 139–47 (1937), and himself suggested that we should set up another series of PIE velars, comparable to the labio-velars; these he writes k^s, g^s, g^sh. Benveniste's argument is chiefly morphological. According to his theory of the root one should assume for τέκτων a root *tek*, and expect reflexes of a form *tkep*, but these are never attested. Likewise beside the form *kpei-*, cf. κτίζω, one should expect a root *kep-*, but again this is not attested. Consequently Benveniste assumes unit phonemes. By the same argument one would have to assume a series of slit fricative-stop phonemes beside the simple stops; for beside the root /ste··/ one finds no forms from *set-*. I consider both combinations, 'movable *s*' plus stop, and velar plus dental, to be clusters phonemically, but units morphologically.

Hammerich has attempted to establish that the plus element in the cluster resulted from the presence of a laryngeal, Laryngeal Before Sonant 15ff. Since he has merely listed the PIE forms and suggested his hypothesis, his attempt is unconvincing. To be sure, there is evidence of laryngeals in some forms with velar-dental cluster, but Hammerich has not made use of such evidence in suggesting his hypothesis.

I conclude that the allophones of the clusters have not been determined, nor their origin. Phonemically, however, the structure is clear. It never contrasts minimally with a succession of velar and dental obstruent phonemes. I therefore write the clusters attested: /kt/, /gdh/ from ghdh, /g^{w}dh/ from g^{w}hdh.

13.3. THE PROBLEM OF THE IE PALATALS, VELARS, AND LABIO-VELARS. A problem of PIE allophonic structure that has been treated variously is the relationship of the palatal and velar stops. Phonetic evidence is found for three positions of articulation in each of three manners of articulation, palatal, velar, and labio-velar; these may be written [k̂ k k^w ĝ g g^w ĝh gh g^{w}h].[1] From the PIE reconstructions of Brugmann and Walde one would assume three phonemes for each manner of articulation. In no IE dialect, however, do we find three contrasting phonemes; the greatest number in any dialect is two. The so-called *centum* dialects have a distinct reflex for [k^w] and only one for [k̂] and [k]. On the other hand the *satem* dialects have distinct reflexes for [k̂], but [k] and [k^w] have fallen together. Two different phonemic interpretations of the data have been made. Meillet, Introduction 91–5, assumes PIE phonemes *k* and *k^w*, Kurylowicz, EI 1–26, the PIE phonemes *k̂* and *k*.

We find evidence for reconstructing the following PIE phonological sequences

[1] Because of the parallelism in development between the voiceless, voiced, and the voiced aspirated stops, for simplification I give examples only of the voiceless stops.

of palatal and velar stops plus vowel; for sequences of such stops plus consonants, see Gdr. I.542–622.

k̂e-	Lat. *cēnseō* 'rate': Skt. *śáṁsati* 'praises'
k̂a-	no evidence
k̂o-	rare. OHG *bircha*: Skt. *bhūrja* 'birch' (for ĝo-)
ke-	rare. Gk. *κείρω* 'cut off': Skt. *kṛntáti* 'cuts'
ka-	Gk. *καρκίνος* 'crab': Skt. *karkaṭa*
ko-	Gk. *μεῖραξ* 'girl': Skt. *maryaká* 'young man'
kʷe-	Gk. *τέσσαρες*, Goth. *fidwōr*: Skt. *catváras* 'four'
kʷa-	OIcel. *hualr* 'whale': OPr. *kalis* 'sheat-fish'
kʷo-	Gk. *ποινή*: Av. *kaēna* 'punishment'.

We may conclude from the first six sequences that palatal or velar articulation varied with the articulation of the following vowel; before *e* the stop was fronted, before *o* it was back, before *a* it was neutral, but non-palatal.

Since *e* interchanged with *o*, there would have been an interchange of the velar allophones in various forms of one word; in verbal forms of the root /lewk-/ the velar allophone would have been found before the thematic vowel in the 1st sg., the palatal allophone before the thematic vowel in the 2d and 3d sg. A similar interchange would have been found in nominal forms, e.g. the *-nt-* participial forms from /lewk-/ with interchange of thematic vowels *e* and *o*.

Such a situation would remain stable as long as the conditioning features were not disturbed. When however the vowel system was disturbed, a phonemic contrast between the palatal and velar allophones would be established. Such changes in the vowel system occurred in most of the *satem* dialects. I assume that a contrast of palatal versus velar stops followed the vowel shift.

Because a consonant interchange was not permitted in the system of forms from one root in PIE while a vowel interchange was possible, either a palatal or a velar phoneme was generalized through a system of forms from one root. For some roots, however, we find some palatal, some velar forms, see Gdr. I.545–7. The velar allophone is found in most forms of the root /lewk-/, e.g. Skt. *rócate* 'shines', *rokā́* 'light', Lith. *laũkas* 'pale'; but in a few forms the palatal allophone was generalized, e.g. Skt. *rúśat* 'light', OPrus. *luysis* 'lynx'.

The assumption of a PIE system with only two velars is strongly supported by the distribution before /a/ and /r/. Before these phonemes we find primarily [k] and [kʷ]. Since we know that at one stage of PIE /e/ and /o/ were members of one phoneme, and have reasonable evidence that /a/ and /r/ never had one palatal, one velar allophone, we may conclude that this distribution before /a/ and /r/ represents a stage of the language older than that of [k̂ k kʷ] before /e/ and /o/.

In the *centum* dialects, on the other hand, where the three vowels /e a o/ did not fall together, the palatal allophones did not become phonemic.[2]

[2] It seems at first glance as though the Gmc. development of the vowels is like that of Ind.-Ir., Baltic, and Slavic, to which I attribute the phonemicization of the palatal allophones. The threefold timbre pattern seems to have been lost too in the Gmc. dialects; for when our Gmc. materials were written down PIE /o/ and /a/, /o·/ and /a·/ had become single phonemes. The Gmc. development, however, may be dated after the operation of Grimm's Law, that is, after the PIE velar system had been rearranged. We have various

The relation between the development of [k̂] to a phoneme and the reduction of the PIE vowel system may be illustrated as follows:

	PIE SYSTEM			
	k̂e	ko	k^we	k^wo
†(possibly analogical	(ke)†	(k̂o)†		
already at this time)	ka		k^wa,	
shifted to	k̂e	ka	k^we	k^wa
	ke	k̂a,		
or in Ind.-Ir.	k̂a		k^wa	
	ka		k^wa.	

The innovation presumably was initiated in one dialect, and spread throughout the *satem* dialects. After the vowel shift the palatal versus velar contrast was the fundamental opposition. The labial articulation of some of the velars became non-significant, and the labio-velars fell together with the velars.

In the *centum* dialects the vowels remained unshifted, and the original allophonic distribution was undistrubed. As Meillet has pointed out, we may support this conclusion about the conservatism of the *centum* dialects by adducing the observation from linguistic geography that an original distribution is often preserved in peripheral areas; although we cannot be certain about the distribution of the IE dialects, Tocharian, Celtic, and Gmc. seem to be languages of peripheral areas.

Except for restricted environments the allophones of the other PIE obstruents are clear, as are those of the resonants. Those of the vowels have been discussed above. In the next chapter I shall attempt to determine the allophones of the remaining class of phonemes, the laryngeals.

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kinds of evidence that the PIE vowel timbre distinction was preserved relatively late into Gmc.: the labio-velars lost their labial element before PIE /o/, maintained it before PIE /a/; the earliest Gmc. names given by Gk. and Lat. writers distinguish between /o/ and /a/ in unaccented syllables, cf. Streitberg, UG 45–7. The conditions to which I attribute the phonemicization of the palatals were not present in Gmc.

14. THE ALLOPHONES OF THE LARYNGEALS

14.1. NECESSITY OF DETERMINING ALLOPHONES. In the preceding chapters reflexes of laryngeals have been examined and material assembled in favor of the laryngeal theory. The investigation has been primarily on the phonemic level. It was directed at the role of the laryngeals in the phonological structure of PIE and of their reflexes in the phonological structures of the various dialects. I shall now examine the material pertinent for determining the allophones of the laryngeals.

As Sturtevant has stated, IHL 15, the term 'laryngeal' is a traditional term; it is now used with a meaning as far removed from its etymological meaning as is the term 'guttural,' which is used by some linguists in the sense 'palatals and velars.' In studies of PIE the term laryngeal is used to refer to phonemes which have no direct reflexes in the dialects. These phonemes may have had glottal, or laryngal, articulation, but few Indo-Europeanists have assumed such articulation for all laryngeals.

Some proponents of the laryngeal theory have consistently attempted to identify the laryngeals phonetically. Möller was the first of these, Eng. St. 3.151 (1880). Of contemporary Indo-Europeanists holding the laryngeal theory Sturtevant indicated by the symbols he chose the primary allophones of each laryngeal phoneme. Others, following Saussure, prefer to deal with laryngeals only on the phonemic level; Kurylowicz draws his only inference about allophones of laryngeals from assimilation phenomena, and catalogues the laryngeals with nonphonetic symbols.

It is of course important to deal not only with phonemic but also with phonetic units. Our only justifiable reason for restricting discussion of laryngeals to the phonemic level would be lack of information. Such information has gradually been assembled and should give us a basis for at least a general description of the laryngeals.

14.2. EVIDENCE IN HITTITE. The potentially most promising evidence, the evidence from orthographical representation in Hittite, can at present be only imperfectly utilized. Cuneiform symbols transcribed with *ḫ* are found in some Hittite cognates of IE forms containing laryngeals. While Hittite orthography was extremely important in establishing the laryngeal theory, it has not provided much information about the phonetic units symbolized. For the description of Hittite is by no means complete;[1] until it is, our use of Hittite for historical purposes will be severely limited.

With current theories about Hittite phonology we can find in Hittite evidence for at best two laryngeals. In some words we usually find *ḫ* written singly, in other words it is usually repeated. Comparing this orthographical pattern with that of the stops Sturtevant concluded that single *ḫ* represents a voiced sound, *ḫḫ* a voiceless sound. Since the *ḫ* symbols represent velar spirants in the lan-

[1] Sturtevant gives a convenient list in transcription of the cuneiform symbols used in Hittite texts for *ḫ*, Comp. Gram. 43–6, 72–3. For subsequent discussions of his on orthographical conventions, see Lang. 16.82–3 with the references there, and IHL 34.

guages with which Hittites were in contact, Sturtevant assumes that *ḫḫ* represents a voiceless velar spirant, *ḫ* a voiced velar spirant, supporting this conclusion with the *ḫ* : *r* confusion in Muršilis Sprachlähmung. This conclusion seems valid but is not wholly certain. For the orthographic pattern may be correlated with vowel patterning. Hendriksen, BHL 38–42, found *ḫ* chiefly after repeated vowels, *ḫḫ* after vowels written singly, and concluded that the repetition of *ḫ*, like that of *l m n r*, gives us no information about the consonant. Unless we find further evidence in support of Hendriksen's thesis, Sturtevant's theory is more convincing than is Hendriksen's. Sturtevant's theory is supported by Hurrian orthographical patterns; to judge by Hurrian orthography, which follows the same patterns as the Hittite orthography, *ḫ* : *ḫḫ* should be correlated with obstruents, not with the resonants.

Much work, however, needs to be done on the Hittite system of orthography. The Hittite orthographic patterns may not be clarified until we obtain further knowledge of Hurrian, a language which is not as well known as is Hittite, and until the history of the spread of the cuneiform symbols is clarified. Until such information is obtained I shall accept Sturtevant's interpretation of the *ḫ* : *ḫḫ* orthography. Moreover until such time we can find no further evidence for laryngeals in Hittite orthography.

The suggestion has twice been made that Hittite orthography marks another laryngeal; spellings like *e-eš-* have been interpreted as indicating initial glottal stop, i.e. [ʔ*eš*-]. One suggestion was made in a posthumous paper of Sapir's, Lang. 15.180 fn.1, another in Sturtevant's report of a conversation with Götze, Lang. 18.181 fn.2. Neither suggestion has been amplified; Sapir indicated that he planned to develop in a later paper his reasons for this interpretation, but no collection of material has been published for, or against, the suggestion.

14.3. ATTEMPTS TO DETERMINE ALLOPHONES IN IE : HS STUDIES. Möller, the first Indo-Europeanist to try to identify the laryngeals phonetically, based his identification on the relationship between the Indo-European and Hamito-Semitic languages. Since one of the chief differences between the consonant systems of PIE and PHS was the presence of laryngal phonemes in PHS, and since these subsequently were lost in some Semitic languages with compensatory vowel lengthening, Möller suggested that Saussure's hypothecated phonemes were glottal sounds. He hesitantly defined *A* as a voiced glottal stop, E (/ʔ/) as a voiceless glottal stop, *O* (/ɣ/) as a laryngal *r*, Eng. St. 3.151. In the same year Sweet suggested the following articulation:[2] *A*, 'the glottal *r*, or voiced glottal trill'; O (/ɣ/), 'the same labialized, the Danish *r*'; *E* (/ʔ/), '*A* palatalized.' Möller modified his description in PBB 7.492, defining *A* as similar to the Semitic alef, a 'voiceless guttural stop,' and *E* as probably the voiced counterpart.

Möller later assumed two more laryngeals, see IHL 16; he changed both his symbols and phonetic descriptions, assuming in 1917 that all of the laryngeals had glottal articulation. His earlier phonetic descriptions, however, are those which have been maintained by Indo-Europeanists who identify the laryngeals phonetically. Sapir, for example, defines the four laryngeals as follows, Lang.

[2] See the Collected Papers of H. Sweet, Arr. by H. C. Wyld, 147 (Oxford, 1913).

14.269: '? (a glottal stop followed by *e*-timbre of full grade vowel in its primary form), ? (another glottal phoneme followed by *a*-timbre of full grade vowel in its primary form), *x* (presumably a voiceless velar spirant = *ḫ*-, -*ḫḫ*- of Hittite), and *γ* (presumably a voiced velar spirant, Arabic 'ghain', = *ḫ*-, -*ḫ*- of Hittite).' In a posthumous article, Lang. 15.181, Sapir's ? is more narrowly defined as a 'glottal stop with velar timbre'; the other descriptions are unchanged. These descriptions are those given by Sturtevant in IHL; later, Lang. 24.259–61, he uses the symbol *h* instead of ?, presumably to indicate a glottal fricative rather than a stop.

The foundation for description of laryngeals from IE-HS relationships is weak, for we are not yet able to reconstruct the early stages of IE and HS, to say nothing of the common source. To illustrate the possible variation in interpretation of our data we may note that Cuny defined the three laryngeals he assumed as palatal (*ç*), velar (*Ⱥ*), and labio-velar (*γ*) resonants, RHA 5.38–9. I conclude that we will again arrive at a more useful formulation by analysis of definable reflexes in the IE dialects than from tenuous material drawn from hypotheses of prehistoric relationships about which we have no accurate descriptive analyses. When we begin from attested forms we of course run the risk of reconstructing reflexes of laryngeals, not the laryngeals; for example, the 'laryngeals' which survived into Ind.-Ir. after voiceless stops may be different from their etyma which produced phonological changes in PIE and pre-IE. In view of the problematic laryngeals arrived at by comparison of IE with HS a reconstruction of such reflexes from attested forms is preferable to derivation from somewhat dubious reconstructions.

In drawing general conclusions about the articulation of the laryngeals I assume that there was continuity in the structural bases of the IE phonological system. The phonological structure itself was changed. But the patterns of change were similar in pre-IE, PIE, and the early dialects, more similar than those between the early dialects and PIE, and those of some non-IE languages like Chinese or Nootka. Thus I would not expect to find characteristic pitch patterns such as those of Chinese for each word in PIE, but rather a use of pitch like that in early Greek. And though a glottal stop is assumed for PIE and pre-IE I should not expect glottalized stops for pre-IE like those of Nootka. The bases for such assumptions have been fully discussed by Sapir in his book, Language 157–82 (New York, 1921). Such assumptions are legitimate when used as a guide in detecting developments, rather than as explanations for them.

14.4. EVIDENCE IN THE IE DIALECTS FOR CONTINUANT ARTICULATION. A phonetic process attributed to all laryngeals is lengthening of preceding vowels that are not homorganic, in the pattern *-eXC*. Such lengthening occurs in IE dialects upon loss of continuants.

In Skt. such lengthening is found when the continuant is a voiced sibilant, e.g. *nīḍá* < **nizdo-* 'nest', *rūḍhá* < **ruẓḍha-* < **rugdha-* 'climbed', *voḍhum* < **vaẓḍha-* < **vagdha-* 'drive'.[3]

In Gk. too such continuants are voiced sibilants, e.g. Ion.-Att. *εἰμί* from **ἐσμι* 'I am', *τρήρων* from **τρασρων* 'cowardly'.

[3] A. Thumb, Handbuch des Sanskrit 107 and 118–9 (Heidelberg, 1905).

In Ital. such continuants are voiced sibilants, *r*, and nasals, e.g. Lat. *nīdus* 'nest' < **nizdos*, *svāsum* < **svarssom* 'black', *equōs* < **equons* 'horses'. In late Old French voiceless spirants are lost with compensatory lengthening, e.g. *testa* > Mod. Fr. *tête* 'head'. Cuny cited this development, RP 2.103, to support the plausibility of the pre-IE changes. Since it is generally assumed that *testa* > **tehte* > *tête* this development seems very like that found for laryngeals. Cuny also cited similar developments in Semitic: Cl. Arab. *ra's* > Mod. Arab. *rās*.

In Gmc. such continuants are voiced sibilants, e.g. OS *mēda*, cf. Goth. *mizdō* 'reward', velar spirants, OHG *mālōn* < *mahlōn* 'summon before a court', and nasals, PGmc. *aηχ*, *iηχ*, *uηχ* > *āχ*, *īχ*, *ūχ*, e.g. Goth. *fāhan*, OE *fōn* 'capture', Goth *þeihan* 'thrive', Goth. *þūhta* 'seemed'. It may be noted that the nasalized *a* in OE was raised as well as lengthened, and fell together with *ō* rather than with *ā*. We do not find such changes after lengthening of short vowel upon loss of laryngeal in pre-IE. In British English such continuants are voiced spirants, *r*, e.g. [ha·d] *hard*, [hɔ·d] *hoard*, [hə·d] *heard*. See Gdr. I.804–7 for further examples of such developments, and references.

These developments parallel those that we hypothecate for pre-IE where /e· a· o·/ resulted from a sequence of /eXC/. As a result I assume that the allophones of pre-IE *X* had continuant articulation.

14.5. EVIDENCE FOR FRICATIVE ARTICULATION. Another phonological feature common to all laryngeals is their role in syllables. From the patterns which Edgerton found we may draw two conclusions: 1. from patterns like *tekt-iy-*, *tēt-iy-* < *teXt-iy-* I conclude that laryngeals had the same effect as obstruents in determining the following allophone of resonants; 2. the patterns also show that laryngeals did not undergo the allophonic variation of resonants. See **2.2.**

IE root structure gives us further evidence that laryngeals pattern differently from resonants, and from obstruents. We find bases of the following structure: (the patterns are arranged in order of frequency; the initial is not significant)

CeRC e.g. /bʰeyd-/ Skt. *bhédati* 'splits'
CeRX e.g. /pewX-/ Skt. *puṇáti* 'purifies', Inf. *pavitum*
CeXR e.g. /leXw-/ Lat. *lāvit* 'washed'
CeXC e.g. /peXs-/ Lat. *pāscō* 'pasture'
CeCX e.g. /metX-/ Skt. *mathnáti* 'shakes', pptc. *mathitá*.

Since we do not find bases of the structure CeCC, and only rarely CeCR,[4] the laryngeals show a greater variety of patterning than either obstruents or resonants, and must be classed in a separate structural set. IE root structure shows progression from most open sound at the peak of the syllable to sounds of greater closure, e.g. CeRC, CReC, except for the one fricative, /s/. According to these sequences the laryngeals patterned like fricatives.[5]

[4] Some of the Skt. 5th class verbs, e.g. *dabhnoti* 'harms', seem to point to a structure CeCR. I assume that the pattern here is dialectal, not PIE.

[5] Some Indo-Europeanists define the laryngeals as 'weaker phonologically' than the resonants because laryngeals are lost with compensatory lengthening of resonants, e.g. [bhuXt-] > [bhūt-]. The non-significance of such a statement is clear when one compares the relation of Modern British English *r* to vowels, e.g. *board* [bɔ·d], *bore* [bɔ·], *rod* [rɔd].

From their role in IE root structure and in the patterns determined by Edgerton I assume that the allophones of laryngeals were neither oral stops nor resonants, but fricatives.

14.6. FURTHER EVIDENCE FOR RELATIVELY OPEN ARTICULATION. Continuant articulation may be supported by the role of laryngeals in Homeric meter. Laryngeals plus ρ, λ make position in Homer. The same patterning is found for σ and ϝ before ρ, not so consistently for voiceless stops and ρ, cf. Munro, Hom. Gram. 342–5. We may note further that such lengthening is more frequent before velar voiceless stop plus ρ, than before dental and labial stops plus ρ. Although this evidence by itself is not weighty, it supports the assumption of continuant articulation for the laryngeals. A similar support for this assumption is the lengthening of *w* and *j* before laryngeals in Gmc.; such lengthening is found elsewhere in Gmc., especially in the WGmc. dialects, before resonants.

These are the general criteria which may be used in broadly defining the allophones of laryngeals. They point to a relatively open consonantal articulation.

14.7. EVIDENCE FOR VOICE. We may conclude from their reflexes in combination with initial ρ, λ, μ, ν in Gk. that three of the laryngeals were voiceless. The reflex of σ plus ρ, λ, μ, ν is written ῥ-, λ-, μ-, ν-, but early inscriptions give evidence that the resulting resonant was unvoiced. (Pron. of Gk. and Lat. 61–4.) Moreover the reflex of /sw-/ and /sy-/ was '. Sapir pointed out that the Gk. reflexes of PIE resonants after three of the laryngeals, /h x ʔ/, were the same as those after PIE /s/. Since the change in the resonants was voicelessness, and since this was produced by one voiceless continuant, σ, it may be assumed that the other continuants which produced the change were also voiceless.

The assumption of voiceless continuant articulation for one of these three laryngeals, /x/ is supported by Hittite orthographic evidence. Sturtevant has demonstrated that the Hittite reflexes of /x/ were voiceless, those of /γ/ voiced velars of similar articulation; the use of the *ḫ*-signs points to a velar fricative articulation. The orthographical evidence in Hittite for voiceless and voiced counterparts is supported by a phonological observation made by Kurylowicz. In some forms of the root /poˑ-/ < /peγ-/ 'drink', the *p* is voiced, e.g. Skt. *pibāti*, presumably by assimilation to the neighboring laryngeal. Such voicing is found in PIE when the phoneme in question is a member of a structural set that contrasts with another structural set without voice; thus the resonants, though voiced, do not produce such voicing. We may therefore assume that the allophones of /x/ were voiceless velar spirants, those of /γ/ voiced velar spirants.

The identification of the allophones of /x/ and /γ/ as velar fricatives is supported by developments in Gmc.

This description is further supported by reflexes in Gk. In Gk. the reflex of PIE /γy-/ is ζ, of /xy-/'. Since other PIE etyma of ζ belong to a structural set contrasting with voiceless phonemes, the same assumption may be made for /γ/.

We find that vowels contiguous with /x/ have an open, relatively back articu-

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In only one environment, the post-vocalic position, is *r* 'phonologically weaker' than the vowel. Unless such observations are restricted to descriptions of phonemes in definite environments, they are pointless. From them we can draw no general conclusions about the allophones of phonemes.

lation. Vowels coalescing with /γ/ on the other hand have a relatively high back articulation, presumably with lip rounding. Because of this vowel articulation I assume that allophones of /γ/ had labial articulation, in addition to velar fricative articulation, and I describe them more fully as labio-velar voiced fricatives. (Evidence in morphological categories in favor of this description has not yet been explored.)

The chief allophone of /x/ then is [χ], of /γ/ [γ^{w}].

The chief allophone of /h/ may be most readily determined from its reflexes in Skt.; /p t k/ plus /h/ became Skt. /ph th kh/. Since these reflexes fell together with unvoiced reflexes of PIE /b^{h} d^{h} g^{h}/, the reflex of /h/ must have been similar to the unvoiced aspiration of these phonemes. I conclude that the chief allophone of /h/ was [h]; the friction was presumably produced in the larynx, but it may also have been produced in the pharynx.

14.8. SUMMARY OF THE EVIDENCE. I am unable to find any further information from which to determine more closely the allophones of /ʔ/. In Gk. a sequence of /ʔe-/ becomes *ἑ*. Although the Gk. smooth breathing contrasts with rough breathing, which was aspiration, we cannot conclude that it represented a glottal stop phoneme. (The Pron. of Gk. and Lat. 70–1.) /ʔ/ did, however, unvoice a following resonant, e.g. Gk. *ὅς* beside Lat. *ea*, Skt. *ayám*; we may conclude that its allophones were voiceless. If it had been a stop we might have expected it to be marked by a symbol when the Greeks adopted a set of symbols which included one for the glottal stop. I therefore assume from negative evidence that the chief allophone of /ʔ/ was a sub-oral spirant with little friction. If its place of articulation had been oral, I should expect its reflexes to be represented by Hitt. *ḫ*. The allophone of /h/ was apparently a glottal aspirated fricative. I conclude that the allophone of /ʔ/ was either a weakly aspirated glottal fricative, or a pharyngeal fricative. I can find no evidence in favor of either description. This is the laryngeal for which we have the smallest amount of phonetic information.

The allophone of /ʔ/ is often described as a 'glottal stop of palatal color,' possibly because /ʔ/ had no effect on neighboring vowels. I can find no support for assuming 'palatal color.' If the chief articulation of /ʔ/ was sub-oral, I should expect no effect on the articulation of neighboring vowels.

I thus assume the following allophones for the laryngeals: [χ] for /x/, [γ^{w}] for /γ/, [h] for /h/, [ḫ] or [ḥ] for /ʔ/. At present we have only general criteria for such conclusions, and these have little more certainty than our conclusions about the allophones of /b^{h} d^{h} g^{h}/. But only if we make such assumptions will we be able to extend our information about the laryngeals and reflexes which as yet are unknown.[6]

[6] Reflexes of the laryngeals in PIE were presented in Chapter 3. A summary of the Gmc reflexes of laryngeals in the neighborhood of resonants was given in Chapter 8, a further Gmc. reflex was discussed in Chapter 9, a further Gk. reflex in Chapter 10, a further Ind.-Ir. reflex in Chapter 11. Studies of reflexes of laryngeals in other dialects and in other environments of the dialects already investigated remain to be done.

I do not assume vocalic allophones for the laryngeals. In Chapter 13 I have listed the PIE vocalic phonemes; in Chapters 12 and 15 I discuss the relationships between laryngeals and vowels and resonants, and the development of the PIE vowel system. The influence of laryngeals on the vowel system is discussed there.

15. THE DEVELOPMENT OF THE PIE PHONEMIC SYSTEM

15.1. BASES FOR SUGGESTING EARLIER IE PHONEMIC SYSTEMS. In chapter 13 I have suggested a phonemic system of PIE which is based on a comparison of the phonemic systems of the dialects and analysis of the patterning of the dialect and PIE phonemes. This system is not the earliest one that we can determine. We know that the PIE phonemic system itself developed from an earlier, different system. For earlier phonemic patterns can still be detected in the PIE system, e.g. an interchange between /e/ and /o/ which correlates partially with location of the accent. Moreover, relic forms are found in various dialects, e.g. Gk. *πότνια* as compared with Skt. *pátnī*. Furthermore, the frequency of some phonemes is quite out of balance, e.g. /b/. By analyzing such characteristics of the PIE phonemic system we can determine at least partially earlier phonemic systems.

The earlier patterns can be detected most clearly in the vowel system. We can conclude either that this was the part of the system that underwent the greatest change, or that it would have preserved more clearly traces of an earlier system. The former alternative is preferable; apparently in pre-IE the obstruents underwent relatively little change as compared with the rest of the system. We have two indications of possible pre-IE obstruent changes: 1. the great infrequency of /b/; 2. orthographic evidence in Hittite for a labio-velar variation of [kw] before vowels, [ku] before consonants, e.g. *a-ku-wa-an-zi* 'they drink', *e-ku-zi* 'he drinks'. Even if we should consider these indications that the labio-velars and /b/ are relatively late additions to the pre-IE obstruent system, such changes would be minor as compared with those found in the rest of the phonemic system. The reconstruction of earlier forms of the IE phonemic system is therefore restricted to the non-obstruents here.

15.2. ACCENT CHANGES IN PRE-IE. The changes in the pre-IE non-obstruent system are associated with changes in the accent system. These were two: 1. phonemicization of pitch accent; and earlier: 2. phonemicization of stress accent. Both periods of distinctive accent were preceded and followed by periods of non-distinctive accent. In the PIE phonemic system pitch accent was non-distinctive; it could stand on any syllable of the word and was not correlated with vowel timbre or vowel length. In constructing the earlier vowel systems we must relate the changes of accent and accompanying vowel shifts with other vowel developments, notably those in the neighborhood of laryngeals.

15.3. CHANGE OF /e/ TO /o/ AND RESULTANT DISRUPTION OF THE PRE-IE PHONEMIC SYSTEM. When we examine the PIE material, we find an interchange between /e/ and /o/, /e·/ and /o·/, /a/ and /o/ which is generally accompanied by differences in pitch accent: e.g. Gk. *ἄκοιτις* 'spouse', *κεῖται* 'lies'; *ἀπάτωρ* 'fatherless', *πατήρ* 'father'; *ἀοιδή* 'singing', *ἀείδω* 'sing'; perf. *ἔρρωγα*, *ῥήγνῡμι* 'break'; *θωμός* 'heap', *τίθημι* 'place'; *ὀξίνη* 'harrow', *ἄκρις* 'tip'; perf. *τέθωκται*, *θήγω θᾰ́γω* 'sharpen'. Hirt, IG 2.172–87, gives further examples, and bibliography. The /e/ (/a/) vowels are characteristically accompanied by pitch accent, the /o/ vowels by lack of pitch accent. Although the /o/ vowels lack pitch accent, they occur where we would expect a normal grade vowel.

After various studies the conditions of change have been defined: /é/ /é·/ [é é· á á·], with phonemic pitch accent, became [ò ò·] when the chief accent was shifted to another syllable, and the syllable accented formerly received a secondary pitch accent.

e.g. /péte/ [péte] > /pèté/ [pòté]

The [o] allophone of /e/ developed regardless of the environment; evidence is found for it in the neighborhood of obstruents, resonants, and laryngeals, including *A*; it developed for long /e·/ as well as short /e/.

I assume that this phonetic change took place before the loss of laryngeals. For /Aé/ [Aa], which in PIE is /a/, interchanges with /Aè/ [Ao]. This assumption is supported by reflexes in Hittite; laryngeals are preserved there in the neighborhood of *a*, but the change of /e/ to [o] had already taken place. Since the change of [e] to [o] is the last of the ablaut changes, I conclude that all ablaut changes took place before any of the phonemic changes that the vocalic system underwent as a result of modification by laryngeals.

15.3a. We may then assume a pre-IE vocalic system with distinctive pitch accent and the phonemes: /e e· $_e$/. These segmental phonemes had various allophones: [ò ò·], [Aa, aA] [Aa· a·A] [A_a $_a$A] and elsewhere [e e· $_e$]. /e·/ was found in syllables which had been open before the loss of a following unaccented vowel (Dehnstufe). Vowels with non-distinctive length were found in syllables in which laryngeal and consonant followed the vowel.

At some time before the establishment of the PIE phonemic system pitch accent became non-distinctive. With this accent shift vowels which had been non-distinctive variants of one phoneme became phonemes. Contrasts between

/tét/ and /tèt/ /tér/ and /tèr/ were shifted to

/tet/ and /tot/ /ter/ and /tor/.

When the pitch accent pattern was disturbed, when vowel timbre instead of pitch became the characteristic distinction between the members of the vowel system /a/, as well as /o/, became phonemic. As the contrast between

/tét/ [tét] and /tèt/ [tòt] was shifted to a contrast between /tet/ and /tot/, so the contrast between

/Aét/ [Aát] and /Aèt/ [Aòt] was shifted to a contrast between /Aat/ and /Aot/.

The disruption in pitch accent therefore initiated the development of the PIE vowel system reconstructed above, that is, the vowels /e o a e· o· a·/.

15.3b. To this development of the vowel system I ascribe the disruption of the laryngeal system. After a vowel system of three timbres had been established by the shift of pitch accent, contrasts which formerly were marked by laryngeal accompanied by vowel timbre were now marked distinctively by vowel timbre. The former contrast between

/pAét/ [pAát] and /pét/ [pét], with the laryngeal supplying the characteristic difference, now was between

/pAat/ and /pet/, with the vowel supplying the characteristic difference. In such environments, and in patterns like /peAt/ [pa·At], the laryngeal was lost.

This loss was succeeded by loss of the two other laryngeals in the similar environments, and eventually by the loss of laryngeals in every environment.

15.4. EARLIER DEVELOPMENT OF /$_e$ e·/. The patterns of an even earlier vowel system have left traces in PIE which have survived the changes listed above. /e/ and /e·/ are characteristically found in accented syllables, /$_e$/ in unaccented syllables. Interchanges of quantity like that between /e/ and /$_e$/ are found in languages with stress accent and correlate with the position of the accent. We may assume a similar correlation in an early stage of pre-IE; when stress accent was distinctive, [e] occurred only in stressed syllables, [$_e$] only in unstressed syllables, e.g. Gk. *χθές* : *χθιζός* 'yesterday', *ἵστᾱμι* 'stands' /'steA-/ ['steA-] : *στατός* /steA-'te-/ [st$_e$A-'te-].

The relation of PIE /e/ to /e·/ is not so readily apparent, but enough patterns remain to show us that /e·/ developed from /e/ when standing in an open syllable and when the following syllable lost its syllabic status. This development (Dehnstufe) occurred for example in the nom. sg. *πατήρ*; by comparison with the acc. sg. *πατέρα* it may be assumed that the nom. too formerly had a third syllable. (See Hirt, IG 2.36–51; the fundamental study is still that of Streitberg, IF 3.305–411.)

Since vowel quantity at the time when stress accent was distinctive was a function of the accent we may assume an early pre-IE vowel system with the contrasts:

[p$_e$'te] : ['pet$_e$]

['pet$_e$] : ['pe·t].

In this stage of pre-IE [$_e$] occurred only when accompanied by minimum stress, [e] only when accompanied by maximum stress, [e·] only when accompanied by maximum stress and a fixed morphological structure. This vocalic system then was composed of one member. The investigations of various Indo-Europeanists have pointed to such a conclusion, but few if any have admitted a linguistic structure with a vowel system composed of one member. Debrunner in his review of EI, IF 56.55–8, noted that Kurylowicz' theories would leave us with only one vowel, but added that Kurylowicz specifically rejected this conclusion. The conclusion may have been generally rejected because of the vocalic structure of the IE dialects spoken today. To my knowledge no IE dialect, spoken today or formerly, has such a structure; and the well-known IE dialects have a comparatively ample vowel system. Consequently the conclusion that from a phonemic point of view a stage of pre-IE had a vowel system of one member seems foreign to the usual observations about IE linguistic structures. But other characteristics of PIE and pre-IE are adequately attested, and generally accepted, though they fail to fit subsequent patterns in IE dialects; such are the PIE variety of formation of present tense forms, the lack of system between present, aorist, and perfect forms. A further reason against such a conclusion seems to have been the peculiarity of such a vocalic system among those found in the well-known European and Asiatic languages. With the increased knowledge of languages the past few years we no longer find a phonemic structure

odd though it has a small vowel system. Unless we find in our early IE material evidence for a different analysis of pre-IE in the stress accent stage we must accept the conclusions of the laryngeal theory and the theory of ablaut.

15.5. THE PRE-STRESS STAGE OF PRE-IE. We can construct one more stage of pre-IE, a pre-stress period. If stress gave rise to conditioned variants, [e e·], at an earlier period such stress must have been non-distinctive.

In accordance with its most common reflex the most open segment of the pre-IE syllable, the syllabic peak, is usually written *e*, as in Benveniste's reconstructions of the IE root. The syllabic peak does not, however, contrast directly with any vowel. Consequently an analysis of the pre-stress stage of pre-IE with a vowel phoneme *e* is misleading. If we find no phonemes in complementary distribution at the peak of the syllable, we cannot assume a segmental phoneme for this position. The peak of the syllable, syllabicity, must have been a prosodic feature. At this stage of pre-IE segmental phonemes were limited in occurrence to the slopes of the syllable. We may label this prosodic feature, syllabicity, with /∧/ in our reconstructions.[1]

It is presumably this pre-stress stage that we have to use for attempts to establish further relations of pre-IE, such as with Proto-Hamito-Semitic. The pre-stress system suggested here could be checked only if we found some such cognate of pre-IE. And with the help of such a cognate we might find answers to problems in the pre-IE obstruent system, such as the origin of /b/, of the labiovelars, of the voiced aspirates, and further information on the allophones of the laryngeals.

15.6. THE VARIOUS STAGES OF PRE-IE. We may summarize our conclusions on the development of the pre-IE and PIE phonological systems by setting up a succession of phonemic systems beginning with the pre-stress system of pre-IE.

A. The pre-stress stage of pre-IE
1. Obstruents: p (b?) b^h t d d^h k g g^h s
2. Resonants: y w l r m n
3. Laryngeals: h x γ ʔ

A non-segmental phoneme /∧/, syllabicity.

B.a. The stage of pre-IE with phonemic stress
1. Obstruents: (unchanged)

[1] I am indebted to W. F. Twaddell for this observation. C. H. Borgstrøm, Thoughts about Indo-European Vowel Gradation, NTS 15.137–87 (1949), like L. Hjelmslev, Accent, intonation, quantité, Studi Baltici 6.1–57 (1936–7), esp. pp. 44ff., prefers to deal with a single vowel in an 'older linguistic state' than PIE. He reconstructs the etymon of Lat. *sunt* in this stage as **hₗäsä-nätä*. On the basis of his phonological assumptions Borgstrøm makes some interesting observations about the development of the IE morphological system. I cannot, however, accept his fundamental assumption that ablaut was not caused by accent shifts. Moreover, his phonemic analysis implies that all non-vocalic phonemes fall into one class, the consonants; the later IE developments support the assumption of several classes, with laryngeals patterning differently from resonants, and both from obstruents. And if we apply the test of continuity in linguistic systems, see above 14.3, the change in linguistic 'type' from a language with a syllabic structure like that in **hₗäsä-nätä* to the IE dialects is remarkable.

2. Resonants: (unchanged)
3. Laryngeals: (unchanged)
   Three non-segmental phonemes: $^{\shortparallel}$, maximum stress
   $^{\shortmid}$, minimum stress
   $\wedge$.

With maximum stress /$^{\shortparallel}\wedge$/ becomes segmental; allophone [e].

With minimum stress /$^{\shortmid}\wedge$/ is not segmental. It remains non-segmental between obstruents, /$^{\shortmid}$C $\wedge$ C/, laryngeals, /$^{\shortmid}$X $\wedge$ X/, obstruents and laryngeals, /$^{\shortmid}$C $\wedge$ X/, /$^{\shortmid}$X $\wedge$ C/. In the neighborhood of resonants it combines with segmental phonemes in simultaneous articulation:

/$^{\shortmid}$C $\wedge$ R/ /$^{\shortmid}$R $\wedge$ C/ /$^{\shortmid}$X $\wedge$ R/ /$^{\shortmid}$R $\wedge$ X/; the R has the allophone [i u r̥ l̥ m̥ n̥].

B.b. Some /$^{\shortmid}\wedge$/ lose their syllabicity and a preceding /$^{\shortparallel}\wedge$/ is /$^{\shortparallel}\wedge\cdot$/. Loss of syllabicity occurred in those syllables standing directly before or after the syllable with the chief stress accent. Hirt labelled these as syllables with zero grade vocalism, and those which retained syllabicity as syllables with reduced grade vocalism. This classification is misleading. For the original distribution depended on the position of the stress; syllabicity or lack of syllabicity was non-distinctive. The terms 'reduced' and 'zero' grade might be used to refer to an interchange, the result of a change; but they must be carefully differentiated from such terms as 'lengthened' or '*o*-grade,' which represent a phonetic, and later phonemic, change rather than the result of such a change.

C. The period of non-distinctive stress.

The allophones of /$\wedge$/ become phonemes; the system is otherwise unchanged.

This stage of pre-IE contains a 4th class of phonemes, which may be labeled: /e e· $_e$/. These have various allophones; an open vowel [a] in the neighborhood of /h x/; a close vowel [e] elsewhere.

D. The stage of pre-IE with distinctive pitch.

The first three classes of phonemes remain unchanged. Pitch-determined allophones of /e e·/ develop:

/é/	[e]	/é·/	[e·]
/è/	[o]	/è·/	[o·].

/e e·/ now have three allophones:

/è è·/ have the allophones [o o·] in any phonetic environment;

/é é·/ have the allophones [a a·] when contiguous with /x h/ (a back allophone also develops for /$_e$/ in the neighborhood of /x h/.

/é é·/ have the allophones [e e·] elsewhere.

When /e/ is followed by laryngeals and consonants its allophones have non-distinctive length.[2]

[2] A similar situation is found in American English. Vowels are longer before voiced stops and fricatives than before the corresponding voiceless sounds; compare *bid* [bɪ·d]: *bit* [bɪt], *bidder* [bɪ·dr̥]: *bitter* [bɪtr̥].

E.a. The period of non-distinctive pitch.

The first three classes of phonemes remain unchanged.[3] The pitch-conditioned allophones of /e e·/ become phonemes. The resultant vowel system is: /e o a e· o· a· $_e$/.

E.b. With this development of the vowel system the laryngeal system becomes disrupted. All laryngeals are lost after /e o a/ when before obstruents; the resulting vowels fall together with /e· o· a·/.

Laryngeals are lost also after, and before, the vocalic allophones of preconsonantal /y w/, and two vocalic phonemes result: /*i*· *u*·/.

Laryngeals also are lost when initial before vowels.

F. The PIE phonemic system.

15.7. CHANGES BETWEEN PIE AND THE DIALECTS. Between PIE and the various dialects the system undergoes further changes. Many of the changes extend over only a part of the IE speech area.

General changes:

1. the laryngeals are lost as phonemes. Reflexes of them survive in various environments. These have been studied above.

2. the allophones of the resonants become phonemic.

3. reflexes of /$_e$/ fall together with the short vowels. (Restricted change: over an east-central innovating area the back vowels /a/ and /o/ coincide. Allophones of velar stops become phonemes over this area, and beyond it.)

4. diphthongs develop when vowels followed by resonants occur between consonants.

After changes 2 and 4 the phonemic system is made up of two classes:

vowels—any phoneme that may be syllabic;

consonants—the non-syllabics.

A complete description of the extent of these and less general developments would be a description of the phonological characteristics of the various dialects. Such descriptions would be moderately complex, and would be analyses of the phonological structure of the various dialects rather than of Proto-Indo-European.

[3] The labio-velars became phonemes at this stage of IE, or even earlier. No means has yet been discovered to determine their relative chronology.

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CELTIC (Old Irish unmarked)

GOTHIC

NORTH GERMANIC (OIcel. unmarked)

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FRISIAN & FRANCONIAN

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SLAVIC (OCS unmarked)

TOCHARIAN

SEMITIC