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Phonetics and Philology

Sound Change in Italic

Jane Stuart-Smith

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For my parents

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Preface

The seeds of this book were sown in the first Comparative Philology lectures I attended given by Paddy Considine in 1985 as part of my first degree in Classics at University College London. As Paddy outlined the basic ideas behind comparative reconstruction and Proto-Indo-European, I wondered then about exactly what these reconstructions might have sounded like, and how they could have changed into the sounds attested, albeit indirectly, in the ancient inscriptions of Greek and Latin. Four years later I started the M.Phil. in Comparative Philology and General Linguistics at Oxford University, and had the good fortune to attend my first Phonetics lectures given by Bruce Connell, a phonetician with a keen interest in the phonetics of sound change, who introduced me to John Ohala and his phonetic model of sound change. From then on, I became determined to try to understand better the mechanisms of reconstructed sound change by considering and applying the findings of contemporary phonetic research. Apart from the exceptional work of W. S. Allen, both a distinguished philologist and a trained phonetician, who gracefully links the two, as in his classic book on the pronunciation of Latin, *Vox Latina*, detailed and informed phonetic discussion tends to be absent from philology. The selection of 'Italic' as my major language group for the M.Phil. naturally led me to encounter the development of the voiced aspirates, and my quest for a resolution to the old debate began. I tackled it first in my M.Phil. thesis, and then again in my D.Phil., which was the basis for this book. For most of my doctoral research I was largely an 'observer' of phonetic research, in that I studied the subject keenly and carried out odd bits of informal auditory and acoustic analysis. Only once I had finished my thesis did I start gathering my own recordings and carrying out systematic instrumental phonetic analysis, first on Panjabi. I then moved on to a long-term study of the accent of Glasgow. As I wrote the book my own personal experience as a phonetician confirmed the ideas I had once had, and enabled me to develop them further. Indeed my current research on variation and change in Glaswegian consonants demonstrates a range and complexity of variation which will inevitably inform models of reconstructed changes for consonants proposed by those working in philology.

The book started life as a thesis, and one that bridged two disciplines, phonetics and philology. I therefore have a number of people to thank for helping me at that stage of the work: John Penney, my 'main' supervisor, for careful reading and wise advice; John Coleman, for phonetic discussion, encouragement and enthusiasm; Bruce Connell, for a careful and systematic introduction to the phonetics of sound change, and Anna Morpurgo Davies, for engaged and lively discussion of the main issues. I also benefited from discussions and feedback

from phoneticians interested in sound change, and in particular with Paul Foulkes, Tore Janson, and John Ohala. My two examiners, David Langslow and Katrina Hayward, were keen and enthusiastic critics. Both provided me with support and detailed feedback, and I was very happy that David agreed to read the book once again in draft and offer more advice. At the same time I am very sad that Katrina will not see the finished volume.

When I took up my post at Glasgow my intrepid colleagues Jeremy Smith and Christian Kay read the thesis and urged me to publish it. Once the book was in draft I was very fortunate to have comments from two anonymous readers for the Press, and from the following readers: Paul Foulkes, Brian Joseph, Joshua Katz, Gerhard Meiser, John Penney, Helmut Rix, Jürgen Untermann and Rex Wallace. It was particularly encouraging for me to have such a positive response from Helmut Rix, and from his colleagues, Jürgen Untermann and Gerhard Meiser, all of whom have done so much to extend our understanding of Italic.

I have received financial support at different stages of this work. My post-graduate work was funded by the British Academy, and supported by Christ Church, my first college. I subsequently received a Levick Sisters' Senior Scholarship from Somerville College, together with generous grants towards conference attendance. The Committee for Comparative Philology and General Linguistics, the Oxford University Phonetics Laboratory, and the University of Oxford also provided financial support for this purpose. I was able to see many of the inscriptions during a research visit to Italy in the autumn of 1992. This would not have been possible without the generous support of the British School of Rome, the Craven Committee, and the University of Oxford. Anna Sommella and the late Alessandro Vaciago were instrumental in helping me to access many of the materials there. More recently, the Arts and Humanities Research Board has helped considerably, but inadvertently, by awarding me a grant for research leave during which I was able to devote my time to writing and completing the book.

I have also received a great deal of personal support. During my graduate days, I was fortunate in my student friends, and in particular in Stephen Colvin, Eleanor Dickey, Niall Livingstone, Philomen Probert and Jason Zerdin, some of whom know far too much about the voiced aspirates and their development in Italic. When I considered applying to the Department of English Language at Glasgow, I was told by several that it was the friendliest department in the country. I can vouch that this is indeed true. All of my colleagues in the Department of English Language have been supportive in their own ways, but Eleanor Lawson has to be thanked for helping with the scanning, Katie Lowe for coffee at just the right time, Simon Horobin for patiently listening to reports of how it was all going, and Mike MacMahon for being a very understanding Head of Department. I must also mention all those involved at Oxford University Press, Henry Miller, and Virginia Masardo for speedy yet careful copy-editing, and especially my patient editor John Davey for waiting for so long to receive the

manuscript. There was a good reason for the delay, or rather two good reasons, in the form of Alexander and Max, who have made the final stages so much more enjoyable. Finally, I thank my family for their love and support: my parents-in-law, my parents, my sister and her family, and my husband, Wolf-Gerrit Früh.

J. H. S-S
30 June 2003

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List of Abbreviations

1	first person
2	second person
3	third person
abl.	ablative
acc.	accusative
adv.	adverb
Alb.	Albanian
Arm.	Armenian
Av.	Avestan
Ben.	Bengali
Cl.Arm.	Classical Armenian
CT	cricothyroid muscle
dat.	dative
D	Degrassi (1965)
EBen.	Eastern Bengali
ELat.	Early Latin
EM	Ernout–Meillet (1979)
EMG	electromyography
Eng.	English
Etr.	Etruscan
f.	feminine
F ₀	fundamental frequency
Fal.	Faliscan
Fal.-Lat.	Faliscan-Latin
fut.	future
Gand.	Gandhari
GDP	<i>Gāndhārī Dharmapada</i>
gen.	genitive
Gk	Greek
Got.	Gothic
Guj.	Gujarati
H.	Hindi
Hary.	Haryanvi
Hz	Hertz
IA	Indo-Aryan
INT	interarytenoid muscle
Iran.	Iranian
imp.	imperative

Lat.	Latin
LCA	lateral cricoarytenoid muscle
Lit.	Lithuanian
LIV	Rix (1998 <i>a</i>)
LF	Giacomelli (1963)
loc.	locative
m.	masculine
Mar.	Marathi
MIA	Middle Indo-Aryan
MIr.	Middle Irish
ms	milliseconds
Nep.	Nepali
neut.	neuter
NHG	New High German
NIA	New Indo-Aryan
nom.	nominative
O.	Oscan
OCS	Old Church Slavonic
OE	Old English
OHG	Old High German
OHern.	Old Harnican
OHG	Old High German
OIA	Old Indo-Aryan
OIr.	Old Irish
OLat.	Old Latin
OLG	Old Low German
ON	Old Norse
<i>OLD</i>	Glare (1982)
OsGk	Oscan-Greek alphabet
OsLat.	Oscan-Latin alphabet
OsNat.	Oscan native alphabet
OU	Oscan-Umbrian
OUmb.	Old Umbrian
OVols.	Old Volscian
Pael.	Paelignian
Pan.	Panjabi
part.	participle
pass.	passive
PCA	posterior cricoarytenoid muscle
perf.	perfect
PIE	Proto-Indo-European
Pk.	Pokorny (1959)
Pkt	Prakrit

pl.	plural
Plt.	Poultney
Po	Pocetti (1979)
Port.	Portuguese
PrGk	Proto-Greek
PrIt.	Proto-Italic
PrLat.	Proto-Latin
pres.	present
Pros.	Prosdocimi
Ps	subglottal pressure
PS	Presamnite
Rom.	Romany
Russ.	Russian
Sab.	Sabellic
sg.	singular
Skt	Sanskrit
SPic.	South Picene
subj.	subjunctive
TA	thyroarytenoid muscle
TI	Tabulae Iguvinae
U.	Umbrian
UmLat.	Umbro-Latin alphabet
UmNat.	Umbrian native alphabet
Uo	oral air flow
Ve	Vetter (1953)
Vest.	Vestinian
voc.	vocative
VOC	vocalis muscle
VOT	voice onset time
WBen.	Western Bengali
WH	Walde–Hofmann (1938)
YAv.	Young Avestan

Conventions

1 Representation of the voiced aspirates

The sounds which are central to this book may be transcribed in a number of different ways, for example *bh*, the old philological convention; *b^h*, the now usual philological convention; [b̥], the phonetic transcription of the International Phonetic Alphabet (IPA 1996); [b^h], found in many phonetic texts, also [b^ʰ] and [bʰ]. Here I use ‘bh’ either in italics to indicate a reconstructed form, or with the appropriate brackets to indicate phonemes or allophones.

2 Fonts

I follow the usual philological conventions of giving reconstructed and attested forms in italics. When referring to examples from inscriptions, italics are used to indicate the Latin alphabet and bold text is used to indicate native alphabet.

3 Letters

I use angled brackets to indicate letters, and give Latin alphabet letters in capitals, Greek alphabet letters in Greek alphabet, and native alphabet letters in lower case. I use 8 to represent the Sabellic figure of eight symbol.

4 Texts

References to Faliscan texts are to the collections in Vetter (1953) and Giacomelli (1963), with more recent inscriptions given according to first publication. Sabellic texts are given as in Rix (2002). References to the Iguvine Tables (Um 1 in Rix 2002) are given without the preceding Um 1. Etruscan texts are given as in Rix (1991).

5 Translations

In earlier work on Italic it was usual to translate Sabellic and Faliscan words into Latin. This had the advantage of giving in one word core meaning, grammatical form, and Latin cognate. It also presumed that the reader was familiar with

Latin, and given that the interpretation of these texts is largely dependent on formal correspondences with Latin, this was a reasonable assumption. Here I give English translations for Sabellic and Faliscan, and supply in addition Latin cognates. When translating names of gods and goddesses, I give the cognate Latin name. The obscurity of many of the texts means that in many cases the meanings of the words cited are far from certain. Thus most translations should be regarded with some caution. For full interpretation, translation and grammatical parsing of all forms, I refer the reader to Vetter (1953) for Faliscan and Untermann (2000) for Sabellic.

6 Sabellic vowels

When giving phonemic representations of Sabellic, I use /é/ for the close vowel arising from **i* and **ē*, and /ó/ for the corresponding close back vowel.

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Introduction: Phonetics and Philology

This book demonstrates how phonetic theory can be used to evaluate and motivate accounts of reconstructed sound change provided by philology. In it I discuss a well-known philological ‘problem’, how the Proto-Indo-European voiced aspirates developed in the ancient Italic languages. For example, what were the changes that took the initial sound **bh* of PIE **bhrātēr* ‘brother’ to what we think was /f/ in Latin *frāter*? Comparative historical reconstruction not only rests on certain essential principles for reconstructing sounds in former states of a language, it also relies crucially on believing that the sounds reconstructed could have developed into the attested reflexes in a way which is consistent with what we know from diachronic and synchronic linguistic description. Otherwise much attention can be paid to the reconstructed form and the attested form, but what lies in between remains nebulous. I argue that phonetic theory provides the key to this particular problem of philology, because it seems to be the only way of establishing an appropriate route from reconstruction to reflex.

The reconstruction of historical sound changes is usually based on the assumption that we know what sound changes are likely and what are not. If we ever want to evaluate a particular reconstructed sound change, that is to assess whether it seems reasonable to assume that one sound could or did become another, we have a range of possible sources of information at our disposal, most of them informal. Most philologists have some knowledge of phonetic theory, usually relating directly to their own language. Such knowledge furnishes assumptions about the basic articulations of segments, and hence how the articulation of one sound might relate to that of another. If we can imagine how sounds might be related to each other in terms of articulation, imagining sound changes that follow similar paths is not difficult. It is also assumed that sound change is related in some way to allophonic variation. Again, if we are familiar with variant pronunciations for particular sounds in our own languages, it is a small step to assume that similar changes may have taken place in the past. The other main resource lies in the banks of known sound changes accumulated by individuals through training and experience, and delimited by personal exposure to particular language groups. If we can compare the sound change before us with one from our experience, we are likely to feel more comfortable with what has been reconstructed.

While this type of evaluation is not very systematic and is potentially biased by personal knowledge and experience, it tends to work well. However, occasionally difficulties arise. If we reconstruct a sound change that involves sounds which are neither in the phoneme inventory of the language we speak, nor even among the main allophonic variants we are aware of, then assessing what might or might not be plausible sound changes becomes more tricky. How are we to know what should or could happen, or how such sounds should behave diachronically?

I deal here with a case of reconstructed sound change of exactly this kind, namely the development of the Proto-Indo-European voiced aspirates in Italic, the ancient Indo-European languages of Italy. While philologists are certainly familiar with the concept and reconstruction of voiced aspirates, usually denoted by the symbol for a voiced stop followed by /h/, for example, /bh/, few have personal experience of how such sounds are pronounced or have changed in the past, and thus few have reliable intuitions about how they might be expected to change. In Italic, the pattern of reflexes is somewhat more complex than in other IE languages, and over the 150 years since their reconstruction two possible routes have been reconstructed to get from the reconstructed sounds to the Italic reflexes. The Italic development presents a number of challenges, but one main problem lies in establishing how we think the changes may have taken place. This is important because even if we are relatively happy with the starting point and end point of a change (and in this case both are not always straightforward), we should like to feel equally happy with what is expected, even implicitly, to have happened in between. Logically, if the route between reconstruction and reflex is uncertain, this undermines the very reconstruction itself. Trying to assess the Italic development using traditional informal methods is difficult. In this book I tackle the problem once more using expected philological methods which I complement with phonetic theory based on experimental phonetics. I argue for a more systematic approach to evaluating reconstructed sound change which is grounded in phonetic theory. My findings demonstrate that the explicit combination of phonetic and philological methods is powerful. Direct reference to phonetic theory allows a solution to be offered to an old problem of philology.

The sound change in question is the development of one series of stops reconstructed for Proto-Indo-European, the voiced aspirates (*bh dh ĝh gh g^wh), into the corresponding reflexes in the Indo-European languages of ancient Italy, whose best-known and best-attested representative is Latin but which also includes the Sabellic languages, Oscan, Umbrian and others, and Latin's close neighbour, Faliscan. The Italic reflexes vary according to the place of articulation and position in the word of the original voiced aspirates, thus presenting a matrix of different possibilities. The complexity is increased by conditioned changes and differences across the Italic languages. Katz (1998: 205) states that 'the development...is perhaps the most-debated phonological problem in

contemporary Latin linguistics', and his comment can certainly be extended to Italic as a whole. The development is often summarised taking the labial voiced aspirate as an example:

- PIE *bh > Lat. *f*- (word-initial)/-*b*- (word-medial)
 Sab. *f* (all positions).
 e.g. Latin *frāter*, Oscan **fratrúm** < PIE *bhrātēr 'brother'
 Latin *albus*, Umbrian **alfu** < PIE *albho- 'white'

The reconstruction of the PIE voiced aspirates was problematic from the earliest reconstructions of Proto-Indo-European (e.g. Schleicher 1852, 1861: 136). Indeed the series is often given as a prime example of an awkward reconstruction whose phonetic realization is uncertain (e.g. Antilla 1989: 341). Despite the complexity of the Italic reflexes, it was possible to discern a common pattern: Sabellic and Faliscan show largely voiceless sounds; Latin agrees word-initially but sometimes diverges word-internally. The first doubts about the voicing of the sounds in the languages other than Latin were raised by Rix (1957) and led to the claim that they too, like Latin, showed voiced reflexes in word-internal position (e.g. Meiser 1998). The first successful account of the development was put forward by the distinguished comparative and historical linguist Ascoli in 1868. Three stages were assumed: devoicing, then spirantization, and then revoicing in Latin in word-internal position. A competing account emerged at the turn of the century, again assuming stages, but this time, spirantization with devoicing word-initially, and word-internally in Italic other than Latin; Hartmann for example, (1890). The debate over the appropriate route from Proto-Indo-European to Italic had begun.

For most of those working on Italic, and many on Proto-Indo-European, the core problem of the Italic development of the PIE voiced aspirates has been the *route*, that is, reconstructing exactly how the changes took place. In practice it has meant deciding whether Ascoli or Hartmann, later Rix, offered a more acceptable solution. This problem is also the main question for my book, though it is accompanied by another key issue, one of evaluation. How are we to know which account is the right one; or perhaps better for a reconstructed route, which is the most plausible? I shall take the view that this particular change is best assessed in terms of phonetic plausibility. This decision is motivated partly by the fact that traditional arguments and evidence, such as related reconstructed sound changes, are not helpful in reaching a solution; and partly by a primary assumption that the basic mechanism of most sound changes, and in all probability of this development, is phonetic. I end up concluding that the most phonetically plausible route is offered by neither Ascoli nor Rix, but by an alternative outlined in Chapter Six.

While I focus on the route of the Italic development, I cannot ignore two other problems which are closely related: namely, the PIE starting point (can we reconstruct voiced aspirates, and if so, what were they?); and the Italic outcome

(what were the reflexes? How are we to interpret the Italic evidence, in particular in languages other than Latin?). Of these I pursue the Italic outcome directly, in some detail, and attempt to establish a comprehensive statement of the Italic reflexes. The starting point is tackled less directly, though in my attempt to provide the necessary information to assess the phonetic plausibility of the Italic development, I end up demonstrating at the same time that the traditional reconstruction of voiced aspirates as a series of PIE stops realized as breathy voiced stops, is phonetically the most plausible solution.

1.1 Philology

In discussing a reconstructed sound change from Proto-Indo-European in Italic, this book is concerned with problems of historical phonological reconstruction, and more generally with problems of comparative philology (in the broad sense of the study of texts in conjunction with comparative and historical linguistic analysis; cf. Smith 1996: 13–15).¹ Basic principles of philology enable comparative phonological reconstruction, the reconstruction of earlier unattested stages on the basis of etymologically-related correspondences in later attested languages, which presume plausible developments between unattested and attested forms.² Thus given the cognate correspondences for ‘pig’ (from Lass 1993: 171), for example, Lat. *porcus*, NHG *Ferkel* ‘piglet’, OE *fearh*, Mir. *orc*, OCS *prasę*, we would reconstruct PIE **p* and presume the changes:

**p* is maintained (Latin, OCS)

**p* > *f* (OE, NHG)

**p* > \emptyset (Mir.)

Lass (e.g. 1997: 216f.) makes the useful distinction between ‘projection’ (reconstruction), and ‘mapping’ (route), getting from reconstruction to attested reflexes, pointing out that the two processes are not necessarily the same. To take the example above, the reconstruction or projection of **p* can be regarded as a process of simple triangulation, which requires among other things the knowledge that *f* and \emptyset may both ultimately go back to *p*. The mapping or route from **p* to the reflexes on the other hand requires the reconstruction of in-between stages (‘missing links’) which conform to what we know about sound change (Lass’s dictum: ‘preserve the integrity of known pathways’; p. 218). Thus while **p* > *f* might be expected to have taken place directly, a direct change of

¹ The British term ‘comparative philology’ tends to be used to describe comparative and historical linguistics with particular reference to Indo-European languages. Given that this sound change falls squarely within the remit of comparative philology, the term ‘philology’ and its derivatives are used here rather than other possible terms, e.g. historical linguistics.

² For a clear statement of the principles, see e.g. Crowley, 1997 93ff.; for a critical discussion, see Lass 1993.

$p > \emptyset$ is unattested, and would require the assumption of several stages, including f , for example, $p > f > h > \emptyset$. Projecting may involve a single step up, but mapping may involve several steps down and is 'a matter of filling gaps in the record' (Lass 1993: 158). The point here is that establishing the mapping or route is an essential part of historical phonological reconstruction, and a task which needs to be carried out explicitly and systematically, so that the final product is as plausible as the reconstruction from which it extends.

In the Italic development, philological principles of comparative reconstruction resulted in the voiced aspirate series, but these immediately faced phonetic objections, and later typological objections to the stop system of which they ended up a part. Unacceptable $/t d dh/$ in place of acceptable $/t d th dh/$: voiced aspirates do not occur without voiceless aspirates. In Chapter Two I consider these objections briefly but conclude that voiced aspirates, that is breathy voiced stops, still seem the most sensible solution for this series. This assumption finds concrete support in the findings from the later phonetic evaluation in Chapter Five. This does not, of course, solve the problem of typology, unless one admits Elbourne's (1998) recent restitution of voiceless aspirates to Proto-Indo-European.

Philology naturally provides the requisite tools for establishing the Italic reflexes, and this is the subject of Chapter Three. I present a rather detailed presentation of the material for two reasons. The first is one of method. We assume that a basic principle of historical phonological reconstruction must be to establish as far as possible what happened (cf. Jeffers and Lehiste 1982: 167ff.; Lass 1997: 44ff.; Sihler 2000: 186ff.). This is particularly important when working with dead languages, such as the Italic languages other than Latin, which are attested in the form of fragmentary and/or obscure inscriptions. For these languages, ascertaining the reflexes of a reconstructed sound is the result of a careful sifting of evidence of a number of different types, which requires resolving questions of epigraphy, textual interpretation, etymology, and internal reconstruction.³ Only once reliable lexical evidence has been found and the orthographic reflexes noted, can we then attempt to identify possible sounds,

³ These tasks will certainly be eased by Rix's important edition, *Sabellische Texte* (2002), which was not available for the majority of my work. Also useful will be the edition due to be published as the outcome of the *Imagines Italicae* project (University College London, director, M. Crawford). The very nature of the Italic inscriptions makes them a difficult source. They range from texts on buildings (which can be damaged by the environment, e.g. the Oscan public inscription Sa 11), to portable objects which can get lost (e.g. the Oscan inscription Cm 7) and then be found again (e.g. the South Picene on a small bracelet Sp CH 2, for which, see most recently, Stuart-Smith, 2000). 'Restoration' can lead to problems (e.g. the enhancement of letters on the photograph of the South Picene inscription Sp AP 4, Stuart-Smith, 2000). So too can reading: the clearest example of this is the misreading of the beginning of the archaic Faliscan 'Ceres' inscription on a reconstructed pot (LF 1/Ve 241) by Giacomelli (1963), which despite correction by Radke (1965) and Giacomelli herself in 1978, has led to the erroneous 'word' **loufir** in the literature, e.g. most recently Watkins (1995: 127–8). I checked a substantial portion of the Italic evidence myself on a fieldtrip in 1992.

which in turn require understanding the particular relationships between orthography and phonology for that language, and synchronic and diachronic consideration of the phonetic and phonological systems concerned. Simply taking a statement from a handbook presumes that all these stages have been carried out with the same degree of rigour and using the same basic assumptions.

It also assumes that such books exist for the Italic languages, which brings us to the second reason for Chapter Three. While there are a number of handbooks for Latin, there is nothing either up-to-date or comprehensive for the other Italic languages—whose evidence is crucial. One must work not only with a number of books of varying age, but also with an increasing number of journal articles whose content extends, and in some cases supersedes, that of the books. The chapter thus represents the first integrated account of the reflexes for the PIE voiced aspirates in the Italic languages.

We would expect the methods of philology to help us to resolve the route problem, but a review of previous arguments for and against the current explanations does not prove fruitful (Chapter Four; a brief history is given at the end of Chapter Two). Language-internal arguments rest on the distribution of the Italic reflexes themselves, on conditioned changes, on the possible representation of stages in loanwords, on the behaviour of *s. None is convincing. External arguments seek help from higher principles of sound change, such as economy or plausibility, the latter really referring to phonetic plausibility based on comparison with attested parallel changes (e.g. Allen 1958: 101). It is at this impasse that an alternative criterion is sought—again phonetic plausibility—but this time evaluated according to two sources of information: phonetic predictions for sound change derived from applying a phonetic model of sound change to the sounds in question, together with an assessment of historically-attested parallel developments of voiced aspirates in Indo-Aryan.

1.2 Phonetics

Why turn to ‘phonetic’ plausibility? Like Connell (1991: 15ff.) we take the view that sound change is a complex notion which may operate on and be described at different levels—phonetic, phonological, and sociolinguistic. However we assume that whatever the conceptualization of sound change may be, the initial mechanism of sound change typically lies in the domain of phonetics (e.g. Hajek 1997: 12), that is, physiology, aerodynamics, acoustics, perception. The main changes in the Italic development result in the voiced aspirate series becoming a series of fricatives (with partial merger with voiced stops in Latin). Given that the series remains, as do many of the oppositions, and that most of the changes are to the phonetic content of the series/oppositions, it is possible to view the changes as ‘mere phonetic changes’ (cf. Antilla 1989: 57). Many though would

probably prefer to describe them as phonological changes, acknowledging that change to the phonetic content of a phoneme alters the segment itself and the oppositions that it holds with others (e.g. Jeffers and Lehiste 1982: 81). Either way, there are good reasons to assume that phonetic changes were primary in this case.

Phonetics is also an essential, if sometimes implicit, component of comparative reconstruction—both of reconstruction and route (e.g. Antilla 1989: 342). Alongside similarity in meaning, it plays a primary role in identifying sets of cognates. Reconstructed forms need to be consistent with what we know is phonetically possible today (e.g. the ‘phonetic legality condition’, Lass 1993: 174), continuing the ‘uniformitarian’ principle associated with the Neogrammarians that the principles governing language structure and language change were the same in the past as they are in the present.⁴ Reconstructed forms also need to be capable of developing into the attested reflexes via phonetically plausible routes (e.g. ‘phonetic naturalness’, Lass 1993: 171).⁵

A critical assessment of what is usually meant by ‘phonetic(s)’ in philology reveals a broad concept, certainly encompassing some phonology with reference to known segments or known pathways, which is largely informal and often vague. Lass (1993: 171–2) sums up the usual assessment of phonetic naturalness: ‘Our intuitive (or “inductive”) judgement of likelihood, based on pseudo-statistics of recurrence of change-types, is the guiding principle here, apparently, as well as (in some but not all cases) stipulations derived from knowledge of the kinds of articulatory or perceptual processes involved’.⁶ What is deemed to be phonetically plausible, then, often rests on intuitive feelings about how languages change, which derive from general observations of language change and phonetics, skewed by personal experience. In many cases, these probably do provide a fair guide, especially when the researcher feels that they have native-speaker knowledge of the sounds involved. Though note that the full extent and scope of structured phonetic variation is only starting to emerge, much of which even non-naive native speakers are not aware (*see* e.g. Docherty and Foulkes (1999); Stuart-Smith and Lawson (1999); Lavoie (2002)). When reconstructed sounds are beyond the ken of the researcher, it all becomes more difficult. How can we expect native-speaker researchers of English, for example, to have intuitive feelings about how voiced aspirates/breathy voiced stops might develop

⁴ We must be cautious about ascribing uniformitarian practice exclusively to the Neogrammarians, since scholars like Ascoli working just before them seem to have been using the principle before it was made explicit (*see* Morpurgo-Davies 1998: 268–9; 90f.).

⁵ This sentiment is frequently expressed in the literature (*see* e.g. Bynon (1977: 53), Antilla (1989: 242); Hock (1991: 581); Ohala (1993: 237); Ross and Durie (1996); Crowley (1997: 93); Meiser (1998: 20)). (*See also* the critique in Lass (1997: 216ff.) developed from Lass (1978), (1984: 332ff.)).

⁶ Cf. his similar comment in (1997: 137, n39): ‘Our pseudo-statistical judgements are often based on gut feel deriving from experience (either skewed or not: we normally don’t know ourselves); this makes them less useful than harder material, but still often indispensable’.

without first or second-hand experience of the sounds? Similarly, should we expect Indo-Europeanists to know the detailed development of this particular series in Indo-Aryan?

I argue that phonetic plausibility will be useful for evaluating the route problem and also the PIE reconstruction, if, alongside reference to parallel developments of the voiced aspirates, phonetic information is derived more systematically from the results of experimental phonetic investigation. The phonetic model of sound change developed by John Ohala over the past twenty-five years provides a suitable theory.⁷ This model takes as a starting point the common observation that synchronic variation is often similar to attested sound changes and tries to offer a motivated connection between the two. According to the model, speech is seen in terms of a message, a string of phonemes, from speaker to listener, to which ‘noise’ is added during the transmission. The phonetic variation is the noise in this analogy, caused by the inherent constraints of the articulatory system of the speaker, and by constraints of the auditory and perceptual system of the listener. To put it simply, the speaker may produce one sound, but the listener may perceive and reproduce it as another, either because the speaker inadvertently produced it more like another (due to articulatory constraints), or because it sounded like another (due to acoustic or perceptual similarity of differently articulated sounds). Examples would be the affrication of apical stops before high vowels, leading to, for example, the English variants /tʃun/ and /tʃʊn/ for *tune*, or the auditory confusion of [θ] and [f] resulting in for example, Cockney /θ/ for /f/ in for example, *think*. Given that these constraints operate continuously, variation is constantly being produced, giving the opportunity for sound change all the time. Ohala argues that the listener is equipped with corrective rules, which factor out the noise, allow for the correct interpretation of the message, and prevent change. In most cases there is enough redundancy for the errors to be corrected, but sometimes error correction is imperfect, and at this point, sound change may occur (or strictly speaking a ‘mini’ sound change, Ohala 1993: 234, which has the possibility of becoming a ‘maxi’ sound change if selected and spread through the lexicon and the speech community).

Ohala identifies two types of imperfect correction which may lead to change. The listener may not detect the appropriate conditions for applying the rule and fail to correct, resulting in a new segment by ‘hypo-correction’ (under-correction), as in the affrication of apical stops before high vowels where these stops are typically released with affrication in this context. . . . ‘sound changes attributed to hypo-correction . . . would involve listeners copying at face value those details of speech that originally owe their existence to the influence of physical phonetic properties of the speech production system’ (Ohala 1993: 259).

⁷ The sequence of papers begins with Ohala (1974a); the presentation in (1993) is particularly relevant for philologists.

Alternatively, the listener may correct unnecessarily and factor out a feature when it is present in more than one segment in a sequence by 'hyper-correction' (overcorrection), which would offer an explanation for the mechanism behind dissimilation, for example, changes such as Grassmann's Law of dissimilation of aspiration, by which, for example, PIE **bhendh-* becomes Sanskrit *bandh-* 'bind'. Thus Ohala offers explanations for sound change, or certainly the origins of sound change, which arises from the observations and results of experimental phonetics, and which can be tested experimentally.⁸

Ohala's model emphasises the role of the listener in the initial stages of sound change, since the under- or over-correction which leads to mini-sound changes is caused by the listener who either fails to filter out new variants or who filters out aspects of speech which are actually intended.⁹ In contrast to earlier accounts which regarded the mechanism of sound change as largely due to incremental shifts of articulation in the speaker (e.g. Paul 1978: 8), this model shifts the focus of change to the listener. However, the speaker still has a role, since much of the variation is caused by the speaker. Indeed it is possible that articulatory factors may play more of a role in creating variation than Ohala's model currently allows, which could explain the direction of some changes. Assuming acoustic similarity as the cause for confusion may not always be sufficient. For example, in the commonly-observed change of /x/ > /f/, which accounts for the present day English pronunciation of <gh> in English *cough* and *enough* as /f/, it seems that while [f] and [x] may be confused, [x] is more often taken as [f], and this often happens in phonetic environments where lip-rounding is present (see Pagliuca and Mowrey 1987; Pagliuca 1982). We shall see that many of the changes discussed for the Italic development appear to have their source in articulatory variation. However, we assume that the mechanism which would have shifted them from 'variants' to 'changes' was perceptual.¹⁰

The point that variation is not change, and requires an additional perceptual process to become change, is underscored by Lavoie's (2001) recent work on consonant lenition in American English and Mexican Spanish. She found that synchronic allophonic variation did not always match neatly with synchronic or diachronic phonological processes. For example, phonetically the impact of

⁸ This is not new to instrumental phonetics. See Ohala (1993: 265f.) for a list of distinguished predecessors, including Rousselot and Grammont; (see also Hajek 1997: 24).

⁹ For a different model but one which also ascribes change to perceptual factors, see Faber (1992).

¹⁰ There are other phonetic models of sound change. Pagliuca and Mowrey's (1987) model of Articulatory Evolution only admits articulatory change, and is thereby substantially weakened. Browman and Goldstein's (1991) model put forward as a part of Articulatory Phonology sees sound change in terms of variation in articulatory 'gestures' during casual speech production, though perception is involved in certain types of change (Foulkes 1993; McMahon, Foulkes and Tollfree 1994: 290ff.). Articulatory Phonology offers an interesting alternative to that adopted here, with the proviso that the gestural specification for voiced aspirates would require some modification.

weakening on a word-medial stop often appears as a stop with incomplete closure and some frication though without the characteristics of a 'true' noisy fricative, while phonological weakening in this position results in fricatives. Lavoie's explanation for this (2001: 166) differs from that of Ohala, but also involves perception: 'I hypothesize that the fricatives result from phonologization. . . . Stops with partial closures are perceived categorically, either as a stop or a fricative. The stop's partial closure eventually gives way to even less closure which, while not quite a fricative gesture, is interpreted as such, and people begin to produce an actual fricative gesture.'

The sound changes in Ohala's model result from the listener's inappropriate processing of variation which in turn is a direct consequence of universal constraints on the articulation, acoustics and perception of speech. The model can therefore only deal with those changes 'which are observed in numerous languages distant from one another typologically, chronologically, and geographically, [and which therefore] must have been caused by factors universally present in all speakers and societies throughout time, namely the inherent constraints of the speech production and perception system' (Ohala 1974a: 355–6). This makes it entirely appropriate as a source of information with which to examine the Italic development since there is no reason to assume that the origins of the development was subject to particular language-specific, sociological or cultural factors.

Ohala's 'mini-sound changes' yield variation within individuals which may or may not go on to become 'maxi-sound changes', or 'a change in the pronunciation norm in a given word' (Ohala 1989: 175). The model offers a motivated account for the phonetic origins of sound change, but does not attempt to explain why or how particular mini-sound changes might subsequently spread (Ohala, e.g. 1989: 175; Foulkes 1997: 272). The question of the subsequent implementation of variants resolves into substantial areas of research, which are not dealt with here. The spread of variants through the lexicon is pursued through studies into lexical diffusion (e.g. Wang 1969; Labov 1994). Sociolinguistic work in language variation and change offers possible explanations for the spread of variation through the speech community.¹¹ Change may result from variants being adopted and accepted by speakers as part of specific sociolinguistic systems, for example, Labov (1972), (1994), (2001). Alternatively, variant selection is speaker innovation which is not in itself change, but which may result in change in linguistic structure if it spreads across and beyond a community, for example, Milroy (1992); McMahon (1994: 248f.).

Perhaps least understood is the 'generalization' of phonetic variants, that is how variants might spread from an original phonetic environment where they arose expectedly to others where they are not expected. This turns out to be

¹¹ More recent models are now emphasizing the role played by dialect contact arising from social and geographical mobility, and the resulting impact on the construction of identity.

important for evaluating the Italic development, since if phonetic variants may be generalized, both the traditional explanations are equally possible. This problem is not particular to this work, but applies to all who use Ohala's model to explain sound change. There must be an assumption of some type of process of generalization for the model to be able to account for attested sound changes, and this is stated explicitly by Ohala himself (e.g. 1989: 175); *see also* Foulkes (1997: 272). However, the question is not a trivial one, indeed it is a major research question in its own right, which is likely to be advanced by the increasingly detailed phonetic analysis of sociolinguistic variation and change which is now being carried out (e.g. Docherty and Foulkes 1999; Stuart-Smith and Tweedie 2000; Stuart-Smith, Timmins, and Lawson, *in prep.*). Observations of contemporary speech show that variants do seem to arise in 'likely' phonetic environments, as predicted by the model, but they also seem to be able to spread to less likely ones. For example, in recent work on the change /θ/ > /f/ in Glaswegian English, there is evidence of [f] only in the expected environments (with lip-rounding, e.g. *tooth, mouth*) in certain speakers, while others show [f] in a range of environments including unlikely ones, with no clear indications as to why there has been generalization across the system in these speakers. However, perhaps the point to be made here is that using the model we can pinpoint phonetic environments where certain variants—and so sound changes—are more likely than others. Certainly, the variants could have been generalized, resulting in either of the routes proposed for the Italic development, that is, they are phonetically possible. But what I want to argue is that the phonetic model supported by observed parallel changes allows evaluation of what is more phonetically plausible.

The interaction between phonetics and phonology in Ohala's model presents phonologization in a simple conceptualization, with a single step from the phonetic to the mental representation. Working from Italian data on nasalization, Hajek (1997) modifies the model to include a level of language-specific phonological and phonetic representation consistent with Lexical Phonology partly motivated by evidence of language-specific differences in what might otherwise be assumed to be the product of universal factors. In this way he is able to model the incorporation of language-specific degrees of phonetic nasalization of vowels before nasalization is phonologized. For our purposes, the basic model seems more useful. While it may be an oversimplification of the processes of phonologization, the basic mechanism of the reinterpretation of variation remains constant. Language-specific variation in itself is not inconsistent with universal constraints, since it seems likely that language-specific variation can only exploit the resources made possible by universal constraints.¹²

¹² This is complicated by the fact that 'universals' here are of course based on language-specific observations!

Within an overall conception of sound change, Ohala's model helps tackle an aspect of the actuation problem, that is, 'why sound change begins' (McMahon 1994: 47) to the extent that it identifies constrained sources for variation and offers a coherent and plausible account for how variation becomes change.¹³ What is important here is that the variants (and thus sound changes) predicted by phonetic constraints are delimited. An interesting incidental finding from the work of Chapter Five, where the model is applied to voiced aspirates, to my knowledge as the first comprehensive application to a series of reconstructed sounds, is that the constraints yield a finite set of predicted variants, which are matched exactly by (a) observed synchronic variants, and (b) historically-attested changes. Nothing was predicted that did not occur, and nothing occurred which was not predicted. Of course, the scope of the variation is quite wide, but the model does impose useful limits, especially for a task of evaluation like ours, when what we need to know is what is likely to happen (and conversely, what is less likely).

In Chapter Five I set the scene for the assessment of the phonetic plausibility of the proposed routes for Italic development using two bodies of evidence, one drawn from phonetic theory ('phonetics') and the other from observed parallel developments ('parallels'). Applying the model of sound change outlined above I consider the phonetic characteristics of voiced aspirates, realised as breathy voiced stops, and in particular, the variation—and hence potential sound changes—that can be predicted from articulatory, acoustic, and perceptual constraints. Phonetic predictions for change are immediately checked against observation of synchronic variation derived from instrumental and auditory analysis of the sounds in New Indo-Aryan languages.¹⁴ The changes predicted by phonetic theory are then compared with parallel changes that voiced aspirates have undergone in the history of the Indo-Aryan languages. Thus with a body of information from 'phonetics' and 'parallels' I am able to evaluate the routes, and in particular the first stage of each, in Chapter Six. The result is somewhat unexpected: Rix's account emerges as least phonetically plausible, Ascoli's is plausible, but a third possibility—which assumes a split development according to position in word from the earliest stage of Italic—seems more so, and this is laid out in Chapter Six. Phonetics and parallels together motivate the assumption that in word-initial position the voiced aspirates devoiced, but that word-internally they remained voiced and changed into fricatives. The word-initial voiceless aspirates then became fricatives. The distribution of voiceless fricatives word-initially and voiced ones word-internally was maintained throughout the

¹³ For further discussion of the actuation question, see McMahon (1997: 248).

¹⁴ I view synchronic variation as consisting both of variation which arises from articulatory constraints and also that resulting from 'intentional' production by listeners-turned-speakers after misinterpretation of variants from articulatory/acoustic/perceptual constraints. See Ohala (1993: 268): 'at any given time all languages are probably flooded by all applicable mini-sound changes'.

history of Italic, with the qualification that in Latin the voiced fricatives became stops before the historical period.

A further result emerges from Chapter Five, namely phonetic support for the reconstruction of the voiced aspirates for Proto-Indo-European. The phonetic discussion takes as a basic assumption that the reconstructed series were voiced aspirates realized as breathy voiced stops (continuing the conclusions of Chapter Two that the phonetic and typological objections against these are not strong enough to warrant a change to the traditional view). The review of all possible phonetic variation for breathy voiced stops predicts a set of changes which are exactly matched by the attested parallel developments of the voiced aspirates throughout the history of Indo-Aryan. All and only all the changes predicted by phonetic theory are found. When we compare these findings with the earliest attested reflexes of the PIE voiced aspirates, we find a very close fit. This strongly supports the reconstruction of the PIE voiced aspirates as breathy voiced stops as the most plausible solution phonetically.

A question remains as to whether a phonetic approach is appropriate for tackling philological problems. Perhaps unsurprisingly, Ohala (1993: 238) himself states that 'it is possible to do better historical phonology by taking into account the mechanism of sound change' and goes on to say that including the results of laboratory study in comparative reconstruction allows 'a more rational choice of sound changes to be posited to convert reconstructed [forms] into attested forms' (p. 266; *see also* Ohala 1995: 169–70). But his views can be found echoed elsewhere for example, Foulkes (1997: 272): 'It is vital that reconstruction, and historical phonology in general, utilizes the findings of phonetic research and phonological theory in order to constantly reassess the validity of its own proposals' (*see also*, e.g. Ross and Durie 1996: 18f.). And there have been distinguished philologists at work before who have referred to phonetics, notably W. S. Allen, whose phonetic expertise has informed philological discussion of Latin, Greek and Sanskrit pronunciation (1978, 1987, 1993), and has also been applied to these problems (1958, 1977).¹⁵

However, it would be a mistake to think that the inclusion of phonetics in philological work is a characteristic of twentieth-century scholarship.¹⁶ The Neogrammarian scholar, Eduard Sievers, was an accomplished phonetician whose *Grundzüge der Lautphysiologie zur Einführung in das Studium der Lautlehre der indogermanischen Sprachen* was published as the first volume in the

¹⁵ The upshot of Allen (1977) is that there can be 'no good reason for interpreting it [i.e. **dh* as a voiced aspirate] in any other way'. His (1958) paper is devoted to providing 'a reasonable basis for the Latin developments in terms of phonetic probability—i.e. with due regard to what can and does happen in other IE languages' (p. 101). He takes Ascoli as the accepted explanation.

¹⁶ Ohala (1993: 238) lists the scholars, including Osthoff, Brugmann and Rousselot, who 'all insisted and sometimes demonstrated that we could understand language change better by paying more attention to the phonetic and psychological aspects of change'.

series *Bibliothek indogermanischer Grammatiken* in 1876.¹⁷ Morpurgo-Davies (1998: 164) notes that the work advanced ‘knowledge of phonetics in general and phonetics of ancient Indo-European languages in particular’. In general, the Neogrammarians called for the study of living languages to inform our understanding of the past, and that included phonetic study. However, there was earlier reference to phonetics in comparative and historical linguistics (see Lehmann 1992: 29f.; Morpurgo-Davies, 1998: 163–4). Consider, for example, the work of von Raumer (1815–76) who argued that ‘a process of sound change required a phonetic understanding of the point of departure and the point of arrival’ (Morpurgo-Davies 1998: 163), or the attempts to use phonetic information to inform historical conclusions by Rapp (1836–41) and Jacobi (1843) (Morpurgo-Davies loc. cit.), or even the outburst of the Germanist von Scherer in 1868: ‘Is it too much to ask that a philologist who seeks a physiological explanation of phonetic processes, should read through some sixty pages of this classical book [sc. Brücke 1856]?’ (in Morpurgo-Davies 1998: 164). The book referred to is the manual of phonetics published by the physiologist, Brücke, *Grundzüge der Physiologie und Systematik der Sprachlaute für Linguisten und Taubstummenlehrer*.¹⁸

I would therefore like to feel that by using an evaluative criterion of phonetic plausibility which refers explicitly to a phonetic model of sound change and the results of contemporary phonetic research, my research belongs to a long-standing tradition in philology proper. However, in so doing I do not intend to throw stones at those who do not. The contention of this book is that for this particular case it seems very difficult to make progress in any other way. I suspect that my methods may well prove useful for other difficult cases of historical phonological reconstruction, but this is a point to be demonstrated by others.¹⁹

¹⁷ The phonetic nature of the Sanskrit voiced aspirates are discussed by Sievers, who concludes that they were produced with ‘Murmelsstimme’ or ‘voiced breath’.

¹⁸ Brücke (1856: 59) argued that voiced aspirated stops are impossible and goes on to suggest that the sounds in Sanskrit must have been voiced fricatives. His later investigation of the pronunciation of voiced aspirates by a native speaker of Hindustani (1859) concludes that the sounds are voiced stops which are devoiced and followed by voiceless aspiration.

¹⁹ For progress in understanding the phonetic and phonological nature of the PIE laryngeals as a result of current phonetic and phonological theory, see now Reynolds, West, and Coleman (2000).

The Italic Sound Change: Background

2.1 The PIE voiced aspirates

The starting point for the set of sound changes discussed here is a series of stops reconstructed for Proto-Indo-European generally referred to as the ‘voiced aspirates’. The PIE sounds are traditionally reconstructed as a series of voiced aspirate stops at five places of articulation (labial, dental/alveolar, palatal, velar and labiovelar), usually represented as **bh*, **dh*, **ĝh*, **gh*, and **gʷh* (e.g. Szemerényi 1989: 55f.; Sihler 1995: 136f.).¹ The voiced aspirates, as their name and transcription suggest, are assumed to be sounds which were both voiced and aspirated. They are reconstructed for Proto-Indo-European partly because the daughter languages show correspondences which point to both voice (Balto-Slavic, Celtic, Germanic) and aspiration (Greek) and partly because such sounds are found in Sanskrit and several New Indo-Aryan languages. Phonetically, voiced aspirates are usually thought of as similar to the sounds found in Indo-Aryan languages today, that is stops that are canonically produced with voicing during closure and with breathy-voiced release. Examples of relevant correspondences for the reconstruction are:

- PIE **bh*: Skt *bhar-*, Gk *φέρ-*, Lat. *fer-*, Got. *bair-* ‘carry’
Skt *nabhas-*, Gk *νέφος*, Lat. *nebula*, Got. *nibul* ‘cloud’
- PIE **dh*: Skt *dhā-*, Gk *θη-*, Lat. *fē-* ‘do, make, put’
Skt *madhya-*, Gk *μέσος* < **methyos*, Lat. *medius*, Got. *midjis* ‘middle’
- PIE **gh*: Skt *him-*, Gk *χίον*, Lat. *hiems*, OCS *žima* ‘winter, snow’
Skt *vah-*, Gk (*F*)*οχ-*, Lat. *veh-*, OHG *weg-* ‘drive, convey’
- PIE **gʷh* Skt *gharmaḥ*, Gk *θερμός*, OLat. *formus* ‘hot’, NHG *warm* ‘warm, hot’
Av. *snaēž-*, Gk *νίφα*, Lat. *nix*, Got. *snaiws* ‘snow’

¹ For a discussion of the Italic treatment a reduced set of only four stops is required (**bh*, **dh*, **gh*, **gʷh*), since the palatal and velar stops fell together at an early stage (Leumann 1977: 146f.).

The reconstruction of the voiced aspirates has met with two objections which I will discuss briefly, though I conclude that neither seriously undermines their reconstruction.

The first objection, and one which was raised soon after their reconstruction for Proto-Indo-European, was phonetic: that sounds which are both voiced and aspirated are physically impossible (*see e.g.* Meringer 1888: 142).² In other words, it was claimed that it is physically impossible for a sound to be voiced, and then to be immediately followed by aspiration (a puff of voiceless breath). To accommodate this a series of different, phonetically more familiar sounds was postulated, usually fricatives, in place of the problematic voiced aspirates (Walde 1897; Prokosch 1917/18).

While the term 'voiced aspirate' may be paradoxical according to traditional definitions of 'voice' and 'aspiration' (e.g. Ladefoged 1993), there is no doubt that stops exist in certain languages such as Hindi, and probably also existed in Sanskrit (Allen 1953: 33–8), which from an auditory point of view at least are voiced stops followed by a period of 'aspiration', during which voicing and breathiness are heard together. Such stops are the usual pronunciation for the phonological series of stops called 'voiced aspirates' in these languages. If these sounds are not phonetically described as 'voiced aspirated stops' (although some phoneticians would keep this term, e.g. Dixit 1987a), they are recognized as involving a phonation type distinct from voicing or aspiration, during which the vocal folds vibrate while apart, which is called 'murmur' or 'breathy voice' (e.g. Ladefoged and Maddieson 1996: 48). Thus there is no phonetic objection to the reconstruction of a phonological series of voiced aspirate stops which are phonetically realized as breathy-voiced stops (*see e.g.* Comrie 1993: 82).³

The second assault on the voiced aspirates came from typology. The voiced aspirates were originally reconstructed for Proto-Indo-European along with three other stop series, giving a four-series system of plain voiceless, plain voiced, voiceless aspirate and voiced aspirate stops: /t d th dh/ (e.g. Brugmann 1897: 92). The four-series system was reduced to three after it was argued that the Indo-Aryan voiceless aspirates could be the result of, among other things, an innovation specific to that group arising from sequences of voiceless stop followed by laryngeal.⁴ Thus arose the 'standard' three-series PIE stop system: /t d dh/ (e.g. Mayrhofer 1986: 98). It was this system, and in particular the appearance of voiced aspirates without a corresponding series of voiceless

² Meringer was referring to views of physiologists such as Brücke, e.g. (1856); (1859) Prokosch (1917/18, 1918/19, 1920/21) and Hopper (1973) express similar concerns.

³ Salmons' (1993: 56) rejection of the voiced aspirates as breathy voiced stops, on the grounds that the glottal gesture which is found during Hindi /bh/ etc. is characteristic of 'whispery voice' or 'murmur', rather than 'breathy voice', is difficult to maintain. He bases his statement on Catford's definitions, which have been correctly rejected by Dixit (e.g. 1987a).

⁴ This was first recognized for Skt *th* by de Saussure in 1891. It was later extended to all the Sanskrit voiceless aspirates by Cuny (1924); for brief discussion *see e.g.* Mayrhofer (1986: 91f.); Elbourne (1998).

aspirates, which was criticized as typologically inconsistent. This is most clearly stated by Jakobson (1957 [1962]: 528): ‘no language adds to the pair /t/–/d/ a voiced aspirate /d^h/ without having its voiceless counterpart /t^h/, while /t/, /d/, and /t^h/ frequently occur without the comparatively rare /d^h/... theories operating with the three phonemes /t/–/d/–/d^h/ in Proto-Indo-European must reconsider their phonemic essence’. Calls were made for the reconstruction of the PIE stop system to be modified. There have been different responses to this challenge.

One approach was to redefine the voiced aspirates and/or the series in some way. The voiced aspirates could be redefined ‘phonemically’, taking the essential feature which distinguished /t d/ from /dh/ as ‘aspiration’. The voiced aspirates could have been phonetically voiced, but phonologically ‘aspirated’ stops, with a redundant feature of voice.⁵ However, this solution, while possible phonologically, does not meet the typological objection, which clearly includes phonetic features in distinguishing between acceptable /t d th/ but unacceptable /t d dh/. It is rejected as ‘sleight-of-hand’ by Allen (1977: 210).

A more drastic redefinition of the PIE stop system is found in the ‘Glottalic Theory’, first presented in two independent articles in 1973, by Gamkrelidze and Ivanov, and Hopper.⁶ According to this /t d dh/ are reinterpreted as /t^(h) t^(h) d^(h)/; the traditional plain voiced stop becomes a glottalic ejective, and the plain voiceless and voiced aspirate stops become plain stops with redundant features of aspiration.⁷ In the Glottalic Theory the stops that correspond to the traditional voiced aspirates are given as voiced stops with redundant aspiration, with the aspirated allophone as most common.⁸

It is difficult to know how a voiced stop /d^(h)/ with a basic allophone [dh] differs from a ‘voiced aspirate’ /dh/ with a basic allophone [dh]. The end result seems little different from voiced aspirates reconstructed in their usual form. Even if the Glottalic Theory satisfies synchronic typological considerations, and this is not clear (*see e.g.* Hayward 1989), a more serious consideration is whether

⁵ This was first noted by Kuryłowicz (1935: 50); for later use in support of the standard system, *see e.g.* Peeters (1971).

⁶ For discussion of the Glottalic Theory with full bibliography, *see e.g.* Salmons (1993). The most comprehensive presentation of the theory by Gamkrelidze and Ivanov is their 1984 book (available in translation, Gamkrelidze and Ivanov 1995) reviewed in detail by Hayward (1989). (*See also* Vennemann 1989).

⁷ The system is set up as follows (*e.g.* Gamkrelidze and Ivanov 1973): (1) The voiced stops of the traditional system should be redefined as voiceless ejectives. (2) Since voiced aspirates cannot exist without voiceless aspirates, the plain voiceless stops should be redefined as voiceless aspirates. (3) The new system consists of ejectives, voiced aspirates and voiceless aspirates. The opposition between the two aspirate series now depends on a feature of voice, and aspiration is a redundant feature; the opposition between the two series can be phonologically reinterpreted as one of ‘voice’ with an optional feature of aspiration.

⁸ Phonemic voiced stops with occasional breathy voiced allophones are possible, and attested in some New Indo-Aryan languages, though the period of breathy voice is very short (*e.g.* Hindi; Dixit 1975: 145).

the reconstructed system can develop into the attested reflexes on which it is based.⁹ In most cases the general assumption for all versions of the Glottalic Theory is that the ‘voiced’ stops (/d^(h)/) must become voiced aspirate phonemes at some stage, either in late Proto-Indo-European or at an early stage of the language in question, in order to develop into the various attested reflexes.¹⁰ Thus there appears to be no substantial change to the content of the series corresponding to the traditional voiced aspirates.

A different type of phonetic redefinition, this time of the voiced aspirate series alone, is presumed by claims that typological parallels for the standard reconstruction do exist. Several languages have been given as showing examples of voiced aspirates beside plain voiced and voiceless stops. The West African Kwa language Mbatto is given by Stewart (1989: 238; also Comrie 1993: 84), the Austronesian language Kelabit by Mayrhofer (1986: 93, n14) and by Hock (1991: 625–6), who gives a related language Lun Daye also found on the island of Borneo and a further example, Madurese, from the Indonesian island of Madura.¹¹

The most recently published phonetic investigation of the Madurese ‘aspirates’ shows that they are phonetically voiceless aspirated stops (Cohn and Ham 1998). The Mbatto stops appear to belong phonetically to those stops which function as tone ‘depressors’, that is a series of stops with voiceless closure which lower the pitch of the following vowel which is often also breathy.¹² The relevant sounds in Kelabit (and possibly Lun Daye) may belong to a rare type of stop which combines voicing during stop closure with voicelessness on release (e.g. Blust 1969: 90) and only occur as ‘an optional characteristic of one set of allophones’ (Elbourne 1998: 4 on Gamkrelidze and Ivanov 1995: 12, n13).¹³

Such stops are not at all like the voiced aspirates ~ breathy voiced stops of the traditional reconstruction (e.g. Hayward 1989: 45, nn9, 12; 46) or of the system which is typologically unacceptable. Even more problematic is the lack of evidence to suggest that these stops could develop into the reflexes found in the

⁹ See e.g. Hayward (1989); Job (1989). For an assessment and rejection of the Glottalic Theory’s predictions for the Italic reflexes of diaspirate roots, see Wallace and Joseph (1994), who also reject a repaired version of this theory, proposed for Italic by Baldi and Johnston-Staver (1989). Gamkrelidze’s (1999) subsequent account is clever but awkward, since the evidence put forward for the maintenance of original voiced stop allophones in e.g. Lat. *fido*, O *ḡifikus* (Cp 37:5) depends partly on the absence of Sab. forms attesting a fricative (and thereby a shared PrIt. fricative stage) and partly on evidence like O *ḡifikus* whose meaning and derivation is not certain.

¹⁰ This is explicit in Baldi and Johnson-Staver’s (1989: 95) account of the development of the stops into Italic, which they represent as: ‘[b^h] > p^h > [ɸ] > f’.

¹¹ Woodhouse (1995) uses this last example to support his redefinition of the series as ‘lax voiceless aspirated stops’ (rejected by Elbourne 1998: 3, n2).

¹² They occur alongside what Stewart (1989) calls ‘voiceless fortis’ and ‘voiced lenis’ stops. See Rycroft (1983) for the phonetics of depressor consonants in southern Bantu languages; see also Jessen and Roux (2002) on Xhosa.

¹³ See Henton, Ladefoged and Maddieson (1992: 87), also Ladefoged and Maddieson (1996: 62–3, 80) for a similar sounds showing mixed voicing in the South African language, Zhu|hōasi.

daughter languages, and in particular into the breathy voiced stops attested in Sanskrit and the New Indo-Aryan languages (*see e.g.* Elbourne 1998: 3–4).

Besides simply accepting the standard system /t d dh/ as a typological oddity (e.g. Allen 1977: 245), an alternative response to the typological objection has been to reconsider the validity of the typological statement itself. The weight of a typological statement depends on the quality of the data on which it is based, usually phonemic inventories. In turn, these are not always classified according to the same criteria (Hayward 1989: 44, 19) or with the same degree of rigour (e.g. Jakobson 1957: 525; *see also* Maddieson 1999). However, a review of the data does confirm that voiced aspirates in extant languages always occur with voiceless aspirates, and that they occur in a small number of languages with a restricted areal distribution.¹⁴ We might want to note, though, that even some typologists are concerned that the evidence may be too limited to form an implicational universal in this case (*see* Comrie 1993: 83–4).

Of course, if the PIE voiceless aspirates are reinstated, the typological objection disappears (e.g. Szemerényi 1967; *but see* Mayrhofer 1983). This has been the task of Elbourne (e.g. 1998), whose concerns about the standard system and desire to achieve a reconstruction which satisfies both synchronic and diachronic typology, motivates a re-examination of the evidence for the PIE voiceless aspirates and a return to the four-series stop system of the Neogrammarians. If Elbourne is right, all worries about the traditional reconstruction of the voiced aspirates vanish.

The upshot of our discussion is this. The phonetic objection against the voiced aspirates simply does not hold. The typological objection is stronger, but it is doubtful whether it is sufficient to abandon the traditional reconstruction. For what follows I assume that the starting point of our development was a series of voiced aspirate stops, realized phonetically as breathy voiced stops, similar to those which are found in contemporary Indo-Aryan languages. Many Indo-Europeanists would accept the voiced aspirates as part of an unusual three-series stop system, but it may even be possible to include them as part of a typologically unexceptional four series system.

2.2 The Italic Development

In this book we are interested in the development of the voiced aspirates in one particular group of IE languages, the ‘Italic’ languages. The Italic languages are

¹⁴ The African languages concerned are: Igbo (West Africa), e.g. Ladefoged *et al.* (1976) and !Xu (South Africa), e.g. Maddieson (1984: 116). The language groups from the Indian sub-continent are: New Indo-Aryan, e.g. Hindi, e.g. M. Ohala (1983); Munda, e.g. Mundari, e.g. Gumperz and Biligiri (1957); and Dravidian, e.g. Telugu, e.g. Caldwell (1913: 146f.). *See* Ladefoged and Maddieson (1996: 57f.).

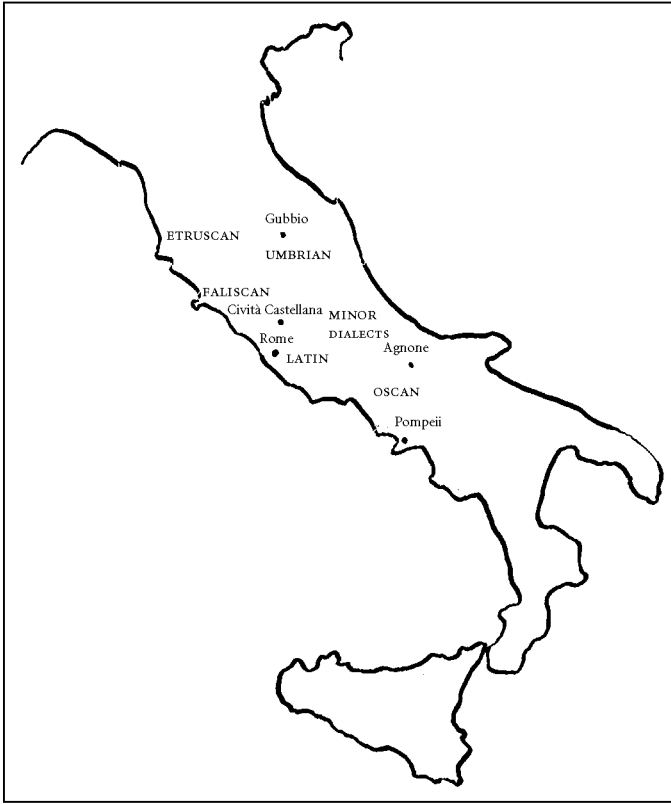


FIGURE 2.1 Map of Italy showing approximate location of the Italic languages and Etruscan from the fourth to the first century BC. Shading indicates areas of Greek colonization

the group of ancient languages spoken across the Italian peninsula, whose best-known representative is Latin. The other languages considered Italic here are Faliscan and the Sabellic languages: Oscan, Umbrian, the Minor Dialects, and the fragmentary evidence for earlier dialects or languages, such as South Picene (see Map in Fig. 2.1).

I use the term 'Italic' for the whole group of languages according to the usual convention (e.g. Buck 1928: 2f.; Leumann 1979: 10*¹⁵). I assume that the development of the Italic languages from Proto-Indo-European took place via a

¹⁵ For a different use of the term 'Italic' to refer only to the Sabellic group, which assumes two separate developments of Latino-Faliscan and Sabellic from PIE, with subsequent language contact to account for similarities between the two groups, see e.g. Devoto (1969). For brief discussion with references, see e.g. Leumann (1979: 27*–28*). Jeffers (1973) argues for an independent development of the PIE voiced aspirates in Latino-Faliscan and Sabellic, but he does not take proper account of the evidence, and is rightly rejected by Joseph and Wallace (1987). For discussion of the relationship of the Italic languages, see the collection edited by Gusmani (1993) with the review by Rix (1994b).

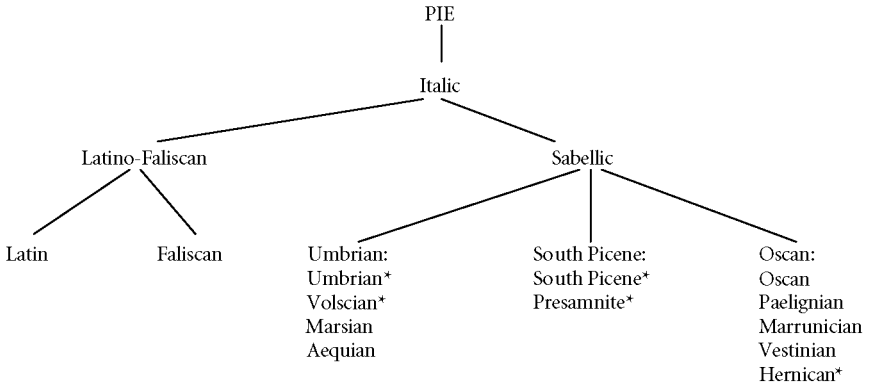


FIGURE 2.2 The Italic Languages. *denotes dialects/languages which are attested in archaic inscriptions, or for which archaic inscriptions exist

common Italic stage (following e.g. Rix 1994*b*; *pace* Untermann 2000: 10). A rough schema of the relationships between the Italic languages and Proto-Indo-European is shown in Figure 2.1 (no time depth is implied; cf. Clackson 2000).

While Latin and Faliscan are undisputed as language labels, the same cannot be said for the names for the other Italic languages. Here I use the following conventions. I refer to the group of languages other than Latin and Faliscan as ‘Sabellic’, thus following Rix (2002 ‘sabellich’, Wallace, p.c., Meiser 1986). This group is often also referred to as the ‘Osco-Umbrian’ group (e.g. Buck 1928, and most recently Untermann 2000, ‘oskisch-umbrisch’). Within Sabellic, ‘Oscan’ and ‘Umbrian’ are not problematic, nor are the names for the individual languages or dialects spoken in central Italy: Paelignian, Marrucinian, Vestinian, Aequian, Marsian, Volscian, Hernican. I refer to these latter varieties as the Minor Dialects (as e.g. Buck 1928), though other terms have been used (e.g. ‘Sabellian’ by Wallace 1984). Finding appropriate names for the earliest forms of Sabellic represented by the small number of fragmentary inscriptions has been difficult, and different scholars have come up with different solutions. Here I use the following labels: ‘South Picene’ (cf. Rix 2002, ‘südpikenisch’ after Marinetti 1985, ‘sudpicene’); ‘Presamnite’ (cf. Rix 2002; Meiser 1986: 19*f*., ‘präsamnitisch’); ‘Old Umbrian’ (cf. Rix 2002, ‘paläoumbrisch’); ‘Old Hernican’ (cf. Rix 2002, ‘paläohernikisch’); ‘Old Volscian’ (cf. Rix 2002, ‘paläovolskisch’).

Italic is taken to consist of two groups, Latin-Faliscan and Sabellic. Here I assume that Latin and Faliscan were separate languages but belong together (following e.g. Wallace and Joseph 1993). The remaining languages constitute the Sabellic group. There has been some discussion as to how the Sabellic languages themselves relate to each other. Meiser (1996) argues for an Umbro-Sabine subgroup which includes: South Picene; Presamnite; Old Umbrian; Umbrian; Volscian, Aequian and Marsian; and possibly also the ‘north Oscan

dialects': Paelignian, Marrucinian and Vestinian. Rix (2002: 4f.) assumes a different grouping following Adiego-Lajara (1992): 'umbrisch': Umbrian (including Old Umbrian), Volscian (including Old Volscian), Marsian, Aequian; 'südpikenisch': South Picene, Presamnite; 'oskisch': Oscan, Paelignian, Marrucinian, Vestinian, Hernican (including Old Hernican).

One characteristic that defines a language as 'Italic' is the word-initial treatment of the voiced aspirates to voiceless fricatives, and these languages all show such a development. One further ancient IE language attested in the North of Italy which seems to show voiceless fricatives in this position is Venetic, though the word-internal treatment and other linguistic features make the classification of this language as Italic difficult, and its position is disputed (*see e.g.* Lejeune 1974: 163–73). Venetic is not included in this assessment, though it is hoped that the conclusions drawn here for the undisputed Italic languages will also be useful to those interested in Venetic.¹⁶

It is usual to refer to the Italic development of the PIE voiced aspirates in terms of a main 'unconditioned' treatment and a set of accompanying '(phonetically) conditioned' treatments. This convention is followed here, with the reservation that the distinction is descriptive—every environment is conditioned by phonetic and phonological factors. Word position appears to be a key factor, since the main treatment differs according to position in the word, word-initial or word-internal, and indeed the treatment itself is one of the few pieces of evidence towards word-boundaries for the ancient Italic languages (*see* Untermann 1968). The main development can be summarized using **bh* as the example:

PIE **bh*- > Lat./Fal./Sab. *f*-
 PIE **-bh*- > Lat. *-b-*, Sab./Fal. *-f-*.

The change to voiceless fricatives in word-initial position is generally uniform in the Italic languages. In word-internal position the development as a whole is more complex and shows a number of different reflexes varying according to place of articulation and language. Nevertheless, across the languages there is a common factor in that fricatives either occur as such, or should probably be reconstructed in order to account for instances such as Latin *-b-* for **-dh-*. Thus the explanations put forward to explain the developments assume a common Italic fricative stage. Phonologically, the main development of the voiced aspirates tends to lead to changes to the phonetic content of the phonemes, which otherwise continue to contrast with the reflexes of the other stop series.¹⁷

The main point of interest of the Italic development concerns the route, and the number and nature of stages, to be reconstructed to get from the PIE voiced

¹⁶ The Venetic evidence and a discussion of possible explanations for the Venetic treatment is given in Stuart-Smith (1996).

¹⁷ For details of the development as a system, *see* p. 220–4.

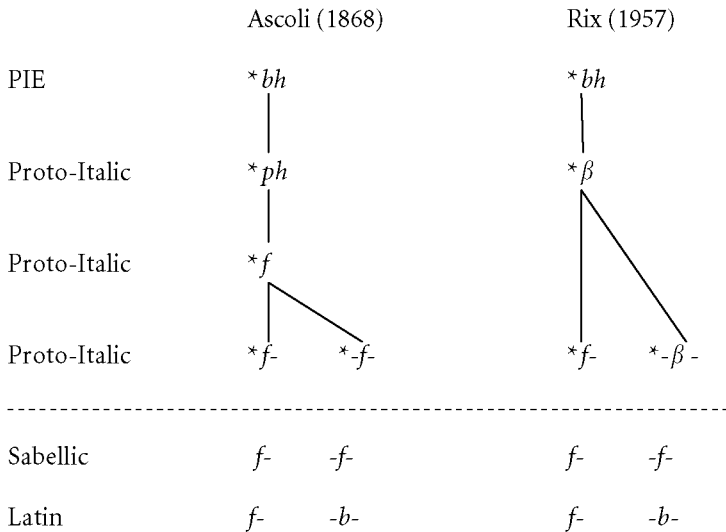


FIGURE 2.3 The Ascoli and Rix explanations for the main Italic development of the PIE voiced aspirates. (*bh is taken to represent the series as a whole. *f*- indicates word-initial; *-f* indicates word-internal.)

aspirates to the Italic reflexes. There are two principal explanations, which are named after the two scholars who formulated them most extensively (see Fig. 2.3): (1) the ‘Ascoli’ explanation, which proposes devoicing of the voiced aspirates and a common voiceless fricative stage (with subsequent revoicing in Latin), and (2) the ‘Rix’ explanation according to which the voiced aspirates became voiced fricatives in Italic and were then devoiced. Of these, Ascoli’s is the standardly accepted explanation (e.g. Buck 1933; Leumann 1977; Sommer/Pfister 1977; Szemerényi 1989), though that of Rix has gained ground (e.g. Meiser 1986). An outline of the history of the debate between the two theories and their supporters follows.¹⁸

The problem of explaining the Italic reflexes of the PIE voiced aspirates is as old as their reconstruction. Curtius (1853) was one of the first scholars to reconstruct voiced aspirates for PIE, and while doing this, he also considered the Italic reflexes, though his explanation referred to direct changes (e.g. *bh > f) and did not include stages. The concept of the Italic development in terms of stages was found first in Corssen (e.g. 1863). This is most clearly seen in his

¹⁸ For a comprehensive survey of previous literature, see Szemerényi (1952/3 [1987]), though note that only a cursory account of Ascoli’s theory is given and that his review is heavily biased towards Ascoli.

explanation of the development of **bh*, which he proposed was to an ‘old’ Italic *f*, ‘a labial aspirate with a strong breath’. This either ‘hardened’ to *b* with ‘loss of breath’ or became *h* with loss of the labial element.¹⁹

The explanation which was to become standardly accepted was proposed only a few years later in 1868. Ascoli’s explanation, which concentrates on the Latin development, was largely prompted by the desire to substantiate a belief in a period of Graeco-Italic linguistic unity.²⁰ Like Corssen, Ascoli thought that the development must have occurred through a series of stages, and reconstructed a process: PIE voiced aspirates > Graeco-Italic voiceless aspirates > Italic voiceless fricatives. These sounds were preserved initially and generally in internal position, but in Latin, the word-internal Italic voiceless fricatives became voiced fricatives and finally voiced stops. The detailed proposal was:

PIE **bh* > PrGr./PrIt. **φ* (*ph*) > PrIt. **f*
 PIE **gh*²¹ > PrGr./PrIt. **χ* (*kh*) > PrIt. **h* (*x*)

In Sabellic, and word-initially in Latin, **f* remained, and **x*- became an aspirate.²² In Latin internal **-f* became voiced between vowels and between ‘liquida’ (liquid/nasal) and vowel, and later became a voiced stop. Word-initially before a liquid **h*- also became a voiced fricative and then a stop. In word-internal position **-h*- either hardened to *k*, or generally became an aspirate, which could be lost, or in some cases became a voiced stop.

PIE **dh* > PrGr./PrIt. **θ* (*th*)
 word-initial: PrIt. **th* > It. *f*
 word-internal: PrIt. **th* > $\left\{ \begin{array}{l} \text{PrLat. } *p(\theta) \\ \text{PrIt. } f > \text{It. } f, \text{ PrLat. } *f^{23} \end{array} \right.$

¹⁹ Corssen (1863: 168) wanted to posit a development to *h* because of forms with *h*, e.g. *horda* ‘pregnant cow’ (~*forda*) which correspond to Sanskrit *bh*.

²⁰ It is now recognized that the acceptance of Ascoli’s theory does not entail accepting Graeco-Italic unity, since the devoicing could have occurred separately in each language; see e.g. Maniet (1954); see too Hajnal (1993), whose argument for the continued presence of /bh/ at the time of the adaptation of the Linear B script for Mycenaean assumes an independent Greek devoicing of **bh* at least.

²¹ Ascoli does not reconstruct labio-velars, and so has a number of words with *f* which are difficult to explain. However, among his possible explanations for *f*, is the suggestion that beside *qu* there may have existed a Proto-Latin **hu* ‘woraus sich *f*entwickeln würde’ (Ascoli 1868: 350).

²² Ascoli identified *h*- as the regular reflex of **gh*-, and *f* for **bh*-/**dh*-; *f* for **gh*- is dialectal (p. 353); *h*- for **bh*-/**dh*- may be from a later change of *f* to *h*- (p. 339).

²³ Ascoli (1869: 428) altered the word-internal stages to:

PrIt. **th* > PrIt. **p* > $\left\{ \begin{array}{l} \text{PrLat. } *p (> d) \\ \text{PrIt. } *f > \text{It. } f, \text{ PrLat. } *f (> b) \end{array} \right.$

When the general shift from fricative to voiced stop occurred in Latin, **p* became *d*, and **f* became *b* regularly.

The proposed changes were supported with examples of parallel developments. For the change of voiced aspirates to voiceless aspirates Ascoli gave the similar change in Romany where voiceless aspirates (which developed into voiceless stops) are found corresponding to the Sanskrit voiced aspirates, so for example Rom. *kham*, *kam* ‘sun’ beside Skt *gharmaḥ* ‘heat’. The Latin medial voicing of fricatives is paralleled by the Latin change **-s- > -r-*, and the appearance of voiced stops for voiced fricatives is also seen in Romance developments, as for example, Port. *abrego* < Lat. *africus* ‘African’, and in Germanic, OE *sveger* beside Got. *svaihro* with *-g-* from **-x-* < PIE **-k-*, cf. Lat. *socrus* ‘brother in law’. The appearance of both dental and labial reflexes for PrIt. **-th-* is paralleled by Germanic *finster*, *dinster* ‘window’ from Proto-Germanic **thinstra*. Germanic also supplies a parallel for the appearance of voiced stops in the neighbourhood of ‘liquida’, as Ascoli noted that the Gothic reflexes for the aspirates only appear as voiced stops when they are preceded by *l*, *r*, *n*. He regarded similar representations in Umbrian (*amb-* beside Oscan *amp-*), together with Oscan *z* and Umbrian rhotacism, as showing signs of the beginnings of a similar voicing process in these languages.

The new explanation presented a development which moved in stages, avoiding any direct continuations and unlikely sound changes. The voiceless aspirated stop stage gave linguistic support to the notion of Graeco-Italic unity, and similarly the common Italic voiceless fricative stage allowed for a period of Proto-Italic unity. Although Ascoli (1869) was required to defend his account the following year against objections raised by Corssen, none was strong enough to shake his position which was quickly adopted.²⁴

Concrete support in favour of Ascoli was offered by Schulze (1895), in the form of the Greek term, *λίτρα*, which was probably borrowed from a language in Sicily, perhaps Sicel, possibly corresponding with Lat. *libra* ‘pound’. Schulze noted that Greek *Μίτρα* represents Avestan *Miθra* ‘Mithras’, and suggested that *λίτρα* likewise was a Greek attempt to represent Proto-Italic **libra*, where <*t*> represents **p*. The Greek loanword would then be proof that as Ascoli had predicted, a stage had existed in Italic at which PIE **dh* had become **p*, before developing into *f* generally, and into *b* in Latin. Schulze’s interpretation of *λίτρα* was regarded as conclusive evidence for a voiceless fricative stage in the development of the voiced aspirates.

Just before the end of the nineteenth century, an alternative explanation emerged whereby the PIE voiced aspirates became voiced fricatives, which then

²⁴ Brugmann (1886: 374), in the first edition of his *Grundriss* described the process in terms of Ascoli’s theory, but inserted a stage of voiceless affricates between the voiceless aspirates and voiceless fricatives. He also expanded the theory to take in the development of the labio-velar **gʷh*: PIE **gʷh > *kʷh > *xʷ > f* in initial position, *w* in intervocalic position, *gu* after *n*, and *g* before a consonant.

devoiced in all positions in Italic, except medially in Latin where they became voiced stops. The suggestion first appeared in passing in two remarks made in book reviews by Hartmann (1890; 1892). In the first, Hartmann suggests that Italic **f* and *h* may have been voiced, in the second he refers to a time of ‘hardening’, presumably from **β* to *b*.²⁵ Although Ascoli’s had become established as the standard account, there was still some debate as to which was in fact correct.²⁶ In the discussions of the problem which followed in the twentieth century, scholars firmly adopted one or the other of the two positions, causing a swing of opinion back and forth between the two.

Meillet (1916) was the first to support the common Italic voiced fricative stage proposed by Hartmann, using the correspondence Lat. *formīca* ‘ant’ ~ Gk *μύρμηξ* < PIE **morm-*. He argued that Lat. *f* must have derived from **m* by dissimilation and that, since *m* usually dissimilates to a voiced sound, the progression must have been **m* > **β* > *f*. That **m* could have developed to **β* indicates that at that period Proto-Italic must have shown voiced fricatives as the reflexes of the PIE voiced aspirates.²⁷

Meillet’s support for a change to voiced fricatives cited positive evidence. Bonfante (e.g. 1934) was the first scholar to try to support Hartmann by demolishing the evidence in favour of Ascoli. He argued that the PIE cluster **-dht-* did not develop into **-zdht-* which then became Lat. *-st-*, as was usually stated in support of a voiceless stage, but that, like **-tt-*, the group became Lat. *-ss-*. For him, the words usually quoted with *-st-* supposedly from PIE **-sdh-* [-*zdh-*], such as *hasta* ‘spear’, were based on false etymologies or could be explained in other ways. He also claimed that Gk *λίτρα* represented not a Proto-Italic stage of **dh*, but an independent development of the voiced aspirates to voiceless stops (via voiceless aspirates) which had occurred in Sicel-Ausonic. Since *λίτρα* reflected a Sicel-Ausonic sound change it could not be used as evidence for the Italic development.

Bonfante’s work anticipated a general adoption of Hartmann’s account by Italian scholars. A few years later Pisani (1940) took up his proposal and tried to prove that voiced fricatives had existed in Italic. He claimed that etymological evidence existed which presupposed a voiced fricative stage. For example, he argued that the correspondence of Lat. *Faunus* ~ Illyrian(Latin) *Daumus* could only be explained if the Latin forms had been borrowed when both Latin and Illyrian showed voiced fricatives. Had Latin possessed voiceless fricatives, we

²⁵ For an early formulation of this development, see von Planta (1892: 435); the first support for Hartmann is found in Hermann (1907).

²⁶ See e.g. von Planta (1892: 434f.), who accepts and presents Ascoli’s theory, although he admits that he cannot find good reasons to reject Hartmann.

²⁷ It is clear from a later article (1918) that Meillet thought that the Proto-Italic voiced fricatives devoiced in *all* positions in the word, and then later revoiced in Latin; for discussion, see Szemerényi (1952/3 [1987]: 631f.).

would find *Daunus* as we do later on. As evidence for early voiced fricatives in Sabellic, he gave Lanuvian Latin *nebrundinēs* ‘testicles’ from **neg^whr-* cf. Gk *νεφροί* ‘kidneys’, which must have been borrowed into Latin from a Sabellic dialect because of the labial treatment of the labiovelar. Pisani also brought in another factor, the development of the PIE voiceless aspirates. He claimed that these stops became voiceless fricatives, and as the reflexes of the voiced and voiceless aspirates were different, the developments for the series could not both have been via voiceless fricatives.

Before Pisani’s paper, most discussion about the Italic development of the voiced aspirates argued for explanations which included voiced fricatives. However during the 1950s three significant papers were published in support of Ascoli. In the first, Szemerényi (1952/3 [1987]) sought to reestablish the development via voiceless fricatives. He began by rejecting the evidence of Meillet and Pisani. He then set out his first argument for a voiceless fricative stage, in the form of the development of the PIE cluster **-sdh-* [-zdh-], which must have become Latin **-sth-* and then *-st-*, as is shown by the words *custōs* ‘guard’, *hasta* ‘spear’, and *uastus* ‘empty, waste’ (supported by suitable etymologies).²⁸ Szemerényi claimed from this that **dh* became **th* in Latin, and in Italic in general—hence the PIE voiced aspirates became voiceless aspirates in Italic. His second argument involves *λίτρα*, which he used to establish a voiceless aspirate stage for Italic, but not in the usual way. Like Bonfante, he took *λίτρα* not as a loanword from Latin but as a Sicel-Ausonic form which also showed devoicing of the PIE voiced aspirates. This devoicing, also seen in other forms (e.g. the name *Rutili*), demonstrated that the Sicel-Ausonic language was an PIE language and one ‘closely akin’ to Italic. Given that devoicing of the PIE voiced aspirates is rare in the IE languages, Szemerényi claimed that the appearance of the change in Sicel-Ausonic presupposed that these languages shared a period of (‘Italic’) unity, during which the PIE voiced aspirates became voiceless aspirates.

The second article was published by Martinet in 1955. One of his aims was to use the development to present an ‘italique commun’ in reply to certain Italian linguists who wanted to disassociate the Latin developments from those of Sabellic (e.g. Porru 1941). Like Ascoli, he assumed that the voiced aspirates became devoiced and then fricatives in all Italic languages, but he then tried to account for the different outcomes in Sabellic and Latin (and Venetic). For him this resulted from an innovation in Sabellic, whereby common Italic **f* (< **ph* < **bh*) changed into ‘labiodental *f*’ in word-internal position. During the period of the initial stress accent, common Italic **f* continued in Latin and was voiced, but the Sabellic labiodental *f* resisted the process. Martinet’s version is a structuralist account of Ascoli, in which the stages of phonetic development are given as general phases affecting the whole system. It is also novel in that he

²⁸ Szemerényi (1952/3 [1987]: 652) also argues for **bhs* > **phs* > *ps* > *sp* in *uespa* ‘wasp’ and disposes of the only counter-example *credō* ‘I believe’.

tries to explain why there should be a different treatment in word-internal position.

Allen's paper of 1958 was the third in favour of Ascoli. His approach was different from that of previous scholars who tended to argue on the basis of Italic evidence alone. Allen's aim was to justify the general plausibility of the changes proposed by Ascoli, usually by presenting historically attested parallel changes for every stage. Since Ascoli himself considered parallel changes to be the most convincing support for his argument, Allen's paper seems to complete the task which Ascoli had originally set out to do. Despite the impressive number of parallel developments cited—and hence independent evidence in support of Ascoli's explanation—it is surprising that the article is rarely cited in its defence (*but see* Wallace and Joseph 1993).

While Ascoli's development in terms of a voiceless fricative stage became established in the handbooks, it was almost immediately overshadowed by the persuasive article of Rix (1957), which presented the clearest formulation of the explanation first hinted at by Hartmann. Much of Rix's article is concerned with explaining the relationship of a group of ethnics, e.g. Lat. *Sabīnī*, *Samnium*, O. *Safinim*, Gk *Σάβνιον*, *Σαννίται*, which are clearly related to each other and the Sabine people and their territory, but difficult to connect. He then turns to the question of the development of the PIE voiced aspirates in Italic, and outlines an explanation similar to that hinted at by Hartmann by which the voiced aspirates became voiced fricatives, which then devoiced word-initially in Italic generally, but only later in word-internal position in Sabellic. Rix reconstructs a voiced fricative stage as he assumed that Oscan /f/ was voiced word-internally during the early part of the historical period. He supports this assumption with two pieces of evidence. The first occurs in the Greek name *Σάβνιον*, which he argues must represent an original Oscan **saβnyom*, and not **safnyom*, and so shows that the word-internal fricative of the Oscan ethnic (which may be from *-bh-) was voiced at the time of the Greek loan. The second comes from the representation of word-internal /f/ in coin inscriptions from Campania and Samnium, which suggest a voiced labial fricative [β].

Many who tackled the problem after Rix were convinced by his use of the Oscan evidence and preferred the assumption that the PIE voiced aspirates became voiced fricatives in Italic (*see e.g.* Untermann 1968: 484f.). In his Master's thesis on the development of the PIE voiced aspirates in Latin, Steinbauer (1979) produced more evidence in favour of Rix. He rejected Ascoli, and Szemerényi in particular, because of the assumed change of *-sdh- [-zdh-] to -st-. For him the etymology of Lat. *audiō* 'I hear' from PIE **awis-dheH₁-*, cf. Gk *αἰσθάνομαι* 'I perceive' confirms that *-sdh- became -d- and at the same time, presupposes an earlier Italic voiced fricative stage. Steinbauer also considered epigraphic evidence. He pointed to the newly-discovered late south Oscan inscriptions from Rossano di Vaglio, where word-internal /f/ was represented with <β>, and from these argued that Sabellic and Faliscan /-f-/ was voiced throughout the historical

period. Further support for the suggestion that the letter <f> might represent [β] was found in the correspondence of Etr. <f> ~ Pun. in a name found on the bilingual Pyrgi Tablets (Cr.4.4, 4.5) as Etr. **Θefarie(i)**, Pun. **TBRJ'**.

Rix and Untermann had thought that the voiced aspirates became voiced fricatives which devoiced word-initially, and then only later in word-internal position in Oscan and Umbrian. The later evidence for a voiced pronunciation opposed a late devoicing in Sabellic, and the Rix account was reformulated by Steinbauer, explicitly only for Latin. The PIE voiced aspirates became Italic voiced fricatives; these devoiced word-initially, but were retained in word-internal position where in Latin they merged with the voiced stops.

The Rix explanation appears in this form in Meiser's statement for Oscan and Umbrian (1986: 73f.), together with more evidence. He argues for a voiced pronunciation of (later) Umbrian /f/ word-internally given the Umbrian ethnic found in Latin as *Mēuānia* and in Etruscan as **mefanate** (e.g. Co.1.28); Lat. <V> and Etr. <f> point to an Umbrian voiced fricative [β]. Meiser also suggests that the Latin treatment of *g* for **gh-* before **r* and **l* in for example *gradior* 'I walk, go' < **ghredh-* supports a common Italic voiced fricative stage.

Many researchers working on Italic now seem to follow Rix, but not all (cf. e.g. Joseph and Wallace 1991: 177, who acknowledge Rix but state Ascoli), and Ascoli is generally cited in the handbooks (e.g. Sihler 1995: 139). A good example of the current position is the presentation given by Meiser (1998: 101; *see also* Eichner 1992) who simply describes and tabulates the changes assumed by each explanation, gives possible arguments for each, and moves on without passing judgement.

The task of this book is to identify the most plausible explanation for the Italic development of the PIE voiced aspirates, be it one of the two existing, or something different. Before any type of evaluation of the current explanations can be attempted, we need first to be certain of the Italic evidence, and this is the subject of the following chapter.

Philology: The Evidence for the Italic Development

3.1 The Italic Evidence

Thus far I have established a possible PIE starting point for the Italic development and have considered the two competing explanations for its progress. It is now time to confirm the Italic end point of the change. The Italic reflexes are to be found in those words whose root/stem/ending can be shown to continue a PIE voiced aspirate. This chapter presents a relatively detailed summary of the evidence for the Italic reflexes, in particular for those languages other than Latin. After a brief introduction to each language and its writing system(s), the orthographic reflexes of the PIE voiced aspirates are determined from a brief statement of the lexical evidence, and these are then assigned sound values from a careful consideration of the orthographic, phonological and phonetic evidence.

I have justified a detailed presentation of the Italic evidence in Chapter One. Here I make a few observations about the presentation of the material. In general, discussions of the treatment of the PIE voiced aspirates in any Italic language tend to amalgamate orthography and phonology by the convention of using characters in italics, e.g. **bh-* > Lat. *f*. The reader is to understand that *f* represents both the letter <F> and the phoneme /f/, which is pronounced [f]. Here, the reflexes are deduced by a two-stage process. First the letters representing the reflexes are derived from the lexical evidence, and then a phonological and phonetic interpretation is established as far as possible. The main reason for this split presentation is practical—the evidence is complex. However, it also serves a useful methodological function. It ensures that we are continually aware of the distinction between letters and their sound values. This proves particularly helpful where the two do not coincide as closely as expected.¹

¹ When discussing reconstructed stages between **bh* and **dh* and attested Italic forms, I use the symbol **f* to represent the intermediate reconstructed stages. This is used as a convenient phonemic label for denoting these stages and does not imply phonetic voicelessness. Interpreting the phonetic status of **f* during the history of Italic depends on the explanation of the Italic development that one chooses to accept.

The content of this chapter has been shaped by three types of argumentation that have been used to evaluate explanations for the Italic development. By the end of the chapter, I aim to have established the Italic reflexes for the PIE voiced aspirates, and to have attempted to answer the following questions:

- 1 *Were the reflexes voiceless in word-initial position and voiced in word-internal position in all the Italic languages?* This distribution of the historical reflexes of Italic has been claimed by for example, Meiser (1998: 101). Moreover it has been used to help argue for one explanation over another; for example, Meiser (1986: 73f.).
- 2 *What conditioned changes can be established for Italic?* Again, certain conditioned changes have been advanced as ‘evidence’; see for example, Meiser (1998: 101).
- 3 *How feasible is it to assume a common Italic voicing of word-internal fricatives?* According to Ascoli, the voiced aspirates became devoiced and then fricatives in all positions in the word. These remained voiceless in Sabellic but were voiced in Latin in word-internal position.² If we find that all the Italic reflexes were voiced fricatives in word-internal position, this means revising Ascoli’s original explanation by assuming that the voiceless fricative reflexes were then revoiced word-internally in Italic generally. Given that PIE *-s- also became voiced in Italic, it might seem sensible to link the voicing of the reflexes of the voiced aspirates with that of *-s-, and assume a common process of voicing which affected all fricatives together. Thus throughout this chapter I also consider the development of *-s- in the Italic languages, to see whether it is plausible to reconstruct a common Italic voicing of fricatives.³

Latin literary texts provide us with a rich vocabulary, giving many examples of the treatment of the PIE voiced aspirates. The Latin evidence has been dealt with in some detail in the handbooks, for example, Leumann (1977: 163ff.), in a Master’s thesis by Steinbauer (1979),⁴ and briefly in Stuart-Smith (1996), Meiser (1998: 101–105). The Latin treatment is therefore given as briefly as possible, with each change illustrated with one lexeme from well-known PIE roots.⁵ With a few reservations, I follow the results of Steinbauer’s discussion of the Latin evidence;

² The phonetic environments are between vowels and adjacent to a liquid. Following a nasal is not included, since it seems likely that in this position a conditioned treatment occurred which always resulted in voiced reflexes.

³ In Italic generally, it seems that there was a contrast between *s, from inherited PIE *s, and *ss, which was the result of a voiceless obstruent cluster, such as *tt. When the possibility of a general process of voicing of fricatives is mentioned, this is done assuming that this would have affected only single fricatives (e.g. *s), but not double, or lengthened fricatives (*ss).

⁴ For a consideration of the evidence for the conditioned change of *-dh-, see also Eichner (1992).

⁵ The first mention of PIE root/stem is accompanied by a couple of cognates; for more details see references *in situ*. Subsequent reference to that root gives only the Italic cognate at which it was first mentioned.

in all cases, further discussion and examples may be found there, and in Leumann, from whom most of the examples are taken.

The situation is rather different for the Italic languages other than Latin, and thus the evidence for these languages is presented in more detail. For each language I give a statement of the lexical evidence which is accepted (the words are clear, and a reliable PIE etymology is available). There is also a brief statement of forms commonly cited in the literature, which I feel are uncertain, or to be rejected altogether.⁶ For further details for lexical evidence from the Sabellic languages, the reader is referred to Untermann's (2000) recent dictionary where full lists of sources may be found.

Assigning sound values to the Latin letters which represent the reflexes of the PIE voiced aspirates partly derives from descriptions of sounds which occur in Latin literature (mainly the grammarians) (*see* Meiser 1998: 50). This information is supplemented by variation in spelling, later developments in the Romance languages, and the interaction of the Latin sound system with that of other languages, for example, Greek, observed in the phonology of loanwords. The statement given here for Latin is not controversial, and is included as comparable background material to the sections on pronunciation in the other Italic languages.

Identifying the pronunciation of the reflexes for these languages is more difficult. No contemporary descriptions of the languages exist and so native alphabet letters are usually assigned their values on the basis of two correspondences, one with Greek, the other with Latin. The first correspondence, native ~ Greek alphabet, supplies basic information about the sound values from our knowledge of early Greek phonology. The second correspondence, native ~ Latin alphabet, results from later Latin alphabet transcriptions, and is particularly useful for those sounds which did not occur in Greek, such as /f/. The extension of Latin sound values to the native alphabet letters is an essential step in ascertaining pronunciation, but, if the sound noted either did not exist in Latin, or was not noted in Latin orthography, it cannot be deduced from the native ~ Latin correspondence. Similarly, the use of a Latin letter does not necessarily imply that the Latin sound is being represented, since Latin orthography may not have been capable of representing the sound concerned.

These two considerations mean that we need to look beyond the traditional native ~ Greek, native ~ Latin correspondences. There are two further possible sources of evidence. The first lies within the languages themselves, in any orthographic variation in the representation of the reflexes, and from general considerations of the phonological status of the reflexes, both synchronic and diachronic. The second is 'external', found in the result of contact with 'foreign'

⁶ Words classed as 'uncertain' are those whose readings are uncertain, whose meanings are obscure, or whose PIE derivation is uncertain.

(non-Italic) languages, such as Etruscan and Greek, where the representation of the relevant Italic sounds in loanwords can be illuminating.

As a general rule, I discuss the pronunciation of the ancient Italic graphemes in a fairly confident manner, arriving at possible sound values which are then represented in phonetic (square) brackets. This presentation is to be taken with the reservation that what are advanced here are, and can only be, educated guesses. We will never know for certain what the precise sound values of the letters were (*see e.g.* Joseph 1997: 177, n14).

The relationship of orthography and phonology is obviously crucial to our understanding of the Italic end of the development. For this reason, I preface the discussion of evidence in the individual languages with brief discussion of a few shared features of the Italic scripts and their development, and in particular, the development of signs to represent /f/.

3.2 The Italic Scripts and the Representation of /f/

All the 'native' Italic scripts show characteristics that point to an original transmission of a Western Greek alphabet via an Etruscan adaptation, which was then developed independently in each language.⁷ Indications that Etruscan intermediaries were involved, and in some cases particular regional versions, range from general letter shape to more specific features such as the lack of <o>, or <d> or the use of the 'c/k/q' convention.

The latter feature refers to the representation of /k/ in Etruscan inscriptions which varied according to region and date. In early southern, and some central, Etruscan inscriptions the unmarked stop /k/ was represented with a different sign according to the quality of the following vowel: <c> before /i e/, <k> before /a/ and <q> before /u/ (<c>, Gk <γ> could be used as there was no voiced velar /g/). Around the mid-sixth century BC <c> was generalized for /k/ in south and central Etruria. Inscriptions from north Etruscan territory never show the 'c/k/q' convention, but first <k>, and then much later, from the fourth century on, <c>. Different conventions in representing Italic /k/ help to identify the Etruscan source alphabet.

The former feature results from differences between the Etruscan and Greek sound systems which led to three Greek letters, <o b d> being redundant or 'dead' in the Etruscan alphabet. Intriguingly, the subsequent Italic scripts each show at least one of these dead letters with their original value. The most likely explanation for this is that a secondary Greek model was available alongside a

⁷ For discussion of the transmission and development of the Etruscan alphabet, *see e.g.* Cristofani (1978), with references; *see also* Penney (1988). For the transmission of the Italic scripts *see e.g.* Lejeune (1957); Cristofani (1978: 418–21), Penney (1988); for a different account, *see* Prosdocimi in Pandolfini and Prosdocimi (1990: 224f.).

primary Etruscan model when the various Italic scripts were developed (Lejeune 1957).⁸ The different outcomes in the various alphabets are the result of varying degrees of influence exerted by the secondary model, with Latin being the most affected (all three letters were revived).

The final feature which all the Italic scripts show and share with the Etruscan alphabet is in each the invention of a sign which is taken to represent the phoneme /f/ (see e.g. Lejeune 1957: 90–2; Lejeune 1966):

FH	early Etruscan, Old Hernican (?archaic Latin)
F	Latin (?Presamnite)
↑	Faliscan; Old Umbrian
8	Etruscan (from 575 BC on); Oscan; Umbrian; Old Sabine (Poggio Somnavilla)
:	South Picene (: Old Volscian)

The assumption that this rather disparate set of signs together represent /f/ is driven by interrelated considerations. The most reliable evidence we have is for Latin, and there F appears to be used to represent /f/. Most of the later inscriptions for Faliscan and Sabellic were written in forms of the Latin alphabet, and so the native alphabet signs are interpreted largely through correspondences, thus Latin <F> in a later form corresponding to native symbol, for example Oscan/Umbrian 8 in an earlier form, leads to the assumption that 8 represented /f/. Reconstruction and cognates also play a part, since, for example, in the correspondence Oscan Latin alphabet *flus* (Poccetti 1979: 184) ‘to Flora’ ~ Oscan native alphabet *fluusaí* (Po 20) ‘to Flora’, we are likely to interpret Oscan native <f>, 8, as /f/ not only because we find later Latin <F>, but also because of the Latin cognate *flōs* ‘flower’, where we take Latin <F> for /f/. When we are working with archaic texts, direct correspondences do not exist, and so recognizing cognates plays a more important role in decoding symbols. For example, South Picene *te:éi* (Sp TE 7) looks like Umbrian *tefe* (e.g. Ib 13) and both look as if they could mean ‘to/for you’, which in turn recalls the Latin second person singular pronoun in the dative, *tibi*, and which makes an interpretation of South Picene : as <f> representing phoneme /f/ possible. There is a degree of possible circularity for the discussion here, because on the one hand we are trying to establish the reflexes of the voiced aspirates, but on the other they

⁸ Prosdocimi (e.g. in Pandolfini and Prosdocimi 1990: 224f.) offers an alternative account which assumes that the process of transmission by reciting the full model alphabet, represented in the earliest Etruscan abecedaria, allowed the original sound values of the letters to be passed on. Even if we accept this suggestion, it does not solve the problem of Italic scripts devised later than c.600 BC, when the dead letters cease to appear in Etruscan abecedaria. There seems to be no need to rule out Greek influence given the substantial Greek presence in southern Italy from the eighth century BC on.

are being identified precisely because they look like cognates from their orthographic/phonological form. Nevertheless this type of orthographic-phonological extrapolation is essential when working with evidence of this kind. It also means that simple statements about e.g. <f> for /f/ in South Picene rest on a number of implicit assumptions.

We shall see from the following sections that /f/ emerges as the most frequent Italic reflex of the voiced aspirates. Assumptions about its pronunciation have been central for explaining the Italic development. I consider here the various letters that were devised, and any possible implications their origins might reveal, with a necessary caution that any conclusions drawn must be rather tentative, and are based on the assumptions just mentioned. For orientation, a map of the early Sabellic dialects is given in Figure 3.1.

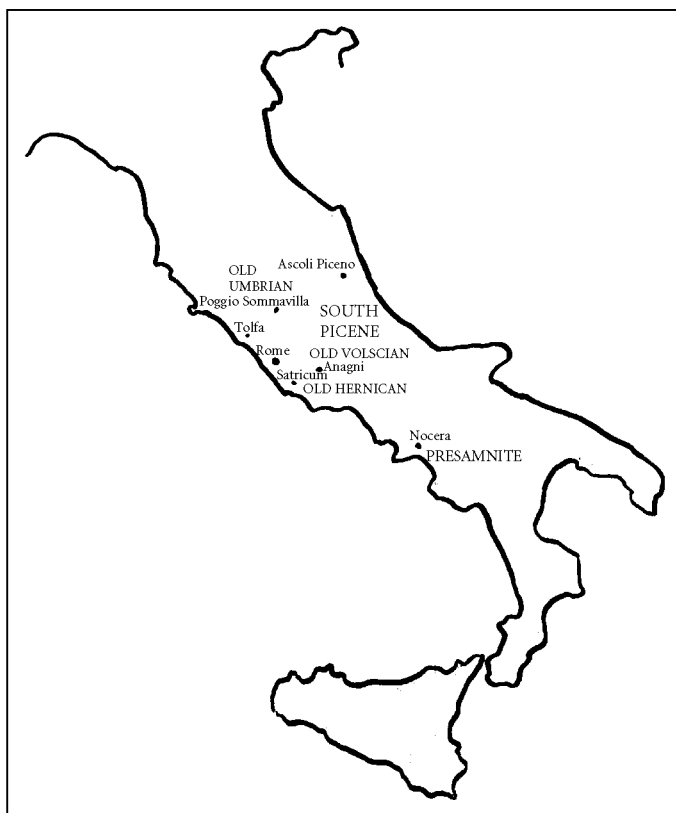


FIGURE 3.1 Map of Italy showing approximate locations of early Sabellic dialects/languages

3.2.1 *The digraph FH*

The earliest Etruscan solution, probably inherited by Latin and Faliscan,⁹ was to use a digraph FH <vh> (also HF <hv>), formed from the signs <v> (digamma) and <h>, traditionally taken to represent /w/ and /h/.¹⁰ The combination suggests that the sound represented was labial with accompanying aspiration or friction, that is some type of labial fricative (e.g. Meiser 1998: 48). The addition of <h> would have distinguished the sound from that represented solely by <v>, but what this denoted phonetically is uncertain. The apparent lack of a voicing contrast in obstruents generally in Etruscan makes voicelessness (as e.g. Agostiniani 1992: 45) less likely. Perhaps <h> was used to represent the friction or noise resulting from closer approximation.

3.2.2 *F and ↑*

It is generally agreed that Latin F is a simplification of the digraph FH (e.g. Wachter 1987: 25); but whether FH is actually attested in archaic Latin is uncertain, and rests on the ancient Latin inscription engraved on the Praenestine Fibula, which may or may not be a forgery (CIL I² 3; see Wachter 1987: 55f.): **manios: med: vhe:vhaked: numasioi**, 'Manios made me for Numerius'. There is early evidence that F was used with its original Greek/Etruscan value of /w/ in archaic Latin, for example in the archaic inscription, *tita uendia* (Giacomelli 1963: 261).¹¹ It seems likely that the simplification of FH to F to represent /f/ was linked to a shift from F to the vowel symbol V to represent /w/, but the exact process is not clear (Wachter loc. cit.).

Faliscan shows ↑ for /f/ and a similar sign is also found in the archaic Umbrian inscription from Tolfa (Um 4: **setums míom face**, 'Septimus made me'). ↑ is usually explained as a modification of F, which as in Latin, remained after the reduction of FH (e.g. Lejeune 1966: 153; Wachter 1987: 25; Meiser 1998: 48).¹² The shape of F may have been changed to ↑ to avoid confusion with the same sign which was being used by Etruscans living in the same area to represent /w/

⁹ The Old Hernican inscription from Anagni (He 2) shows <hv> in **hvidas** possibly cognate with Latin *findo* 'cleave'. Cristofani (1996) argues that the recently discovered Presamnite text on the Garigliano Bowl from Marica (Ps 10), **ahuidies**, shows <hu> for /f/ ('Afidius'). Vine (1998) follows Mancini (1997) and takes the name as 'Audeius' (see also Baldi 1999: 168f.).

¹⁰ For discussion of the Etruscan digraph, see e.g. Wachter (1987: 23f.) (see also Pandolfini and Prosdocimi 1990: 218f.).

¹¹ Despite Colonna (1993), the reading of the text, |ADEUA|, on the recently discovered sherd from Satricum (725–650 BC) is too uncertain to argue that V denotes /w/. The earliest evidence for the use of V for /w/ in Latin is probably from Gabii (SALVETOD TITA; Colonna 1980: 51f.).

¹² As for Latin, this explanation assumes that F did not represent /w/, and in Faliscan too, /w/ is denoted by <u> and not <v> (F), which is never attested (Lejeune 1966: 153).

(Lejeune loc. cit.). Another possibility is offered by Prosdocimi (Pandolfini and Prosdocimi 1990: 220; 90–2), who takes ↑ as a modification of <ϕ> (Gk /p^h/)—perhaps pointing to a bilabial pronunciation—as attested in his reading of the final letter of the disputed late seventh-century Capena-Leprignano alphabet.

3.2.3 *Presamite <f> (Ps 20: Tortora)*

The derivation of the unusual sign in the archaic Presamnite inscription from Tortora (Ps 20) otherwise written in the Achaean Greek alphabet, is uncertain, but probably goes back to Greek digamma. Similar letters are found with the value <v> /w/ in South Picene and the very old Presamnite inscriptions from Campania (Lazzarini and Poccetti 2001: 38f.). Formal comparison with Sabellic cognates (in for example *fufwʔoδ*, which looks as if it is a past tense verb from Sabellic *fu-*, in for example, O **fufens** ‘were’ Cp 29) and the appearance of digamma in the same inscription, both suggest that the letter must be read as <f>. If this symbol does represent /f/ here, and the inscription is largely obscure, the use of a letter originally used to represent a voiced sound /w/ may indicate an attempt to indicate that /f/ was realized as a voiced fricative either generally or in particular contexts (see the discussion of the origins of 8 <f> below).

3.2.4 *The origins of 8*

From the early sixth-century BC a new sign for /f/, 8, was introduced into all the Etruscan scripts.¹³ The Oscan and Umbrian native alphabets also show 8 for /f/, and this convention shows that these scripts were adapted from Etruscan models which had already incorporated the new sign.

Until the re-reading of the Poggio Sommavilla inscription (Um 2; Pallottino 1973), it was generally assumed that 8 was an Etruscan invention (e.g. Buck 1928: 24–5), a modification either of the dead letter B , or of H <h>, after a simplification of FH <vh> (e.g. Buonamici 1932: 162f.; Meiser 1998: 48). Poggio Sommavilla presents an instance of the sign a century before the earliest attestation in Etruscan, and in a text which is thought to be in an early form of an Italic (Sabellic) language. Cristofani’s suggestion that 8 was an Sabellic invention, an adaptation of beside existing B , which subsequently spread to the Etruscan scripts, seems plausible (Cristofani 1977: 105f.; followed by Pandolfini and Prosdocimi 1990: 241; Agostiniani 1992: 45; Bagnasco-Gianni 1995: 47).

The signs for /f/ found in the South Picene and Old Volscian inscriptions are probably reduced forms of 8. The origins of the South Picene script are

¹³ The earliest attestation of the sign is now thought to be on an inscription from Caere (Cr 2.51; 575–550 BC); cf. e.g. Agostiniani (1992: 45). The first abecedarium showing 8 dates to the mid-sixth century BC and is from Magliano (III.1 in Pandolfini and Prosdocimi 1990: 48–9).



FIGURE 3.2 The Poggio Sommavilla inscription (Um 2); from Marinetti (1985: 169)

uncertain, but the use of a sign derived from 8 has been used to point to a later Etruscan model, even if the dating is rather tight (so Marinetti 1985: 47, n2).¹⁴ Perhaps a better solution is to assume that the South Picene script was derived from the Etruscan alphabet via an early Sabellic intermediary (cf. Cristofani 1978: 420), which would make : a direct modification of the early Sabellic letter 8.

The shape of 8 reflects two possible starting points, H or B (Pandolfini and Prosdocimi 1990: 220f.), but two pieces of evidence point to B as more likely. The first is found in the Poggio Sommavilla inscription. 8 occurs—presumably for /f/—four times, numbered as 15, 18, 24, 32 in Cristofani (1977); see Fig. 3.2.

The shape of three of the signs is a rough figure of eight with curved strokes, but that of letter 32 different in that one side of the letter is straight making it look like a backward-facing B (the letter faces to the right, while the other letters face to the left).¹⁵ The second is given by a late sixth-century, possibly Etruscan,

¹⁴ The earliest South Picene inscription (Sp AQ.2) already shows the reduced sign . for /o/ (/f/ does not occur), and dates to around the same time as the first instances of Etruscan 8.

¹⁵ Rix (1996) reads the letter as <s> corrected to <ɣ>.

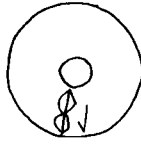


FIGURE 3.3 Graffiti number 4 from Anagni after Colonna and Gatti (1990: 244, Fig. 4)

sherd from the excavations of the Hernican sanctuary at Anagnia (Colonna and Gatti 1990: 244–5, no4; see Fig. 3.3).

The pot base shows two letters read as <fl>. The formation of the first letter is clear: first a right-facing was drawn with angular strokes, and then two curves were added to the spine of the letter, facing in the opposite direction.

While the development of 8 from H, from FH, would have been purely orthographic, a modification of B might have phonetic implications, though these would depend on the language of the inventor. In the Etruscan script, was a spare letter, and so its use to represent the labial fricative would be sensible given that the other ‘labial’ letters were already in use to represent the unmarked stop /p/ (<p>), the marked stop ? /p^h/ (<ϕ>), and the approximant /w/ (<v>). This makes it difficult to infer any particular phonetic significance from the choice of . If, on the other hand, the inventor spoke a form of Sabellic, using as a starting point may be more informative. Like Etruscan, we would assume a labial fricative was being represented which was distinct from the two stops and the approximant. However, unlike Etruscan, we would find being used twice—for the voiced stop and the fricative—and the other available ‘labial’ letter, <ϕ>, not being used at all.¹⁶ While it is possible that was used to emphasise a bilabial pronunciation of the fricative, [ϕ] rather than [f] (e.g. Pandolfini and Prosdocimi 1990: 219), this could equally have been indicated by <ϕ> (and Prosdocimi uses exactly this argument for Faliscan). What we wonder is whether the choice of over <ϕ> reflects an attempt to represent a **voiced** pronunciation of /f/, either generally or in particular contexts (e.g. word-finally as possibly in **hedusef** if this is the correct reading).

The upshot of our discussion is this. Our evidence for the development of 8 is scarce and subject to different interpretations. The representation of /f/ with FH (and later F, †) does not allow us to infer much about pronunciation beyond the assumption that the sound was probably a labial fricative. However, if 8 was devised by a Sabellic speaker with as the starting point, the choice of over <ϕ> looks like a determined attempt to represent a voiced pronunciation of /f/, either generally or in certain phonetic environments.

¹⁶ In Greek <ϕ> represented the voiceless aspirate stop [p^h]. Its precise value in Etruscan is disputed, but some type of voiceless labial stop is usually suggested (?[p^h], ?[pʰ], ?[pf]).

3.3 The evidence of Latin

Latin was the language spoken in Rome and in the surrounding area, Latium. There were some dialect variations which are most clearly seen in the inscriptions found outside Rome (e.g. in Praeneste) and in glosses which record variants spoken in *Latiō rŭre* (in the countryside of Latium), but these have left little trace in the literary texts. The main source of evidence for the Latin treatment of the voiced aspirates is the rich vocabulary attested in the literary tradition. Relevant words from the small number of archaic inscriptions (before 300 BC) confirm the later evidence,¹⁷ while the evidence of glosses is somewhat divergent.

3.3.1 *The Latin alphabet*

The Latin writing system is first attested in inscriptions dating to the seventh century BC from Rome and Latium.¹⁸ Letter shapes, and the early use of the 'c/k/q' convention, show that the Latin alphabet was derived from a South Etruscan model, but with the revival of the dead letters <d> <o> and <x> (Wachter 1987: 14f.).

The archaic alphabet ran from left to right, and consisted of the following letters: <A B C D E F Z H I K L M N O P Q R S T V X>.¹⁹ In early inscriptions /k/ and /g/ are both represented by <C/K/Q> according to the quality of the following vowel, but from the mid-sixth century <C> was generalized, although <QV> was retained for /k^w/ (<K> was only preserved in a few forms, for example *Kal.* for *Kalendae*). Classical Latin shows three more characters, <G>, <Y> and <Z>. A distinct sign for /g/, <G>, was devised in the third century BC, supposedly by Sp. Caruilius Ruga, by adding a diacritic to the letter <C> (Wachter 1987: 324f.).²⁰ <Y> and <Z> began to be used during the first century BC (Leumann 1977: 11–12).

¹⁷ So e.g. *feced* equivalent to later *fēcit* 'made' from the Duenos inscription (Wachter 1987: 70f.). The recently-discovered archaic inscription, c.500 BC, the Lapis Satricanus (de Simone 1980; Wachter 1987: 75f.; de Simone 1996) adds the form *suodales*, Classical Latin *sodales* 'companions', probably to be derived from the root **swedh-*, cf. e.g. Ved. *svadhā*. Even more recent is the fifth-century inscription from Campania (Cristofani 1996), which may possibly show *trifos* 'three' for Classical Latin *tribus*, from PIE **tribhyos-*, though the crucial letter may in fact be 'an unusual or crudely-formed B' (Vine 1998: 261). Vine suggests that if <F> is intended, this could either be an archaism, showing the (presumably voiced) fricative preceding the merger with /b/, or be an Oscanism where /f/ would be expected.

¹⁸ For more discussion see e.g. Wachter (1987) with references; for discussion of selected inscriptions, see Vine (1993).

¹⁹ This is the alphabet as attested on the earliest abecedarium, which dates to the fourth century BC; Wachter (1987: 32). Although <Z> occurs in this alphabet, in its original position, the letter is not found in Latin inscriptions before the first century BC (see Wachter 1987: 43f.).

²⁰ The new letter was unusually inserted into the alphabet in the place of <Z>, rather than added at the end (see Wachter loc. cit.).

3.3.2 Latin: The lexical evidence

3.3.2.1 PIE *bh in Latin²¹

The main development of *bh word-initially before vowels and liquids (*r, *l) in Latin is to <F>: for example, *ferō* ‘I carry’ <*bher-, cf. Gk φέρω, Skt *bhar-*; *frāter* ‘brother’ <*bhreH₂tēr, cf. Gk φράτηρ, Skt *bhrātar-*; *flōs* ‘flower’ <*bhleH₃s, cf. Got. *blōma*, Mir. *blāth*. Intervocally Latin shows : for example, *tibi* ‘to/for you’ <*tebhei, cf. Skt *tubhyam*, OCS *tebĕ*. This is also the conditioned development after a nasal: for example *umbilicus* ‘navel’ <*H₃mbh-, cf. Gk ὀμφαλός, Skt *nabhya-* ‘hub’. Before *-t-, we find <P> (e.g. *scriptus* ‘written’ <*skribhtos, *-to- participle to *skreibh-, cf. Gk σκαρῖφάομαι; Leumann (1977: 196), and *uespa* ‘wasp’ <wobhsā (*webh- ‘weave’, cf. YAv. *vaβža-ka-* ‘spider-like animal’)²² may provide evidence for a development to <P> before *-s-.

The appearance of , and not <F> in *barba* ‘beard’, cf. NHG *Bart* <*bhardhā, is usually explained as a single instance of assimilation, not pertinent to the general treatment word-initially (Leumann 1977: 168; Steinbauer 1979: 70), though Katz (1998: 205f.) following an idea of Cowgill, suggests there may be another instance in *urbs* ‘city’ if from *bhrggh-, cf. NHG *Burg*, and possibly also in the hapax *berber* from the phrase, *sta berber* ‘stay put!’, from the Carmen Arvale (CIL I² 2), if from *dherghros, cf. Av. *darazra* ‘firm’ (ibid: 214–216). Both derivations assume the progression *dh...ghr->*f...fr->*f...br->*b...br-, though *urbs* is assumed to have lost initial *b from a reanalysis of prepositional phrases such as *emborbi ‘in the city’.

3.3.2.2 PIE *dh in Latin²³

Word-initial *dh- is represented by Latin <F>: for example, *fūmus* ‘smoke’ <*dhūmos, cf. Skt *dhūmas*, OCS *dym*. We follow the traditional view in taking the main word-internal treatment of PIE *-dh- to be a change to <D>: for example, *medius* ‘middle’ <*medh-, cf. Skt *madhyas*, Gk (Hom.) μέσσος <*methyos, with a conditioned development to after *u, before *l, and before and after *r, and after *n (e.g. Leumann 1977: 167; Meiser 1998: 104–5): for example, *iubeō* ‘I order’ <*yeudh-, cf. Skt *yudh-* ‘fight’; -*bulum*, -*bula* <*-dhlom, -*dhlā*, cf. Gk -θλον, -θλη, in for example, Lat. *stabulum* ‘stable’ <*stH₂-dhlom, cf. NHG *Stadel*; *uerbum* ‘word’ <*werdh-, cf. Got. *waurd*; *ruber* ‘red’ <*rudh-ro-, cf.

²¹ See Leumann (1977: 167); Steinbauer (1979: 56–60; 77; 90–1); Stuart-Smith (1996: 18–19); Meiser (1998: 102f.).

²² So Steinbauer (1979: 90); also WH 2, 770, Szemerényi (1952/3 [1987]: 653). This, and the alternative etymology from *wopsā, cf. OHG *wafsa*, Lit. *vapsa* (EM 728) assume metathesis of *-s-.

²³ See Leumann (1977: 167–8); Steinbauer (1979: 61–4; 79–80; 84–90); Stuart-Smith (1996: 19–23); Meiser (1998: 103f.).

Gk ῥυθρός, Skt *rudhiraḥ*;²⁴ *offendicēs* ‘knots of the straps fastening a priest’s cap’ (Fest. 222.13L) <**ob-bhendh-*, cf. Skt *badhnāti*, Got. *bindan*. In so doing, we reject Serbat’s suggestion that is regular and <D> conditioned (Serbat 1968; see Steinbauer 1979: 79; Eichner 1992: 58f.), and the arguments put forward by Risch (1979) for a double treatment of **-dh-* after **u* to and <D>, taking *rudis* ‘rough’, *rūdus/raudus/rōdus*²⁵ as dialectal forms from the root **reudh-* beside usual Latin *ruber*, *rōbur* or *rūfus* (probably a Sabellic loan; e.g. Meiser 1998: 105). Risch’s suggestion that the meaning of *rudis* as ‘rough’ developed from an earlier ‘raw’ or ‘red’ is difficult to support from the evidence (see OLD 1665), but more seriously, there appears to be no other words which show such a treatment.²⁶

The ‘regular’ Latin treatments of the clusters **-sdh-*, and **-dht-* are more difficult to ascertain. The cluster **-sdh-*, phonetically [-zdh-], seems to show both <D> and <ST>. Despite Steinbauer (1979), the evidence for the outcome <D> is difficult. *audiō* ‘I hear’ has been linked with Skt *avih*, Gk αἰσθάνομαι <**αFυσ-θ-* and derived from stems showing **-dh-* (e.g. **awis-dh-yō*: Pk 78, WH 1, 80; **awisdheH₁-*: Steinbauer 1979: 89; root **H₂weis-*, LIV 257), but the etymology remains obscure (EM 55). The derivation of *crēdō* ‘I believe’ from a compound of **kred-* ‘heart’ and the root **dheH₁-*, **kred-dheH₁-*, continued in Skt *śrad-dadhāti* ‘trust’ (Pk. 580; WH 1, 287; LIV 119) is also given as evidence for **-zdh-* <D> (e.g. Leumann 1977: 168), but here **-zdh-* is only a reconstructed stage with no comparative evidence (EM 148; Steinbauer 1979: 88). Even if **-zdh-* did occur, the existence of compounds like *condere* ‘to found’, to the root **dheH₁-*, could have affected any ‘regular’ sound change (Leumann 1977: 168; but see Sihler 1979: 164).

Evidence for a development to <ST> is better (Meiser 1998: 119), but also thin: proposed etymologies for *custōs* ‘guard’ and *uastus* ‘empty, waste’ include **-sdh-/zdh-*, but are uncertain.²⁷ The best possibility is *hasta* ‘spear’, which

²⁴ Lat. *rūfus* ‘red-haired’ must be a loanword from a Sabellic language, see e.g. U. *rofu* (VIIa 3). In general for this root, see Risch (1979).

²⁵ Respectively Fest. 320L, Paul. Fest. 339L, and Varro, *LL* 5.34.163. (A derivative appears in *rūdusculum/raudusculum*, which refers to a bronze coin and then a small sum of money, and in the name of a gate, *Rōdusculana*, *Rauduscula*, Paul. Fest. 339L; Varro, *LL* 5.34.163.) For the variation in vocalism see Risch (1979: 623); EM 224. Leumann (1977: 73, 166) also connects *rūdus* ‘small stones, rubbish’ with these forms, but it is not clear that it belongs here (Risch 1979: 623, fn. 28).

²⁶ *arduus* ‘difficult’, if compared with Gk ῥηθός, Skt *ūrdhvaḥ*, seems to be an exception, but should probably be explained in the same way as <D> in *uidua* ‘widow’ (< **widewā*; Leumann 1977: 167), by assuming a starting point **aradhewo-*. At the time of the conditioned change, the reflex of **-dh-* was not directly next to **u*; Eichner (1992: 59, n23); Sommer/Pfister (1977: 139); see also Schrijver (1993: 312–13).

²⁷ *custōs* has been linked with Gothic *huzds* ‘treasure’, and derived from **kusdho-*, cf. Gk κύσθος (WH 1, 319). Szemerényi (1952/3 [1987]: 645f.) also derives *custōs* from **kusdho-*, but mainly from the correspondences with Iranian forms, Iran. *kusda*, Av. *kaozda* ‘palace’ (Leumann 1977: 168). An alternative derivation is that of Nowicki (1978), where *custōs* is from **kudh-to-sd-*, with **kudh-* ‘hidden’ formed to the root *(s)*keudh-* ‘hide’ (**keudh-*, LIV 319), and **-sd-* from **sed-*. Meiser’s

either comes from **ghast-*, cf. Mlr. *gas(s)* ‘shoot’ (Pk. 412–13; WH 1, 636; Feist 1920: 157) or is grouped together with the several cognates pointing back to an original **ghasdh-*, for example, Got. *gazds* ‘spike’, Mlr. *gat* ‘willow twig’ Szemerényi (1952/3 [1987]: 648f.; EM 290).

The treatment of the cluster *-*dht-* is even more problematic. Here we seem to have good evidence, in the *-*to-* participles (e.g. *iussus* ‘ordered’ <**yudh-to-*, from **yeudh-*, cf. *iubeō*, Skt *yudh-* ‘fight’), and in *aestus* ‘heat’ (<**aidh-tu-*, to **aidh-*, cf. *aedēs* ‘hearth’, Skt *idh-* ‘kindle’) for the same original cluster *-*dht-* giving two results, <S(S)> and <ST>.²⁸ The traditional view (e.g. Leumann 1977: 168; Meiser 1998: 124) is to take <ST> in *aestus* as the regular treatment of the cluster, and to assume that <S(S)> in the participles is the result of analogical reshaping.

3.3.2.3 PIE **gh* in Latin²⁹

In word-initial position, **gh-* appears as <H> (or Ø) before all vowels except **u*, where we find <F>: for example, *hostis* ‘stranger, enemy’ <**ghosti-*, cf. Got. *gasti-*, OCS *gost*, *ānser* ‘goose’ <**ghans-*, cf. Skt *hamsah*, Gk *χῆν*; *fundō* ‘I pour’ <**ghu-n-d-* (cf. Got. *giutan*), from **gheu-* cf. Gk *χύ-το*, Skt *hu-*. Before **r* or **l*, **gh-* seems to show two treatments, <G> or <R>/<L> (e.g. Leumann 1977: 166). In fact, the possible examples for the second treatment, **ghr-*/*ghl-* <R>/<L> (e.g. *rāuus* ‘raw’, *lūridus* ‘pale yellow’) are etymologically very uncertain (Steinbauer 1979: 76f.).³⁰ The reflex in this position seems to be <G> (cf. Meiser 1998: 103): e.g. *gradior* ‘I go/walk’ <**ghredh-*, cf. Got. *grid*, OCS *grędō*, *glaber* ‘smooth’ <**ghladh-ros*, cf. OHG *glat*, OCS *gladk*.

Word-internally we have evidence for several conditioned treatments for **gh*: <G> before **l* (e.g. *figulus* ‘potter’ <**dhigh-los*, from **dheigh-*, cf. Gk *τεῖχος*, NHG *Teig*; Leumann 1977: 165; Meiser 1998: 104) and after **n* (e.g. *fiŋgō* ‘I fashion/make’ <**dhi-n-gh-*, from **dheigh-*, cf. *figulus*), <C> before **t* (e.g. *uctus*

(1998: 119) version is slightly different: *custōs* is from **kusto-sd-*, where **-sd-* is from the root **sed-*, cf. Lat. *sedere* but **kusto-* is from **ku(dh)s-dhH₃o-*. Szemerényi (1952/3 [1987]: 649) and Meiser (1998: 119) are unusual in deriving *uastus* from **wazdh-*, comparing OIr. *fota*. Elsewhere the word tends to be connected with OIr. *fás*, OHG *wuosti*, from **wāstos* (Pk. 346; EM 714–5; WH 2, 737).

²⁸ *infestus* ‘hostile’ is less certain, despite Leumann’s (1977: 168) connection with Gk *ἄθεστος* and derivation from **ŋ-g^whedh-*, which is unusual and rejected by Steinbauer (1979: 84). We should probably agree with Ernout-Meillet (317) and take it as of uncertain etymology. If one accepts Nowicki (1978), *custōs* also belongs here.

²⁹ **gh* refers to both the palatal and plain velar voiced aspirates, which fell together in Italic; see Leumann (1977: 164–6); Steinbauer (1979: 66–7; 71–7; 80); Stuart-Smith (1996: 23–5); Meiser (1998: 103f.).

³⁰ Despite attempts to connect *rāuus* ‘raw’ with Germanic forms such as ON *grār*, OHG *grāo*, <**ghrH₃wos* (WH 2, 421; Meiser 1998: 103), the etymology remains obscure (EM 565). Again the connection between Gk *χλώρος* and *lūridus* ‘pale yellow’ is uncertain; there are no clear correspondences (EM 371).

‘carried’ <*wēgh-tos, *to- participle to *wēgh-, cf. Gk ὄχος, Skt *vahati*) and <X> for the cluster *-ghs- (e.g. *uexī* <*wēgh-s-, from *wēgh-, cf. *uectus*). Recently Katz (1998) has argued for a further conditioned change of *-gh- to after *r, in *orbis* ‘disk’ which he links with U *urfeta*, Ilb 23 (translated as ‘balls’ for ‘testicles’) and derives from *H₁rg_h-, cf. Gk ὄρχεις, and *urbs* and *berber* which he takes from *bh₁rg_h- and *dherghros respectively (see on *bh above). If these derivations are correct, this conditioned change of *-rg_h- is paralleled by similar changes for *-rd_h- (*uerbum*) and *-rg^wh- (*febris*).

More difficult is the treatment of intervocalic *-gh-, where we find both <H> (or Ø) and <G>:³¹ e.g. *uehō* <*wēgh-, cf. *uectus*, *meiō* ‘urinate’ <*H₃eigh-, Gk ὀμείχω, Skt *mehati*; *figūra* ‘figure’ <*dheigh-, cf. *figulus*. Here we accept the traditional assumption that <H> was the regular outcome of *-gh- intervocalically (as e.g. Leumann 1977: 165; Meiser 1998: 104). Forms with <G> are then explained as analogous formations after those where <G> occurred as a regular reflex. Thus <G> in *figūra*, for example, may occur after analogy with expected <G> in related forms such as *figō* and *figulus*.³²

3.3.2.4 PIE *g^wh in Latin³³

In word-initial position the labiovelar voiced aspirate is represented by Latin <F>: for example, OLat. *formus* ‘warm’ (Paul. Fest. 74.6L) <*g^whormos, cf. Skt *gharmaḥ*, Gk θερμός. Word-internally, we find <V> between vowels and <GV> after *n: for example, *nūit* ‘it snowed’ <*sneig^wh-, cf. Gk νείφει, OHG *snīwan*; *ninguit* ‘it snows/is snowing’ <*sning^wh-, present with nasal infix to the same root. Like *-ghs-, *-g^whs- is found as <X>: for example, *nix* ‘snow’ <*sniġ^wh-s, also from *sneig^wh-.

The development of *-g^wh- before *r is more difficult.³⁴ We find good evidence for the reflex in *febris* ‘fever’ from *dheg^wh-rī-, cf. Gk τέφρα, Lit. *degū* (Szemerényi 1952/3 [1987]: 640; Steinbauer 1979: 80), but <G> and <F> may also be possible. In fact, <G> is very uncertain since Leumann’s (1977: 166) derivation of *fragrāre* ‘to smell’ from *g^whrā-g^whrā-, cf. Gk -φρη- in ὀσ-φρη-σομαι requires an unusual formation with uncertain correspondences (EM 251).

³¹ See Szemerényi (1952/3 [1987]: 633; 641–2); Steinbauer (1979: 47). -h- in Skt *aham*, beside Lat. *ego* ‘I’, is probably not from *-gh-, but from the combination of *g and a laryngeal (e.g. Leumann 1977: 461).

³² Assuming <G> as the regular outcome of intervocalic *-gh- (as e.g. Pisani 1940, whose evidence is refuted by Szemerényi (1952/3 [1987]: 641–2) requires awkward explanation of the forms with <H>, for example, the assumption that <H> in *uehō* is an orthographic marker of vowel hiatus in a form /weō/ formed from the perfect *ue-xī*, after analogy with *struō*, *struxi* (Pisani 1932).

³³ See Leumann (1977: 166); Steinbauer (1979: 65–6; 80); Stuart-Smith (1996: 26–7); Meiser (1996: 103–5).

³⁴ Although Leumann (1977: 166) links *tergus* ‘back’ with Gk (σ)τέρφος, deriving both from *(s)terg^whos, the correspondence is far from certain (Steinbauer 1979: 80). We do not know what the treatment of *-g^wh- was after *r.

So too is <F>, which arises in the group of apparent cognates for Gk νεφροί 'kidneys' and OHG *nioro*, both from **neg^whr-*, found in glosses: *nebrundinēs* (Paul. Fest. 157.9L, dialectal form from Lanuvium for *testiculōs* 'testicles'), *nefrōnēs* (*ibid.*, Praenestine Latin form for the same), and *nefrundinēs* (Fest. 342.35L, an old form for *rienēs* 'kidneys'). This evidence is confusing, since the forms with <F> are said to be archaic or Praenestine Latin (where might be expected), while that with is apparently from Lanuvium in Volscian territory, where a Sabellic treatment with <F> might be more likely, cf. U. **vufu** (e.g. I1b 21). If these words do continue PIE **-g^wh-* (*φ* in Gk νεφροί could also represent **-bh-*), *nefrundinēs/nefrōnēs* may be Sabellic loans (Joseph and Wallace 1992: 112), or show <F> from the type of quasi-initial treatment that is assumed for *īnferus* 'lower' (Leumann 1977: 166; Meiser 1998: 105), while Lanuvian *nebrundinēs* probably shows the Latin treatment to (Steinbauer 1979: 80).

3.3.3 Latin: From orthography to phonetics

The pronunciation of the Latin reflexes is not controversial; nor is their place in the phonological system of Latin. However, to enable comparison with what happens in the other Italic languages, I present here a short statement of the phonetics and phonology of the Latin reflexes (*see* Table 3.1).³⁵ This is particularly necessary since the sound values of the non-Latin native alphabet letters are largely assigned on the basis of subsequent correspondences with Latin letters.

3.3.3.1 /f/ in Latin

The main development of word-initial **bh-*, **dh-* and **g^wh-* is to <F>.³⁶ If the reading of *trifos* with <F> for later Latin *tribus* is correct (Cristofani 1996; Vine 1998), we may also have evidence for <F> for /f/ in word-internal position, though the letter may equally be an unusual form of . The letter <F>, a simplification of FH <vh>, represents the phoneme /f/, which had a limited distribution in Latin, occurring word-initially before vowels or the liquids /r l/, and only rarely in word-internal position, usually as the result of compounding (e.g. *pro-ferre* 'to offer'), or in loanwords from Sabellic languages (e.g. *rūfus* 'red-haired');³⁷ for discussion and exceptions, (*see* e.g. Leumann 1977: 169–70). At the labial place of articulation, /f/ was the fricative, contrasting with the voiced and voiceless stops /p b/ and with the approximant /w/. Beside /f/, there were two

³⁵ For details of Latin pronunciation and phonology, *see* Allen (1978); Sturtevant (1940); *see also* Sommer/Pfister (1977), who give historical discussion.

³⁶ If the reading of *trifos* with <F> for later Latin *tribus* is correct (Vine 1998; Baldi 1999), we may also have evidence for <F> for /f/ in word-internal position.

³⁷ Joseph (1997: 176) takes *rūfus* as dialectal Latin.

TABLE 3.1 The consonants of Latin (after e.g. Allen 1978)

	<>	//	<>	//	<>	//	<>	//
vless stops	P	p	T	t	C/K/Q;C	k	QV	k ^w
vd stops	B	b	D	d	C/K/Q;G	g	GV	g ^w
fricatives	F	f	S	s	H	h		
liquids			L	l	R	r		
nasals	M	m	N	n				
glides	V	w	I	j				

Notes

- 1 <X> represented /ks/.
- 2 <Z> was used for Greek <ζ> [z] in Greek loanwords from the first century BC. The first inscriptional attestation of Lat. <Z> for Gk <ζ> is found on a denarius dating to 81 BC (CIL I, p. 757, app. numm. no. 293); see Biville (1990: 101).
- 3 The phonemic status of the sounds represented by <QV> and <GV> is disputed. /k^w/ and /g^w/ are given as single phonemes (as Allen 1978: 16f., 25) rather than clusters /kw/ /gw/ (as in e.g. Leumann 1977: 150).

other fricatives, /s/ and the glottal fricative /h/. Given these oppositions, the likely pronunciation of Latin /f/ would have been as bilabial or labiodental voiceless or voiced fricatives ([ϕ] [f] [β] [v]). Most descriptions suggest that the usual pronunciation of Latin /f/ was as a voiceless labiodental fricative [f] (voiceless: Quint. 12.10.29; labiodental: Mar.Vict. 6.34.9 K (see, e.g. Allen 1978: 34–5)).

Latin /f/ was probably [f] in all positions, which means that in words of Sabellic origin, such as *rūfus*, cf. for example, U. *rofu*, where Sab. /-f-/ was probably voiced [β] (see following sections on Oscan and Umbrian, below), Latin /-f-/ [f] replaced Sab. /-f-/ [β] by straight sound substitution. The only cases where Latin /-f-/ may have been voiced are very early, in *trifos* if this is indeed the reading and not *tribos* (Vine 1998), and very late. Latin spellings of Sab. /-f-/ with <V>, as in the place names e.g. *Mēuānia* beside *Mefanas*, or *Priuernum* beside *Priferium*, probably reflect late attempts to represent the pronunciation of Sab. /-f-/ [β], which only became possible after the pronunciation of Latin /w/ (<V>) changed to [v].

Untermann (p.c.) notes that of the Sabellic place names represented in Latin, only those which were probably borrowed early into Latin, *Stabiae*, O **stafianam** (Po 1) and *Tiber*, show /b/ for Oscan /f/. He takes this, and the usual representation with <F>, for example, *Allifae*, *Corfinium*, to indicate that ‘die inlautenden Fricativae etwa im 3./2. Jhd. im ganzen osk-umbr. Sprachgebiet stimmlos geworden sind’. However, an alternative interpretation is that in *Stabiae/Tiber* the Sabellic forms were borrowed with [-β-] before Latin [-β-] had become /b/ (as he implies), but that subsequent borrowings show <F> for Sabellic [-β-] since this was the nearest representation for [-β-] that Latin possessed after [-β-] had merged with [b] /b/.

Spellings such as *im fronte* for *in fronte* ‘at the front’ (CIL I² 1420) have been used to argue that in early Latin, and until the late Republic, /f/ was pronounced as a bilabial fricative [ɸ]; (see e.g. Leumann 1977: 173). While it is probable that Latin /f/ did show bilabial variants (cf. the pronunciation of German /f/; Hall 1992: 38), these spellings could equally be interpreted as attempts to represent a labiodental nasal [ɱ], which would not be unexpected before [f] (cf. Eng. *triumph* [traɪʊmf]); Allen (1978: 35).

Latin /f/ mainly derives from the voiced aspirates, but also continues *s- before *r, e.g. *frīgus* ‘cold’, Gk *ῥίγος*, from **srīgos* (Leumann 1977: 189). The development of **bh-* and **g^wh-* (also **ghw-*) to a labial fricative is not surprising, but that of **dh-* is less obvious and is usually explained as the result of a confusion at a dental fricative stage, **θ* (<**dh-*) with **f*. The development of **sr-* to /*fr-*/ is often linked with the development of **dh-* to /*f-*/, and taken via a reconstructed stage **θ*; (see e.g. Leumann 1977: 189).

3.3.3.2 /h/ in Latin

The main development of **gh* word-initially (before all vowels except **u*) and word-internally (between vowels) is represented by <H> or Ø. The two outcomes are linked, in that Ø is the result of the loss of the sound noted by <H>. The Latin phoneme /h/,³⁸ represented by <H>, showed a defective distribution from the earliest period: /h/ occurred word-initially before vowels, but only rarely word-internally between vowels (after consonants only in a few compounds, e.g. *adhibeō* ‘I add to’).³⁹ That the loss of /h/ began before the earliest texts is shown by those words which are never spelt with <H>, but where /h/ is expected (from **gh*).⁴⁰ /h/ continued to be lost during the historical period, but to differing degrees depending on the position of the sound in the word, and on the variety of Latin. It is generally assumed that /h/ was lost earlier in rural dialects of Latin and in colloquial urban Latin, than in the language of the educated classes, though even for these speakers, using /h/ may have been largely an educated convention (Untermann p.c.).⁴¹

In word-initial position, /h/ was lost relatively early in rural Latin (cf. e.g. Varro’s comments on rustic *ēdus* for *haedus* ‘goat’, *LL* 5.97), and probably also in

³⁸ For more details see e.g. Leumann (1977: 173–5); Allen (1978: 43–5).

³⁹ There are a few instances of interjections which show word-final <H>, e.g. *āh*; the realization of /h/ in this position is not known (see Leumann 1977: 173, 175).

⁴⁰ It also took place before rhotacism, as is shown by *diribeō* ‘separate’ < **dis-hib-* < **dis-hab-* (Meiser 1998: 105).

⁴¹ Thus *ānser* without expected /h/ < **gh*, is usually explained as of rural origin (Coleman 1990: 15; Joseph and Wallace 1992: 113) and Allen (1978: 43) gives the lack of /h/ in *meiō*, and *liēn* ‘spleen’ as the due to the fact that these are ‘more or less vulgar words’. For the loss of /h/ in dialectal Latin, rural and urban, see e.g. Coleman (1990: 14–15); see also Joseph and Wallace (1992: 109), who argue that the non-standard urban dialects of Latin are probably based to a large extent on the regional dialects of immigrants from the surrounding countryside.

colloquial urban Latin to judge from inscriptional evidence (e.g. *ostiam* for *hostiam*, CIL I² 193), and reports of the tendency to use /h/ where it was not expected (e.g. Arrius in Cat. 84) and similarly hypercorrect variants of forms with /h/ where it was not etymologically justified (e.g. *humerus* beside *umerus* ‘shoulder’, cf. Skt *aṃsa-*).⁴² Educated speakers of Latin may have pronounced /h/ word-initially (hence the possibility of hypercorrection), but even in the literary standard, metrical rules indicate that /h/ was very weak in this position.⁴³

In word-internal position /h/ was lost in many words in most varieties of Latin, including the literary standard, at an early period (e.g. *nēmō* ‘noone’ < **ne-hemō*). <H> is retained in the spelling of some words (e.g. *uehō* ‘I carry’, *trahō* ‘I drag’), but by the end of the Republic it seems that even literary Latin had lost /h/ in this position (cf. *mī* for *mihi* ‘to/for me’; *nīl* beside *nihil* ‘nothing’ in the same line, Cat. 17.21). Orthographic conservatism led to the use of <H> in the spelling of forms where the sound was now lost, and from this <H> became common as an orthographic marker, to mark either vowel hiatus (e.g. *ahēnus* ‘bronze’ < **ayenos*, cf. Skt *ayas*) or vowel length (e.g. *mehe* for *mē* ‘by/ from me’ Quint. 1.5.21; Leumann 1977: 174). In later Latin attempts were made to reintroduce the sound intervocalically, where it appears spelt with <CH> or <C> (probably with the value [x] as contemporary Gk <χ>), in forms like *michi*, *nichil* (see e.g. Löfstedt 1961; Leumann 1977: 175).

Both grammarians’ descriptions (e.g. Quint. 1.5.19: *spīritus* ‘breath’; Mart. Cap. 3.261: *aspīrātiō* ‘aspiration’), and the origins of Latin <H> (from Gk <h>), suggest that the main realization of Latin /h/ was as a voiceless glottal fricative [h]. Between vowels, however, it seems likely that /h/ was a voiced glottal fricative [ɦ], at least immediately before the loss of /h/ in this position; Allen (1958: 103–4); Allen (1978: 43, 45).

Latin /h/ derives from **gh*; other than false extension of /h/, the only other source of the sound was Greek loanwords, and then only in word-initial position.

3.3.3.3 *The ‘f/h’ alternation in Latin*

The grammarians provide us with a number of glosses which attest dialectal variation in Latin (regional and social: Joseph and Wallace 1992), and which show contradictory treatments of the voiced aspirates. This mainly concerns the sounds in word-initial position (but see above for *nebrundinēs/nefrundinēs*), where <F> occurs for expected <H> and <H> for expected <F>.⁴⁴ Some

⁴² For the implication that hypercorrect forms reflect socially-determined variation, in this case and in general in Latin, see Joseph and Wallace (1992: 109f.). This variation led to some confusion about which words should be spelt with <H> and which without (e.g. (*h*)*arēna* ‘sand’, (*h*)*arundō* ‘reed’ (see e.g. Allen 1978: 44).

⁴³ /h/ does not ‘make position’, e.g. *adhibeō* is scanned with the first vowel short, and words beginning with /hV-/ are elided as if they were /V-/ alone (see Leumann 1977: 175).

⁴⁴ The forms are listed in Leumann (1977: 168), and given in full in Hiersche (1965). For discussion see Ernout (1906), (1909); Coleman (1990) and Joseph and Wallace (1992).

of these variant forms continue voiced aspirates: <H> for <F><*bh-/*dh-, e.g. *horda* ‘pregnant cow’ for *forda* (Varro, *RR* 2.5.6) <*bhor-, cf. Gk *φορός* to *bher- ‘carry’, *hebris* for *febris* ‘fever’ (Ser. *Aen.* 7.695) <*dheg^whr-; <F> for <H><*gh-, for example, *fostim* for *hostis* ‘stranger, enemy’ (Paul. *Fest.* 74L) <*ghosti-. Forms of this type are also attributed to Sabine and Faliscan, and are attested in some Faliscan inscriptions.

The most satisfactory explanation for the Faliscan variation is proposed by Wallace and Joseph (1991), who suggest that word-initial /f/ became /h/ by regular sound change in some varieties of Faliscan, but that pressure either from dialects of Faliscan which retained /f/, or perhaps more probably Latin (where /f/ and /h/ were distinct) led to hypercorrection, and instances of /f/ for /h/.

Although Wallace and Joseph restrict their discussion to the ‘f/h’ alternation in Faliscan, they make it clear (p. 85) that the forms reported in the Latin glosses reflect a real tendency in dialectal Latin. Their explanation accounts equally well for the Latin variation. In certain non-standard varieties of Latin, /f/ became /h/. The maintenance of the distinction in standard Latin led to hypercorrection in non-standard dialect speakers (Wallace and Joseph 1991: 180, n35; also Joseph and Wallace 1992: 109).

3.3.3.4 /b d/ in Latin

The main word-internal development of *bh- and *dh- was to and <D> respectively; also represents the result of conditioned developments of *dh-, *gh- and *g^wh-. and <D> represented the voiced stop phonemes /b/ and /d/ respectively; (see e.g. Leumann 1977: 158–9: /b/, 154–6: /d/). Both occurred in word-initial and word-internal position, but only /d/ could also occur word-finally. Within the voiced stop series /b/ and /d/ contrasted with /g/ and /g^w/. /b/ contrasted with /p/, and with /f/ and /w/, while /d/ was distinct from /t/ and /s/. It seems likely that /b/ and /d/ were pronounced as voiced labial and dental stops,⁴⁵ as [b] and [d] (cf. Ter. *Maur.* 6.331 K; Allen 1978: 13).

/b/ and /d/ were not only the reflexes of *bh- and *dh- (and *g^wh). Both stops also continued the inherited voiced stops *b and *d (e.g. *baculum* ‘stick’, Gk *βάκτρον*; *duo* ‘two’, Gk *δύω*). Word-initially /b/ was also the reflex of *dw- (e.g. OLat. *duis* ‘twice’ for later *bis*, cf. Av. *dvi-dvis*), a cluster which was retained as late as the mid-third century BC; Leumann (1977: 131). In word-internal position, /br/ arose from the cluster *sr-, for example, *fūnēbris* ‘funereal’ <*fūnes-ri-s, cf. *fūnus*, -*eris* (Leumann 1977: 206). This last change is often linked to the development of the voiced aspirates, and in particular, to the conditioned change of *dh- to /b/, which is usually explained as the result of a confusion

⁴⁵ See, e.g. Allen (1978: 20–1). Before /t/ and /s/, /b/ was probably pronounced as a voiceless stop [p]. This description is relevant for the pronunciation of the stops in early and classical Latin. /b/ was later realized as a fricative [β] or [v], but the first evidence of this pronunciation is not found before the first century BC; Leumann (1977: 139).

with the reflex of **-bh-* at a fricative stage. The change of **-sr-* to *-br-* shows that Latin */b/* could be the reflex of a previously voiceless sound, and thus that word-internal reflexes in Latin could go back to a previously voiceless stage.

3.3.3.5 */g/ in Latin*

Before **l* and **r*, word-initial **gh-* gives <G>. Word-internal **-gh-* before **l* also gives <G>. <G> represents */g/*, which could occur word-initially and internally, and which was usually pronounced as a voiced velar stop [g]; Allen (1978: 22–3).⁴⁶ In the voiced stop series */g/* contrasted with */b d g^w/*, in the series of velar sounds, only with the voiceless stop */k/*.

/g/ is the reflex of the inherited PIE voiced palatal and velar stops. It is also the reflex of the labial-velar **g^w* before **r* (e.g. *gravis* ‘heavy’ <**g^wraw-*, cf. Gk *βαρύς*), before **l* (e.g. *glandi-* ‘acorn’ <**g^wlnd-*, cf. OCS *želōd*) and before **n* (e.g. *agnus* ‘lamb’ <**ag^wnos*, cf. Gk *ἀμνός* (<**āβvός*); e.g. Leumann (1977: 150–1).

3.3.3.6 */w/ in Latin*

The main intervocalic development of **-g^wh-* was to <V>, and this was also the result of the intervocalic cluster **-ghw-*, which merged with the inherited labial-velar voiced aspirate at an early period in both word-initial and word-internal position. <V> was used in Latin to represent both the back rounded vowel */u/* and the labial approximant */w/* (see e.g. Allen (1978: 40–1); Leumann (1977: 131–9)). Since the reflex of **-g^wh-* was intervocalic, <V> represented the consonant */w/*. */w/* contrasted with the palatal glide */j/*, and in the labial series was distinct from the stops */p b/* and the fricative */f/*. It seems likely that the pronunciation of */w/* was as a voiced labial-velar approximant [w] (Sturtevant (1940: 140–3); Allen (1978: 41)).

/w/ was also the reflex of the plain voiced labial-velar **-g^w-* between vowels (e.g. *ūuēsco* ‘get wet’ <**weg^w-* <**ug^w-eH₁-ske/o-*; Meiser p.c.; Peters 1980: 65), and of the cluster **-dw-* (e.g. *suāuis* ‘sweet’ <**swādwi-*, cf. Skt *svādus*).

3.3.3.7 *Before/after *r in Latin*

In word-internal position, **-dh-* shows conditioned changes to */b/* [b] before and after **r*, and this is also found for **-g^wh-* before **r*, and possibly also for **-gh-* after **r* if we accept Katz’s (1998) new ‘Urbi et Orbi’ rule. If we assume that the Proto-Italic reflexes for these voiced aspirates were fricatives, this change has a parallel in Latin *-br-* from **-sr-* in for example, *fūnēbris*. The comparative Faliscan and Sabellic evidence is thin. Only Umbrian is really useful with **rufro**

⁴⁶ Before [n], in e.g. *agnus* ‘lamb’, */g/* was probably [ŋ]; Allen loc. cit.

(Ib 24) ‘red’ < **rudhro-*, **urfeta** (Ilb 23) ‘balls/testicles’ < **H₁orghī-*, **vufru** (Ilb 21) ‘offering’ < **H₁wog^whro-*, and here the outcome is always /f/ (see below at 3.7.3.4).

3.3.3.8 Clusters with nasal in Latin

After the nasal **n*, probably [ŋ], the velar voiced aspirate gives <G> /g/ [g], and the labial-velar <GV>. <GV> represents /g^w/, phonetically [g^w] (Allen 1978: 25). /g^w/ had a very limited distribution, only occurring after /n/; as well as being the reflex of **-ng^wh-*, it also derives from **-ng^w-* (e.g. *unguen* ‘nail’ < **ong^wen-*, cf. Skt *anjanam*) (Leumann 1977: 150). The changes of **gh* and **g^wh* to /g/ and /g^w/ are regarded as changes conditioned by the preceding nasal, because the main intervocalic developments are to /h/ and /w/ respectively. **bh* and **dh* also show voiced stops (/b d/) after a nasal, but since voiced stops also appear intervocalically, it is less clear that the nasal conditioned a change to stop. Evidence from Umbrian (the only other Italic language with evidence for changes in this environment) shows clearly that the development of the voiced aspirates after a nasal was conditioned, though not necessarily shared (*pace* Allen 1958: 109; Meiser 1998: 104); see 3.7.3.5. I therefore assume here that the Latin development of the four voiced aspirates, **bh*, **dh*, **gh*, **g^wh*, to the voiced stops /b d g g^w/ respectively, should be seen as changes conditioned by the preceding nasal.

3.3.3.9 Clusters with *s in Latin

We find that the reflexes fall into two groups, according to whether the voiced aspirate precedes or follows **s*. Clusters with **s* as the second element were **-bhs-* (only word-internal) and **-ghs-* and **-g^whs-/g^whs*, which became <PS> and <X>. <PS> represents the sequence /ps/, phonetically [ps] (for /p/ [p] (see Allen 1978: 12–13); for /s/ [s], 35–7.). <X> is used to note /ks/, phonetically [ks] (Allen 1978: 45). In word-internal position <X> also represents the reflex of the clusters **-ks-*, **-gs-*, and **-g^ws-* (Leumann 1977: 202); word-finally, it represents the result of **-ks*, **-k^ws* and **-gs*; Leumann (1977: 221). The only cluster attested with **s* as the first element is **-sdh-*, probably *[-zdh-], which seems to become <ST> in Latin. <ST> represents the cluster /st/, phonetically [st] (for /t/ [t] (see, e.g. Allen 1978: 13–14). All clusters of voiced aspirate with **s* in Latin show voiceless reflexes.

3.3.3.10 Clusters with *t in Latin

We have evidence for the treatment of three voiced aspirates in a word-internal cluster before **t*: **-bht-*, **-dht-*, **-ght-*, which became <PT>, <S(S)>/<ST>, and <CT>. <PT> is for /pt/ [pt], and <CT> notes the sequence /kt/ [kt]. The cluster **-dht-* shows both <S(S)>, for /ss/ [ss], and <ST>, for /st/ [st]. As for

clusters with *s, all the Latin reflexes for voiced aspirates before *t are voiceless. Comparison with the evidence from the other Italic languages for the treatment of *-bht- and *-ght- suggest a common Italic devoicing and deaspiration of the clusters to *-pt- and *-kt- (on Latin, see Meiser 1998: 124). The treatment of *-dht- is only paralleled in Umbrian, where the same two reflexes are found, and which are probably also the result of a common Italic conditioned change of this cluster.

3.3.3.11 *The treatment of *-s- in Latin*

In Latin intervocalic *-s- became /r/ by the middle of the fourth century BC; for example, *aurōra* ‘dawn’ <*ausōs, cf. Skt *uṣas-* (Leumann 1977: 178–80).⁴⁷ We may assume that *-s- had become voiced [z] before this date (represented by <S>).⁴⁸ We shall see that the intervocalic voicing of *-s- to [z] probably dates back to common Italic (cf. rhotacism in Umbrian; Meiser 1986: 38).

*s could also occur adjacent to a liquid, in the clusters *-sr-, *-sl-, *-ls-, *-rs-; these clusters could be primary (inherited), or secondary (arising from internal syncope of a short vowel). The treatment of *-s- in secondary clusters is not generally useful for determining whether a common Italic voicing took place, since internal syncope took place separately after the split of common Italic, and even after the split of common Sabellic. Moreover, in Latin, we might well expect the outcome of a secondary cluster of *-s- and a liquid to be voiced, since *-s- was probably already voiced before the cluster was formed, and so the clusters would have been [-zr-], [-zl-], [-rz-], [-lz-].

In Latin, the primary clusters *-sr- and *-sl- became /-br-/ and /long vowel + l/, in for example, *fūnēbris* <*fūnesris,⁴⁹ or *dīluō* ‘dissolve’ <*dis-luō (Leumann 1977: 204–6).⁵⁰ Primary clusters of *-rs- and *-ls- become /-rr-/ and /-ll-/ respectively, for example, *farreus* ‘granary’ <*farseyos, *uelle* ‘to wish/want’ <*welsi (Leumann 1977: 210–11). All the reflexes suggest that *-s- was voiced in this context.

We conclude that *-s- in Latin became voiced between vowels and in primary clusters adjacent to a liquid. This could support a general process of voicing of voiceless fricatives in Italic.

⁴⁷ Intervocalic *-ss- remained voiceless, and was simplified to /-s-/ after a long vowel or diphthong c.100 BC (see Leumann 1977: 180–1).

⁴⁸ It is possible that /s/ was voiced [z] intervocalically at the time of the transmission of the alphabet and that <S> was used to represent this. Gk <ζ> then represented [zd] (Lejeune 1972: 112f.), while Etr. <z> represented [ts].

⁴⁹ *-sr- also appears as /-Ṽr-/ but this is limited to compounds of *dis- before roots beginning in *r-, e.g. *dī-rigō* ‘arrange’, and may be the result of analogy rather than regular sound change, e.g. Buck (1933: 149).

⁵⁰ *-s- before all voiced consonants became voiced *[z], and was usually lost with compensatory lengthening. The voicing of *-s- before voiced stops and voiced aspirates may have taken place before the split of Proto-Indo-European (Leumann 1977: 204).

3.3.4 The development of the PIE voiced aspirates in Latin

We can now summarize the main treatment of the PIE voiced aspirates in Latin as follows:

word-initial position

*bh-><F> /f/ [f]

(dialectal Latin /f/ > /h/)

*dh-><F> /f/ [f]

*gh-><H> /h/ [h]

(occasional hypercorrection to /f/); /h/ > Ø

*g^wh-><F> /f/ [f]

word-internal position

*-bh-> /b/ [b] (?<F> /f/ [β])

*-dh-><D> /d/ [d]

*-gh-><H> /h/ [h̥]; /h/ > Ø

*-g^wh-><V> /w/ [w]

Conditioned changes of voiced aspirates in Latin can be summarized as:

*word-internal *dh:*

*-dh-> /b/ [b], after *u,

before *l, and before and after *r

*word-initial *gh:*

*gh-><F> /f/ [f], before *u

*gh-><G> /g/ [g], before *l and *r

*before/after *r*

*-dh-> /b/ [b], before/after *r

*-gh-> /b/ [b], after *r

*-g^wh-> /b/ [b], after *r

*word-internal *-gh-*

*-gh-><G> /g/ [g], before *l

*-gh-> /b/ [b], after *r

*word-internal *g^wh:*

*-g^wh-> /b/ [b], before *r

After a nasal:

*-bh-> /b/ [b], after *m

*-ndh-><D> /d/ [d], after *n

*-gh-><G> /g/ [g], after *n [ŋ]

*-g^wh-><GV> /g^w/ [g^w],

after *n [ŋ]

*clusters with *s:*

*-bhs-><PS> /ps/ [ps]

*-ghs-><X> /ks/ [ks]

-g^whs-/-g^whs><X> /ks/ [ks]

*-sdh- [-zdh-]><ST> /st/ [st]

*clusters with *t:*

*-bht-><PT> /pt/ [pt]

*-dht-><SS> /ss/ [ss]; <ST> /st/ [st]

*-ght-><CT> /kt/ [kt]

*-g^wht-><CT> /kt/ [kt]

This description to large extent states the traditional view. Latin continues voiceless reflexes word-initially, voiced reflexes word-internally. There may even be evidence for the fricative stage always reconstructed for Latin immediately preceding /b/, though this is far from certain. Any divergence from the main treatment is found in conditioned developments in particular phonetic contexts.

The Latin treatment of PIE *-s- is consistent with the assumption of a common Italic voicing of fricatives should this be required.

3.4 The evidence of Faliscan

Faliscan was the language of the Falerii, a people whose centre until the mid-third century BC was Falerii Veteres, now the site of modern Civit  Castellana about 50 kilometres north of Rome.⁵¹ In 241 BC the town was destroyed by the Romans, and a new capital was built a few kilometres away at Falerii Novi. Faliscan is mainly attested in about 150 inscriptions, mostly from the two towns, although some have also been found in sites to the north and south of Civit  Castellana. A few glosses are also attributed to Faliscan.

The inscriptions date from the seventh to the second century BC. They are usually grouped into three periods (after Giacomelli, e.g. 1963: 29): the ‘archaic’ period to which the vase inscriptions of the seventh and sixth centuries BC belong, the ‘middle’ period covering the inscriptions, mainly funerary, from the fifth to the third century BC, and the ‘Roman’ period, for those inscriptions which are later than 241 BC and the building of Falerii Novi.

Falerii was situated within Etruscan territory and had close cultural and political links with the Etruscans. Several inscriptions show strong Etruscan influence.⁵² Faliscan was not only subject to Etruscan influence; the few later inscriptions show, as far as one can tell from the scanty evidence, a language which was very similar to Latin, with Faliscan elements.

Defining the linguistic status of Faliscan with respect to Latin is difficult. The language seems to be more closely linked to Latin than to the Sabellic languages (e.g. in the continuation of the labial-velar in e.g. *-cue* ‘and’, Lat. *-que* < **k^we* beside the Sabellic labialized treatment, e.g. O. *p id* ‘any’, e.g. Cm 1B15, beside Lat. *quid* < **k^wid*). But having said that, it is not very clear where one should draw the line between Latin and Faliscan. Some regard Faliscan as a dialect of Latin, ‘latino dialettale’, as opposed to ‘latino propriamente urbino’, with a similar position to that of Praenestine Latin (cf. e.g. Campanile 1961; R. Giacomelli 1978). The traditional view, however, is to see Faliscan and Latin as separate but closely related languages, both deriving from an earlier shared Latino-Faliscan stage (e.g. Giacomelli 1963: 20 f.; see also Rix 1994a). This position is also taken by Joseph and Wallace (1991), who argue that the features usually adduced to show that Faliscan was a regional Latin dialect, such as the monophthongization of **ai* > *e* in, for example, the term for a public official

⁵¹ For more details see Giacomelli (1963). For general discussion of the historical background, see Salmon (1982: 26).

⁵² Giacomelli (1963: 39) lists the inscriptions which show Etruscan characteristics of language or script.

efiles, Ve 264, beside Lat. *aedilēs*, a notorious ‘rustic’ feature in Latin, are not found in the earliest inscriptions, but only in texts from c. 300 BC. Moreover, they are even found in Latin inscriptions from the city of Rome. These features seem to reflect certain areal developments in central Italy, and thus cannot be used to argue that Faliscan in particular was a regional dialect of Latin. Joseph and Wallace consider Latin and Faliscan to be closely related, but use the different treatments of the velar voiced aspirate in Latin and Faliscan to show that they were separate languages (*see also* Wallace and Joseph 1993; Joseph 1997). The Falisci were from the earliest period regarded by the Romans as a distinct cultural and political entity, and the inscriptions which attest the language also constitute a distinct corpus, if only with regard to their script, with recognizably ‘Faliscan’ characteristics at all linguistic levels. Faliscan here is regarded as a language distinct from Latin.

3.4.1 *The writing systems of Faliscan*

3.4.1.1 *The Faliscan native alphabet*

Most Faliscan inscriptions are written in a native alphabet, which is attested from the seventh century BC. The alphabet contains the following letters:⁵³ <a (?b) c d e f z h i (θ) k l m n o p q r s t u x> (Giacomelli 1963: 30). Note the presence of the Etruscan dead letters <d> and <o>, and, if we accept Prosdocimi’s reading of LF 3/Ve 243 (Prosdocimi 1990) and his identification of the Capena-Leprignano alphabet as Faliscan, possibly also . The earliest Faliscan inscriptions are written from left to right, the same direction as the ancient Etruscan inscriptions from Cerveteri and Narce (Giacomelli 1963: 36). After the fifth century BC, the direction changed, and the alphabet ran from right to left, perhaps as a result of Etruscan influence (Giacomelli 1978: 513). The letter shapes, and the early use of the ‘c/k/q’ convention, suggest that the Faliscan alphabet was derived from a South Etruscan model.⁵⁴

3.4.1.2 *The Faliscan-Latin alphabet*

Only a few of the later inscriptions are written in the Faliscan-Latin alphabet, which is similar to the early Latin alphabet, so: <A B C D E F H I L M N O P Q R S T V X Z>; <G> is not attested (Giacomelli 1963: 38).

⁵³ The order given is based on that of Etruscan abecedaria. If we accept the new reading of the late seventh-century Capena-Leprignano alphabet (as in Pandolfini and Prosdocimi 1990: 90f.), then we could have evidence for the order of the first letters until <k>, with the difference that the alphabet shows <v> where we give <f>.

⁵⁴ The alphabets which show the closest resemblance are those of the inscriptions of Narce, although the shape of the letter <u> is different; Giacomelli (1963: 29). I do not accept Wachter’s (1987: 31f.) derivation from an earlier Latin model; for discussion and rejection of this (*see* Stuart-Smith 1996: 149).

3.4.2 *Faliscan: The lexical evidence*3.4.2.1. *PIE *bh in Faliscan*⁵⁵

I accept as evidence for word-initial **bh-*: **far** ‘?grain’, cf. Lat. *far* (in **farme--tom**, LF 1/Ve 241) <**bhars*, cf. Got. *barizeins* ‘of barley’; and **filea** ‘daughter’, cf. Lat. *filia* (e.g. **filea** LF 67/Ve 270, *file* LF 144, **hileo** LF 97/Ve 296) from a suffixed form of the zero grade of **bhweH₂-*, cf. Messapic *bilia* ‘daughter’, Alb. *bir* ‘son’ (Hamp 1971), following Lejeune (1967), Untermann (1993a: 320). The gloss *habam* for *fabam* ‘bean’ (Ter. Scaur. VII 13, 9 GLK);⁵⁶ <**bhabhā*, cf. Russ. *bobъ*, provides additional evidence for <H> for <F> from **bh-* (Wallace and Joseph 1991: 90). The only reliable evidence for the word-internal treatment is the future marker **-fo**, cf. Lat. *-bo* (in **carefo** ‘I will lack’, **pipafo**, **pafo** ‘I will drink’ LF 5/Ve 244) <**bh(w)o*, again from **bhweH₂-*.

The names **hapi** and **ofetios** are rejected as evidence. **hapi** ‘of Fabius’ (LF 10/Ve 249), if cognate with *faber* ‘craftsman’ <**dhabhros*, cf. Arm. *darbin*, should probably be taken as a Latin loan from *Fabius*, given <p> for **bh-* beside **carefo** (for <h> for <f> see 61–2). Even deciding on an appropriate word division of **ofetios**, usually read as ‘Ofetius’ (LF 3/Ve 243) a name of obscure etymology, is difficult. Prosdocimi’s suggestion (1990: 307f.) that **iofetios** is a name yielding an erotic pun on **iofete**, from the same inscription, which he interprets as ‘have intercourse’, from **yebh-*, cf. Slavonic *jeb-* ‘have intercourse’, Skt *yabhati*, is very uncertain.

This limited evidence shows <f> <F> for word-initial **bh*, and <f> for word-internal **bh-* between a vowel and **w*. Word-initial **bh-* is also found as <h> in an inscription dating to the middle period and <H> in a gloss (Wallace and Joseph 1991: 90).

3.4.2.2 *PIE *dh in Faliscan*⁵⁷

There is one good lexeme continuing word-initial **dh-*: **fiked** ‘fashioned’ (LF 11/Ve 257,⁵⁸ also **f[if]iqod** LF 1/Ve 241), assuming that this is a reduplicated perfect linked with Lat. *fungō* ‘I fashion, make’ <**dheigh-* (e.g. Lejeune 1955: 146f.; Joseph and Wallace 1991: 177f.).⁵⁹ Untermann’s (1993: 465) cautious derivation from **dhe-dheH₁-k-* (reduplicated perfect of **dheH₁-*), cf. O. **fikus** (Cp 37:5;

⁵⁵ See Stuart-Smith (1996: 31–33).

⁵⁶ Varro (in Vel. Long. *Gramm.*, 7.69.8, frag. 77) ascribes this pronunciation to the ‘antiqui’.

⁵⁷ See Stuart-Smith (1996: 34–37).

⁵⁸ For a confirmation of this reading now that the object has been rediscovered, see Gulinelli (1996).

⁵⁹ Reduplicated aorist <**dhe-dhigh-e-* to **dheigh-* according to LIV 122; neo-perfect according to Meiser (p.c.).

Lejeune 1955), would make the Faliscan inscription more congruent with the frequently attested Latin *mē fēcīt* ‘made me’, but requires an unusual change of *-ē- to -i-. Both etymologies take <f> as the reflex as *dh-. Word-internal *-dh- is better represented: **efiles** ‘aediles’, cf. Lat. *aedīlēs* (e.g. LF 15 I/Ve 264) <*H₂eidh-, cf. Lat. *aedēs* ‘temple, house’ (e.g. Rix 1994a: 96, n36); **ifra** ‘below’ (LF 88), cf. Lat. *infrā* for /infrā/<*ḡdheros, cf. Skt *adharaḥ*,⁶⁰ and **loferta** ‘freed woman’, cf. Lat. *liberta* (e.g. LF 121 I/Ve 322a, also **lofirtato(s)**, e.g. LF 25 II/Ve 253) <*H₁leudhero-, cf. e.g. Gk ἐλεύθερος, OLat. *loebertātem* (Paul. Fest. 108.5L), O. **lúvfreis** (Fr 5; see Leumann 1977: 61; see also Rix 1994a: 94–5).

Less certain evidence for word-initial *dh- is found in the names **firmia/firmio** ‘Firmia’/‘Firmius’ (e.g. **fir<.>mia** LF 143I/Ve 338a, **hirmia** LF 66V/Ve 269c; **firmio** LF 71V/Ve 274e, **hirmio** LF 61/Ve 317), if cognate with Skt *dharmaḥ*<*dher- (Hirata 1967: 52), although -i- for *-e- is unusual. Also uncertain for word-internal *-dh- are **iofete** and **rufia**. Both words are from the same archaic inscription (LF 3/Ve 243) whose lack of word division makes the secure identification of words difficult. If **rufia** is a name, ‘Rufia’ (cf. Prosdocimi 1990: 294), the word must belong to the group of Italic names, for example, Lat. *Rūfus*, *Rūfius* (CIL VI 2587), Pael. *rufries*, O. **rufriis** (Cm 14 C8) derived from *reudh-, cf. Lat. *ruber*; Giacomelli (1963: 216). **(i)ofete** is very uncertain. Vetter gives **ofeti** ‘Ufenti’ (gen. sg.), as another form of the ?name **ofetios** in the same inscription. Prosdocimi (1990: 294f.) changes the reading to **iofete**, and suggests that the form is an imperative, ‘have intercourse’, to *yebh- (see p. 56). Perhaps more likely but still uncertain, is Rix’s proposal (1993: 86), which takes **iofete** as cognate with Lat. *iubēte* ‘order’, cf. OLat. *ioubeatis*, from *yudh-, cf. Lat. *iubeō*.

I do not accept the forms **fitā**, **hapi** and **l(o)uf(i)r** as evidence for the treatment of *dh. **fitā** ‘fashioned’, cf. Lat. *facta* (LF 1/Ve 241) has been seen as a *-to-participle *dhighto-, to *dheigh- (e.g. Giacomelli 1978: 526) but the reading is uncertain and not helped by the lack of word division in this archaic inscription. I have already noted under *bh above that **hapi** is likely to be a Latin loan from *Fabius*, and not a direct reflex of *dhabhros. More importantly, as the word is still cited in the literature (e.g. Joseph and Klein 1981: 512; Watkins 1995: 127), I note that the reconstructed form **l(o)uf(i)r** (LF 1/Ve 241), once interpreted as the god’s name, see Latin *Liber*, and derived from *H₁leudheros (e.g. Giacomelli 1963: 42), does not exist. The correct reading is **l---uf-**; Giacomelli (1978: 525); Untermann (2000: 439).

In word-initial position *dh- is represented by <f> (and possibly also <h> in inscriptions from the middle period). Word-internally the reflex of *-dh- is <f>, which occurs between vowels and after an original sonant nasal *ŋ.

⁶⁰ Lat. *infrā* is problematic because it shows medial <F> for *-dh-. Giacomelli (1963a) suggests that the Latin form may be a Faliscan loan. It is equally possible that Lat. <F> arose from a quasi-initial treatment of *-dh-, with *in-* wrongly taken as a prefix, as perhaps also in *infirmus* ‘lowest’; Leumann (1977: 169).

3.4.2.3 PIE *gh in Faliscan⁶¹

Word-initial *gh- is attested in **foied** ‘today’ (LF 5/Ve 244), cf. Lat. *hodiē*, both from the ablative expression *hō(d)-diē(d) (cf. NHG *heute* <*hiu-tagu, Leumann 1977: 468), with *hōd from the stem *ghe/o- cf. Skt *gha*, *ha*. The demonstrative **hec** ‘here’ (e.g. LF 85a/Ve 286A, also **fe** LF 72 I/Ve 275, *heic* LF 121 IX/Ve 322i) is from the same stem but with the demonstrative particle *-ke, from *hei-ke, cf. Lat. *hīc*, OLat. *hec*, OLat. *heic*. **huti[c]ilom** ?‘little water vessel’ (LF 1/Ve 241), may also show evidence for *gh-, if a diminutive, parallel to Lat. *fūtis* ‘water vessel’ <*ghu-, cf. Lat. *fundō* ‘I pour’ (Giacomelli (1963: 248); Wallace and Joseph (1991: 90)). Reliable evidence for word-internal *-gh- is found in **fiked** and **lecet**. **fiked** (also **f[if]iqod**) is a reduplicated perfect to *dheigh-, cf. on *dh above. **lecet** ‘lies’ (LF 85a/Ve 286A) is probably from *legh-, cf. Lat. *lectus* ‘bed’, Gk λέκτρο, λέχος, NHG *liegen* (Vetter (1953: 301); Joseph and Wallace (1991: 178); LIV 357).

Less certain evidence for *gh- is found in: the proper name **fere** (LF 42/Ve 348), if <f> is for <h>, and the name is cognate with Lat. *Herius*, O. **hereiis** (Cm 14 C10) usually derived from *gher-, cf. O. *herest* (Lu 1, e.g. 12); e.g. Giacomelli (1963: 192); and **let** ‘bed’ (Renzetti Marra 1990, B1, also **lete** LF 136/Ve 342a2) may show the treatment of *-gh- before *t, if these ?words are forms of a noun derived from *legh-tos, cf. Lat. *lectus*, cf. **lecet**, but in both cases the reading and interpretation is difficult. Also uncertain is the name **marhio** ‘Marhius’ (LF 123 VI/Ve 324f), which looks as if it belongs with O. **maras** (Cm 14:18), **marahis** (Cm 14:9) and Etr. **marhies**. The word may be a loan from Etruscan, which in turn had borrowed the form from Italic (word-internal <h> is also rare in Etruscan). While the anaptyxis in the Oscan forms shows that <h> could continue PIE *gh-, there are no cognates for the word outside Italic to confirm this.

Words which I reject as evidence are: *harisp[ex]* ‘soothsayer’, cf. Lat. *haruspex* (e.g. LF 121 IX/Ve 322i), which is probably Latin (Vetter 1953: 313); and **fitā** in LF 1/Ve 241, whose reading is very uncertain (*see p. 57*).

In word-initial position PIE *gh- is found in Faliscan as <h> <H>, and occasionally as <f> in inscriptions dating to the middle or Roman periods (Wallace and Joseph 1991: 90). In word-internal position the reflex of *-gh- is represented by <c> <k> <q>. *-gh- may have been lost completely from the cluster *-gh-.

3.4.2.4 PIE *g^wh in Faliscan

There is no evidence of the treatment of the labiovelar voiced aspirate in Faliscan.

⁶¹ See Stuart-Smith (1996: 37–40).

3.4.3 Faliscan: from orthography to phonetics

The consonant system of Faliscan, and its representation in the native and Latin alphabets is given in Table 3.2.

3.4.3.1 /f/ in Faliscan

The main treatment of *bh and *dh is to <f> <F>, with occasional instances of <h> in inscriptions from the fourth century BC onwards. The sign transcribed as <f> is †, probably derived from F after a simplification of the digraph FH <vh>. <f> is taken as equivalent to the later Fal.-Lat. letter <F>, although there is only one correspondence to establish this in the Latin abbreviation for *filius/filia* ‘son/daughter’, for example, f (LF 16/Ve 317) = f (LF 121/Ve 322i). <f>, and less frequent <F>, are found word-initially before a vowel and intervocally (only <f>). The letters are both taken to represent /f/, which contrasted with the labial stops /p/ and /b/, with the labial approximant /w/ (<u>), and with the fricatives /s/ and /h/ (during the archaic period).

Beyond the correspondence with Latin <F>, there are little indications as to how Faliscan /f/ was pronounced. Meiser (p.c.) suggests that an archaic Etruscan inscription dating to the third quarter of the seventh century BC from Faliscan territory might suggest a voiced pronunciation of /f/ as [β] in word-internal position. The Italic stem *ruf-, from PIE *reudhro-, cf. Lat. *ruber*, cf. the Faliscan

TABLE 3.2 The consonants of Faliscan

	<>	//	<>	//	<>	//
vless stops	p, P	p	t, T	t	c/k/q, C/Q	k
vd stops	p/?b, B	b	d, D	d	c/k/q;c, ?G	g
fricatives	†, F	f	s/z, S	s	h, H	h
liquids			l, L	l	r, R	r
nasals	m, M	m	n, N	n		
glides	w, V	w	i, I	j		

Notes

- is found if we accept Prosdocimi's (1990) reading of LF 3/Ve 243.
- <d> seems to be used for expected /t/ in two inscriptions (LF 59/Ve 320; Renzetti Marra 1990); Peruzzi (1997) takes this to reflect an actual shift in pronunciation.
- <x X> represented /ks/.
- As in Latin, <u V> was used to represent both /w/ and the vowel /u/.
- <z> occurs throughout the inscriptions, usually in word-initial position, mostly in names, and where one would expect <s>. See e.g. **zextos** (LF 1/Ve 241), **zextoi** (LF 123/Ve 324b), beside **sesto** (Ve 324a), or **folcuso** (Ve 324d) beside **folczero** (Ve 324a), **folcozero** (Ve 324b), both from the same tomb. In a later inscription (LF 59/Ve 320), whose language is described by Vetter as Latin, we find *zenatuo*. This use of <z> is usually thought to be an orthographic variant for /s/ (e.g. Giacomelli, 1963, 33). In forms which are considered Etruscan (e.g. the name, **aruz**, Ve 332, it is assumed that the sign was used with its Etruscan sound value, [ts]).

woman's name **rufia** (LF 3/Ve 243), occurs in an Etruscan name as **ruvries** (Fa 3.2; third quarter of the seventh century), where <v> alone could be used to represent a voiced fricative, though it could equally be a writing error whereby expected <h> was omitted from the digraph <vh>. If it is intentional, there is also the caution that while this representation would be further evidence for voiced /f/ in this position in Etruscan, this might simply be a reflection of Etruscan voicing of the Italic fricative after it had been borrowed into Etruscan (see the discussion of Etruscan **θefariei**, Cr.4.4, 4.5, and **mefanate**, for example, Co.1.28, below 3.9.1.4). This can only be treated as indirect evidence of voiced /-f-/ in Faliscan.

It is usual to assume that the sound was a labial fricative, labiodental, or perhaps bilabial (Hiersche 1965: 116), and also voiceless, given the Latin correspondence. However, while a voiceless fricative pronunciation may be an appropriate extension word-initially, indirect evidence suggests that it may not be so appropriate word-internally.⁶² We have seen that there may be indirect evidence from Etruscan pointing to a voiced pronunciation word-internally. We shall also see that the sound represented by Oscan native alphabet <f>, and later Latin <F>, was probably a voiced fricative word-internally in a voiced context, and this was probably also true for Umbrian and the other Sabellic languages. Assuming that Faliscan /f/ was not voiced in this position would make Faliscan the only Italic language not to show a voiced reflex of word-internal *-bh- and *-dh-. I therefore work here with the assumption that Faliscan /f/ was realized as a voiced fricative between vowels (noting at the same time that this pronunciation is inferred from indirect evidence).⁶³

For words with secure etymologies, Faliscan /f/ is derived solely from the voiced aspirates *bh and *dh. The change of *-dh- to /f/ following the sonant nasal *ŋ in **ifra** (LF 88) <*ŋdherā can be compared with the similar treatment in Oscan (from *bh, in **anafríss**, Sa 1A9, <*ŋbhri-bhos).

3.4.3.2 /h/ in Faliscan

*gh is represented in word-initial position by <h> <H>, and, from the middle period on, <f> is occasionally also found where <h> would be expected. <h> <H> occur in word-initial position, and once word-internally in the name **marhio**, Ve 324f, possibly an Etruscan loan. Initial <h> <H> occurs before vowels, and once before <l>, in **hlau/elea**, a woman's name (LF BXVI/Ve 327d), where Latin correspondences would predict <F>. Faliscan <h> corresponds to Fal.-Lat. <H>, for example, in **hec** (LF 85/Ve 286a) = **heic** (LF 121/Ve 322i). The shape of <h> shows some variation, but this is not usually interpreted as

⁶² pace Untermann (p.c.) who points out that the representation with Lat <F> alone may always point to [f].

⁶³ See e.g. Meiser (1998: 101) who gives Fal. **carefo** (LF 5/Ve 244) as [karēβo] (with no comment).

phonetically significant.⁶⁴ <h> <H> are assumed to represent the glottal fricative /h/, which contrasted with /s/, and during the archaic period, with /f/. As a guttural fricative, /h/ was distinct from the velar stops /k/ and /g/.

It has been suggested that Faliscan /h/ was realized as [x], a voiceless velar fricative, (e.g. Hiersche 1965: 115). While it is possible that the Etruscan letter from which Faliscan <h> was derived could have been used to represent [x] (cf. the late Latin representation of Gk <χ> [x] with <H>); Biville 1990: 202), I follow the traditional view and assume that Faliscan /h/ was pronounced as [h], a voiceless glottal fricative. While this is only an assumption (Joseph 1997: 177, n14), it is supported by: the correspondence with Latin <H>; the derivation of the Faliscan letter <h> from Etruscan, and earlier West Greek, <h>, both representing [h] (e.g. Wallace and Joseph 1991: 89); and most compelling, the Faliscan 'f/h' alternation, which probably results from a change of /f-/ to /h-/ and which thus presumes that /h-/ was [h], at least from the fifth century BC.

Word-initial *gh- is the only source of /h-/. Note that *gh- becomes /h/ before all vowels, including *u (**huti(c)ilom**, LF 1/Ve 241), where Latin shows a conditioned change to /f/. This change constitutes one of two innovations which separate Faliscan from Latin (Joseph and Wallace 1991: 180).

3.4.3.3 The 'f/h' alternation in Faliscan

The Faliscan reflexes for the voiced aspirates word-initially are complicated by evidence which shows <h> where we expect <f> and vice versa (for a summary and discussion, see Wallace and Joseph 1991). This is unlike the other Italic languages which generally show uniform treatments. This alternation of initial <f> and <h> is not confined to words which continue voiced aspirates but is also found in a few other words of uncertain or unknown etymology, for example, the name **holcosio** (LF 123III/Ve 324e) beside **folcozeo** (LF 123 II/Ve 324b).

The most likely explanation for the alternation is that of Wallace and Joseph (1991).⁶⁵ They point out that the earliest inscriptions show the typical Italic treatment of initial /f/ and /h/ for *bh-/*dh- and *gh- respectively (e.g. **far**<*bhars, **f[if]iqod**, <*dheigh- and **huticilom**, possibly from *ghu-ti-, all in the seventh-century Ceres inscription), and that the 'f/h' alternation is only attested later (the earliest instance is **foied** in LF 5/Ve 244, usually dated to the fourth

⁶⁴ The shape is usually a rectangle standing on its shorter end with a horizontal crossbar. In the Ceres inscription, the bar is oblique, but in later inscriptions it is horizontal. In the Capena-Leprignano alphabet <h> is without a bar altogether, very much like the South Picene sign and the signs transcribed as <h> from Old Sabine.

⁶⁵ Other explanations are difficult to support: the interpretation that the variation reflects a special 'rural' dialectal Latin treatment of the voiced aspirates in word-initial position (e.g. R. Giacomelli 1978; Campanile 1961) ignores the earliest evidence (Wallace and Joseph 1991: 89); recourse to Etruscan influence (e.g. Giacomelli 1963: 1978; Leumann 1977) is difficult because the Etruscan change of /f/ > /h/ occurred much later; and Hiersche's acoustic confusion of [ϕ] and [x] (the values of <f> and <h>) is weakened by the lack of evidence of a pronunciation of [x] for /h/.

century BC; Giacomelli 1963: 123, n42, after Giglioli 1935). Wallace and Joseph suggest that word-initial /f/ became /h/ in Middle Faliscan, but not in all Faliscan dialects (or all lexical items), thus accounting for the occasional instances of /h/ for /f/ beside expected and earlier /f/. Forms which show /f/ for /h/, like, for example, **foied**, are then explained as the result of socially-motivated hyper-correction, or the inappropriate use of /f/ for /h/ as a result of the influence of a Faliscan dialect where /f/ had not become /h/, or from that of standard urban Latin, with which Faliscans would have had increasing contact, and where /f/ and /h/ were distinct.

3.4.3.4 /g/ in Faliscan

In word-internal position *gh appears in early inscriptions as <k q> and later as <c>. These letters are usually taken for /g/, which means assuming that Faliscan, like Latin, used the 'c/k/q' convention to represent both /g/ and /k/, although there is only indirect evidence for this (e.g. <q> in **eqo**, LF 1/Ve 241, 'I' beside Latin *ego*, or <c> in **arcentelom**, LF 1/Ve 241, 'silver' beside Lat. *argentum*, O. **aragetud**, Cm 6). I also follow the standard view, as for example, Giacomelli (1963: 125), Wallace and Joseph (1991: 177f.), that the letters in these words represent /g/ as the reflex of *-gh-, but at the same time acknowledge that the absence of <G> from later Faliscan–Latin inscriptions prevents further confirmation.⁶⁶ Faliscan /g/ contrasted with the voiced stops /b/ and /d/, and with the voiceless velar /k/ and occurred word-initially (before vowels, and before /r/) and in word-internal position, intervocalically and before /n/ and /r/. As well as being the reflex of *-gh-, intervocalic /g/ also continued inherited *g (e.g. **eqo** 'I' <*egHom; cf. Lat. *ego*, Skt *aham*). I shall assume that /g/ was realized as a voiced velar stop, [g].

If this interpretation of the scanty evidence of Faliscan is appropriate, /g/ for word-internal *-gh- is unique among the Italic languages, which otherwise show /h/. This development also constitutes the second innovation separating Faliscan from Latin (Joseph and Wallace 1991: 177–80).

3.4.3.5 Clusters with *t in Faliscan

There is only evidence for one conditioned development in Faliscan, in the word-internal cluster *-ght-, which becomes <t>, if we can trust the reading of **lete** (LF 136/Ve 342a2). Before *t, *-gh- effectively disappears. Given the evidence of the other Italic languages for the treatment of this cluster, where *-gh- appears either as /k/ (Latin, e.g. *lectus*), or /h/ (Oscan, from *-kt- before internal syncope,

⁶⁶ It is not possible to establish independently that these letters do not represent /k/ ([k]); see e.g. Wallace and Joseph (1993: 145). I note that comparison with other Italic languages fails to reveal any evidence for a development of *-gh- (or any voiced aspirate) to a voiceless stop in intervocalic position (while acknowledging that this is in itself a circular argument).

e.g. **kahz**, Sa 42, < **kaghtos*), it seems likely that **-ght-* showed a conditioned devoicing to **-kt-* in common Italic, and that in Faliscan **-kt-* became **-ht-*, and then **-h-* was lost before /t/ (cf. the Umbrian treatment of **-kt->/ht/>/t/* with compensatory lengthening of the preceding vowel).

3.4.3.6 The treatment of **-s-* in Faliscan

If we accept the derivation of **carefo** (LF 5/Ve 244) as an independent Faliscan development from a root **kas-*, cf. O. **kasit** (Cp 33), Lat. *castus* (*careō*), once as /r/, which suggests that Faliscan like Latin showed rhotacism (e.g. Giacomelli 1978: 515),⁶⁷ **carefo** would then be positive evidence for the voicing of **-s-* between vowels in Faliscan. Even if we reject **carefo** as evidence of full rhotacism, we may still want to assume that Faliscan /s/ from PIE **-s-* did become voiced between vowels, but that this was not represented in the orthography.⁶⁸ This may be inferred from the treatment of the secondary cluster **-rs-* which gives <r>, probably for /*(r)r/* or /*r/* with compensatory lengthening of the preceding vowel, in for example, the goddess' name **ceres** (LF 1/Ve 241) < **keresēs*, cf. Lat. *Cerēs*, since a voiced outcome is more easily explained if we assume that **-rs-* was already [-*rz-*], with [-*z-*] < **-s-*.⁶⁹

The Faliscan evidence is consistent with the assumption that PIE **-s-* became voiced intervocalically at an early stage, and thus that a common Italic voicing of voiceless fricatives could have taken place in word-internal position.

3.4.4 The development of the PIE voiced aspirates in Faliscan

I summarize the main treatment of the PIE voiced aspirates in Faliscan as:

<i>word-initial position</i>	<i>word-internal position</i>
* <i>bh-><f></i> /f/ [f]; /f/>/h/ [h]	* <i>-bh-><f></i> /f/ ?[β]
* <i>dh-><f></i> /f/ [f]; /f/>/h/ [h]	* <i>-dh-><f></i> /f/ ?[β]

⁶⁷ The shape of <r> which occurs on the inscriptions (LF 5/Ve 244) on the two kylixes from La Penna (Cività Castellana) is different in **carefo** from that in **crā** (Giacomelli 1978: 512, after Belardi 1964). If the signs are intentionally different—and if **carefo** is from **kas*—<r> in **carefo** may have been a particular sign to denote the variant of /r/ resulting from rhotacism, which would suggest that that rhotacism was not complete in Faliscan at the date of the inscription (fourth century BC; Giglioli 1935: 49). However, the variant sign may simply be orthographic, perhaps provoked by the similar shape of the preceding letter <a>.

⁶⁸ This is assumed by Bonfante (e.g. 1966), who takes <z> where clearly Faliscan, as representing a voiced variant [z] for /s/ between vowels both within and across words in sandhi. While Bonfante may be right (cf. Wachter 1987: 44), the native alphabet evidence is too limited to establish sandhi processes (there is only one good example, LF 59/Ve 320 with **de zenatuo**) and this is not helped by more recent discoveries (Renzetti Marra 1990).

⁶⁹ There does not appear to be any evidence for the treatment of **-s-* in a primary cluster with a liquid.

**gh*-><h> /h/ [h]; hypercorrection to /f/ **-gh*-><c k q> /g/ [g]
 **g^wh*- no evidence **-g^wh*- no evidence

We may also have evidence of a single conditioned change in Faliscan:

Clusters with **t*:
 **-ght*-><t> /t/ [t]

Faliscan is usually regarded as more closely related to Latin than to the other Italic languages, but in the development of the voiced aspirates it seems to perch between Latin and Sabellic. The treatment word-initially was probably /f/ for **bh* and **dh*, and /h/ for **gh* (even before **u*, unlike Latin); word-internally we have /f/ for **bh* and **dh* but probably /g/ for **gh* (unlike any Italic language). There is no direct evidence of the pronunciation of any of the reflexes, and thus the assumption that they were voiceless word-initially and voiced word-internally is inferred. There is little evidence of conditioned treatments in Faliscan, though what there is fits with that of the Italic languages generally (i.e. devoicing before **t*). **-s-* may have become voiced between vowels in Faliscan. There is no objection from Faliscan to the proposal of a common Italic voicing of word-internal fricatives.

3.5 The evidence of the early Sabellic inscriptions

I move now to the Sabellic languages, and begin with the earliest Sabellic texts, which are attested in a small number of archaic inscriptions. Most of these belong to a dialect/language called ‘South Picene’, though there are also a small number of inscriptions from central and southern Italy possibly representative of other early dialects/languages: ‘Presamnite’, ‘Old Umbrian’, ‘Old Hernican’, and ‘Old Volscian’ (for approximate locations in Italy, *see* map in Fig. 3.1 p. 35).

The inscriptions are linked by their age, all dating to before the fourth century BC, and their obscurity—while the odd word may look familiar, most forms are very uncertain. Nevertheless, the language(s) represented by the inscriptions all look Italic, and more specifically Sabellic. This impression arises partly from similarities in vocabulary, for example, SPic. **nerf** ‘men’ (Sp TE 6); cf. U. *nerf* (e.g. VIa 30), and morphology, for example, the genitive singular of thematic stems in *-es* in for example, PS **lucies**; cf. U. *-es* in for example, **katles** (e.g. Ila 22), but to a large extent from the general appearance of <f> and <h> in word-internal position, for example, SPic. **mefiún** ‘in the middle’ (Sp AP 3); cf. O. **mefiai** (Cm 1B31), which is a common feature of the later Sabellic languages. Rix (2002) groups these texts as follows (*see* Fig. 2.1 p. 20): Old Umbrian and Old Volscian with ‘umbrisch’; South Picene and Presamnite together as ‘südpikenisch’; and ‘Old Hernican’ with ‘oskisch’.

If these inscriptions do show early forms of Sabellic, they add a fresh dimension to the reconstruction of the history of the peoples of early Italy. This

meagre evidence attests the early presence of varieties of Sabellic across a wide area, not only where expected, in northern-central Italy (regions inhabited by the Umbri and Sabini), but also in the east (the land of the Picentes) and in the south, in Campania (*see* recently, Rix 2000). Thus there would be linguistic support for the ancient tradition which considered the Umbri and the town of Ascoli Piceno to be of Sabine origin (Marinetti 1985: 37), and which claimed that the Osci, the predecessors of the Etruscans and Samnites in Campania, spoke an early form of Sabellic (Meiser's 'umbro-sabinisch'; 1987a: 108).⁷⁰

The early Sabellic writing systems are linked with each other in that they show similar letters and conventions, some of which also turn up in the early Etruscan inscriptions of Narce (e.g. the abecedarium, no. I.2 in Pandolfini and Prosdocimi 1990: 21f.), and later in third-century inscriptions from Capena (Briquel 1972: 831f.). The exact details of the adaptation and spread of these early writing systems are not clear, but it seems that shortly after the transmission of the alphabet to the Etruscans, a number of related yet distinct scripts were developed in central Italy (for discussion, *see* e.g. Briquel 1972: 838f.; Cristofani 1978: 419–20).

Almost all of the early Sabellic texts are obscure. Any interpretation is usually made on the basis of the formal recognition of words (or letter sequences if there is no punctuation) with words known from Sabellic or Italic. In this way words are identified and, if possible, given a PIE etymology. If a word contains <f> or <h> and a formal match can be found in Italic for which there is a PIE etymology continuing a voiced aspirate, then the letters are taken to represent the reflex of the voiced aspirate. This is the most sensible method available, but it is of course circular, and so we consider all evidence from these inscriptions as very uncertain. (Translations are equally uncertain and those given here should be regarded with appropriate caution.)

3.5.1 *South Picene*

Apart from two inscriptions on late fourth-century helmets found in Bologna and Bari, most of the South Picene inscriptions were found in the territory which roughly matches that assigned by the Romans to the Picentes, that is the inland area running along the eastern coast about the towns of Asculum Picenum (Ascoli Piceno) and Teate Marrucinum (Chieti). They are engraved on stone blocks or stelae, and date to the sixth and fifth centuries BC (Marinetti 1985: 62).⁷¹ The discovery of four more inscriptions, three in 1973 at Penna San Andrea, and one later at Cures in Sabine territory, revived interest in the texts;

⁷⁰ For a discussion of the possible relationships between the languages of these texts and the later Sabellic languages, *see* Meiser (1996).

⁷¹ Text references to the inscriptions are to the texts as in Marinetti (1985). I follow Marinetti's reading of all texts except AP 4 and CH 2, for which *see* Stuart-Smith (2000).

and a subsequent breakthrough in the decipherment of the script meant that they could be read properly for the first time.⁷²

Although many inscriptions are complete and show punctuation (only Sp AQ 2 and Sp BO 1 do not), most of the words are quite obscure. Nevertheless, certain forms, such as **safino-** (e.g. *safinas*, Sp TE 5) presumably ‘Sabine’ and **tútas** (Sp TE 5) ‘people’, suggest that the language was Sabellic. South Picene has been thought to belong more closely to Umbrian than to Oscan, though not a direct predecessor (e.g. Marinetti 1985: 42; Meiser 1987a: 105f.), and it has also been suggested that the languages found later in the same region—Paelignian, Marrucinian and Vestinian—continue South Picene, but show an ‘Oscan’ appearance as a result of subsequent Samnite influence (Marinetti 1985: 44; Meiser 1987a). A different interpretation is given by Rix (2002: 1f.) who follows Adiego (1992) in taking South Picene (together with Presamnite, *see p. 71*) as a separate subgroup of Sabellic. According to this view, the later languages would then show some substrate influence but historically belong with Oscan.

3.5.1.1 *The South Picene alphabet*

The South Picene alphabet is attested from the sixth century BC,⁷³ and shows the following letters (after Marinetti 1985: 59): <a b g d e v h i k l m n o p q r s t u ú f *>. ⁷⁴ The alphabet is for the most part deciphered. The readings of Radke (1962) and La Regina (in Cianfarani *et al.* 1978) played an important role in the decipherment, since both scholars realized that . (Radke) and : (La Regina) were not punctuation marks but reduced forms of O <o> and figure of 8 <f>.

The script probably derives from a South Etruscan model given the use of <q> for /k/ (Marinetti 1985: 50), which usually occurs before /o/ or /u/ (also with intervening /l/; cf. Briquel 1972: 842, n3), and <k> for /g/ (Marinetti 1985: 53). Certain signs, such as the reduced figure-of-eight (:) for <f>, suggest an early Sabellic, or Sabellic/Faliscan intermediary for the alphabet, which may have been developed in Capenan territory; Briquel (1972: 838f.), esp. 842–3; also Rix (1992a: 250).

3.5.1.2 *South Picene: The orthographic evidence*

3.5.1.2.1 *PIE *bh in South Picene*

While there is no evidence for the treatment of *bh- in word-initial position, the situation is more promising for word-internal position, where we find <f> for *-bh- in **tefeí** ‘to/for you’ (Sp TE 7; also **tefeh**, Sp CH 2), if the word is cognate

⁷² Marinetti (1985) provides the definitive edition, and also a full discussion of the background to the inscriptions and previous interpretations.

⁷³ Of these, Sp AQ 2, the inscription on the Capestrano Warrior, is written in the most archaic script (Marinetti 1985: 56f.).

⁷⁴ The inscriptions run up and around the stones, with no fixed direction. The letters too may occur at varying orientations; Marinetti (1985: 57).

with U. **tefe** (e.g. Ib 13), O. **tfei** (Cp 37:3), and from **tebhei* (cf. Lat. *tibi*); Untermann (2000: 753). **-bhos* also seems to be continued by <s>, if the phrase **súais manus** (Sp AP 2) is equivalent to Lat. *suīs manibus* ‘with their own hands’. **-us in manus** shows the abl. pl. ending from **-u-bhos*, cf. Lat. *-bus*, OLat. *-bos*, from **-bh(y)os*, cf. Skt. *-bhyas* (Leumann 1977: 416; Untermann 2000: 450). Presumably **-bh-* became **-f-* between vowels, but after final-syllable syncope the cluster **-fs* (<**-fos*) assimilated to **(s)s* as in Oscan.

Another form may continue **-bh-*, but is less certain. The identification of **safinas** ‘Sabine’ (e.g. **saf/inas**, also **safinús**, Sp TE 5) as an ethnic, cognate with O. **safinim** (Sa 4), Lat. *Sabīnī*, *Samnium*, *Sabellī*, seems sensible, and is supported by its appearance with **tútas** ‘people’ (O. *touto*) and **nerf** ‘men’ (U. *nerf*, e.g. VIa 30). The linguistic history of this group of names is uncertain. The most recent solution for the Italic period is that of Rix (2000: 198f.), who starts with a noun **saβnōs* and derives from this **saβn-iyō->*saβnyom*, the source for Lat. *Samnium* and O. **safinim** (e.g. Sa 4). SPic. *safīno-*, Lat. *Sabīnī* would also be from a regular derivative **saβn-īno-* with dissimilation of the first nasal (similarly <**sabh-n-īno-*, Untermann 2000: 642). Lat. **Sabellī*, which can only be from **saβen-lo-*, must be a loan from an Sabellic form, perhaps **saβno-lo-*. Most attempts at a PIE etymology continue **-bh-*, but are uncertain (e.g. see recently de Simone 1992: **sabh-o-<*s_e-bho-* ‘il proprio’, also **sabh-en/on-<*sa-bho-*; Rix 2000: **s_ebh-nō-s* ‘coloro che (non) appartengono (che) a se stessi’).

I reject as evidence for **bh* the words **fitia-**, for example, **fitiasom** (Sp TE 5) and **qolofitúr** (Sp AP 2). While etymologies have been suggested which continue **bh*, the meanings and etymologies of both are unknown (Untermann 2000: 298; 408).

The reflex of word-internal **-bh-* seems to be represented by <f> and <s>, the latter probably resulting from assimilation with **-s* after final-syllable syncope.

3.5.1.2.2 PIE **dh* in South Picene

The outcome of **dh* also seems to be represented by <f>, although again there is only evidence in word-internal position. **estuf**, if a deictic adverb ‘there’ (Sp TE 5, also **estufk**, Sp AP 2), is usually taken from **esto-dhi(ke)*; for **esto-* cf. U. **este** (Ia 1) for **-dhi(ke)*, cf. U. **pufe** (Ib 33) <**k^wu-dhi*; Rix (1986: 591–2). **mefiún** ‘in the middle’ (Sp MC 1, perhaps also **lefin** Sp AP 3) looks very much like Oscan **mefiaí** (Cm 1B31) and thus can be derived from **medhyo-*, cf. Lat. *medius* (Meiser 1986: 77; Untermann 2000: 464), with **-ín** reflecting a combination of the locative ending and the postposition *en*, as in O. **húrtín** (Sa 1A1) ‘in the grove’ <**hortei-en* (Marinetti 1981: 148).

I reject the following forms as too uncertain in meaning and etymology to be considered as evidence for the treatment of **dh*: **efidans** (AP 5); **fitia-**, for example, **fitiasom** (Sp TE 5); **rufrasim** (Sp CH 1) (Untermann 2000: 198; 289;

636). The reading of **me[n/t]fistrúí** (Sp TE 5) makes it too doubtful to be considered seriously (see Fig. 20 in Marinetti 1985).

3.5.1.2.3 PIE *gh in South Picene

The evidence for *gh is all uncertain. The single word of Sp AP 6, **heries**, looks like a derivation from the root *her- from *gher-, either a verbal form (cf. U. **heries**, e.g. Ib 10) or perhaps more likely a name in the genitive singular, cf. the Oscan names in her-, for example, **hereiis** (Cm 14C7); Marinetti (1985: 154); Untermann (2000: 322f.). In word-internal position the two forms which may continue *-gh- show <Ø>. Although the context of **nemúnei** (Sp TE 5) is unclear, it is commonly equated with Lat. *nēmō ‘no one’ from *ne-hemōn-, cf. *hemōnem* Fest. 89L., where *hem-/hom- (Lat. *homō* ‘man’, O. **humuns**, Cp 37:9) is from *(dh)ghom-, cf. O. **humuns** (Cp 37:9) (Untermann 2000: 490). This derivation assumes that *h was lost after it became intervocalic in composition. Taking the less certain, ?verbal form, **veia/t** (Sp MC 1) from *legħ-yā-ti from the root *legħ- ‘lie’ (cf. Fal. **lecet**, LF 85a/Ve 286A), with *l->w- as in **vepetí** (<*lep-) in the same inscription (e.g. Joseph and Wallace 1991: 181, n34; Untermann 2000: 830), also assumes loss of *h intervocalically.

South Picene shows <h> for word-initial *gh-, but no reflex of intervocalic *-gh-, presumably after the loss of *-h-.

3.5.1.2.4 PIE *g^wh in South Picene

There does not seem to be evidence for the treatment of *g^wh in South Picene. One word which has been put forward as a possible candidate is the possible place name **úlú>erna** (Sp BA 1), whose interpretation is complicated by the uncertain sign >: ?<g/v> (Marinetti 1985); ?<g> (Adiego-Lajara 1990). Janda (1993) connects the form with the ethnic *Uluernatēs* (Pliny, *Nat.Hist.* 3.65) and suggests that here > should be read as <v>. He also goes further and argues that *Uluerna is cognate with the Sabellic names *Priuernum/Prifernum*, all continuing prefixed forms of a stem *-g^wherno-. While Janda’s identification of the Italic cognates seems plausible, it is more difficult to be sure that these names do go back to a PIE root continuing *g^wh.

3.5.1.3 South Picene: from orthography to phonetics

A tentative sketch of the consonant system is given in Table 3.3.

3.5.1.3.1 /f/ in South Picene

The symbol : <f>, which is usually taken to be a reduced form of 8, also found in Old Sabine, Oscan, Umbrian and Etruscan, represents the reflexes of *bh and *dh. <f> is taken to represent the phoneme /f/, which could occur word-initially, and word-finally, but which is found most frequently in word-internal position (between vowels, before or after a liquid, or before a voiceless stop). As far as we can tell, /f/ contrasted with the other fricatives /s/ and /h/

TABLE 3.3 The consonants of South Picene

	<>	//	<>	//	<>	//
vless stops	p	p	t	t	k/q/>	k
vd stops	b	b	d	d	k/>	g
fricatives	:/>	f	s	s	h	h
liquids			l	l	r	r
nasals	m	m	n	n		
glides	w	v/u, ú	i	j		

Notes

- 1 In BA. 1, > represents /f/ [β]; Janda (1993).
- 2 /l/ does not occur in word-initial position (except perhaps in Sp CH.2, **lufaniom**, although this is uncertain; see Stuart-Smith 2000). Elsewhere, *l- seems to become /w/ (<v>, <u>) or /y/ <i> (only Sp CH.1).
- 3 /w/ is represented by <v> and <u> word-initially, in e.g. **vepetí** (Sp MC.1); see Adiego-Lajara (1992: 82–4). <ú> may also represent /w/ between vowels, in e.g. **kaúieh** (Sp AQ.1); Meiser (1987: 113); but see Adiego-Lajara (1992: 84f.), for whom <ú> represents the offglide of a diphthong ending in /ó/, the reflex of *w after resyllabification.

(word-initially and perhaps word-finally), and the other labial consonants /p b/ and the sound represented by <v u ú> which was probably /w/ [w].⁷⁵

We have no direct information about how /f/ was pronounced. From the use of the reduced sign **8** which elsewhere seems to have represented a labial fricative, together with the phonemic oppositions just outlined, we might expect /f/ to have been a labial fricative (bilabial or labiodental), which was voiced or voiceless. One indication that South Picene /f/ may have been voiced in a voiced context word-internally (following a liquid) may occur in **úlú>erna**.⁷⁶ The interpretation that > represents a voiced allophone of /f/ (rather than simply /w/) is suggested by Janda's identification of possible cognates, *Prifernum/Priurnum*, whose orthographic alternation points to <F>/<V> being used to denote [β] for /-f-/. (Janda's derivation from **-g^wherno-* would also suggest that > represents a Sabellic fricative, cf. the Umbrian treatment of word-internal **-g^wh-* is to /f/, but this is far from certain.) It seems possible that in South Picene—as we will find in the other Sabellic languages, and possibly from the evidence of Presamnite **adaries** (Ps 5), if <d> represents [ð]—/f/ was voiceless word-initially, but voiced word-internally (intervocally and adjacent to a liquid). Word-internally before a voiceless stop, /f/ may well have been voiceless: **oftorim** (Sp CH 1) is of uncertain etymology (Untermann 2000: 787), but the

⁷⁵ This is suggested by the use of <v> (= Gk <F>), and perhaps too by the use of <u> for <v> word-initially.

⁷⁶ The sequence **úlú>**- would have arisen through anaptyxis, from an original cluster **ul>*-; Janda (1993: 150).

cluster <ft> /ft/, looks similar to that of Oscan, for example, *scriftas* (Lu 1:25) <*skriptas (<*skribht-), where /ft/ is from an earlier *-pt-.⁷⁷

South Picene /f/ did not only derive from the voiced aspirates.⁷⁸ /f/ in **múfqlúm** (Sp TE 5), if ‘monument’, cf. Lat. *monstrum* <*mons-stlom (Marinetti 1985: 118; uncertain, Untermann 2000: 480), may continue the reflex of the primary cluster *-nss-, cf. for example, U. **spafu** (Va 20) <*spānsso-. As in Umbrian, this is an indication that word-internal /f/, which may have been [β], could continue a voiceless sound, in this case *-ss-. Similarly, the loss of the nasal before *-f- indicates that the fricative immediately resulting from *-ss- was voiceless. A distinction of /-f-/ and /-β-/ may have existed in a small number of words, but is not attested in the historical period, showing that the two fricatives merged into /-f-/. This form, as those in Oscan and Umbrian which derive from primary clusters with *-ss-, suggests that possibly voiced reflexes of the PIE voiced aspirates in South Picene could go back to an earlier voiceless fricative stage.

In **manus** (Sp AP 2) ‘hands’ <*manubhos, word-internal /f/ < *-bh- shows a further development. Presumably *-bh- became *-f- between vowels, giving *-ufos, and then after final-syllable syncope (*-ufs), *f assimilated to s.

3.5.1.3.2 /h/ in South Picene

*gh- becomes <h>, but intervocally no reflex occurs. South Picene <h> is □, also found at Poggio Sommavilla, in the Leprignano alphabet from Capenan territory, and in two Etruscan inscriptions from Narce. The sign is usually derived from West Gk <h> (Marinetti 1985: 51), although it has also been taken from *samech* (Rix 1992a: 251). In word-initial position, it seems likely that <h> represents /h/. What <h> stands for word-internally or word-finally, where it is found most frequently, is less certain.

According to Marinetti (1985: 92f.), some cases of word-final <h> represent /h/ from *-s, while others represent a diphthong in the process of becoming a monophthong, either marking a palatal fricative from the offglide *-i, or the long vowel which results. Marinetti’s first suggestion has now been abandoned in favour of a derivation of /h/ from final *-d in a number of forms, for example, **qúpírih** ‘well’ (Sp AP 2) <*kuprēd (Meiser 1987a: 120), although it is very unclear what sound <h> would represent in these instances. Those forms where /h/ does not seem to come from *-d are now explained according to Marinetti’s second interpretation, that is, that <h> marks some aspect of the process of monophthongization, or the results (or both?). If it is assumed that the written sequence <Vh#> represents the resulting long vowel (e.g. Adiego-Lajara 1992: 66f.), this

⁷⁷ Meiser’s (1996: 197) derivation from *ope-H₃ok^weie- would make /ft/ a secondary cluster here, and would allow the assumption that *-ft-> /ht/ in South Picene, linking it more closely to the other ‘Umbro-Sabine’ languages.

⁷⁸ Word-final /f/ in **estuf** (Sp TE 5) is from intervocalic *-dh-; *f became final after the loss of the short vowel *é <*i. Otherwise, word-final /f/ is from final *-ns, in **nerf** (Sp TE 6), which is presumably an accusative plural as U. *nerf* (e.g. VIa 30).

implies that <h> in final position could act as an orthographic marker of vowel length (perhaps extended from the representation of the development of final *-d).

Intervocally <h> may also have served as an orthographic marker of vowel hiatus after the loss of *-w- in **súhúh** 'with his own means' (Sp TE 1), if from **sowōd*; Adiego-Lajara (1992: 97–8). Such usage is easier to explain than that word-finally. Intervocalic *-gh- is not represented by any reflex, for example, in **veiat** (Sp MC 1). Presumably, *-gh- became *-h- (voiced [ɦ]), which was then lost (as in e.g. Umbrian).⁷⁹ At the time of the introduction of writing, intervocalic *-h- (<*-gh-) still existed, and was written as <h>. When *-h- was no longer pronounced between vowels, the letter <h> effectively marked the presence of vowel hiatus and could then be used to mark hiatus between two vowels, where no etymological /h/ had ever existed. The use of <h> to mark vowel hiatus implies that at an earlier period in South Picene, *-h- was pronounced between vowels. Thus we assume that *-gh- became *-h- which was then lost.

It seems that only in word-initial position did <h> note /h/, which, as far as we can tell, only derives from word-initial *gh-. There are few indications to help us identify the pronunciation of South Picene /h/, but the derivation of the sign from Gk <h> (via Etr. <h>) suggests a voiceless glottal fricative [h]. It is possible that before its loss in intervocalic position, *-h- was a voiced glottal fricative [ɦ].

3.5.1.3.3 The treatment of *-s- in South Picene

<s> is found for /s/ perhaps from *-s- in for example, **-asom** in **fitiasom** (Sp TE 5), if this form is a genitive plural of an -ā- stem. Any assumption that /s/ was voiced intervocally must be made by extension from what we know of Oscan, Umbrian and Latin. South Picene provides no evidence to support or reject a common Italic voicing of word-internal fricatives.

3.5.1.4 The development of the PIE voiced aspirates in South Picene

<i>word-initial position</i>	<i>word-internal position</i>
*bh- no evidence	*-bh-><f> /f/ ?[β]
*dh-><f> /f/ ?[f]	*-dh-><f> /f/ ?[β]
*gh-><h> /h/ ?[h]	*-gh->*-h- [ɦ]>∅
*g ^w h- no evidence	*-g ^w h- no evidence

3.5.2 Presamnite

The Presamnite inscriptions are collected together as Ps 1–20 in Rix (2002). These archaic inscriptions are of different types but share the property that they were generally found in the south of Italy in areas which were occupied by the

⁷⁹ This also affected secondary intervocalic *-h-, cf. **nemúnei** (Sp TE 5).

Oscan-speaking Samnites from the fourth century on. Most (Ps 4–19) are short inscriptions engraved onto pottery vessels from southern Campania, and fall into two groups in terms of their dating and orthography. Ps 4 and 5, from Nocera and Vico Equense respectively, form one group. Both date to the sixth-century BC, and are written in an archaic script which shows some similarities to the South Picene alphabet. They also both show sequences, now read as **bruties**||**esum**, **ievies**||**esum** (e.g. Wallace 1990), which consist of a name in the genitive singular followed by the verb ‘to be’ (so, e.g. ‘I belong to Brutius’), which is also found in the South Picene inscription Sp TE 4 (cf. also Ps 13 **lucvies**, **cnaivies** both with **esum**; Joseph and Wallace 1987). The second group (Ps 6–19, also Ps 3) date to the fifth century BC and are written in an archaic Etruscan alphabet (Cristofani 1993). The other three inscriptions (Ps 1, 2 and 20) are from even further south, from Lucania and Bruttium, and are written in versions of the Achaean Greek alphabet. The most recently-discovered Presamnite inscription is a substantial but broken and unpunctuated text, possibly a public decree, on a stone block from Tortora (Lazzarini and Poccetti 2001). The alphabet shows digamma, presumably for /w/, and a further sign which Lazzarini and Poccetti (2001: 38) call a ‘mezza farfalla’, that is, half a bow, which occurs with a slightly different shape in Ps 5 and South Picene with the assumed value /w/. In Ps 20 we have to assume that this sign has a different value, and it is read as <f> by the editors and by Rix, largely because with this reading it is possible to recognize Sabellic/Italic-looking verb forms in *fufvFod/fufFod* ‘were’, cf. O. **fufens** ‘were’ (Cp 29) and the incomplete *fefikeδ* ‘did/made’, cf. O. *fefacid*, Lu 1:10; *ava:faKET*, Lu 18).⁸⁰ While linguistic features of these texts have been used to link them to the Umbrian (or Umbro-Sabine) group of languages, as opposed to Oscan which was spoken later in the same area (e.g. Meiser 1996), Rix (2002: 5) now argues that they should join the South Picene texts in a separate ‘South Picene’ group.

The inscription from Tortora is incomplete and largely obscure but may provide potential evidence for the treatment of word-initial *bh- and *dh- as <f>, if we are right in assuming that *fefikeδ* and *fufvFod/fufFod* continue reduplicated ?perfects from *dheH₁- and *bhweH₁- respectively (see Lazzarini and Poccetti 2001: 76f., 122f.). Otherwise there does not seem to be any evidence for the treatment of the PIE voiced aspirates in this group of inscriptions. The two words which have been mentioned are not reliable. Colonna’s (1974: 386) reading of the first word of Ps 4 took the first letter as <f>, giving **fraties**, which suggested a name perhaps cognate with Lat. *frāter*. However, the shape of the first letter and in particular its similarity to that of South Picene has led to a revised reading of **bruties** (e.g. Meiser 1986: 20; Wallace 1990: 172). The reading of the second word is not disputed, but its etymology is very uncertain. **adaries**

⁸⁰ The bottom halves of both the letters read as <f> are missing, so <n> is also a possible reading, but seems to be less useful (Lazzarini and Poccetti 2001: 75).

(Ps 5) is also a name, probably referring to the maker of the vessel (Wallace 1990: 174–5). Arena (1974: 390) equated the form with later Lucanian Oscan *afaries*, Lu 48, suggesting that <d> in **adaries** represents a voiced fricative [ð] as the reflex of *-dh-. While the connection of the names may be appropriate, we have no further evidence to support a derivation of <d> <F> from *-dh-.

In the Tortora inscription, the use of a sign for <f>, presumably /f/, which may ultimately go back to Greek digamma (<v> for /w/) and which is used in other Presamnite inscriptions for /w/, may indicate that /f/ was voiced either generally or in certain contexts. The Presamnite inscriptions also provide some intriguing orthographic evidence which may be relevant. If we accept Arena's connection of **adaries** with *afaries* (Lu 48) we would have the striking correspondence of early (sixth century) <d> with later (first century) <F>. The place of articulation does not pose a problem, since we usually assume that Fal-Sab. /f/ from *dh results from an earlier merger of *θ with *f. <d> in **adaries** could be evidence for this dental fricative (of whatever origin) before the merger with the labial fricative in this variety of Sabellic at least. This representation would also point to a voiced pronunciation of the fricative intervocalically ([ð]) in this word in a Sabellic dialect from the mid-sixth century BC.

3.5.3 Old Umbrian

The short inscription written on an early sixth-century vase discovered at Tolfa (Um 4) is usually referred to as 'Old Umbrian' (most recently Rix 2002 'paläoumbrisch', Um 4). In the initial publication of the inscription (Colonna 1983), the reading was given as **mošm:smutes/face**, but Rix (1992a; 2002: 62) suggests a more intelligible reading, by taking the first row from left to right and reading *samech* <š> as <í>: **setums:míom/face**, 'Septimus made me' (followed by Meiser 1996). While the few words seem to show an affinity with Umbrian, hence the label, the script is more typical of the few archaic inscriptions from Capena (e.g. Colonna 1983: 584–5), a Faliscan city in Etruscan territory.⁸¹

If Rix's interpretation of the inscription is correct, it provides evidence for <f> for *dh-. **face** looks like a perfect, formed to the present stem *fak-, from the zero-grade *dhH₁k- of the root *dheH₁k- (cf. Lat. *fēcit*), as in Umbrian, cf. **fakust** (IV 31), **fakurent** (Ib 34) (Untermann 2000: 256). Like Umbrian, **face** from *faced (<*facet) would show loss of the secondary ending *-d, cf. U. **dede** 'gave' (Um 16), beside for example, Lat. -ed in OLat. **feced** 'made' (cf. de Simone 1983: 593).

The sign read <f> is †, as in Faliscan, although with a curved top stroke. We can only assume that <f> represents /f/ (from the correspondence with the Faliscan arrow-shaped letter), perhaps pronounced [f]. **setums** is also interesting.

⁸¹ Although Capena was in Etruria, the ethnic identity of the city is uncertain; Salmon (1982: 26).

If the word is cognate with Lat. *Septimus*, and the language of the inscription is an early form of Umbrian, we seem to have evidence for a very early loss of **h* from the cluster **-ht-* (<**-pt-*), in comparison with the later Umbrian of Iguvium (where the use of <h> to mark vowel length shows that the loss of **-h* cannot predate the orthography significantly), and with the roughly contemporary Umbrian of Perugia, where Etruscan loans with <h> (e.g. *śehtmal*, Pe 1.738, <**sehtum-*) suggest that Umbrian /h/ was still pronounced before **-t-*. Thus this eastern form of Umbrian may have lost **-h-* in this position somewhat earlier than in the western varieties of the language; Rix (1992a: 246); Meiser (1996: 197).

Rix (1996; 2002) also includes the two earliest possible Sabellic inscriptions, from Poggio Sommavilla (Um 2) and Magliano Sabino (Um 3), dating to the late seventh century, within his Old Umbrian group. The language of both is difficult to interpret. The Poggio Sommavilla inscription was reread by Pallottino (1973) while that from Magliano Sabino was first published by Firmani (1977).⁸² Both are written in an archaic script, with <o> and <d>, with some similarities in letter shape with South Picene signs (notably in the empty rectangle for <h>) and also with letters found on later inscriptions from Capena (Briquel 1972).

The readings of both inscriptions are difficult. The Magliano Sabino inscription is fragmentary, with five sherds belonging to at least two vases. For possible readings, see Firmani (1977: 112); Colonna (1983: 583); Marinetti (1984: 373); Rix (1992: 38, n7); Bagnasco-Gianni (1995: 39); and most recently Rix (2002: 62 = Um 3).

The inscription from Poggio Sommavilla is complete and consists of three lines, one around the neck of the flask, and one on either side. Until recently, the usual reading of the two shorter lines was that of Pallottino (1973): (b) **skerfs**, (c) **hedusef**. The longest line was first read as: **aletneipohehik.feufs**, but Marinetti (1985a: 167–8; 1991: 601–2) suggested an alternative: **faletnei pohehike ufs**, analysing it into **faletnei**, a dat. sg. of the recipient, **pohehike**, a verb of ‘giving’ or ‘making’, and **ufs** a nom. sg. subject from **ufos*. The latest attempt at an interpretation/reading is by Rix (1996), who gives: (a) **faletne! poíei skerfs**, (b) **skerfs**, (c) **her/duseí**, meaning ‘Falendo, per chi (è) lo scritto? Lo scritto? È per colui che (l’) ha ordinato (ricevuto)’. (Rix’s text of Um 2 is very similar.) While this reading has the advantage that the text makes sense (and fits in with other ancient dialogue inscriptions), it does require the assumption that the empty rectangle was used in the same inscription with two values, <h> and <í>, and that the final letter is not <f> but <í>, corrected from an erroneous <s>.

⁸² Ve 513 may also belong here, although it dates to the fifth century BC and has been ascribed to Latin by Colonna (1980) (for a new reading, see Marinetti (1984)).

There are obviously several different ‘words’ which could be identified in these two inscriptions, and certain interpretations have included etymologies with voiced aspirates. I do not regard any as suitable evidence, but mention some briefly here. One reading of **skerfs** could take *-fs* as the dat./abl. pl. ending from **-bhos*, cf. O. **luisarifs** (Cp 8) but it could also be a nom. sg. from **-fos* (Cristofani 1977: 106), or a nom. pl. from **-fes* (Marinetti 1991: 602). Rix’s reading sees the word as a noun from **skerf-*, derived perhaps from a contamination of **gerbh-* with **skreibh-* (Rix 1996: 237–8).⁸³ **pohehike** and **hedusef** have both been derived from stems continuing **dh-*, assuming a ‘Sabine’ treatment of *h-* for *f-* (e.g. **pohehike** ‘fashioned’ <**dheigh-*, cf. Fal. **ffiked** (LF 11/ Ve 257), Marinetti 1991: 601–2; **hedusef** <**dhēlūkens*, cf. Lat. *fēlicēs* ‘fortunate’, Durante 1978: 823, n74). Neither is particularly compelling, especially given the fact that the *f/h* alternation in Faliscan—and probably also Sabine—was relatively late, and so probably not relevant for these early texts. Rix’s reading **herusei**, as a perfect active participle in **-us-*, cf. O. *sipus* (Lu 1:5) to **her-* from **gher-*, would give evidence for **gh-*,⁸⁴ as could **her**, if we accept Rix’s word-division of the MS inscription (**[k]ioi her**), perhaps an abbreviation of the Sabellic name *Herius* (Colonna 1983: 583), from the same root. Both interpretations are very uncertain.

The Old Sabine inscriptions do not contribute much evidence to augment the picture of the treatment of the PIE voiced aspirates in the early inscriptions provided largely by South Picene, but they do add some information about orthography. <h> and <f> are both attested, presumably noting /h/ and /f/, which may have contrasted (at least word-initially if Marinetti’s (1991: 601–2) reading of **faletnei** is correct. The pronunciation of /h/ is uncertain, but we might expect [h] assuming that □ was taken from Gk <h> (via Etr. <h>).⁸⁵ The Poggio Sommavilla inscription also shows the sign, presumably <f>. The shape of one instance, the final letter of **hedusef** (n032 in Cristofani 1977) looks very much like a backward-facing B, and has provoked the suggestion that the sign 8 is an early Sabellic (rather than Etruscan) invention from B . Taken alone, it is difficult to know whether this particular sign, for word-final /f/, is of any phonetic significance (and Rix reads it as a different letter altogether). However, later evidence from Umbrian, suggests that word-finally after a vowel, /f/ could have been voiced [β] (see Meiser 1986: 29 on the loss of final /f/ in Umbrian). If letter 32 is an orthographic variant of <f>, it could reflect a voiced pronunciation of /f/.⁸⁶

⁸³ Untermann (2000: 685) gives Rix’s derivation as: ‘<**skʰβ-i-s* <**skribhi-s*.’

⁸⁴ Rix’s alternative reading, **hedusei**, assumes a similar formation to the root **ghed-*.

⁸⁵ As for South Picene, if we accept Rix’s (1992: 38, n7) derivation of □ from *samech*, we cannot make any inferences about the pronunciation of the sound.

⁸⁶ We might expect /f/ in **faletnei** and **skerfs** to be voiceless, since word-initially, and before /s/, Sabellic /f/ seems to have been [f].

3.5.4 *Old Volscian*

‘Old Volscian’ is represented by one inscription (VM 1), on a tiny axehead from Satricum, which dates to the first-half of the fifth century BC. The text, which shows some letter forms similar to the scripts of Capena, and to the South Picene alphabet (. for <o>, : for <f>) reads: **íúkúh:ko:efies**. This sequence is interpreted as ‘for the grove of Aedius’ by Rix (1992: 38), who takes <š> for [h] or [ð], the weakened reflex of /-d/ before its loss after a long vowel. He suggests that the phrase is from an earlier **loukōd-kom aifieis*, cf. U. **vukukum kuretios** ‘at the grove of the Coredii’ (Ib 4).

Rix’s reading yields possible evidence for the treatment of PIE *-dh- as <f>, if we accept that **efiei** is a name in the genitive singular with a stem **ef-yo-* from the root **aidh-* (cf. Lat. *aedēs*; Rix 1992: 39). The form is not quite straightforward, since where we would expect *-ēs <*-eis (given the monophthongization assumed for the other forms), we find **-ei**, which is either a mistake, or possibly the result of a palatalized /s/.

3.5.5 *Old Hernican*

The Hernici, traditionally assumed to be of Sabine or Marsian extraction, occupied the area of Latium to the south-east of Rome.⁸⁷ It is probable that they, like most of the hill peoples of central Italy (e.g. Aequi, Marsi, Sabini), spoke a Sabellic language. Until recently the Hernici were assumed to be illiterate (e.g. Coleman 1986: 126, n3), but this picture has now been changed by the discovery of four inscriptions from a sanctuary excavated at Anagnia (Anagni), in the centre of Hernican territory (He 1–3; Colonna and Gatti 1990, no. 4; Rix 1998). Of these, the later inscription, *c.titieis.esu* (He 3), looks Oscan, and Rix (2002) groups all three inscriptions within the ‘Oscan’ group.

Of the two earlier inscriptions only one, He 2, gives a text of any length, and this is incomplete, running across one side of a fifth-century vase: **]matasudmomnihvidasnikait[**. The script is closer to an early Latin script than those of the other early Sabellic inscriptions, both from the letter shapes, and also from the use of <hv> for /f/ (cf. e.g. Colonna and Gatti 1993). Rix (1998; 2002: 93) gives the reading: **]matas udmom ni hvidas ni kait[sis**, with a possible meaning of ‘... water vessel of [female owner], do not break or smash [it/me]...’.

Of the few ‘words’ which have been identified as possibly Italic, **hvidas** may provide the only evidence for the treatment of word-initial **bh-* in these early inscriptions. **ni . . . ni** looks as if it may be a negative (cf. O. *ni*, OLat. *nei* on the Duenos inscription, CIL 4), making **ni vhidas** a prohibition meaning ‘you

⁸⁷ The tradition may be accurate, if their name does indeed derive from the possibly Marsian word *herna* ‘stone’. For the historical background, see Salmon (1982: 6–8).

should not split (i.e. break)', with **hvidas** a second person verb to the PIE root **bheid-*, cf. Skt. *bhinadmi*. The exact formation is uncertain: Untermann (2000: 278) proposes a present subjunctive, Rix (1998: 252f.) argues for a special 'prohibitive' and Meiser (p.c.) suggests an old subjunctive aorist like Latin. *attigas, attulas*.

3.5.6 The development of the PIE voiced aspirates in the early Sabellic inscriptions

Given the difficulty of these texts, this summary is offered with caution:

<i>word-initial position</i>	<i>word-internal position</i>
* <i>bh</i> -><f> /f/ ?[f] (PS, Old Her.)	*- <i>bh</i> -><f> /f/ ?[β] (SPic.)
* <i>dh</i> -><f> /f/ ?[f] (SPic., PS, Old Umbr.)	*- <i>dh</i> -><f> /f/ ?[β] (SPic., Old Volsc.)
* <i>gh</i> -><h> /h/ ?[h] (SPic., Old Umbr.)	*- <i>gh</i> ->*- <i>h</i> - ?[fi]>∅ (SPic.)
* <i>g^wh</i> - no evidence	*- <i>g^wh</i> - no evidence

If we can trust our interpretation of the lexical evidence, the earliest forms of Sabellic together show /f/ for **bh* and **dh*, and /h/ for **gh*. South Picene and Old Umbrian may provide clues to suggest that /f/ was voiced word-internally and word-finally. More evidence for the voicing of /f/ might also come from Presamnite, where there is possibly evidence that in this variety at least, the dental fricative had not yet merged with /f/ (cf. PS **adaries**).

3.6 The Evidence of Oscan

The Romans called the language of the Samnites 'Oscan', after the pre-Samnite inhabitants of Campania. The Samnites were originally based in the mountainous region of Samnium in central Italy (Salmon 1967), but during the fifth century they expanded their territory, and moved down into Campania, seizing Capua in 424 BC and Cyme in 421 BC (see Frederiksen 1984: 134f.). Etruscan and Greek, widely spoken in Campania, were replaced by Oscan. Oscan spread further south as the Samnite expansion continued into Apulia, Lucania and Bruttium during the fourth century. By the third century, the Frentani, the eastern neighbours of the Samnites, were also using Oscan. Oscan is attested in some 400 inscriptions which date from the early fourth to the first century BC. The inscriptions occur over a wide area reflecting the extent of the Samnite occupation, from Samnium and northern Apulia, to Campania, Lucania, Bruttium, and even Messina in the south.⁸⁸ Most inscriptions are written in a native alphabet derived from an Etruscan model, but those found in the south are in the Greek alphabet. A few later inscriptions use the Latin alphabet.

⁸⁸ For a comprehensive overview of the Oscan inscriptions with bibliography, see Prosdocimi (1978).

The content of the Oscan texts is diverse. Beside private epitaphs, maker inscriptions, curses, stamps and graffiti, there are official public inscriptions, such as stone block from Avella, the *Cippus Abellanus* (Franchi De Bellis 1990), the building inscriptions from Pompeii (Antonini 1977) and Pietrabbondante (La Regina 1966, Lejeune 1972b), or the charter from Bantia, the *Tabula Bantina* (Del Tutto Palma 1983; Crawford 1995). The *aituns* inscriptions from Pompeii seem to have had a military function (Vetter 1953: 47; Poccetti 1988). There are also religious texts, such as the bronze tablet of Agnone (Del Tutto Palma 1996), the *iúvila* inscriptions from Capua (Franchi de Bellis 1981), or the group of inscriptions from the sanctuary of Mefitis at Rossano di Vaglio (Lejeune 1990; Del Tutto Palma 1990), as well as several private dedicatory inscriptions.

3.6.1 *The writing systems of Oscan*

3.6.1.1 *The Oscan native alphabet*

The Oscan native alphabet was used in the northern part of the Oscan-speaking area (e.g. Samnium and the territories of the Frentani and Hirpini) and in Campania from the fourth century BC. The alphabet usually runs from right to left, and was developed from a North Etruscan model (indicated by the use of <k> for /k/), but with the revival of <d> and <g>, probably after the mid-sixth century BC given the appearance of 8 for /f/.⁸⁹ The full Oscan alphabet consisted of the following letters: <a b g d e v z h i k l m n p r s t u f í ú>.⁹⁰ The last two letters <í ú>, which are used to represent /é/ and /o/ respectively, only appear regularly on inscriptions after about 300 BC, and are generally thought to be later additions to the alphabet, although exactly when they were added is disputed: c.300 BC for Lejeune (1957); separately and earlier (<í> second half of the fifth century BC; <ú> later but before 350 BC) for Antonini (1989).

3.6.1.2 *The Osco-Greek alphabet*

Most Oscan inscriptions from the South of Italy (Lucania, Bruttium, and Messina after the capture of the city by Oscan soldiers in the early third century BC) are written in an adapted form of the Greek alphabet.⁹¹ One view is that the alphabet was taken over from Greek colonists in southern Italy during the early

⁸⁹ For discussion, see e.g. Lejeune (1957: 100); see also Antonini (1989).

⁹⁰ The order is known from late first century fragments of alphabets written on the walls of the Casa del Fauno from Pompeii (Po 93–101), together giving: <a b g d – v z h i k [-] – p r s t u f í ú> (e.g. Antonini 1989).

⁹¹ For the Osco-Greek alphabet in general, see Lejeune (1970), (1972); see also Del Tutto Palma (1989).

fourth century BC, so Lejeune (1970: 276–7). More recently, Cristofani (1998) argues for a specific location for the derivation. He points to the similarity between signs for /f/ used in early Osco-Greek alphabet inscriptions and those used in the early Campanian coin inscriptions minted in Naples, and suggests that an Osco-Greek alphabet for representing Oscan was devised at Naples and spread from there to the south of Italy along with the Samnite expansion. The full alphabet shows the following letters: <α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ τ υ χ ψ φ ω>. As in the Oscan native alphabet, the representation of the vowels was reformed, although this was more extensive and seemed to take place in one go, around 300 BC. The reform involved the addition of two letters, <η> and <ω>, which were used in the Ionic alphabet for /ē/ and /ō/ (for discussion, see Lejeune 1970: 288–305; 1972; see also Del Tutto Palma 1989: 111–15). At a later stage, perhaps the mid-second century, the Greek letter <ζ> was added to the alphabet to represent the reflex of *dy-, voiced [z] /-s-/ between vowels, and the voiced outcome of secondary clusters involving *-s- [z] (Lejeune 1990: 34).

3.6.1.3 The Osco-Latin alphabet

Under the influence of Rome both the native and Osco-Greek alphabets were abandoned. Several first-century inscriptions are written in the Latin alphabet, the longest of which is the Tabula Bantina (Lu 1). The earliest Latin alphabet inscriptions seem to be Fr 12 and 16 from the territory of the Frentani. The Osco-Latin alphabet is similar to that of the city of Rome, but with the addition of <Z> (<ζ>) from the Osco-Greek alphabet: <A B C D E F G H I L M N O P Q R S T V X Z>. There was no attempt to reform the representation of the front vowels, which were noted with <E> and <I>.

3.6.2 Oscan: The lexical evidence

3.6.2.1 PIE *bh in Oscan⁹²

The following PIE forms with *bh- are continued in Oscan: *bhars in **far** ‘grain’ (Cp 37: 8), cf. Lat. *far* (Untermann 2000: 265); *bhreH₂tēr in for example, **fratrūm** ‘brothers’ (Cp 29), cf. Lat. *frāter* (Untermann 2000: 293); *bhruHg-yo- in **fruktatiuf** ‘produce, profit’ (Cm 1A21), cf. Lat. *frūgēs*, U. *frif* (e.g. VIa 42), Got. *brūkjan* (Pk 173), Untermann (2000: 299); and *bhleH₃s- in for example, **fluusai** ‘to Flora’ (e.g. Po 20), cf. Lat. *flōs* and possibly also **fluusasiais** if for **fluusasiais** ‘at the festival of Flora’ (Sa 1A20) (Untermann 2000: 291) (whether *φλοσσοι*, Lu 13, belongs here is less certain; Untermann 2000: 292). *bheH₂- is found in a number of verb forms, for example, **faamat** ‘calls the names’ (e.g. Po 34), cf. Lat.

⁹² See Stuart-Smith (1996: 57–65). In general references are to Untermann (2000), where further comprehensive discussion and bibliography can be found.

fāma, cf. Gk *φημί* (Pk 105; LIV 55), prefixed in for example, *αφαματεδ* (Lu 6) ‘ordered’ (Untermann 2000: 253–4), and in the zero grade in a perfect participle stem in **fatium** ‘speak’ (Cp 36), Untermann (2000: 266–7). **bhweH₂-* is continued in the present stem formation **bhū-ye/o-*, cf. Lat. *fiō*, cf. Fal. **filea**, in for example, **fiēt** ‘are taking place’ (Cp 33), Untermann (2000: 279–80). **bhweH₂-* is also the most probable source of the imperfective verbs in *fu-*, for example, (**ad**)**fust** ‘will be’ (e.g. Cp 32), and the past tense forms **fuens** (e.g. Cp 29) and **fuans** (Cm1A10), both of which are probably from a reduplicated stem, but whose precise formation is disputed (see Untermann 2000: 251). (**fu**, Cp 31, is often connected with the latter forms, but is uncertain, mainly because of the difficult form which precedes it, **taief**/, FDB **staief**.)

Word-internal **-bh-* occurs in the following forms: **leubh-* in *loufir* ‘or’ (Lu 1:8), Untermann (2000: 437); **gheHbh-yo-* in *hafiest* (Lu 1:8), Untermann (2000: 315); the third and second person singular dative pronouns **sebhei* and **tebhei* in **sifei** (Cp 36) cf. Lat. *sibi* and for example, **tif[eī]** (Cm 13) cf. Lat. *tibi* respectively, Untermann (2000: 681–2, 752–3); and **bhweH₂-* again, though this time in a prefixed thematic stem **probh(w)o-*, yielding Lat. *probāre* and the Oscan forms attested in for example, **prufatted** ‘approved’ (e.g. Po 11) and *amprufid* ‘improperly’ (Lu 1:30) (Untermann 2000: 583–4). <f> is also found for **-bh-* when in composition, as in **amfr/et** ‘surround’ (Cm1B19/20), probably from **amferent*, from **am-bher-*, cf. Lat. *ferō* (Untermann 2000: 276). *-f-* from **-bh-* in the dat./abl. pl. ending **-éfs* (from **-ifos*), attested in archaic texts as <-ifs, -efs>, in for example, **luisarifs**, the name of a month (Cp 8) and the obscure dedication, *βετεfs πεχετεfs* (Lu 30), underwent a further change during the historical period and assimilated to the following fricative. In texts from the third century onwards we find the ending occurring as <-íss/-is(s), -IS>, for example, **anafriß** ‘rain, showers’ (Sa 1A9), *ligis* ‘laws’ (Lu 1:25). Before **t* we also find <F> in *scritfas* ‘written’ (Lu 1:25), **-to-* participle to **skreibh-*, cf. Lat. *scriptus* (Untermann 2000: 685).

Several other Oscan words are often said to show reflexes of **bh* but are less certain. **fertalis** (Cp 24) is uncertain in case and meaning, but may be connected with Lat. *fer(c)tum* and go back to **bherg-*, cf. Ved. *bhṛjati* (Pk 137; LIV 63); ‘semant. wenig plausibel’: Untermann (2000: 274). The Oscan name which occurs on coins as for example, **alafaternum** (nCm3b/c) may be cognate with Lat. *albus*, U. **alfu**, and be from **albho-* ‘white’, cf. Gk. *ἄλφος* (Pk 30); for example, Meiser (1986: 78) (Untermann 2000: 80). **safinim** is clearly the Oscan form of the ethnic found in Lat. *Samnium* (Gk *Σάννιον*), both from earlier **saβn(i)yom* (Rix 2000: 199), but establishing a secure etymology outside Italic is difficult. Similar difficulties occur for the name **urufis** (Cp 38), which may be cognate with Lat. *Orbius* (Schulze 1933: 221, n1). One form which may show the treatment of **bh* to <f> after a sonant nasal is **anafriß** (e.g. Sa 1A9). This word is usually translated as ‘rain, showers’, and taken from **ṛbhri-bhos*, cf. Lat. *imber*, Skt. *abhra* ‘cloud’ (Pk 316; e.g. Meiser 1986: 70), but is of uncertain meaning

(Untermann 2000: 96). The etymology of *am-* in for example, **amnúd** ‘circle’ (Cm 1A16) is also disputed. Most, for example, Rix (1994a: 15–16, n20), Meiser (1998: 106), take the prefix back to an earlier Sabellic **amb-*, from **H₂mbhi-*, cf. Gk ἀμφί, Skt *abhi*. In this case, < m > would represent the outcome of **-mbn-* < **-mbh-n-*, assuming that the laryngeal caused **ṃ* to become **am-* at an early stage, allowing the reflex of **-bh-* to become **-β-* then **-b-* as after an inherited nasal (as is found in Umbrian), so *amboltu* (VIb 52) ‘should walk around’. Others, for example, Untermann (2000: 83) prefer a derivation from **H₂(e)m-*.

I do not accept the following forms as evidence for the treatment of **bh-*: **f(i)lius** ‘son’, for example, **f[.]** (Sa 2), *f* (Cm 15) in onomastic formulae is Latin, for example, Lejeune (1976: 127); so too are *flatu* ‘breath’ (Cm 15), Vetter (1953: 46), and **sabins** ‘Sabine’ (Po 63), Lejeune (1976: 41). **fisiais** ‘festival’ (e.g. Cp 8) is probably from **dheH₁s-* (see below). *πιζηι* (Lu 35) is obscure (Untermann 2000: 562); and so too are the etymologies of the names **staf[ii]/anam**, Antonini (1977: 324) (Po 1) and **stafidins** (Sa 21). **tribuf** (Si 3), if equivalent to the Latin term *tribunus* ‘tribune’, could be a Latin loan, or is either a reformation of an original **tribhun(o)s* under the influence of the root **treb-* ‘build’ or a formation directly from **trēb-ōn-* (Adiego 2002); in all cases < B > would not continue **-bh-* directly.

In word-initial position, before vowels and **r* and *l*, **bh-* is represented by Oscan < f > < f > < F >. In word-internal position **-bh-* became < f > < F >, between vowels, and possibly also after **l* and before **r*. < F > < f > is also found for **-bh-* before **t*, and probably also after **ṃ*. *-f-* from **-bh-* in the dat./abl. pl. ending *-éfs* underwent a further change during the historical period and assimilated to *s*.

3.6.2.2 PIE **dh* in Oscan⁹³

Oscan continues the following PIE forms with **dh-*: **dheH₁s-* in for example, **fíisnú** ‘temple’ (Cm 1B4), cf. Pael. *fesn(am)*, Lat. *fanum* (< **dhH₁s-no-*), and probably also in for example, **fisiais** ‘festival’ (Cp 8), cf. Lat. *fēriae* (Untermann 2000: 281–2); *dheigh-* in the noun for example, **feihúss** ‘walls’ (Cm 1B5), cf. Lat. *figūra*, Untermann 2000: 269–70; and **dhugH₂tēr* in for example, **futír** ‘daughter’ (e.g. Si 8), cf. Gk *θυγάτηρ*, Skt. *duhitār*; Untermann (2000: 306). Prefixed and reduplicated perfect forms of the root **dheH₁-* are recognized in a number of Oscan verbs, for example, **manafum** ‘I charged’ (Cp 37: 1) < **man-f(ef)om* < **dhe-dhH₁-om*, **prúffed** ‘approved’ (e.g. Sa 25) < **pro-dhe-dhH₁-et*, cf. Lat. *prōdidit*, Untermann (2000: 448–9; 585). (*-fed* < **-fefed* may also occur in **aikdafed** ‘?built’ (Sa 7) and *αι[1]fed* (Lu 14), though both are uncertain; Untermann 2000: 67–8). **prúftú(set)** ‘were placed’ (Cm 1A16) probably also belongs here as a **-to-* participle to the zero grade of the root **dhH₁-* (Untermann 2000: 585). Less

⁹³ See Stuart-Smith (1996: 65–71).

certain is *famelo* ‘family’ (Lu 1:22), cf. *famel* ‘slave’ (Paul. Fest. 77L), which has clear Italic cognates in for example, U. **fameñias** (IIB 2) Pael. *famel* (Pg 11) and which Rix (1994a: 35ff.) derives from **dhH₁meliyā-* (Untermann 2000: 262). **dheH₁-* (in the zero grade) is also continued with the extension **-k-* in the present stem **fak-yo-*, for example, **fakiiad** ‘should sacrifice’ (Cp 33), the perfect stem **fe-fak-*, for example, *fefacust* (e.g. Lu 1:11), and the participle **fak-wo/ōs*, e.g. *facus* (Lu 1:30); Untermann (2000: 256f.). *ava:φακετ* ‘erected’ (Lu 18) and possibly *αλκειτ* if for *αφακειτ* (Lu 13) probably show a prefixed form of *fak-* with **an-*. The *n*-stem noun attested in **fakinss** ‘deeds’ (Cm 13) probably also belongs here, together with the less certain verb **fifikus** ‘(if) you ?did’ (Cp 37), if from **fe-fēk-us-s*, a Campanian dialectal variant of the perfect stem beside Lucanian **fefak-* (Untermann 2000: 259).

The PIE locative particle **-dhi* is usually taken as the source of *-f(e)* in the adverb **puf** ‘where’ (e.g. Po 34), cf. U. **pufe** (Ib 33). **-fir** in **sakrafir** ‘be sacrificed’ (Cp 32) is now derived from PIE **-dhyeH₁*; García-Ramon (1993) (earlier *<*-dhyāi*, cf. Skt *-dhyai*; Rix 1976). **lúvfreis** ‘the god Liber’ (Fr 5) is from **H₁leudhero-*, cf. Lat. *Liber*, Fal. **loferta** (LF 121 I/Ve 322a (Untermann 2000: 438–9), and for example, **meñiai** ‘in the middle’ (Cm 1B31) is from **medhyo-*, cf. Lat. *medius* (Untermann 2000: 464). The nominal stem **stH₂dhlo-* (from **st(e)H₂-* with **-dhlo-*, cf. Lat. *stabulum*) is continued in **staflatas(set)** ‘were set up’ (Cp 24), and the later form *σταβαλανο* ‘should be set up’ (Lu 5). *<f>* is found before **r* in **plifriks** (Si 3), from the phrase **tribuf plifriks** which looks like the Oscan equivalent for Latin *tribunus plēbis*, and which Adiego (2002: 4) takes from **plēdhr-īko-s* a secondary formation to the adjective **plēdhrō-*, cf. Gk *πληθύς*.

Less certain is the continuation of the root **reudh-*, cf. Lat. *ruber*, in the name **rufriis** (Cm 14C8), cf. Lat. *Rūfrius* (e.g. CIL X 4563; e.g. Lejeune (1976: 143) (Untermann 2000: 637). Another form that looks possible but which is uncertain is **fangvam** ‘tongue’ (Cm 13), which must go back ultimately to **d₁ghwa-*, cf. OLat. *dingua*, Got. *tuggō* (Pk 223), though quite how is unclear. **d...gh > dh...gh-* or **d...gh > *dh...g-* are both possible; Meiser p.c. (Untermann 2000: 264).

I do not accept the following as evidence for the treatment of **dh*: *fortis* (Lu 1:12) has a cognate in Lat. *fortius* ‘stronger’, but no certain PIE etymology beyond that; **statif**, referring to some kind of offering in the religious text, the Tabula Agnone (e.g. Sa 1A2) has been argued to continue a locative in **-dhi* (so Prosdocimi in Prosdocimi *et al.* 1978: 834), but the formation would be most unusual (Untermann 2000: 702); and for example, **aidil** ‘aedile’ (Po 11) looks like a Latin loan (Untermann 2000: 66–67). The names **aifineis** (Sa 31), cf. Lat. *Aedīnius* (e.g. CIL VI 1058; Schulze 1933: 116), *afaries* (Lu 48), cf. Lat. *Afarius* (e.g. CIL X 146), and **urufis** (Cp 38), cf. Lat. *Orbius* are also of unknown etymology. *πωμοφοκ* (Lu 5) has been formally related to the official title, *praefucus*, with *-φοκ* for *-fucus*, but is most uncertain (Untermann 2000: 601).

In word-initial position before a vowel **dh-* is represented by <f> <f> <F>. Word-internally **-dh-* is found as <f>, between vowels, and before **r* and **l*. Before **l*, **-dh-* is also found as <β> in a later Greek alphabet inscription.

3.6.2.3 PIE **gh* in Oscan⁹⁴

PIE **gh-* is continued in the following Oscan words. The verb forms in **hēp-* ‘hold/have’, for example, *hipid* ‘should hold’ (e.g. Lu 1:8) are from the suppletive perfect stem **ghēp-* to the present **gheHbh-yo-* attested in for example, *hafie{i}st* ‘shall hold’ (Lu 1:8), cf. OIr. *gaibim* (Untermann 2000: 315). Those in **her-* ‘wish’, for example, *heriad* ‘should wish’ (Cp 36) are from a verb **her-yo-* to the root **gher-*, cf. Skt *haryati* (Pk 440; LIV 156–7), which is also found in the names *herentateis* (e.g. Cm 10) and *heirens* (e.g. ZO 1) continuing the present participle and gerundive stems respectively (Untermann 2000: 319–20; 321–4). The names *heirennis* (Cm 6) and *hereiis* (Cm 14) may also belong here, as may the noun *heriam* (Cp 37:1), though the meaning of the latter is far from certain (Untermann 2000: 321). The PIE ‘earth’ root **(dh)ghom-* is usually seen in *humuns* ‘people’ (Cp 37:9), from **hom-ōn-* from **hem-ōn-*, cf. Lat. *nēmō*, and also in for example, *hu[n]truis* ‘lower’ (Cp 37:7) from a contrastive in **-tero-* to **hom-* or perhaps **homi*, cf. Lat. *humī* ‘on the ground’ (Untermann 2000: 329, 333). The reading and context of ?*hoμoi* (Lu 29) is too uncertain to consider it here; Untermann (2000: 395–6). Less disputed is the etymology of *húrz* ‘grove’ (Sa 1B3), which is usually taken from **ghortos*, cf. Gk *χόρτος* (Pk 442; Untermann 2000: 334), together with the name *húrtiis* (Sa 23) and possibly also *ορτυις* (e.g. tLu 6). Only for example, *feihúss* ‘walls’ (Cm 1), from **dheigh-* provides good evidence for the Oscan treatment of word-internal **-gh-* to <h>.

Other forms have been discussed, but are less certain. A number of names may derive from PIE roots with **gh*, but their etymologies are unclear: for example, *heleviis* (tSa 41), *aahiis* (tSi 2), *mahiis* (Sa 40), *maras*, *marahaes* (Cm 14C8, Cm 14E2), *rahiis* (Cm 14D8). The precise meaning—and with it the etymology—of <v>*ehiianasúm* (Cp 33) is uncertain, though it has been connected with the Oscan gloss *ueia* ‘cart’ (Paul. Fest. 506.3L), which is usually taken from **wegh-*, cf. Lat. *uehō*; Untermann (2000: 829; 831). Again, the exact meaning of *verehasiúi* (Sa 1A11), beyond its function as an epithet for Jupiter, is not known. It has been derived from the root **wergh-* (e.g. Pk 1154) cf. Lat. *uergō* (e.g. cautiously, Buck 1928: 93), but this is uncertain (Untermann (2000: 840–1).⁹⁵ Also uncertain are the meaning, form, and etymology of the small number of forms in *kah-*, probably ‘take’, e.g. *καηας* (Lu 39) ?present subjunctive, and the

⁹⁴ See Stuart-Smith (1996: 72–78).

⁹⁵ *vereias* (Fr 2), *verehias* (Cp 32) ‘military/political association of young men’ (and other forms) are sometimes mentioned here, e.g. Ballester (1993: 212f.), but the etymology of these forms is also very uncertain (Untermann 2000: 842). (Rix 2000: 217 takes them from a stem without **-gh-*, **werg-iyā-* ‘atto del cingere’).

uncertain **kahz** (Sa 42) perhaps a *-to- participle, though most tend to take Oscan *kah-* back to a west-PIE root **kagh-*, cf. OHG *hag* ‘hedge’ (Untermann 2000: 362). **kaías** (Fr 2) might also belong here, if from **kaghiyā-*, as Rix (2000: 213, n30). The derivation of **fangvam** (Cm 13), *fancua* (Cm 15) ‘tongue’, discussed above under **bh* is also uncertain. The PIE form must be **dn̥ghwa-* but exactly how <g>/<C> come from *-*gh-* is unclear.

I do not accept the following words as evidence: **ehiianasúm** (Cp 33) is now read as **vehiianasúm** and cannot be regarded as continuing a prefixed form of the root **ghi-*; **fifikus** (Cp 37:5) is probably not from **dheigh-* (as e.g. LIV 122) but from **dheH₁k-*; and I take **futír** (e.g. Si 8,9) from **dhugh₂tēr*, not **dhugh₂tēr*.

In word-initial position **gh-* is found in Oscan as <h> <h> <H>. In two instances, in inscriptions in the Greek alphabet, <h> is omitted (if the names are indeed connected with those in the native alphabet showing <h>), and are from roots in **gh-*). Intervocally, we find *-*gh-* as <h>. Before **t* we may find <h> (if **kahz**, above, is from **kagh-to-s*).

3.6.2.4 PIE **g^{wh}* in Oscan

There is no evidence for the development of the labiovelar voiced aspirate in Oscan.

3.6.3 Oscan : From orthography to phonetics

Oscan was spoken over a wide area, and the inscriptions attest some dialectal variation in the treatment of certain sounds or clusters, for example the different treatments of **dy-*, in Campania to /dy-/, then /y-/, but in Lucania to /dy-/, and then to /z-/ (e.g. Lejeune 1990: 35), or the palatalization observed at Bantia (e.g. Buck 1928: 66–7); for more detailed discussion, see Rix (1996a). A summary of the consonant system of Oscan, taking the Oscan of Samnium and Campania as the standard, is shown in Table 3.4.⁹⁶

3.6.3.1 /f/ in Oscan

The main reflexes of **bh* and **dh* in are noted by OsNat. <f>, OsGk <f> (also <β>), and OsLat. <F>. These various signs together represented the phoneme /f/, which was the labial fricative contrasting with the labial stops /p b/ and the labial approximant /w/. In the fricative series, /f/ contrasted with the alveolar /s/ (also /z/ in south Oscan) and the glottal fricative /h/ (in initial position at least).

⁹⁶ After von Planta (1892–7), the most detailed account of the Oscan sound system still remains that of Buck (1928), although Meiser’s recent study (1986) of Umbrian phonology includes elements of Oscan.

TABLE 4.4 The consonants of Oscan

	<>	//	<>	//	<>	//
vless stops	p, π, P	p	t, τ, T	t	k, κ, C/Q	k
vd stops	b, β, B	b	d, δ, D	d	g, γ, G/C	g
fricatives	θ, flβ, F	f	s, s/ζ, S/Z	s	h, h/Ø, H	h
liquids			l, λ, L	l	r, ρ, R	r
nasals	m, μ, M	m	n, ν, N	n		
glides	w, F, V	w	i, ι, I	j		

Notes

- 1 In Bantian Oscan, the clusters *-ry-, *-ly-, *-ty-, *-dy-, *-ky- became /r'/ /l'/ /s/ /z/ and /ks/, noted by <R(R)>, <L(L)>, <S>, <Z> and <X> respectively (e.g. Buck 1928: 66–7). The change of *dy- to /z/, represented by <ζ>, is also found at Rossano di Vaglio, although the cluster (<δi>) is attested in an earlier inscription (Lu 27); (Lejeune 1990: 35); (see Rix 1996: 25of.).
- 2 OsNat. <z> represented the cluster /ts/ arising from final-syllable syncope, in e.g. **húrz**<hortos>.
- 3 In Del Tutto Palma's (1990: 122–3) reading of Lu 28 OsGk <ψ> occurs for /ps/.
- 4 The cluster /ks/ was noted by <x>/<ξ>/<X>.

The representation of /f/ in Oscan is relatively complex, and has implications for our understanding of the Italic development of the PIE voiced aspirates as a whole. I therefore break the more extended discussion up into two sections, beginning with orthography.

3.6.3.1.1 Oscan /f/: Orthography and pronunciation

The Oscan native and Osco-Greek alphabet letters for /f/, <f> <f>, correspond to the Osco-Latin letter <F> (e.g. **fluusai**, Po 20 = *flus*, Pocetti, 1979: 184 = *φλουσοιο*, Lu 13), suggesting a pronunciation as a voiceless labiodental fricative [f].⁹⁷ However, subsequent evidence of orthographic variation indicates that Oscan /f/ was not always [f] but that in certain positions in the word, it was pronounced as a voiced fricative [β].

Oscan native alphabet. In the Oscan native alphabet, the sign which corresponds to later Latin <F> is the sign 8.⁹⁸ In the majority of texts written in the native alphabet, 8 occurs without variation, but significant variation in both the shape of the letter and the actual letter chosen to represent word-internal /f/ is found in certain third-century coin inscriptions.⁹⁹ These variant spellings are

⁹⁷ Untermann (p.c.) views the lack of variation in the representation of /f/ with <f> during the second/third centuries BC as an indication that during this period /f/ was always pronounced as [f].

⁹⁸ This sign appears in the earliest inscriptions in the OsNat. alphabet, the coin inscriptions of *Fistelia* (405–400BC; Rutter 1979: 83); Antonini (1989: 45).

⁹⁹ The most comprehensive account of Oscan (and Italic) coinage, with drawings, is still Sambon (1903); but for the Campanian coins see also Rutter (1979). The texts are given in Vetter (1953), who seems to have based his edition on that of Conway (1897). For each coin type a number of different actual coins exist. The discrepancies in the coin texts given in Conway, Sambon and Vetter suggests that the different editors had access to different coins.

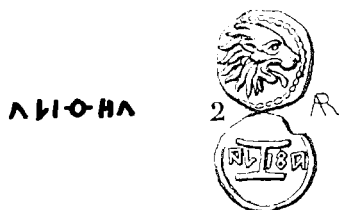


FIGURE 3.4 Coin inscriptions from Allifae, left: Sambon 818 and right: 819
(from Friedländer 1850: Plate V: Allifae: 2)

usually discussed together with the orthography of the earliest Oscan coinage, the ‘Campanian’ coinage of the late fifth to early fourth centuries BC, which was minted for a number of Sabellian communities at Naples probably by Greeks. However in the earlier texts variation in the spelling of Oscan /f/ tends to occur in legends which are entirely Greek (in script and language). As such, they appear to be the attempts of a foreign, Greek-speaking, engraver trying to represent Oscan. I take the view that such representations constitute a different type of evidence from native speakers representing the sounds of their own language, and therefore discuss these texts in detail at the end of the chapter, where foreign representations of Italic phonology are treated as a whole. For our purposes here, the main finding from the Greek spellings is a clear attempt to distinguish between a voiceless fricative word-initially and a voiced pronunciation word-internally.

The only unusual Oscan notation of /f/ in an early coin legend which is not Greek occurs in a mixed script inscription from Allifae, on the earliest coins for this community (Sambon 818; Rutter 1979: 181; nSa 1a; 400–395 BC; see Fig. 3.4):¹⁰⁰ **aliθha**.¹⁰¹ The two signs, **θh** (in Rix) together correspond to **θ** <f> in the Oscan script and language inscription, **alifa** (Sambon 819; nSa 1c). This suggests that **θh** was an ad hoc digraph for word-internal /f/ (Antonini 1989: 46, 54). The first sign in the digraph is unusual; it is roughly diamond-shaped, with a horizontal bar on either side, and is similar to a sign found in some later Oscan inscriptions (though without the side bars) on the coinage of Nuceria, where it corresponds to Oscan **θ** <f>. The origins of the sign are unknown.¹⁰² This unusual representation suggests that there was some uncertainty about how to indicate the pronunciation of word-internal /f/, and that **θ** was not felt to be suitable (it occurs on the marginally earlier coins of Fistelia from the same mint,

¹⁰⁰ The two later mixed script legends: *AAAIIfANON* (Sambon 821, OsNat. <f>); and *AIIBIA* (Sambon 824, OsNat. <l>), are best regarded as in the Greek script with the occasional Oscan letter.

¹⁰¹ Despite Vetter’s reading (as Conway no. 183c) of the last letter as Oscan <a>, it is clearly closer to the Greek in form (see Rutter (1979), plate 32, no. ARI).

¹⁰² Antonini (1989: 46) suggests a modification of Greek <φ> via an Etruscan intermediary.

1006, 1013, 1015ab	⊖
1008	⊖
1007b	⊖
1008ab	⊖
1010	↑
1011	⊖
1011a	⊖
1008b	⊖
1005	◊
1005, 1007	◊
1015c	○

FIGURE 3.5 Signs for /f/ used in the coin inscriptions from Nuceria Alfaterna (numbers are from Sambon 1903)

and so was available). If we compare the use of Greek <β> in the Greek inscriptions to represent the same sound some thirty years later (nos. 820–2, 825: 375–50bc), it seems possible that θh may have been an attempt to represent a voiced pronunciation ([β]).

Variation in the native alphabet representation of Oscan /f/ is only attested later, in the third century BC coin inscriptions of Nuceria and Venafrum:

Nuceria Alfaterna: The coins of Nuceria Alfaterna, an Oscan town in Campania, now Nocera, are grouped by Sambon into two types, silver didrachms from 280–268 BC (nos. 1005–1011), and a later bronze type, from 260–210 BC (nos. 1013–1015).¹⁰³ Most coins bear a version of the legend **nukrinum alafaternum** (e.g. no. 1013). The word **alafaternum** occurs variously as: **alafaternum** (nos. 1005, 1007, 1013–15), **alafaternu** (no. 1006), **alavfnum** (no. 1008), **al**[. (no. 1009), **alaf**[...]**rnnum** (no. 1010), **alavtvm** (no. 1011). Not only does the word **alafaternum** vary considerably, but so do the actual signs which are together transcribed as <f> (see Fig. 3.5).

Both Conway and Vetter also report the variants O and B for the coin type equivalent to Sambon no. 1005. Note too the use of <v> (shaped both F and J)

¹⁰³ In Vetter these coins are given under 200 A 9 a–c. In Conway, under no. 144, p. 141–2.

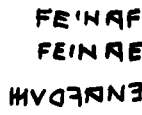


FIGURE 3.6 Coin inscriptions from Uenafrum, Sambon 1075

in conjunction with <f>. In 1008 <vf> are probably used together to represent /f/; in 1011, <v> seems to have become detached from <f>.

?*Uenafrum*: The identification of the second set of coins is uncertain, but they are usually seen as issues from the Oscan town in Samnium whose ethnic appears in Latin as *Uenāfrum*. The coins show three legends: **veinav** (nSi 2b = Sambon 1075), **[v]enavrum** (nSi 2a = Sambon 1075), and **enav** (Conway 1897: 146, xvii) (see Fig. 3.6).

The main difficulty in reconciling the texts and Lat. *Uenāfrum* is the spelling of the first vowel with <ei> beside Lat. <E>. *F* was originally taken as <f> (so Conway), but later editors (e.g. Vetter; also Rix 1957: 141, n47), regard the sign as a variant of <v>, which here represents word-internal /f/ before a liquid.

These two sets of coins are the only coins from the third century BC which attest Oscan ethnics with word-internal /f/ and both show variation in the representation of this sound. Contemporary coins with word-initial /f/ are those from *Frentrum (nFr 1 = Sambon 195), which show the legend **frentreí**, where <f> is always 8.

If we take the variants of the two coin sets together, we find word-internal /f/ represented in four ways:

- 1 with 8
- 2 with a number of unusual signs
- 3 with other letters: *F* <v>, B
- 4 with a digraph of *F/* <v> and angular variants of 8.

It is not possible to deduce anything particular about the pronunciation of the sound from the first two representations (beyond some uncertainty), but the choice of the alternate letters, <v> and , which otherwise represented [w] and [b], strongly suggests an attempt to represent a voiced sound. The use of the digraph <vf>, and that of *F* (also *]*) <v>, suggests a continuant (Rix 1957: 142). It seems more than likely that the sound represented was a voiced labial fricative, [β] or [v]. I conclude that during the third century BC in the Oscan of Samnium and Campania, /f/ was pronounced as a voiced fricative word-internally (before

and after a liquid).¹⁰⁴ This finding fits with the earlier Greek representation of word-internal /f/ in the Campanian coinage, which again points to a voiced labial fricative. The early Greek evidence also provides indications of the pronunciation of /f/ word-initially, as a voiceless labial fricative. The contemporary coin texts from *Frentrum, in the eastern territory of the Frentani, show no variation in the representation of word-initial /f/. It is possible that this lack of variation reflects the representation of a voiceless labial fricative [f], although this must remain speculative as long as we have no evidence for the representation of word-internal /f/ from Oscan of this area.

To sum up: in most texts, and in the earliest coin inscriptions, /f/ is always represented by Oscan native alphabet 8. In two sets of coin inscriptions from towns in Campania and Samnium, orthographic variation indicates that word-internal /f/ was pronounced as a voiced labial fricative in these areas during the third century BC. The lack of variation observed generally for word-internal /f/, with <f> 8, is not unusual; compare the similar representation of /s/, where it seems likely that intervocally this was [z], but nevertheless, all native alphabet texts always show <s>.

Oско-Greek alphabet. Just as the original West Greek alphabet required the addition of a sign to represent Etruscan and Italic /f/, so the Greek alphabet which was adapted to represent Oscan also lacked a sign for Oscan /f/. The Oско-Greek inscriptions show a number of signs, transcribed here with <f> (see Fig. 3.7); of

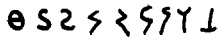


FIGURE 3.7 Signs for /f/ used in the Oско-Greek alphabet

these θ and S/reversed S are found on fourth century inscriptions,¹⁰⁵ while S and the others are found on third- and second-century inscriptions.¹⁰⁶

The signs are together usually regarded as modifications of the sign 8, from the Oscan native alphabet (Lejeune 1966: 174; 1970: 275–6, Fig. 2); followed by Antonini (1989, 53) for the development of the sign found on the coins of the Fenserni (see also Cristofani 1998).¹⁰⁷ If the various signs were taken from 8, it is difficult to infer anything about the pronunciation of /f/ at the time of the

¹⁰⁴ The vowel between /l/ and /f/ in *alafaternum* is anaptyctic; **alfa-* > **al^afa-*.

¹⁰⁵ The only Campanian Oско-Greek inscription (Cm 9) dates to the fourth century BC, and represents /f/ with a digraph <vh>, probably after Etruscan influence (*Fhpvεis*, so Lejeune 1966: 174–6).

¹⁰⁶ A variant is also found on the Oско-Greek alphabet coin legends of the Fenserni (Sambon 796–8; 395–390 BC), somewhat earlier than at Rossano di Vaglio (not before the mid-fourth century BC) (Antonini 1989: 49–50).

¹⁰⁷ For an alternative account, see Del Tutto Palma (1989: 109f.).

adaptation of the Osco-Greek alphabet based on the origins of the sign. The subsequent developments are also without any phonetic significance, since they can be seen as purely orthographic.

There is one significant instance of variation in the Osco-Greek representation of /f/, which involves the use of another letter, <β>, otherwise used for /b/ (cf. e.g. βρα/τεῖς, Lu 16, beside *brateis*, Lu 1:6 ‘thanks’). <β> is found for word-internal /f/ in two late inscriptions from the Lucanian site of Rossano di Vaglio:

μεβιττη (Lu 34): The two-word dedicatory inscription to the goddess Mefitis, μεβιττη/αραΦιναι, is usually dated to the end of the second century BC. <β> is clearly used for /f/; all other instances of the divine name show <f> (e.g. μεφιττη, Lu 33), which corresponds to <F> in the Latin version of the name (e.g. *Mefiti* (CIL X 130)).

σταβαλανο (Lu 5): The second instance of <β> for expected <f> is found in one of the latest of the Rossano texts.¹⁰⁸ That <β> in σταβαλανο represents /f/ is confirmed by the correspondence with <f> in another form of the verb, **stafilā* ‘set up’, in the participle *staflatas* (Cp 24).¹⁰⁹

In both cases the representation of /f/ with <β> indicates that between vowels, and before a liquid, the sound was a voiced fricative, either bilabial [β], or labiodental [v] (for the latter, see Lejeune, 1990: 34). The use of the Osco-Greek letter <β> for the voiced fricative pronunciation of /f/ may have been provoked by a change in the Greek pronunciation of <β>, from [b] to [β] (Lejeune loc. cit.). Thus we have evidence that in Lucanian Oscan, during the late second- and early first-centuries BC, /f/ was pronounced as a voiced labial fricative in a voiced environment word-internally.

A glance at the representation of intervocalic /s/ from inscriptions at Rossano di Vaglio, as well as the later Tabula Bantina (from the same region), suggests that /s/ was also pronounced as a voiced fricative between vowels. At Rossano we find occasional <ζ> for intervocalic /s/: in ειζιδομ ‘the same’ (Lu 5), cf. εισειδομ (Lu 11) (Lejeune 1990, 34). In the Tabula Bantina, intervocalic /s/ is often found represented by <Z>, for example, *ezum* for **esom* ‘to be’. It seems likely that in these cases <ζ> <Z> was for [z], a voiced alveolar fricative¹¹⁰, the voiced outcome of PIE *-s- between vowels.

¹⁰⁸ Lejeune (1990: 26f.) divides the Oscan inscriptions from Rossano into those which belong to period A (before 300 BC) and which belong to period B, from 300 to 100 BC. The later period B is then divided into an earlier phase, B¹ for the third century, and B² for the second century. By classifying Lu 5 as an inscription of period B², and by dating it to the end of the second century BC (p. 30), Lejeune effectively suggests that the inscription is one of the latest Oscan texts from the site.

¹⁰⁹ The differing shape of the roots in Lucanian σταβαλα- beside Capuan *stafila-*, is the result of anaptyxis in the cluster *-fl- in the Lucanian form.

¹¹⁰ Otherwise <ζ> <Z> represents the outcome of **dy-*, e.g. ζωΦη (Lu 35) beside early διαΦη (RV 56) ‘to Jupiter’, also ζουες ‘of Jupiter’ (Lu 38), or a voiced affricate [dz] from the secondary cluster *-dz-, in πιζη ‘of the source’ <*pidesei, perhaps also in Φενζη ‘to Venus’ /wen^dzei/ <*wenesei (see Lejeune 1990: 34).

Since the Osco-Greek evidence is relatively late and from a specific area, we might wonder whether it reflects a dialectal feature particular to Lucanian Oscan, that is, a late voicing of fricatives in southern Oscan. I argue that it does not for two reasons. The first objection comes from the evidence for the representation of /f/ from other areas of Oscan. There is good evidence for a voiced pronunciation of word-internal /f/ in third-century Samnite and Campanian Oscan, and the Greek evidence of the Campanian coinage and the name *Σάβυιον* establish the same for fifth- and early fourth-century Oscan. There is no reason to think that the voicing observed in the Oscan of Rossano di Vaglio was isolated from this. It seems much more likely that /f/ was pronounced as a voiced fricative word-internally (between vowels and adjacent to a liquid or nasal) in Oscan generally. The second objection concerns /s/. As with the representation of /f/, we cannot tell whether the change in the Lucanian spelling of /s/, from <s> to <ξ> (or <Z>) reflects an actual change in pronunciation that had just taken place (in the second century BC), or a change in spelling convention for a voiced allophone of /s/ which had arisen at an earlier period of Oscan, common Sabellic, or even common Italic.¹¹¹ In fact, it seems likely that between vowels at least, *-s- was voiced at an early period in Oscan (cf. the outcomes of secondary clusters which are all voiced, suggesting that /s/ was [z] before internal syncope). Moreover, the presence of rhotacism in Latin and Umbrian, taken together with the late Oscan spellings with <ξ> <Z>, strongly suggest that /s/ was voiced intervocally much earlier, probably during common Italic. Thus I assume that Lucanian Oscan, as other dialects, had had voiced pronunciations of /f/ and /s/ word-internally for some time, but that they only became apparent after a late change in orthographic representation (Lejeune 1990: 35).

This variation in the representation of Oscan /f/ in the native and Osco-Greek alphabets shows clearly that in word-internal position, in a voiced environment (between vowels, and adjacent to a liquid), /f/ was pronounced as a voiced labial fricative. Spelling variation in the native alphabet is limited to coin texts, and in the Osco-Greek alphabet to late inscriptions; otherwise no variation is observed in either script. No variation is ever found in the Osco-Latin alphabet, where /f/ is always noted by <F>, which shows that OsLat. <F> was used to represent both voiceless [f] and voiced [β]. This is perhaps not surprising, since there was no obvious Latin letter to note [β]. Moreover, the variation makes it clear that the native alphabet and OsGk letters <f f> were also used to represent both [f] and [β]. The implications of this conclusion are important for the interpretation of the native and Latin alphabet characters in the other non-Latin languages: a non-varying representation of /f/ with native <f> and adapted Latin <F> could have been used to denote both voiceless and voiced pronunciations.

¹¹¹ This convention may have arisen because [z] from /-s-/ became identified with /z/ (<*dy-), which was represented with <ξ> (Lejeune 1990: 34f.).

3.6.3.1.2 *Oscan /f/: Distribution and history*

In word-initial position /f/ only occurs before a vowel or before a liquid (/r/ or /l/). In Oscan words with secure etymologies, initial /f-/ continues only the voiced aspirates, *bh- and *dh-. There is little evidence from Oscan itself about the pronunciation of word-initial /f/, but we shall see that the early fourth-century Greek coin legends from Campania point to a voiceless pronunciation. Further indications that initial /f/ was voiceless may be found in *ατφαματτεν[ς]* ‘ordered’ (Lu 3), where the suffix-final consonant *-d of the preverb *ad- ‘to’ was devoiced to /t/ when added to a root beginning with *f- (*fāmā- ‘speech’). This devoicing suggests that word-initial /f/ was voiceless at the time of the formation of the compound, and we may probably assume that in general root-initial /f/ was pronounced as a voiceless fricative, as long as the compound could still be analysed into prefix and root from the continued existence of the un-compounded verb (e.g. **faamat**, Po 34, beside *ατφαματτεν[ς]*).

In word-internal position, Oscan /f/ occurs between vowels and adjacent to a liquid or nasal, and before /t/ and /s/.¹¹² Word-internal /-f-/ in a voiced context occurs between vowels, and occasionally (in Capuan Oscan) directly before a liquid. In most cases where an etymology exists, /-f-/ continues *bh- or *dh-, which were either between vowels (or between a vowel and *y, so *-dh-), or adjacent to a liquid or nasal, including the sonant nasal *ɲ, cf. **anafriss** (Sa 1A9) <* *ḡbhribhos*. Oscan /-f-/ is usually found between vowels, both inherited and anaptyctic, since in most cases consonants in clusters with liquids or nasals in Oscan showed anaptyxis.¹¹³ The phenomenon of anaptyxis means that for most varieties of Oscan /f/ is not found in a cluster with a liquid or nasal, since this cluster is usually broken by an anaptyctic vowel. Anaptyxis is usually regarded as a productive process during the historical period, and this is why we distinguish /-f-/ in clusters with liquid/nasal with anaptyctic vowels from instances of ‘true’ intervocalic position (e.g. **alafa-** in **alafaternum**, nCm 3bm, which is for /al^afa-/). Oscan anaptyxis can help to assign a relative chronology to a particular change of the voiced aspirates in Oscan. A cluster with a liquid/nasal regularly showed anaptyxis, but only if the following consonant was guttural or labial; the process was blocked if the following consonant was a dental (Buck 1928: 51). The development of /f/ from PIE *dh is usually assumed to have taken place via a dental fricative stage, during which there was a confusion of dental and labial,

¹¹² I do not take <f> in **culcfnam** (Cm 27) for /f/. **culcfnam** must be a variant of **culchna** (Cm 22), for Gk *κυλίχνη*. <ch> in **culchna** corresponds to Gk <χ>, for [k^h]. <cf> for <ch> is odd, but probably reflects an orthographic error, rather than an actual confusion of word-internal /f/ and /h/ in Oscan (as Biondi 1993; Mancini 1996). Sironen (1987: 109, n4.) excludes the forms from his discussion of Greek aspirates in Oscan on the grounds that they are ‘etrusco-italici’.

¹¹³ Anaptyctic vowels arose either from clusters of consonant preceded by liquid/nasal (e.g. *-lf-: **alafaternum**, nCm 3b; *-rf-: **urufiis**, Cp 38; *-nf-: **anafriss**, Sa 1A9), or from clusters of consonant followed by liquid/nasal after a short syllable, in most varieties except the Capuan dialect (e.g. *-fl-: *σταβαλανο*, Lu 5, but Capuan **stafatas**, Cp 24; *-fr-: **tefürüm**, Sa 1; *-fn-: **safnim**, Sa 4) (see Buck 1928: 51–3).

leading to a merger of the dental fricatives with the labial fricatives. This merger took place in all the Sabellic languages, and in certain contexts in Latin. We saw above that the evidence of **adaries** (Ps 5) might suggest that in an early variety of Sabellic this merger had not yet taken place. The rules of Oscan anaptyxis, however, show that in Oscan at least, the merger of dental and labial fricative must have been complete before anaptyxis began.

We have seen that orthographic evidence points to a voiced pronunciation of /f/ in a voiced context, between vowels or adjacent to a liquid or nasal. That this voiced fricative could be the reflex of an originally voiceless cluster, **-ssr-*, is shown by **tefúrúm** ‘place for burnt offering’ (e.g. Sa 1A17) <**tessro-*, <**tepsro-*, cf. Lat. *tepor*, Skt *tapas* ‘heat’ (Pk 1069–70; Untermann 2000: 737). We cannot know whether **-f-* resulting from **-ss-* (<**-ps-*) was phonetically voiced or voiceless, since this to a certain extent depends on the nature of **-f-* (from the voiced aspirates) with which it merged. If **-f-* from **-ss-* was voiceless, and **-f-* from the voiced aspirates was voiced (e.g. Meiser 1986: 174, ‘zumindestens zunächst’), this could have continued the phonemic distinction (of /ss/ vs. /bh, dh/) in the small number of words affected. There is, however, no trace of such a distinction in historical Oscan, where /-f-/ from both sources was surely voiced. **tefúrúm** serves as a reminder that Oscan /-f-/ ([β]) could continue a once voiceless cluster, and hence that the voicing observed in historical Oscan (and just before) could be the result of a recent process of voicing during Italic.

Word-internal /-f-/ is also found in a voiceless context, that is before /t/ and word-final /s/.¹¹⁴ There are only three instances of the cluster /-fs/ (dat./abl. pl. ending), all of which date to the fourth century BC. The same ending is later attested as /-s(s)/. The assimilation of /f/ to the following voiceless /s/ after final syncope makes it likely that /f/ was phonetically voiceless in this position.¹¹⁵ It also seems likely that /-f-/ before /t/, as in for example, *scriftas* ‘written’ (Lu 1:25) was voiceless [f]. This may also be inferred from the fact that /f/ continues an earlier voiceless labial stop **p*, cf. Lat. *scrīptae*: **-bht-* gave **-pt-*, which then became /ft/ [ft].¹¹⁶ A further indication that /f/ was pronounced as a voiceless fricative in this position is the odd spelling of /f/ with <hf> in the name **uhftis** (Cm 14), cf. **ufteis** (Cp 37), which is either an attempt to represent a voiceless pronunciation of /f/, [f] or [φ] before /t/, or reflects the beginnings of the change of [f] to [h] before /t/, as found in Umbrian (Buck 1928: 78).

In word-final position Oscan /f/ is only found following a vowel. Final /-f/ does not usually derive from **bh* or **dh*, since the PIE voiced aspirates did not

¹¹⁴ <f> is also found after <p>, in <pf>, in the name **upfals** (Cp 3), **upfaleis** (Cp 9), presumably for the cluster /pf/. This is the only instance of this cluster, and since the origin of the name is unknown, we do not know what it continues.

¹¹⁵ A change of **-fs* to /-s(s)/ is also reconstructed for the acc. pl. ending in Oscan. The regular ending **-f* <**-ns* (found in Umbrian) was redefined with the addition of **-s*; **-fs* then gave attested /-s(s)/; Rix (1986).

¹¹⁶ The change of **-pt-* to **-ft-* is assumed to be common Sabellic (Meiser 1986: 93).

occur suffix-finally. The only exception is **puf** ‘where’ (e.g. Po 34), where /f/ is final after apocope of the final short vowel: **k^wudhi* > **pufê* > *puf*. The other instances of final /-f/ are from word-final *-ns (nom. sg.), as in for example, **essuf** ‘self’ (Sa 4), from **ipsōns*; Buck (1928: 72–3). We do not have any information about the pronunciation of word-final /f/.

3.6.3.2 /h/ in Oscan

In Oscan, the reflex of word-initial and word-internal **gh* appears as <h h H>. <h h H> together represent the defective phoneme /h/,¹¹⁷ which probably only occurred in word-initial position, and which was either weakly pronounced or lost altogether in word-internal position (between vowels),¹¹⁸ as is shown by the use of the letter <h> to mark vowel hiatus. In word-initial position at least, /h/ contrasted with the fricatives /f/ and /s/, and perhaps at an earlier stage also in word-internal position. In the ‘guttural’ series, /h/ was distinct from the velar stops /k/ and /g/.

The correspondence of native and Greek alphabet <h h> with Latin alphabet <H> is usually taken to suggest that Oscan /h/ was a voiceless glottal fricative [h]. This also seems likely from the derivation of the native and Greek alphabet which were based on the Etruscan and Greek letters respectively. There is no orthographic variation which matches the allophonic variation observed for /f/.¹¹⁹ Nevertheless, the loss of /h/ intervocally may perhaps point to a voiced allophone [ɦ] in this position (and in a voiced context generally). If we assume that word-initially /h/ was voiceless [h], we might also expect this pronunciation for instances of root-initial /h/, where a compound might have been felt to contain a root beginning with /h-/, for example, *pruhipid*, *pruhipust* (Lu 1) beside unaffixed *hipid* from the same inscription.

Word-initial /h/, which derives mainly from **gh*-,¹²⁰ only occurred before vowels. In this position /h/ was stable, and does not seem to have been liable to

¹¹⁷ Examples of correspondences are: **haf**[iatír] (Po 39) = *hafie*[i]st (Lu 1:8); **kahad** (Cp 37:6) = *kaħas* (Lu 39); **heirens** (ZO 1) = *ħirevns* (Lu 5).

¹¹⁸ Word-final <h> occurs in only four words: **puh**, **sulluh** (Cp 37), **púieħ** (Cp 41), and **upsatuh** (Si 4–6). In **puh** and **sulluh** <h> is where we would expect final /d/ (Buck 1928: 84). A change of final /d/ to /h/ is not otherwise attested in Oscan, but does seem to be found in South Picene and perhaps also Old Volscian. In **púieħ** and **upsatuh**, both from eastern Campania, on the other hand, /s/ is expected. <h> is not easy to explain (Rix 1996). Again final /s/ does not become /h/ in Oscan; nor is this change now accepted for South Picene; furthermore it is not found in the Presamnite inscriptions, and so cannot be ascribed to substrate influence (as is possible e.g. for monophthongized -es; Rix 1996). A common factor for both words is that they are followed by parts of the verb ‘to be’ which begin with /s/, **súm**, **set** and perhaps the appearance of <h> is connected with this.

¹¹⁹ In the Osco-Greek alphabet the earlier inscriptions show H, and the later ħ (Lejeune 1990: 31), but this is regarded as a purely orthographic change.

¹²⁰ /h/ in **hereklúı** is ultimately from Greek /h/ since the word is borrowed from Gk Ἡρακλῆς, although via Etruscan (cf. De Simone 1970: 291–2). /h/ in **herukinaı** (Cm 10), also a Greek loanword, is not expected, and is probably the result of a false analogy, perhaps after the name of the Oscan goddess **herentateis**, which is found in the same inscription (Buck 1928: 93).

loss. <h h H> are rarely omitted in word-initial position, and possibly only in two Osco-Greek inscriptions, in the names *ερητης* (Lu 24) and *ορητης* (tLu 6)—if these are indeed versions of **Heriis*, for example, **hereiis** (Cm 14) and **húrtiis** (Sa 23). This omission may reflect a southern, rather than a general Oscan, tendency for initial /h/ to be lost.¹²¹

In word-internal position the signs <h h H> occur between vowels, before <t>, <s>, and <p> and the cluster [ts], marked by <z>.¹²² Between vowels, <h h H> do not always represent /h/, since the signs are found where /h/ is not etymologically justified, for example, in **piihúí** (Sa 1B15), possibly also *πεηετεις* (Lu 30), which go back to **pīyo-* ‘godly’ cf. Lat. *pīus* (Meiser 1986: 48f.), or in **stahint** ‘stand’ (Cp 25), beside **staiet** (Cm 1B32), from a stem **stā-ē-* (Meiser 1986: 56). In these cases, the signs mark vowel hiatus, and the evidence of *πεηετεις* shows that this practice goes back to the fourth century BC. The use of <h h> to mark vowel hiatus can only be explained by assuming that /h/ did once exist between vowels and was written in this position. Once /h/ was no longer pronounced (or pronounced very weakly), but <h> was still written, the letter would have marked a break between the two vowels, and so could be extended to mark vowel hiatus in general. This presumes that at the earliest period of writing, /h/ between vowels was still pronounced sufficiently to be noted, but it must have been weakened and lost quickly, given the early instances of <h> for marking general vowel hiatus. We cannot know for certain what the pronunciation of /h/ was between vowels, although presumably directly before the loss, it was a voiced glottal fricative [ɦ] (see on the similar assumption for Latin /h/, Allen 1978: 43, 45).

Like intervocalic /f/, intervocalic <h> is also found between vowels which have arisen via anaptyxis (e.g. **marahis** Cm 14:9). That a liquid in a cluster **-rh-* could show anaptyxis in the same way as before a velar stop (cf. e.g. **aragetúd** ‘silver’, Cm 6, Lat. *argentum*) shows that at an early period of Oscan, /h/ functioned as a guttural consonant in this position, and hence that it was still pronounced.

In a voiceless context, the situation is different. We find <h> before <t>, <p>, <s> and <z> [ts]. In **kahz** (Sa 42), if from **kaghtos*, <h> represents the outcome of **-gh-* in a cluster before **t* (<z> is for /ts/ from **-tos*). Given the similar change attested in *scritfas* of **-bht-* to /ft/, probably via **-pt-*, we may assume that **-ght-* became **-kt-*, and that **-kt-* then became /ht/. The change of (inherited) **-kt-* to /ht/ (<ht>) is found in for example, **saahútum** ‘sacred’ (e.g. Sa 1A17) from **sanktos*, cf. Lat. *sanctus* or the name **úhtavis** (Cp 36) from **oktāwyois*,

¹²¹ Campanile (1992) argues for more such forms, *ιριος* (Lu 2) and *οριουμ* (Lu 44) though these are much less certain.

¹²² I do not include here cases where <h> (also <H>) is used together with a voiceless stop to mark a Greek voiceless aspirate, as in **culchna** (Cm 22), or **aphinis** (Po 40), and probably also in **tryhiú** (Cp 36); wrongly in *phim* (Lu 1:25) for **pim*. For discussion of the Oscan representation of the Greek aspirates (see e.g. Sironen 1987).

cf. Lat. *Octāuius* (Buck 1928: 89). This development only affected clusters of **-kt-* which had been formed before internal syncope, as secondary clusters were retained, for example, *factud* ‘should do’ < **fakitōd*. Thus, if **kahz** is from **kaghtos*, the development of **-ght-* to **-kt-* must have preceded internal syncope, and so probably dates to a common Sabellic stage. Umbrian also shows a similar treatment of inherited clusters of **-kt-*, although the use of <h> as a length marker shows that /h/ was lost with compensatory lengthening of the preceding vowel. We have no orthographic evidence for the pronunciation of Oscan /h/ before /t/, but it seems likely /h/ was not lost in this position; <h> is always written, and is not extended to mark vowel length in general (as it is in Umbrian).¹²³ It seems likely that /h/ from **k* was voiceless in this position.

3.6.3.3 Clusters with **t* in Oscan

Elsewhere in Italic we find that voiced aspirates in clusters with **t* show conditioned treatments to voiceless reflexes. In Oscan the historical reflexes of the voiced aspirates (**bh* and **gh*) in this position appear to be similar to the main word-internal reflexes: **-bht->* <FT> /ft/; **-ght->* <hz> /hts/. Nevertheless, they may be the result of a general Italic conditioned devoicing of voiced aspirates before **t*, given the correspondence of Oscan *scriftas* (Lu 1:25) with Lat. *scriptae* ‘written’, which points to an earlier Italic stage **-pt-*, and the treatment of **-kt-* as an inherited cluster, which puts it chronologically before internal syncope. That /f/ and /h/ before /t/ are the reflexes of **p* and **k* suggests that the fricatives were voiceless in this position. Furthermore, the odd spelling of <hf> for /f/ (if <hf> in **uhftis**, Cm 14:11, for <f>) may be an attempt to represent voiceless [f] before /t/.

3.6.3.4 Clusters with (sonant) nasal in Oscan

The evidence for a conditioned change after a sonant nasal is indirect and occurs in **amnúd** (Cm 1A17) which is assumed to go back to **H₂m̃bhi-no-*, via stages **am̃bino-* > **ambino-*, with the development to **-b-* caused by an early change of the sonant nasal itself conditioned by the preceding laryngeal; Rix (1994a: 15–16). Thus in this reconstructed development, the reflex of **-bh-* after laryngeal + sonant nasal falls together with those occurring after inherited nasals, which are not otherwise attested in Oscan, but which developed to stops in Umbrian, which may be representative for Sabellic generally. Otherwise, the development in **anafriss** (e.g. Sa 1A9), if from **ṇbhribhos*, where **-bh-* becomes /f/ (probably [β]), after the sonant nasal **ṇ*, shows the same reflex as the main word-internal treatment (cf. the similar change in Fal. **ifra** (LF 88) < **ṇdherā*).¹²⁴

¹²³ Cf. Lejeune (1993), who refutes the existence of an Oscan proverb *ē-* ‘out of’ from **eh-*, from **ek-* before **-t-* (as e.g. Buck 1928: 49).

¹²⁴ The reconstructed development of **fangvam** is too uncertain to allow us to consider it here as evidence for Oscan /g/ from **-gh-* after a sonant nasal.

3.6.3.5 The treatment of *-s- in Oscan

In Oscan the main word-internal reflexes of the PIE voiced aspirates were voiced fricatives [β], [ɦ] (or Ø) in the historical period. <f> for [β] from *-ss- in **tefúrúm** (Sa 1A17) shows that Oscan /f/, and the reflexes of the voiced aspirates in general, could be the reflex of an earlier voiceless sound. A consideration of the treatment of *-s- in Oscan supports the assumption of a general voicing of fricatives in a voiced context word-internally in common Italic.

It is usually assumed that intervocalic /s/ in Oscan was voiced [z], and that this was the result of an earlier, common Italic voicing of *-s- between vowels (e.g. Buck 1928: 74; Lejeune 1990: 35). While this is not represented in the native alphabet, which always shows <s>, later Osco-Greek inscriptions show <ζ> for /-s-/, presumably for [z] (Lejeune 1990: 34), and the Tabula Bantina in the Latin alphabet uses <Z> for /-s-/. Another indication that *-s- was voiced intervocalically at an early stage, is the outcome of secondary clusters of *-s-: so for example, *-ds-, *-ns- become <ζ>, <νζ>, for [dz], [n^dz],¹²⁵ in πιζζηι ‘of the source’ (Lu 35), if from **pidesei* (Lejeune 1990: 34f.) and in *Ἐνζηι* (Lu 31) ‘to Venus’. The voiced reflexes are a good indication that *-s- in the cluster was already voiced [z], and thus the clusters were *-ds- [-dz-], *-ns- [-nz-]. The secondary cluster *-rs- also shows a voiced outcome, becoming /rr/ in for example, **kerri** ‘to Ceres’ (e.g. Sa 1A3) <**keres-ē-* (see Buck 1928: 76).

There is also further evidence in the coin legends of Aesernia (Sambon 175–189, Ve 200 B 6, nSa 5). The coinage is from two periods, the earlier group (Sambon 175–82) dating from 280–268 BC, and the later one (Sambon 182–9) from after 268 BC. Many coins bear legends, all in the Latin alphabet. The name of the Oscan community appears as *aisernio* (Sambon 179, 183 = Ve 200 B 6a, nSa 5), or as versions of *aiserninom* (Sambon 182 = Vetter 200 B 6b, c; also *aisernino*, Sambon 175–8, 184; *asernino*, Sambon 181; *aisernnio*, Sambon 186; see Fig. 3.8).¹²⁶

What is striking about the spelling of the name is the shape of the letter <S>; sometimes this is S, both curved and angular, but the sign is also found reversed. In other words, it looks very similar to the letter <Z>. That the letter is in fact <Z>, taken over from the Greek alphabet, and used here to note the voiced alveolar fricative [z], seems likely for two reasons.¹²⁷ First, Latin <S> from contemporary inscriptions is never found reversed; the direction of the sign is always the same as the general direction of all of the letters of a particular line of an inscription (see e.g. Wachter 1987: 101–238). Secondly, the earlier coins from Aesernia share signs with coins issued by other Samnite communities,

¹²⁵ Meiser (1986: 163) is different, taking <νζ> for /-nts-/.

¹²⁶ The first of these forms may represent an Oscan nominative singular of the name **aiserniú*, the second may be a Latin version of the Oscan ethnic, *Aeserninōrum*.

¹²⁷ Such a use for Gk <ζ> would be entirely possible at this date. In archaic and classical Greek <ζ> usually represented the sequence /zd/, but from the fourth century on there are indications of a change to /z/ [z] (cf. Lejeune 1972: 112f., esp. 115–16).

175	A I Z E R N I N O	
176	A I Z E R N I N O	A I S E R N I N O
178	A I Z E R N I N O	
179	A I S E R N I O	
180	A I Z E R N I N O	
181	A Z E R N I N O	
182	A I S E R N I N O M	
183	A I S E R N I O	A I S E R N I O
184	A I S E R N I	A I Z E R N I N O
186	A I S E R N N I O	
187	A I S E R N I N O	

FIGURE 3.8 Coin inscriptions from Aesernia (numbers are from Sambon 1903)

Compulteria and Suessa, and also with those issued by the Greek-speaking city of Naples, possibly from a single mint (Sambon 1903: 107). It seems likely that the apparently reversed sign is <Z>, and that the <S>/<Z> variation in the legends represent a voiced [z] allophone of /s/ between vowels. It is not surprising that this allophone was not represented from the time of the adaptation of the native alphabet as there would have been no sign available to represent [z] (Etruscan <z> noted the voiceless affricate [ts]).

The treatment of *-s- in primary clusters adjacent to liquid also shows voiced reflexes in Oscan. The only cluster attested is *-rs-, which becomes /r/ with compensatory lengthening of the preceding vowel, cf. for example, **teer[úm, terúm** (Cm 1A12) < *tersom, cf. Lat. *terra* ‘land’ (Untermann 2000: 736).

3.6.4 The development of the PIE voiced aspirates in Oscan

Main (unconditioned) changes

<i>word-initial position</i>	<i>word-internal position</i>
*bh- > < f f F > /f/ [f]	*-bh- > < f f F > /f/ [β]
*dh- > < f f F > /f/ [f]	*-dh- > < f f β F > /f/ [β]
*gh- > < h h H > /h/ [h]; (?/h/ > Ø in south Oscan)	*-gh- > < h h H > /h/ [h̥]; /h/ > Ø
*g ^w h- no evidence	*-g ^w h- no evidence
<i>clusters with *t:</i>	
*-bht- > *-pt- > < FT > /ft/ [ft]	
*-ght(os) > *-kt(os) > < hz > /hts/ [hts]	

I confirm that the main reflexes for Oscan were /f/ and /h/, and that there appears to have been a conditioned development before *t. The initial claims

that Sabellic /f/ might have been voiced word-internally, and thus that all the Italic languages showed voiced reflexes in this position, were based on evidence from Oscan (Rix 1957). My review of the Oscan evidence, and in particular the representation of /f/ in the Oscan native and Osco-Greek alphabets, confirms that the claim can be substantiated for the entire historical period. It also reveals that the various letters for /f/ were usually used to represent voiceless [f] and voiced [β] without variation.¹²⁸ These findings extend to the Italic languages other than Latin, as they show that the consistent use of native <f>/ Latin <F> do not necessarily represent a single pronunciation of voiceless [f]. It is more than likely that in these languages too the signs were also used to note a voiced pronunciation word-internally.

3.7 The Evidence of Umbrian

Umbrian was spoken in an area to the north of Rome, which is roughly equivalent to modern Umbria. The language is attested in the form of inscriptions,¹²⁹ the longest and most significant of which are the Iguvine Tables.¹³⁰ The Iguvine Tables originate from Iguvium (now Gubbio). They consist of seven bronze tablets, some engraved on both sides, containing over 4,000 words. The text, much of which is obscure, describes the rituals of a local priesthood, the Atiedian Brethren, giving detailed prescriptions for the priests to follow. The tablets do not present a single recension, but were written over a long period, probably from the second half of the third century to the late second century BC.¹³¹ They are written partly in an Etruscan-based native alphabet, and partly in the Latin alphabet; the tablets written in the native alphabet chronologically precede those in the Latin alphabet, which was adopted at the end of the second century. As well as the Iguvine Tables, there are also some twenty-seven short inscriptions from other sites, which date from the fourth to the first century BC.¹³² They, like the Iguvine Tables, are written in both the native and Latin alphabets.

¹²⁸ A similar situation is found for the representation of intervocalic /-s-/ , which was probably [z]; only in the coin texts from Aesernia and the late inscriptions of Lucania is [z] explicitly represented, otherwise /s/ is represented by <s s S> with no variation.

¹²⁹ For the five Umbrian glosses, see Meiser (1986: 7).

¹³⁰ See e.g. Buck (1928), with Latin translation and brief commentary; Vetter (1953), with Latin translation and commentary; Poultney (1959), with English translation and commentary; Devoto (1962 = Third Edition), with Latin translation and commentary; Prosdocimi (1978a), with Italian translation and commentary; and more recently, Prosdocimi (1984), with a newly-edited version of the text (with good photographs). For previous bibliography, see Prosdocimi (1978a: 588–591); Meiser (1986: 295); Ancillotti and Cerri (1996).

¹³¹ For the absolute dating of the Iguvine Tables, see e.g. Prosdocimi (1984: 151–61).

¹³² These inscriptions are collected in Rix (1983: 105f.), Meiser (1986: 4f.), and most recently with full discussion in Rocca (1996).

3.7.1 The writing systems of Umbrian

3.7.1.1 The Umbrian native alphabet¹³³

The Umbrian native alphabet was used from the fourth to the second century BC. The alphabet was derived from a North Etruscan model, probably after the mid-sixth century, given the use of **θ** <f> for /f/ (e.g. Lejeune 1957: 100–2). The inscriptions show some variation in letter shapes and in the notation of the velar stops, reflecting the practices of Etruscan scripts from neighbouring areas. In the short inscriptions, /k g/ are represented by <c>, typical of the later southern and central Etruscan scripts, while the script of the Iguvine Tables uses <k>, and this, together with the use of an upside-down v shape for <m> (Maggiari 1982), suggests a close similarity with the alphabets of the Perugia–Cortona region (cf. Cristofani 1978: 420). The Umbrian native alphabet consists of 19 letters: <a b ṛ e v z h i k l m n p r s t u f ç>. As well as showing **θ** <f> for /f/, the Umbrian alphabet shows a number of other similarities to the Oscan native alphabet: the direction, from right to left; the use of <z> to represent [ts]; and the use of <u> for /u/ and /o/, although unlike Oscan, the signs for vowels in Umbrian were never revised. As a result the three front vowels, /i/, /é/ and /e/ were represented by only two signs, <i> and <e>. While there is a good deal of variation in the representation of the vowels, some regularity does appear, with <i> and <e> being used for /i/ and /e/, and <i> <ei> or <e> for /é/ (see Rix 1983: 97f.).

The Umbrian writing system changed during the historical period. In the Iguvine Tables, <t> is used to represent both /t/ and /d/, and <d> as such is not attested. Nevertheless, the fourth century inscriptions from Todi (Um 16) and Ameria (Um 21,22) suggest that the inventors of the Umbrian script did revive <d> to represent /d/. After the change of /d/ in intervocalic position to some sort of (voiced) fricative,¹³⁴ the use of the letter <d> was limited to this sound alone, and <t> was then used to represent both /t/ and (initial) /d/ following the example of <k> for /k g/.¹³⁵ In both the Todi and Ameria inscriptions, however, we find it used even for initial /d/ (e.g. **ṛnum**, Um 16, **ṛnu**, Um 21, for /dōnum/ ‘gift’), thus confirming that the sign which was later restricted to /t/ (in the Iguvine Tables) was originally used to denote /d/. A further change concerned the creation of a sign, transcribed <ç>, to represent the palatal fricative which resulted from /k/ before a front vowel, in for example, **façia** (Ia 17) < *fakyād; Meiser (1986: 200f.). The sign looks like an inversion of

¹³³ For discussion of Umbrian orthography, see e.g. Poultney (1959: 25–8); Meiser (1986), *passim*; Prosdociami (1984: 138–142) (for the Iguvine Tables); Rocca (1996: 12–16) (for the short inscriptions).

¹³⁴ e.g. **teṛa** (e.g. Ib 34) /deṛa/ < *didāt. /t/ was also the reflex of intervocalic *l, e.g. **fameṛias** (IIB 2), cf. Lat. *familiae* (see Meiser 1986: 206f.).

¹³⁵ See Meiser (1986: 218f.).

<ř>; presumably the sign <ř> came to be associated with the fricative resulting from **-d-* and **-l-*, and to represent the new fricative arising from the palatalization of **k*, <ř> was inverted (Lejeune 1957: 102).

3.7.1.2 The Umbro-Latin alphabet

The Latin alphabet was adopted at the end of the second century for the Iguvine Tables and is also found in some short inscriptions dating from the second century. The Umbro-Latin alphabet consisted of the following letters: <A B C D E F G H I L M N O P Q R S Š T V X>. An extra sign, <Ś>, was adopted for the Iguvine alphabet, and was used (beside <S>) where <ç> is found in the native alphabet (e.g. **saçe**, Iib 24 ~ *sansie*, Vlb 9). The native letter <ř> corresponds to Umbro-Latin <RS>, <R>, or <S> (e.g. **teřa**, Ib 34 ~ *dirsa*, Vb 13; **ařfertur**, Ib 41 ~ *arfertur*, VIa 3; **akeřuniamem**, Ib 16 ~ *acesoniame*, Vlb 52). I also note the presence of <Q> and <X>. <X> could be used to represent /ks/ (e.g. **fratreks**, VIIb 1 ~ *fratreks*, Va 23). <Q> was sometimes used to represent a voiceless velar before /u/ (as in Latin inscriptions); for example, **dequrier** (Vb 11) beside **tekuries** (Iib 1).

3.7.2 Umbrian: The lexical evidence

3.7.2.1 PIE **bh* in Umbrian¹³⁶

Umbrian continues several PIE roots with **bh-* which are also found in Oscan. *far* 'grain' (Vb 10) is from **bhars*, cf. O. **far** (Cp 37:8) as is the derived adjective in **-eyo-*, for example, **fasiu** 'granary' (IIa 12), and possibly also **farariur** 'who deal with grain' (Um 8) <**far-āsio-*. **bhreH₂tēr*, cf. O. **fratrúm** (Cp 29) gives for example, **frater** 'brothers', and its derivatives (**fratreks**, e.g. Va 23; *fratreca*, VIIb 2; and *fratreca*, VIIb 1), while *frif* 'crops' (e.g. VIa 42) is from **bhruHg-*, cf. O. **fruktatiuf** (Cm 1A21). The past participle **fato** (VIb 11) is now assumed to be from **bhH₂-to-*, to the root **bheH₂-* 'speak', cf. O. **faamat** (Po 34) (e.g. Untermann 2000: 267). The other verbal root with **bh-* continued in the two languages is **bhweH₂-*, cf. O. **fiēt** (Cp 33) which is the ultimate source of the imperfective *fu-*, found in for example, **futu** 'should be' (e.g. IIa 22), **fust** 'will be' (e.g. Ib 7; also prefixed in e.g. **amprefu**/**<u>s** 'you should go about', Ib 20/1 <**am-prai-fus-*) **fefure** 'should be' (IIa 4), and which gives **fito** 'event' (VIb 11) <**bhruH₂-to-*, a **-to-* participle to the suffixed present **bhruH₂-ye/o-*, found in for example, **fuia** (III 1) 'should be' (short *-u-* from **-uH₂-* is explained in different ways, cf. for example, Rix 1983: 100f.; Untermann 2000: 280). The verb forms in *fer-*, for example, **fertu** 'should bring' (e.g. IIa 17) and with the prefix **am-*, for example, **aferrum** 'lead round', (Ib 10), are from **bher-*, cf. Lat. *ferō*, as is the term

¹³⁶ See Stuart-Smith (1996: 81–9).

for the high priest, **arfertur** (e.g. Ib 41), usually taken as an agent noun from **ad-ber-tōr-* (Untermann 2000: 48–9; 275f.).

PIE forms with word-internal **-bh-* are also largely shared with Oscan. We find: **alfu** ‘white’ (Ib 29) from **albho-*, cf. O. **alafaternum** (n Cm 3b; Untermann 2000: 79–80); the dative second singular pronoun **tefe** (e.g. Ib 13) from **tebhei* cf. O. **tif(ei)** (Cm 13); the dat./abl. pl. ending **-bhos* which gives *-s* in Umbrian, as in for example, **aves** ‘birds’ (Ia 1), **fratrus** ‘brothers’ (e.g. Vb 8); and two forms ultimately going back to the root **bheuH₂-*, **prufe** ‘properly’ (Va 27), cf. O. **amprufid** (Lu 1:30) from **probh(w)o-*, cf. Lat. *probus* and probably also **trifu** ‘tribe’ (Ib 16) from **tri-bhu-* (Untermann 2000: 764–5; Rix 2000: 204). Before **-t-* we find <H> in U. **screhto** ‘written’ (VIIb 3), the **-to-* participle to **skreibh-*, cf. O. **scritas** (Lu 1:25). After **-m-* we find <p> , if **kumpifiatu combifiatu** ‘should announce’ (Ib 14, e.g. VIa 17) is from **kom-bhidh-yā-* (e.g. Meiser 1986: 75), where **-bhidh-* is the zero grade of **bheidh-*. Further evidence occurs in the verb forms for example, **amprehtu** ‘should go around’ (Ib 21), and **amboltu** ‘?should walk about’ (VIb 52), which are derived from stems with a prefix **amb(r)-* from **H₂m̥bhi* (e.g. Meiser 1986: 75; Rix 1994a).

The obscure meaning of much of the Iguvine Tables has led to numerous different interpretations being offered for many words, many of which continue PIE voiced aspirates. It would be impossible to discuss here everything which has appeared in the literature, and which I reject as uncertain. I only briefly mention here those forms which are often discussed in the literature. **fahe** (Vb 13) is uncertain, but may mean ‘from the haunch’ (Rix 1986a) and be derived from **bhāghu-*, cf. Skt *bāhus* (Untermann 2000: 254–5). **felsva** (Va 11) is also difficult; it may mean ‘feast’ and be from **bhelghs-wā-* from **bhelghos* ‘cushion’, cf. Got. *balgs*, from the root **bhelgh-* ‘swell’, as Meiser (1988) (Untermann 2000: 272).¹³⁷ **frehtu** (IV 31) and **frehtef** (IIa 26) probably belong together, and may go back to a root in **bh-*, perhaps **bhreig-*, a variant of the root **bhreg-* ‘roast’ (cf. O. **fertalis** (Cp 24); cf. Untermann 2000: 295–6). The god’s name for example, **fise** (Ia 15), and its derivatives (e.g. *fisim*, e.g. VIa 41; *fisouie*, e.g. VIb 9; *fisouina*, e.g. VIb 9), is usually linked with Lat. *fidō*, *fisus* and taken from **bhidh-tu-* to the root **bheidh-*, but is uncertain (Untermann 2000: 286–7). So too are **furfaθ** (Ib 1) and prefixed **efurfatu** (e.g. VIb 17), which are usually derived from **bhordh-ā-ye/o-*, a denominative verb in **-ā-* to **bhordh-* ‘board’ (or **bhṛdho-*), from the root **bherdh-* ‘cut’ (Pk. 138), cf. for example, ON *bord*, Eng. *board* (Untermann 2000: 302–3). The ?adjective **ufestne** (IV 22) describing the **vasus** ‘vessels’ is very uncertain, but may refer to some type of sealing, cf. Lat. *offendix*, and go back to **op-bhedh-to-* to the root **bhendh-*.

¹³⁷ The usual interpretation *holera* ‘vegetables’, cf. dialectal Latin *folus* in Paul. Fest. 74L, from **gheles-wo-*, requires the difficult assumption that *f-* for usual *h-* arises from the word being a loanword from a dialect where *f-* was regularly found for *h-* (e.g. Poultney 1959: 221).

I reject the following as evidence for the treatment of **-bh-*. The context of *fel* ‘son’ (Um 29) makes it more likely to be a Latin loan than the Umbrian cognate (Untermann 2000: 270–1). **vufetes** (e.g. Ila 31) is uncertain, but probably not cognate with Lat. *libita*, from the root **leubh-* (as Poultney 1959: 184); most derive it from **wog^whēto-* ‘?votive’; and while **urfeta** (Iib 23) is uncertain, Katz’s recent derivation from **H₁orghī-* provides an attractive solution.

Word-initially, before vowels and before **r*, Umbrian shows **bh-* as <f> <F>. Between vowels and before **l* and after **r*, the reflex of **-bh-* is <f> <F> (<s> <S> in the dat./abl. pl. ending). After the nasal **-m-*, **-bh-* is represented by <p> , while the cluster **-bht-* is continued as <HT>.

3.7.2.2 PIE **dh* in Umbrian¹³⁸

There is some evidence for the treatment of **dh-* in Umbrian. **feliuf** ‘sucking’ (Ia 14) is usually taken as an adjective from **dhēl-yo-* to a noun **dhē-lā*, cf. Gk *θηλή*, Lat. *fēlāre* (Untermann 2000: 271–2). The word for ‘temple’, for example, **fesnaf(e)** ‘to the temple’ (Iib 16) is derived from **dheH₁s-no-*, cf. O. **físnú** (Cm 1B4). Also like Oscan, Umbrian continues the zero grade of the root **dheH₁-* with the extension **-k-* in parts of the verb meaning ‘do/make’ corresponding to Lat. *facere*, namely the present stem **fak-yo-* for example, **façiu** ‘sacrifice’ (Ila 16), **façia** ‘should sacrifice’ (Ila 17) (also the adjective **façefe**, ‘sacrificial’, Iib 9) and in the perfect stem **fak-*, for example, **fakust** (IV 31); cf. O. **fakiiad** (Cp 33). Although the formation is rather odd for this verb in Italic, Umbrian also shows forms which may come from **fē-*, from the unextended root **dheH₁-*, for example, in the present imperative **fetu** ‘should sacrifice’ (e.g. Ia 3), and possibly also the perfect passive participle, for example, **feta** ‘prepared’ (Iib 13) (and **?a/anfehtaf**, Ila 34) if unusually from full grade formation **dheH₁-to-* (see Untermann 2000: 256f., 100). A suffixed form of **dheH₁-* may be continued in **fameñias** ‘family’ (Iib 2), if from **dhH₁meliyā-*, cf. O. *famelo* (Lu 1:22).

Word-internal **-dh-* is continued in the following forms. Since Lejeune (1968: 110–1), *ef* (VIa 4) is taken as a second singular imperative, ‘go!’, from **idhi* (cf. Untermann 2000: 207f.). The adverbs **ife** ‘there’ (e.g. Iib 12) and **pufe** ‘where’ (e.g. Ib 33) are usually derived from forms with the locative particle **-dhi* (<**i-dhi* and **k^wu-dhi* respectively), cf. O. **puf** (Po 34). The verbs **herifi** ‘be necessary’ (Vb 6), **cehefi** ‘be taken’ (VIa 20), and **pihafei** ‘be purified’ (VIa 29) are now generally interpreted as present passive infinitives, cf. O. **sakrafir** (Cp 32) with both Oscan and Umbrian endings continuing a suffix in **dhyeH₁* (García Ramón 1993; **-dhiēi* (Untermann 2000: 323). Another suffix beginning with **dh-*, adjectival **dhli-*, cf. Lat. *-bilis* in for example, *flēbilis* ‘weeping’ is probably attested in *-fele* in **façefe** ‘sacrificial’ (Iib 9) and **purtifele** ‘to be offered’ (Iib 25,

¹³⁸ See Stuart-Smith (1996: 89–97).

cf. *purdouitu*) (Untermann 2000: 617). **kumpifiatu** ‘should announce’ (e.g. Ib 14) may be from *kom-bhidh-yā-* (see **bh* above), while **rufu** (Ib 24), *rofu* (VIIa 3) (and probably also *rufre*, VIa 14) look like adjectives from **rudhro-*, cf. Lat. *ruber* and **reudho-* cf. Lat. *rufus*, to the root **H₁reudh-* ‘red’ (Untermann 2000: 637–8). The imperatives *ahauendu* (VIIa 27), *preuendu* (VIIa 11), **vetu** (e.g. Ib 29) can be derived from **-wendh-e-tōd* to the root **wendh-* ‘turn’, cf. Got. *gawandjan* (Untermann 2000: 835).

Several words can be considered less certain as evidence for **dh-*. The meanings of **fiktu** (Ia 28) and **afiktu** (Ia 31) are uncertain; if their object **vestičam** refers to a sacrificial cake, then a derivation from **dheigh-* ‘mould’, cf. Lat. *figūra* is possible (Untermann 2000: 284). **fikla** (e.g. IIa 18) might also belong here (Untermann 2000: 283). *frite* (e.g. VIa 24) may be cognate with Lat. *frētus* ‘relying’ from **dherH₁-* cf. Skt *dhārayati* ‘support’ (Untermann 2000: 298), and **furu** (Ib 42), cf. Lat. *forum*, may be from **dhworom*, cf. OCS *dvorŭ* (Untermann 2000: 305), but neither is secure. Several other forms may be evidence for the treatment of **-dh-*. The verb e.g. **furfaθ** (Ib 1; see **bh* on pp. 101) may be from **-bhordhā-*. *stafle* (VIb 39; possibly also **staf/li**, Ia 30/1) is uncertain but is usually connected with O. *stafatas*, and may go back to **stafilā-* ‘set up’ derived from a nominal stem **stH₂dhlō-*, cf. Lat. *stabulum* (Untermann 2000: 693–4). **tafle** (IIb 12) and *uef* (e.g. Vb 12, ? for *uef(raf)*) seem to have Latin cognates in *tabula* ‘board’ and *libra* ‘pound’, and may derive from stems with **-dh-* (e.g. **iH₂dhlā-*; **leidhrā-*), though finding wider cognates is not easy (Untermann 2000: 730; 828). *uerfale* ‘?temple’ (VIa 8) might be from **werdh-* (see Lat. *uerbum*, but see Untermann 2000: 844). Under this category fall three words which may show the treatment of the clusters **-sdh-* and **-dht-*: *(an)hostatu* (e.g. VIb 59; e.g. VIb 62) and **ufestne** (IV 22), **fise** (e.g. Ia 15). *(an)hostatu* looks like Lat. *hastātus* ‘armed with a spear’, an adjective derived from the noun *hasta* ‘spear’ which may go back to **ghasdh-*; if so (and ignoring the unusual *-o-* beside *-a-* in Latin), we find <ST> for **-sdh-*. If we can derive **ufestne** and **fise** from **op-bhedh-to-* and **bhidh-tu-* respectively (see **bh* on pp. 101), Umbrian like Latin, appears to show both <st> and <s S> for **-dht-*.

I reject the following forms as evidence. The etymology of the god’s name **vufiune** (Ia 20) is obscure (see e.g. Ancillotti 1993: 1–3; 23; Untermann 2000: 862). *hondu* (e.g. VIb 60) is probably not from **ghom-dhH₁-tōd* ‘should dash to the ground’ (as Buck 1928: 194) but may be from **ghund-e-tōd*, ‘should pour’ (see **gh* at 3.7.2.3). Despite Meiser (1986: 76), the meaning and etymology of **per-suntru** (IV 17) is very uncertain.

In word-initial position before vowels and before **r*, **dh-* is represented by <f> <F>. This is also the reflex of **-dh-* word-internally, between vowels, before **l*, and before and after **r*. There is also evidence for the treatment of **-dh-* word-internally in three other contexts: after **-n-* we find <D>; the cluster **-sdh-* [-zdh-] seems to give <ST>; and **-dht-* seems to show two outcomes, as in Latin, <s S> and <st>.

3.7.2.3 PIE *gh in Umbrian¹³⁹

Three undisputed Umbrian roots continue PIE *gh-. The group of verbal forms for example, **habia** (e.g. Va 17), **haburent** (VIIa 52), **hatu** (Ib 11) are all based on a root *hab-,¹⁴⁰ probably from *gheHb- (Pk. 407–8; LIV 174), but seem to belong to two different verbs in Umbrian. One meant ‘have, hold’ and showed a present stem *habē- while the other meant ‘take, seize’ and had a present in *hab-ye/o- (Untermann 2000: 311f.; 316). The other verbal root, *gher-, ‘wish’, attested in for example, **heriest** (VIIa 52), **eretu**, **heritu** (IIa 4; e.g. VIa 27), is also found in Oscan (see O. **heriad** Cp 36); while the root is clearly *her-, the shape of the present stem is disputed (see Meiser 1986: 112; Untermann 2000: 321f.). Also from *gher- are the fossilized verb forms for example, **heris** ‘either . . . or’ (e.g. Ia 4), and **pisher** ‘whoever’ (VIb 41), though exactly what these continue is uncertain; also possibly **herintie(s)** (Um 21, 22), which most take as a name that is formally a present participle to *her-, cf. O. **herentateis** (e.g. Cm 10) (Untermann 2000: 324–5; 560). The third root, *hom-, from *(dh)ghom-, is again shared with Oscan (cf. O. **hu[n]truis**, Cp 37:7) and is found in the noun **homonus** ‘people’ (e.g. Vb 10) from *homōn-, cf. O. **humuns**, the fossilized comparative **hutra hondra** ‘below’ (Ib 42; e.g. VIa 15) < *hom-tero- (or *homi-tero-), and the corresponding superlative **hodomu** ‘lowest’ (e.g. VIa 9) < *hom-trimo- (Untermann 2000: 329; 331; 332). Much less certain, though perhaps also from the same root are: **huntak** (e.g. III 3), **hunte** (e.g. Ib 4) and **huntia** (e.g. IIa 15) (Untermann 2000: 332f.). Only the first person singular dative pronoun **mehe** (VIa 5) from *meghei, cf. Lat. *mihi*, and the verb forms in **-veitu**, for example, **arveitu** (e.g. IIa 12), from *-wegh-e-tōd*, cf. Lat. *uehitō* ‘should carry’ are good evidence for word-internal *-gh- (Untermann 2000: 479–80; 830–1).

Less certain as evidence for *gh- are: the forms of the Umbrian demonstrative pronoun **erihont** (VIb 50) corresponding to Lat. *īdem* ‘the same’, whose second part in *-(h)ont* is often derived from *ghe/o-, cf. Fal. **foied** (LF 5/Ve 244; Untermann 2000: 229–30);¹⁴¹ *(an)hostatu* ‘with/without spears’ (e.g. VIb 59) which may be from *ghasdh-; **eitipes** ‘decreed’ (e.g. Va 2) which may be a compound whose second part **ipes** may be from *hēpens, 3 pl. perfect from *ghēp- (otherwise only attested in Lucanian Oscan, cf. O. *hipid* (Untermann 2000: 210); and the two uncertain verbal forms—**ehiato** (VIIb 2) which may be cognate with Lat. *hiō* ‘I gape’ from *gheiH₂- (Untermann 2000: 201), and **hondu** (e.g. VIb 60) which may be from *ghund-e-tōd, to the root *gheud- ‘pour’ (cf. Lat. *fundō*) (so Meiser 1986: 168; Untermann 2000: 331). Word-internal *-gh- may be represented in **fahē** ‘from the haunch’ (Vb 13), if from *bhāghu-, and **cehefi** ‘be taken’ (VIa 20; also **kukehes** ‘?should take’ III 21), if these verbs do

¹³⁹ See Stuart-Smith (1996: 97–103).

¹⁴⁰ This is also found with a prefix, e.g. *prai-, e.g. **prehabia** (Va 5); Untermann (2000: 311).

¹⁴¹ **isunt** (e.g. IIa 28), **suront** (e.g. VIb 8), and **sururont** (e.g. VIb 35) ‘likewise’ probably also show **-ont** *-ont* from **-hont*.

belong together and derive from the same root as Oscan **kahad** (**kagh-*); cf. Untermann (2000: 380). If we accept Katz's (1998) interpretation of **urfeta** (IIb 23), as an accusative plural meaning 'testicles' (literally 'balls'), formally equivalent to Lat. *orbita* 'track, rut', going back to **H₁orgh-*, cf. Gk *ὄρχεις*, we may have evidence for U <f> for *-*gh-* before **r* (of uncertain etymology: Untermann 2000: 805). The outcome of **gh* after a nasal may be attested in (a)**fiktu** (Ia 28; Ia 31) if these forms are from *(-)*dhingh-e-tōd* to the root **dheigh-* 'mould' (see above on **dh*; Meiser 1986: 179), and also in **krenkatrum cringatro** 'belt' (Ib 11; VIb 49) if this is a noun from **krenghatro-* to the root **kreng-* 'gird' (Pk. 936), cf. ON *hringr* (Meiser 1986: 75; Untermann 2000: 204).

In word-initial position before vowels **gh-* is represented by <h> <H> (if *hondu* is from **ghundh-e-tōd*, also before **u*) and once Ø. Word-internally, in intervocalic position, *-*gh-* became <h> <H> or Ø. The evidence for the treatment after a nasal is uncertain, but points to <k G> for *-*gh-*.

3.7.2.4 PIE **g^wh* in Umbrian¹⁴²

Umbrian is the only Sabellic language to show any evidence for the treatment of **g^wh*, but even this is limited to two rather uncertain forms which may be from the same PIE root **weg^wh-* 'vow' (Pk. 348), cf. Skt *vāghat-*: **vufru** (e.g. IIb 21) may be semantically equivalent to Lat. *uotiuum* 'votive', and if so, may be from **H₁wog^whro-* (Untermann 2000: 863); **vufetes** (IIa 31) is often taken to be a past participle from **wog^wheto-*, 'offered', to the same root (Untermann 2000: 861; *uouse* (VIb 11) is often also mentioned here, but the sound changes required from **wog^whikyo-* are difficult; Untermann 2000: 867).

I do not accept the following forms as evidence: the god's name, for example, **vufiune** (Ia 20) is of obscure etymology; **kunikaz**, *conegos* 'bowing' (e.g. IV 15; e.g. VIb 5), while often derived from **kōn-knig^wh-ā-tos* to the root **kneig^wh-*, cf. Lat. *cōnīueō* 'I close my eyes' is very uncertain (e.g. Meiser 1986: 88; cf. Untermann 2000: 417); and *ninctu* (VIb 60) seems unlikely to be cognate with Lat. *ninguit*, and derived from **sneig^wh-* 'snow' (Vetter 1953: 262; Untermann 2000: 497–8).

This limited evidence suggests that <f> was the regular Umbrian reflex of **-g^wh-* between vowels and before **r*.

3.7.3 Umbrian: From orthography to phonetics

The phonology of Umbrian has received attention in the work of Meiser (1986). A summary of the Umbrian consonant system (following Meiser 1986: 28–9) is shown in Table 3.5.

¹⁴² See Stuart-Smith (1996: 103–5).

TABLE 3.5 The consonants of Umbrian

	<>	//	<>	//	<>	//	<>	//	<>	//
voiceless stops	p, P	p	t, T	t					k/c, C/Q	k
voiced stops	b/p, B	b	ř/t, D	d					k/c	g
fricatives	f, F	f	s, S	s	ř, RS/R/S	ř	ç, Ś/S	š	h, H	h
liquids			l, L	l	r, R	r				
nasals	m, M	m	n, N	n						
glides	w, V	w	i, I	j						

Notes

- 1 Apart from the early use of <ř> for /d/, native alphabet inscriptions use <t> and <k> for both voiced /d g/ and voiceless /t k/; e.g. **testre** (Ilb 27) ~ *destre* (VIb 49); **kumiaf** (Ia 7) ~ *gomia* (VIa 58). Occasionally even /b/ is found with <p>, e.g. **hapinaf** (Ia 24) ~ *habina* (Ia 27), *habina* (VIb 22); Meiser (1986: 284).
- 2 <z> (<S>) represents /ts/.

3.7.3.1 /f/ in Umbrian

The main reflexes of *bh and *dh, and probably *g^wh (possibly also *-gh- after *r), are noted by <f> and <F>, which represented the phoneme /f/, found word-initially, word-internally, and in word-final position. In the Umbrian consonant system, /f/ was the labial fricative, distinguished from /p b w/ by degree of approximation. In the rich fricative series, /f/ contrasted with the alveolar /s/, the palatal /š/, and retroflex /ř/ (word-internally); in word-initial position, and at an early period also in word-internal position, /f/ also contrasted with the glottal fricative /h/.

The correspondence of native alphabet <f> to Latin <F> suggests that the main realisation of /f/ was as a labiodental fricative. This also seems likely given the phonological position of /f/ within the Umbrian consonant system. Whether this fricative was voiced or voiceless is difficult to say from Umbrian orthography. In the native alphabet /f/ is represented by 8, in the Latin by F, without variation except in word-final position where the sign is occasionally omitted, or <p> is found in its place. The alternation with <p> (e.g. **kutep** for ***kutef**, Ib 3–4) is usually explained as being purely orthographic.¹⁴³ The omission of final <f F> is found in both alphabets (e.g. **tréf**, Ia 7 ~ **tre**, Ia 3; **restef**, Ib 9 ~ *reste*, VIb 47), but is more common in the Latin alphabet inscriptions. This may reflect the actual loss of /f/ in final position, perhaps via a voiced pronunciation [β] (Meiser 1986: 276f.). The consistent use of Lat. <F> might suggest that /f/ was a voiceless labiodental fricative, but as we have seen from the Oscan evidence, it is possible that the letters were used to note both a voiceless fricative [f] and a voiced fricative [β]. Meiser (1986: 29, 73f.) suggests that /f/ was voiced in a voiced

¹⁴³ <p> may have been used for <f> after archaic usage, from a time when the Etruscan alphabet did not always use additional signs like <f>; Vetter (1953: 180). Alternatively, the letter might have been a by-form of <f>, similar to <p>, like the Faliscan sign for <f> † (Buck 1933: 24).

context word-internally. He points to indirect evidence of such a pronunciation at a very late stage of Umbrian in the Latin representation of the name of the Umbrian city *Mēuānia*,¹⁴⁴ whose stem is found otherwise in Latin as *Mefan-* (*Mefanas*, *Meflanus*, *Mefanas*) (Schulze 1933: 214), and in Etruscan as **mefanate** (e.g. Co. 1. 28) in an ethnic based on the stem. The correspondence of Lat. <V> beside Etr. <f>, which could represent [β] (see 128–31), strongly suggests that /-f-/ in this Umbrian name was voiced [β],¹⁴⁵ although the use of Lat. <V> makes this evidence very late, since it is unlikely that <V> could have been used to note a fricative much before the end of the Republic (Leumann 1977: 139).¹⁴⁶

Word-initially /f/ is found before a vowel, or a liquid (/r l/), and for words with firm etymologies, always continues *bh- or *dh-. We have no evidence of the pronunciation in this position, but assume a similar distribution to Oscan (from the evidence discussed above), and hence that word- and root-initial /f/ (e.g. **afērum**, ‘carry round’, Ib 10 <*am-bher-) was a voiceless fricative [f]. In word-internal position the distribution of /f/ was limited, occurring only in a voiced context, that is between vowels or in clusters with a liquid. /-f-/ (I assume [-β-]) in this position was the reflex of the voiced aspirates (*-bh-, *-dh-, *-g^wh- and *-gh- after *r) and was also the regular outcome of several clusters involving *-s- or *-ss- adjacent to a liquid or nasal.

The outcome of the secondary cluster *-rs- was /-rf-/ ([-rβ-]), in for example, **parfam**, a kind of bird observed during the ritual, cf. Lat. *parra* (Ib 13) <*paresā-* (Untermann 2000: 513). It is likely that *-s- in this cluster was already voiced [z] from a common Italic voicing of *-s- between vowels, and so a voiced reflex is not surprising. Primary clusters of *-ss- adjacent to a liquid or nasal resulted in /f/: *-rss- became /rf/, for example, *trahuorfi* ‘crosswise’ (VIIa 25) <*transworssēd (Untermann 2000: 758; *-ss- is from *-tt-: Meiser 1986: 173); *-ssr- became /fr/, in for example, **tefra** ‘burnt offerings’ (IIa 27) <*tessro-* <*tepsro- (Meiser 1986: 97); and *-nss- became /f/ alone, in for example, **spafu** (**fust**) ‘should be spread/ thrown’ (Va 20) <*spānsso- <*spāntto- (Meiser 1986: 164). The loss of *-n- before the fricative resulting from *-ss- shows that the reflex was voiceless (Meiser 1986: 56), and thus that *-ss- first became a voiceless labial fricative. If at the same time *-f- from *-bh-/*-dh-/*-g^wh- was voiced, there would have been a contrast between [f] and [β] in a small number of words, which was lost by the historical period. The treatment of these clusters with *-ss- shows that the assumed voiced fricative allophone [β] of Umbrian /-f-/ could go back to

¹⁴⁴ The earliest appearance of the word is in Livy (9.41.13).

¹⁴⁵ While the stem in Etr. **mefanate** is a loan from Italic, the implied voicing of /f/ (from the use of Etr. <f>) could be a result of Etruscan phonetic processes. The voicing noted by <V> in Latin *Mēuānia*, on the other hand, is unlikely to have been caused by a Latin voicing of /-f-/ and so may be attributed directly to the Umbrian source.

¹⁴⁶ The late merger of /w/ and [β] from /f/ would be confirmed by the Etruscan representation of an Umbrian name derived from Lat. *scaevus*, **scefi(a)** (Pe.1.63) (see 128–31).

a sound which was once voiceless, and therefore, that the voiced reflexes of the voiced aspirates could continue an earlier voiceless fricative stage.

While in the historical period word-internal /f/ does not occur in a voiceless context, we can reconstruct certain environments where it would have occurred, and might have been voiceless [f]. The dat./abl. pl. marker from **-bhos* ends up as /-s(s)/. **-bh-* became **-f-*, but after final-syllable syncope, **-f-* assimilated to **-s*: **-bhos* > **-fos* > **-fs* (cf. O. *-fs*) > **-ss*. Whatever the status of voicing of **-f-* between vowels, in the cluster **-fs*, **-f-* was probably voiceless.¹⁴⁷ Another probable voiceless context where **-f-* is reconstructed is in clusters before **t*. The primary cluster **-pt-* (<**-bht-*) became **-ft-*, and then /ht/, later /Øt/ with compensatory lengthening. This was also the treatment of the secondary cluster **-pt-* <**-bt-* after syncope. We may probably also assume that this was the development of the secondary cluster **-ft-*, where **-f-* was from **bh*, **dh* or **g^wh* (Meiser 1986: 180).

Since PIE did not permit word-final voiced aspirates, we do not expect /-f/ to be a reflex of a voiced aspirate except where a final vowel has been lost by apocope, as in *ef* 'go!' (VIa 4) <**idhi*. In general, final /f/ is the reflex of word-final **-ns*; Meiser (1986: 98f.). The loss of final /-f/ may suggest that /f/ was pronounced as a voiced fricative [β] in final position (Meiser 1986: 276f.). If so, this would be paralleled by the change of final /-s/ to /-r/ which is attested in the Umbrian texts (see Meiser 1986: 277f.).

3.7.3.2 /h/ in Umbrian

The main reflex of **gh* in word-initial and word-internal position is represented by <h H>. In word-initial position, <h H> represented /h/. In word-internal position the use of the signs in both alphabets to represent vowel hiatus and vowel length indicates that /h/ was lost early in the historical period. /h/ does not ever seem to have occurred in word-final position. As in many Italic languages, for most of the historical period, Umbrian /h/ only contrasted with other phonemes in word-initial position. In the fricative series, /h/ contrasted with the labial /f/, alveolar /s/, palatal /š/, and retroflex /ř/. /h/ was the guttural fricative alongside the velar stops /k/ and /g/.

There is no direct orthographic evidence as to the pronunciation of Umbrian /h/, and the variation in sign shape which does occur is not phonetically significant. The correspondence of native alphabet <h> to Latin <H>, and the derivation of the sign from the Etruscan letter <h> (from Gk <h>) suggests that /h/ was a voiceless glottal fricative [h]. This value seems appropriate for initial /h/, but intervocalic position, /h/ may have been a voiced glottal fricative [ɦ], at least before its loss during the early historical period of Umbrian (inferred from the similar change in Latin; Allen 1978: 43, 45).

¹⁴⁷ /-s(s)/ resulting from **-fs* does not undergo final rhotacism (Meiser 1986: 153).

In word-initial position Umbrian /h/ is only found before a vowel, and of those words with possible etymologies, most go back to initial *gh-. If *honda* (e.g. VIb 60) is from *ghundetōd, Umbrian, like Faliscan, shows /h/ for *gh- before all vowels, including *u (cf. Lat. /f/ for *gh- before *u). The one word which does not continue a root with *gh is **hapinaf** ‘lambs’ (e.g. Ia 24). If this is cognate with Lat. *agnus*, Gk ἀμνός < *ἀβνος, and from *agʷnos ‘lamb’, /h/ must be explained as an analogical extension from another root; Meiser (1986: 286). In word-initial position, and probably also syllable-initial position, /h/ was probably realized as [h], and seems to have been quite stable. Bar one instance, <h H> is always written. There is, however, a tendency for syllable-initial /h/ to be lost when the first part of a compound ended in a consonant; so e.g. *anostatu* (VIIa 48) ~ *anhostatu* (VIb 60)/*hostatu* (VIb 59); **erarunt** (IVa 1) ~ **erahunt** (Ib 23); Meiser (1986: 285–6).¹⁴⁸ The single omission of initial <h> in **eretu** (IIa 4), beside usual *heritu* (e.g. VIa 27), may also be explained in this way, if we take **neip(h)eretu** as a virtual compound (Meiser loc. cit.).

In word-internal position, /h/ was probably lost by the time of the earliest Iguvine Tables (III/IV, second half of the third century BC). This may be inferred from the use of the letters <h> and <H> as orthographic markers for vowel hiatus and vowel length in these early Tables, which suggests that /-h-/ was lost shortly after the introduction of writing.¹⁴⁹

In the native alphabet <h> in intervocalic position either represents the reflex of intervocalic *-gh-, for example, **kukehes** ‘should take’ (III 21) if from *konkaghess, or marks vowel hiatus, for example, **pehatu** ‘should purify’ (III 3) < *pīyātōd. Intervocalic *-gh- became /h/, perhaps voiced [ɦ], which was written with <h>. After the two vowels were no longer separated by [ɦ], but only by a brief hiatus (or a severely weakened pronunciation), still written <VhV>, the letter <h> could be extended to mark vowel hiatus in general. Latin alphabet <H> was also used to mark vowel hiatus, e.g. *stahu* ‘I stand’ (Um 11) for /stāʔō/, but was additionally used in the sequence <V₁HV₂> (where V₁ = V₂) to mark vowel length, e.g. *sehemu* (VIb 36) beside *semu* (VIb 16), of unknown meaning (for lists of the evidence, see Meiser 1986: 137–42). This convention represents a further stage in the loss of intervocalic /h/. Presumably the use of <VHV> to mark length originated in cases, such as *cehefi* (VIa 20) where *-gh- became /h/ [ɦ], then Ø, between two like vowels, which subsequently contracted to a long vowel, represented by <EHE>. After such an example, the sequence <VHV> could then be extended to represent any long vowel.

As for intervocalic /h/, /h/ arising from clusters with *-t- was also lost during the early historical period of Umbrian. The primary cluster *-kt- became /ht/ in

¹⁴⁸ It is unclear why Meiser (1986: 29) dates this loss to ‘spätaltumbrisch’ (first half of the second century BC; p. 12), when the earliest example of this (**erarunt**) is from Table IV, which probably dates to before the second century (altumbrisch).

¹⁴⁹ The earliest forms attesting <h> are too obscure to identify precisely what the letter represents: **aha(I)**, Um 16 (see Rix 1971: 177, n1, Rix 1983: 105; **reh**, Um 34).

Umbrian, for example, **rehte** (Va 24) ‘correctly’ < **rektēd* (Meiser 1986: 92–3). This development is also supposed for the primary cluster **-pt-*, e.g. **screihtor** (VIa 15) ‘written’ which probably goes back to common Italic **skripto-*, cf. Lat. *scrīpto-*, with **-pt-* from **-bht-*, and for secondary **-pt-*, if **hahtu** (IIa 22) ‘should take’ is from **habitōd* (as Meiser 1986: 178).¹⁵⁰ Before /t/, /h/ was lost with compensatory lengthening of the preceding vowel. This is clear from the omission of <h H> where /h/ is expected, e.g. **etuřstamu** (Ib 16), **eturstahmu** (VIb 53) ‘should drive out’ (see list in Meiser 1986: 32), from spellings indicating a long vowel, for example, **eheturstahamu** (VIb 55), and from the subsequent use of <Vh> to mark vowel length in general (see Meiser 1986: 31, 272f.). The loss of /h/ and subsequent vowel lengthening must have taken place after the introduction of writing. **-Vht-*, noted *<Vht>, became **-t-* with compensatory lengthening of the preceding vowel but still written <Vht>; the sequence <Vh> (and subsequently <VH>) was then extended to mark long vowels in general, in any position of the word (for a list, see Meiser 1986: 30–1). Vowel length, however, was not always represented in Umbrian, nor is etymological /h/ always found where expected. Analysis of the spelling conventions across the Tables in the native alphabet shows that different sections of the text in the Tables use different conventions, yet within these sections the practice is relatively consistent (Meiser 1986: 272f.). Since the earliest Tables, III and IV, both use <h> for vowel length, it seems probable that /h/ was lost before /t/ before the engraving of III/IV, that is, before the mid-third century (Meiser 1986: 290). There is no evidence from the earlier short inscriptions that can date the loss more precisely.

3.7.3.3 Umbrian palatalization and *gh

In Umbrian the inherited velars **k* and **g* were palatalized before a front vowel or **l*; see for example, Meiser (1986: 200f.). In general, **gh* became /h/ also before front vowels (e.g. **heries**, VIIa 52; **kukehes**, III 21, with no obvious palatalization). The only evidence for palatalization of **gh* is **-veitu** /weytu/ (IIa 12) < **-weghetōd*, where the outcome of **gh* before **t* after internal syncope is the same as that for **k* and **g* in the same position. The evidence of **-veitu** suggests that intervocally the reflex of **gh* was palatalized along with **k*/*g*, and we may probably assume that in word-initial position too, the reflex of **gh-* also showed palatalized allophones before front vowels. If the front vowel was retained, the palatalized allophone lost its palatalization and became a glottal fricative, falling together with the other reflexes (Meiser 1986: 206). Only if the front vowel was lost via syncope (before **t*) did the reflex continue to be involved in the process of palatalization, falling together with those of **k*/*g*.¹⁵¹

¹⁵⁰ The change of **-pt-* to /ht/ may have taken place via a stage **-ft-*, given the Oscan treatment of this cluster; cf. O. *scriptas* (Lu 1:25) (Meiser loc. cit.).

¹⁵¹ **fiktu** (Ia 28) < **dhinghetōd* shows that this process was blocked by a preceding nasal.

3.7.3.4 *Before/after *r in Umbrian*

If we accept Katz (1998), Umbrian is the only Sabellic language to show evidence for a conditioned change of *-gh- to /f/, [-β-] after *r in **urfeta** (Iib 23).¹⁵² This is similar to the development of *-g^wh- in general and before *r, for example, **vufuru** (e.g. Iib 21) <*H₁wog^whro-.

3.7.3.5 *Clusters with nasal in Umbrian*

While Oscan has only indirect evidence of *-b- from *-bh- after a nasal, Umbrian is the only Italic language other than Latin to show direct evidence for the development of the voiced aspirates following a homorganic nasal. *bh, *dh, *gh seem to appear as <p B>, <D>, and <k G>, representing the voiced stops /b d g/, probably [b d g], respectively. At first glance this treatment looks similar to that of Latin, but while in both cases the treatment was conditioned by the preceding nasal, another development within the Umbrian consonant system indicates that the change was probably not shared with Latin, and so cannot be regarded as a common Italic development.¹⁵³

The evidence for *-mbh->/mb/ is unproblematic: **kumpifiatu** (Ib 14), **com-bifiatu** (VIa 17) <*kom-bhidh-yā-tōd; **amboltu** (VIb 52) continuing *H₂m̄bhi-. Other changes in the consonantal system suggest a relative chronology for the change (see Meiser 1986: 77). In Umbrian, inherited clusters of *-mb- are assumed to have become *-mm-, and this included clusters of *-mb- from *-ng^w-, the only example of which is **umen** ‘nail’ (e.g. Iia 19) <*ong^wᵛ, cf. Lat. *unguen* (Meiser 1986: 94; Untermann 2000: 796). The stage *-mb- (<*mbh-) can only have been reached after this assimilation had taken place, and since the change of labiovelars to labials dates to common Sabellic, this puts the final stage to the common Sabellic period or later. If we can extend this to all places of articulation, we may assume that the final stage of ‘nasal + stop’ was only reached after the assimilation of primary clusters of ‘nasal + stop’.

The evidence for the treatment of *-ngh- [ŋgh]>/ng/ [ŋg] is also straightforward, if we can take **krenkatrum** (Ib 11), **cringatro** (VIb 49) from *krenghatro-. (a)**fiktu** (e.g. Ia 28), if from *dhinghetōd is less so, as <k> in (a)**fiktu** could represent either /k/ or /g/. Meiser reads **fiktu** as /fénktu/ assuming a development *dhinghetōd>*féngetōd>*fénktud>/fénktu/, with devoicing of *-g- before *t. While secondary clusters of voiced stops before *t do show devoicing,¹⁵⁴ the only example of a cluster where the voiced stop is preceded by a nasal does not: **-uendu** (VIIa 27) if from *wendetod (<*wendhetōd), has <ND> for the outcome

¹⁵² Oscan would seem to show /h/ here, but the evidence for this treatment is very uncertain.

¹⁵³ Cf. Allen (1958: 109). Meiser (1998: 104) himself suggests that the development is ‘beraits uritalisch’ in his most recent statement. However his etymology for Lat. *unguen* with reference to U. **umen** on p. 100 makes this unlikely.

¹⁵⁴ The best example is **hahtu** (Iia 22) <*habitōd, assuming *-bt-> *-pt-> *-ft-> /ht/> /Øt/ (Meiser 1986: 178).

of **-nd(e)t-* (Meiser 1986: 180). Thus it is possible that **fiktu** represents /fɛngdu/, and <k> is for /g/.

The evidence for the treatment of **-ndh-* is less clear than that for **-mbh-* or **-ngh-*. This is *-uendu*, which is probably from **-wendhetōd*, perhaps via **wendetōd* (e.g. Meiser 1986: 180). The difficulty is that <ND> does not directly represent the outcome of **-ndh-*, but rather the outcome of **-ndh(e)t-*. **-ndh-* could have become **-nd-*, which in a secondary cluster with **t*, **-ndt-*, would have given /nd/, or alternatively, **-nd-* (<**-ndh-*) could have assimilated to **-nn-*, and then the secondary cluster **-nnt-* could have yielded /nd/. Beside the development of **-mbh-* to **-mb-* we might well assume a development of **-ndh-* to **-nd-*, but probably not a further assimilation to **-nn-* (*contra* Meiser 1993: 261). Nevertheless, while we cannot be clear about the stages of the development between **-ndhet-* and /nd/, *-uendu* does show clearly that after a nasal **-dh-* did not merge with the reflex of **-bh-* and become /f/, and thus that **-dh-* showed a conditioned development in this environment.

3.7.3.6 Clusters with **s* in Umbrian

Again, Umbrian would be the only Italic language apart from Latin to attest the development of **-sdh-* [-zdh-], which appears as <ST>, if we can believe that for example, *hostatu* (VIb 59) is from **ghasdh-*. <ST> represents /st/, probably [st], and so as in Latin, we find a voiceless reflex of this cluster.

3.7.3.7 Clusters with **t* in Umbrian

Umbrian also shows evidence for the treatment of the clusters **-bht-* and **-dht-*. **-bht-* appears as <HT> in *screhto* (VIIIb 3), *screihtor* (VIa 15) with <H> as a length marker for the long vowel after /h/ was lost with compensatory lengthening; Meiser (1986: 272). Comparison with Oscan and Latin forms, *scriftas*, *scriptus*, points to a common Italic stage **-pt-*, which became **-ft-* in Sabellic and then /ht/ in Umbrian. It seems likely that Umbrian /h/ from **-f-* (<**-p-*) was voiceless [h] before /t/.

Neither form attesting the Umbrian treatment of **-dht-* is particularly certain. If the etymologies are correct, **ufestne** (IV 22; <**op-bhedh-to-*) suggests a development to <st> for /st/ [st], and **fise** (e.g. Ia 15; <**bhidh-tu-*) a change to <s S> for /s/.¹⁵⁵ The apparent lack of regular reflex is similar to the Latin treatment of **-dht-*, which shows the same pair of reflexes. The development to /s/ is the same as that of an original ‘dental + dental’ cluster in Umbrian, cf. for example, the perfect stem in *sesus* ‘should sit himself’ (VIa 5) which may go back to **se-sd-us-e-t* or **sed-us-e-t*, both to **sed-* ‘sit’, cf. Lat. *sedeo* (Untermann 2000:

¹⁵⁵ The lack of rhotacism in **fise** shows that the Proto-Umbrian, and perhaps common Sabellic reflex of **-dht-* was voiceless **-ss-*.

681–2). I assume that (as in Italic generally) all reflexes of voiced aspirates in clusters with *t were voiceless.

3.7.3.8 *The treatment of *-s- in Umbrian*

It is very likely that the reflexes of the PIE voiced aspirates in word-internal position were voiced in Umbrian. I consider now the Umbrian treatment of *-s- word-internally to see whether it would make sense to assume that these voiced reflexes could have arisen from earlier voiceless fricatives which underwent a common Italic process of voicing.¹⁵⁶ Of primary importance are the treatments of *-s- intervocalically and adjacent to a liquid.

In intervocalic position, PIE *-s- shows a voiced reflex in Umbrian appearing as /r/ (e.g. **eru**, Va 26, *erom*, VIII 2 ‘to be’ <*es-om; Meiser 1986: 239f.).¹⁵⁷ The appearance of /r/ for *-s- in both Latin and Umbrian suggests that the voicing of *-s- to [z] took place during a common Italic stage, and this is supported by the evidence of Oscan, and perhaps also Faliscan. As in Latin, the actual merger of [z] to /r/ in Umbrian was relatively late (Meiser 1986: 240–1).

The treatment of *-s- in a primary cluster with a liquid is attested for only one cluster, *-rs-, which became /-rs-/, for example, *tursitu* ‘should drive away’ (Vib 60) <*torsetōd (Meiser 1986: 172; <*torseyetōd, Untermann 2000: 777). There are no indications to suggest that /s/ in the resulting cluster was voiced. While it could conceivably have become voiced during the historical period of Umbrian, /s/ in this position cannot have been voiced in either common Italic or common Sabellic, otherwise the cluster would have merged with the secondary cluster *-rs-, which was [-rz-], and which showed a different treatment, to /-rf-/ (e.g. **parfam**, Ib 13, <*paresā-). The Umbrian treatment of primary *-rs- shows that while *-s- seems to have become voiced intervocalically during common Italic, we cannot assume that *-s- also became voiced adjacent to a liquid. The voiced reflexes which are observed in Latin and Oscan for these clusters must be language-specific innovations, and cannot be the result of a process of voicing during common Italic.

The implications of this evidence are significant for an explanation of the development of the PIE voiced aspirates which assumes an Italic voiceless fricative stage. While a common Italic voicing can be proposed for fricatives generally in intervocalic position, it is not possible to assume such a process for fricatives adjacent to a liquid. All the Italic reflexes of the voiced aspirates in word-internal position show voicing both between vowels *and* before/after a liquid. Any explanation that wanted to propose a voiceless fricative stage, which then became voiced, would presumably require a general common Italic voicing

¹⁵⁶ As in Oscan, there are no reasons for proposing a late process of voicing which took place in Umbrian alone, to account for voiced reflexes of the voiced aspirates. The late voicing of stops observed in Umbrian is not relevant here, and does not seem to reflect a common process; for discussion (cf. Meiser 1986: 162).

¹⁵⁷ Intervocalic /s/ in Umbrian is usually the reflex of *-ss-.

of fricatives between vowels and adjacent to a liquid. The Umbrian treatment of **-rs-* shows that such a process cannot be assumed. Instead, one would have to assume a two-stage voicing, the first in common Italic that affected all intervocalic fricatives; and the second in the individual languages that, in most, affected the fricative reflexes of the voiced aspirates and **-s-* adjacent to a liquid; but in Umbrian only the reflexes of the voiced aspirates.

3.7.4 The development of the PIE voiced aspirates in Umbrian

Main (unconditioned) changes in Umbrian

word-initial position

- **bh-* > <f F> /f/ [f]
- **dh-* > <f F> /f/ [f]
- **gh-* > <h H> /h/ [h]
- **g^wh-* no evidence

Conditioned changes:

After a nasal:

- **-bh-* > <p B> /b/ [b], after **m*
- **-dh-* > <D> /d/ [d], after **n*
- **-gh-* > <k G> /g/ [g], after **n* [ŋ]

word-internal position

- **-bh-* > <f F> /f/ [β]
- **-dh-* > <f F> /f/ [β]
- **-gh-* > <h H> /h/ [fi]; /h/ > Ø
- **-g^wh-* > <f F> /f/ [β]

*clusters with *s:*

- **-sdh-* [-zdh-] > <ST> /st/ [st]

*clusters with *t:*

- **-bht-* > **-pt-* > **-ft-* > <HT> /ht/ [ht] > [t]
- **-dht-* > <S> /s/ [s]; <ST> /st/ [st]

The main treatment of the PIE voiced aspirates in Umbrian is similar to that found in Oscan and in the earliest Sabellic inscriptions. I also assume a similar distribution of the reflexes, voiceless word-initially and voiced word-internally, though I note that the evidence is either indirect and/or late. After Latin, Umbrian has the most evidence for conditioned treatments, showing evidence of clusters with a nasal, and with **s* and **t*. While it would seem to make sense to assume that the conditioned treatment following a nasal goes back to common Italic, another (secure) change makes it difficult to assume a shared change to voiced stop in this context. Umbrian also supplies surprising, but important support for the proposal of a common Italic voicing of fricatives. In Umbrian PIE **-s-* became voiced intervocalically, but not in primary clusters with a liquid (e.g. **-rs-*). The voiced word-internal reflexes of the voiced aspirates in Italic occur both intervocalically and adjacent to a liquid. If an earlier voiceless fricative stage is assumed, the historical voicing of the Italic reflexes cannot easily be explained by postulating a general process of voicing of word-internal fricatives in common Italic. A general intervocalic voicing could have happened at an early stage, but voicing adjacent to a liquid must have taken place independently in each Italic language.

3.8 The Evidence of the Minor Dialects

I conclude my survey of the evidence for the PIE voiced aspirates in the Sabellic languages by considering the 'Minor Dialects': Paelignian, Marrucinian, Vestinian, Sabine, Marsian, Aequian, Hernican, and Volscian.¹⁵⁸ The scanty remains of these languages, also called the 'Sabellian languages' (e.g. Wallace 1984), exist in some eighty inscriptions from central Italy, written in various versions of the Latin alphabet, occasionally with additional characters. Most inscriptions date to the second or first century BC, but a few are earlier, from the third or fourth century BC.

The languages themselves are named after the Roman names for the tribes which occupied the areas in which the inscriptions were found (*see* Map in Fig. 3.9).¹⁵⁹ We cannot be certain that the spread of the languages and the tribal areas coincided exactly, and there are a few inscriptions which, though found in one region, seem to show the language of another. The evidence of most of the languages is scanty and obscure, and often shows strong Latin influence. More information about these languages can be gleaned from a small number of glosses, and from a few Latin inscriptions which show some dialectal influence.¹⁶⁰

Within Italic, the Minor Dialects are generally taken together, and classified with Oscan and Umbrian as Sabellic. The similar treatment of the PIE voiced aspirates in word-internal position is one of the main reasons for this grouping. Further sub-classification of the languages is disputed. The traditional view is that Paelignian, Marrucinian, and Vestinian were closely related to each other and Oscan (perhaps even developments of a northern dialect of Oscan, so e.g. Vetter 1953, Durante 1978), while Marsian and possibly Aequian and Sabine, together with Volscian (if not to be considered separately: Conway 1897, Vetter 1953) were nearer to Umbrian. There have been two recent attempts to readjust the position: the first by Coleman (1986), who assigns Volscian to 'Oscanic' and Vestinian to 'Umbrianic'; and the second by Meiser (1987*a*), who, following an idea of Marinetti (1985: 43f.), suggests that the 'nordoskisch' group (Paelignian, Marrucinian and Vestinian) are not latinized versions of Oscan (e.g. Durante 1978: 803–4), but rather 'oscanized' versions of earlier 'Umbro-Sabine' dialects, such as South Picene. More recently, Rix (2000: 4f.) follows Adiego-Lajara (1992) in taking Paelignian, Marrucinian and Vestinian together with Oscan, and Marsian, Aequian, Sabine and Volscian with Umbrian, returning to the traditional groupings.

¹⁵⁸ For a recent detailed discussion of these languages, *see* Wallace (1984); *see also* Durante (1978); Coleman (1986). For more details of the lexical evidence, *see* Stuart-Smith (1996: 108–24).

¹⁵⁹ For discussion of the historical background, *see e.g.* Salmon (1982).

¹⁶⁰ For lists of non-Latin personal and place names from these regions, *see* Conway (1897).

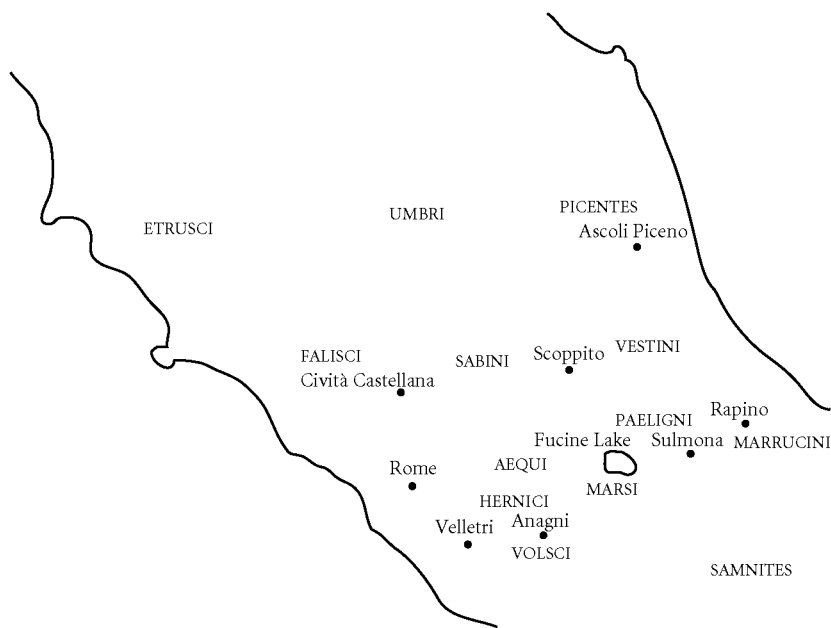


FIGURE 3.9 Map of central Italy showing approximate locations of the tribes of central Italy

3.8.1 *Paelignian*

Paelignian territory was situated in the mountainous area to the east of the Fucine lake, with the chief settlement at Sulmo (modern Sulmona). Paelignian is the best represented of all the Minor Dialects:¹⁶¹ Pg 1–59.¹⁶² The inscriptions date from the third to the first century BC, but most are from the second half of the second century to the first half of the first century. Most texts are short, and are either dedications or epitaphs, containing little more than personal names (*see* Poccetti 1982).¹⁶³ The two most recent inscriptions, however, are more substantial, the poetic epitaphs (Pg 9, 10). Of these, the ‘Herentas’ inscription (Pg 9) provides us with the longest Paelignian text. The language of this text is unusual, since it contains a number of features which are characteristic (or ‘hypercharacteristic’) of both Oscan and Umbrian. Meiser’s explanation (1987a: 123–4) seems the most likely: the text is probably the result of a conscious

¹⁶¹ A detailed treatment of Paelignian may be found in Zamudio (1986). *See also* Wallace (1984: 76–99); Meiser (1987a); Coleman (1986: 102–7); Durante (1978: 793–804).

¹⁶² I do not take MV 3 and 7 as Paelignian (as Zamudio 1986: 43–4), but consider them Marrucian (*see* note 167).

¹⁶³ The nature of a number of texts is disputed; Pg 12, 13, 14, 16, 18, 19, 20 are taken as dedications by Vetter, but epitaphs by Poccetti (1980: 1985) and Rix (2002). p. 1 is a public building inscription.

attempt to write ‘Paelignian’. The author used elements from co-existing varieties of Paelignian, and added an invented letter, and archaisms (sometimes incorrect), to distance the language from Latin. As a result, most forms from these two inscriptions have to be regarded with some caution.

3.8.1.1 *Paelignian: The lexical evidence*

3.8.1.1.1 *PIE *bh in Paelignian*

Only two forms—both for word-internal position—may be considered secure evidence for *bh: (a) *pros* ‘honest’ (Pg 10) is usually taken from **probh(w)o-*, from the root **bheuH₂-* (cf. O. *amprufid* Lu 1: 30), U. **prufe** (Va 27), and (b) *seffe* for *sefei* ‘to her’ (Pg 4) is from **sebhei* (cf. O. **sifei** Cp 36). A few other forms are less certain. The name *alafis* (Pg 2) may belong with U. **alfu** (Ib 29) and go back to **albho-* (Untermann 2000: 80), while *uus* (Pg 9) may be semantically equivalent to Lat. *uōbīs* ‘to you (plural)’ (<**uōbeis*) but be from **wōbhos* with the nominal dat./abl. ending as in Oscan **-fs/-s**, U. **-s** (Untermann 2000: 865–6). *lifar* (Pg 9) is much more difficult, and may continue **-bh-* if from **lifār*, a present passive subjunctive to a verb **lif-* from **lubh-*, cf. Lat. *libet* ‘be pleasing’, or **-dh-* if cognate with Lat. *liber* and from **H₁leudheros*, cf. Fal. **loferta** (LF 121 I/Ve 322a) though with some contamination (Untermann 2000: 430–1).

The evidence for the treatment in word-initial position is uncertain and possibly from the single root **bher-* (see Lat. *ferō*), if the words are not adaptations of Latin words: the words are *fertlid* ‘fertile’ (Pg 9), possibly from full grade **bher-* and *forte(s)* ‘fortune’ (Pg 10), from the phrase *forte faber* (cf. Lat. *faber est quisque fortunae suae* ‘each is a craftsman of their own fortune’), which may be cognate with Lat. *fors* ‘chance’ and from the o-grade **bhor-* (Zamudio 1986: 97) or zero-grade **bh_ɹ-ti-* (Untermann 2000: 304).

I do not accept the following forms as evidence. The abbreviation *f* (e.g. Pg 46) is an abbreviation for Latin *filius* ‘son’. The name *alpis* (Pg 5) may be connected with ‘Sabine’ *alpus*, and be from **albh-*, but a direct derivation is unlikely; see Sab. *alpum. firata* (Pg 9) is uncertain in meaning and etymology (Untermann 2000: 285).

**bh* appears to become <F> in Paelignian, with a possible further development to <S> in the endings **-fs* following final syncope.

3.8.1.1.2 *PIE *dh in Paelignian*

Again, the treatment of **dh* in Paelignian is to <F>. *fesn(am)* ‘temple’ (Pg 2), from **dheH₁s-nā-* (see O. **fiisnú** Cm 1B4) provides the only good evidence for word-initial **dh*, while *ecuf* ‘here’ (Pg 10) probably from **ekō-dhi* (e.g. Zamudio 1986: 99) (see O. **puf** (Po 34) and *loufir* ‘free’ (Pg 11) from **H₁leudheros*; see on **bh* above) supply the firm evidence for **dh* in word-internal position.¹⁶⁴

¹⁶⁴ If *lifar* (Pg 9) is also from the same stem, we must assume that the difference in form is due to conscious alterations typical of the Herentas inscription.

Other forms which may continue **dh* are less certain. *famel* ‘slave’ (Pg 11) probably belongs with U. *famel*, Lat. *famulus*, and may go back to **dheH₁-m-elo-* (see O. *famelo* Lu 1:22). *faber* (Pg 10) on the other hand is probably from **dhabros* (e.g. Untermann 2000: 254), but may be a Latin loan, given its context (the proverb *forte faber* is probably modelled on a Latin original, see above). *rufries* (Pg 47) looks as if it is a name in **-iyo-* to the stem **rudhro-*, from the root **reudh-* (see Lat. *ruber* (Zamudio 1986: 99)). The meaning of *pristafulacirix* is unclear, but the morphology seems easier to explain; the form looks like a hyperdialect form of a word formed to the stem **stafilā-* ‘set up’, which is attested elsewhere in Sabellic, cf. for example, O. **staflatas** (Cp 24) and goes back to **stH₂dhlo-*, to the root **steH₂-* with the suffix **-dhlo-*.

3.8.1.1.3 PIE **gh* in Paelignian

Only the treatment of word-initial **gh-*, to <H>, is attested. Two forms which seem fairly secure are the goddess’s name *herentas* (Pg 9), probably a present participle to the Sabellic root **her-* from **gher-* also found in O. **herentateis** (Cm 10) and *hospus* ‘hospes’ (Pg 11) which is taken from **ghosti-potis*, cf. Lat. *hostis, potis*, Got. *gasts* (Untermann 2000: 335). The name *heleuis* (e.g. Pg 37) is less certain, though it may be from **ghelswo-*, cf. O. **heleviis** (tSa 41; Zamudio 1986: 99). The etymology of *hanustu* (Pg 9) is too uncertain for the form to be considered evidence.

3.8.1.1.4 PIE **g^wh* in Paelignian

Unlike Zamudio (1986, 100), who takes *firata* (Pg 9) from **g^whislo-* (but see Untermann 2000: 285), I do not consider there to be any evidence for the treatment of **g^wh* in Paelignian.

3.8.1.2 Paelignian: From orthography to phonetics

Paelignian is the only Minor Dialect whose full consonant system, and its representation in the Latin alphabet, may be summarized (see Table 3.6 Zamudio 1986; Meiser 1987a).

3.8.1.2.1 /f/ in Paelignian

<F> notes the reflex of **bh* and **dh*, and represents the labial fricative /f/, which contrasted with labial /p b w/. In the fricative series, /f/ was distinct from the alveolar /s/, the glottal /h/ (word-initial position; /h/ is not attested word-internally), and the palatal /ʃ/ word-internally.

The representation of /f/ with Latin <F> could suggest that the pronunciation of the Paelignian sound was as a voiceless labiodental fricative [f]. The phonemic oppositions in Paelignian allow for the assumption of both voiceless and voiced realizations. I suspect that <F> may have represented both [f] and [β], partly given indirect evidence such as the Paelignian use of <S> for [z] (for /S/ and /-s-/) and the inferences which we can draw from the Oscan evidence,

TABLE 3.6 The consonants of Paelignian

	<>	//	<>	//	<>	//	<>	//
vless stops	P	p	T	t			C	k
vd stops	B	b	D	d			C/G	g
fricatives	F	f	S	s	S/Ð	ž	H	h
liquids			L	l	R	r		
nasals	M	m	N	n				
glides	V	w	I	j				

Notes

- 1 <C> represents both /k/ and /g/ (cf. e.g. Zamudio 1986: 96). Beside /f/ and /s/ Paelignian also seems to show another fricative (?affricate), noted here as /ž/, represented by <S>, and in Pg 9 by a novel letter <D>, probably invented for this inscription in an attempt to demonstrate the independence of Paelignian from Latin (e.g. Meiser 1987a: 123). /ž/ continues the palatalized reflex of *-dy-, possibly an affricate [dz] in e.g. the name *petiedu* (Pg 9) <*petiedyā (cf. Lat. *Petiedia*) given the use of an adapted form of <D>, which then became a voiced fricative [z] noted by <S>, cf. the name *musesa* (Pg 12) <*musedyā (cf. Lat. *Mussedia*); cf. e.g. Coleman (1986: 103); Zamudio (1986: 50–3).
- 2 The cluster /ks/ was noted by <X>.

and partly from direct evidence for the possible value of <F> in Paelignian. This is found in the form *afded* (Pg 9) which shows <F> for expected , in *af-* for *ab-*; cf. inscriptional Latin *af* for *ab* (see Vine 1993: 188). It seems likely that <F> here represents a fricative pronunciation of /b/, [β], which arose first in Latin through assimilation of /b/ with *w and *l when the preposition *ab* occurred before words beginning with these consonants. The variant *af*, pronounced [aβ] before a voiced consonant and [af] before a voiceless one (Ernout 1909: 92f.), was then generalized to all contexts. Paelignian *afded* may be an example of such a generalization, with <F> for [β] (/b/) before voiced /ž/, and if so, demonstrates that <F> could also have been used to represent a voiced pronunciation of /f/. Given the allophonic distribution of /f/ in Oscan and Umbrian, we may suppose that /f/ in Paelignian showed a similar distribution: voiceless [f] word-initially and in a voiceless context word-internally, and voiced [β] in a voiced context word-internally.

In word-initial position, /f/ only occurs before a vowel, and continues *dh- in words of secure meaning and etymology. Word-internally, /f/ is found between vowels and adjacent to a liquid (or /ž/), or in a voiceless context, before /t/. Between vowels, Paelignian /f/ is from intervocalic *bh and *dh, and also from *bh and *dh adjacent to *l (*alafis*, Pg 2; *pristafalacirix*, Pg 9). Paelignian, like Oscan, showed anaptyctic vowels arising from clusters of consonant with liquid or nasal. The majority of inscriptions show that anaptyxis regularly occurred when the liquid/nasal preceded, but not when it followed; thus *alf- became /a^lf-, but *ruf-* /ruf- remained. Only the Herentas inscription shows anaptyxis in clusters of consonant followed by liquid (*pristafalacirix*, *sacaracirix*: Pg 9), but the peculiar double anaptyxis, together with other oddities of the inscription,

make it likely that these forms are consciously created archaisms (cf. e.g. Durante 1978: 802–3). /f/ in *cerfum* ‘of Ceres’ (Pg 9) is found after /r/ without anaptyxis, but again *cerfum* is from the Herentas inscription, and may perhaps be an Umbrian-like element in the text, with /rf/ for secondary *-rs- rather than the regular outcome /rr/; cf. Meiser (1987a: 110). /f/ could also be voiceless in certain contexts word-internally. *pros* (Pg 10) and *uus* (Pg 9) both show <S> for /s/, probably [s], as the outcome for *-bhos. I assume that *-bh- became *-f-, which assimilated to /s/ in the cluster *-fs, formed after final-syllable syncope (see Zamudio 1986: 109). Again, before /t/, in the name *oftories* (Pg 48) < *optōri-yos, /f/ continues *-p-, and was probably voiceless [f] (cf. e.g. Oscan *-pt- > /ft/).

3.8.1.2.2 /h/ in Paelignian

Word-initial *gh is found in Paelignian as <H>, for /h/. /h/ is only found in word-initial position before a vowel, where it continues either *gh-, or Greek /h/ in *herec.* (Pg 2) ‘Hercules’ from the Greek loan *Ἡρακλῆς* (via an Etruscan intermediary).¹⁶⁵ The representation of /h/ with Latin <H> suggests that the sound was a voiceless glottal fricative [h]. There is no evidence for the development of *gh word-internally, nor is /h/ attested in this position. It is possible that the cluster *-ht- (< *-kt-) occurred at an earlier stage in Paelignian, but that as in Umbrian *h was lost, perhaps with compensatory lengthening, before our texts (see *aticus* (Pg 1) < *aktikōs and *sato* ‘sacred’ (Pg 12) < *sānktom (Meiser 1987a: 110; Meiser 1996: 204).

3.8.1.2.3 The treatment of *-s- in Paelignian

It seems possible that word-internally Paelignian /f/ < *-bh-, *-dh- was voiced. We find no direct evidence that PIE *-s- was voiced between vowels in Paelignian, as /-s-/ is represented by <S> without variation, but there are two pieces of indirect evidence to suggest this. The first is the use of <S> to note /ž/, which shows that <S> could represent a voiced fricative [z]. The second is the treatment of the secondary cluster *-rs-, which became regularly /(r)r/, in for example, *ceria* ‘of Ceres’ (e.g. Pg 12) < *kerez-yā-. The appearance of a voiced reflex makes sense if we suppose that *-s- in the cluster was already voiced, and that *-rs- was phonetically [-rz-]. Thus it seems likely that Paelignian showed a voiced allophone [z] for intervocalic *-s-, which was voiced at an earlier stage (see e.g. Zamudio 1986: 112). There is no evidence for the treatment of *-s- in primary clusters, so Paelignian taken alone allows the assumption of a general voicing of fricatives in common Italic.¹⁶⁶ As we have seen, however, the Umbrian

¹⁶⁵ <H> in the spelling of the names *Arghillus* (Pg 42) and *Char.* (Pg 39) probably represents the aspiration of the Greek aspirated stop /k^h/ (Pocchetti 1982: 335, 337).

¹⁶⁶ There is a hint that a voiced context could provoke voicing in Paelignian, in the spelling of the Greek name Ἀρχιλλος as *Arghillus*, which shows <GH>, rather than expected <CH>, for Gk /k^h/ after /r/ (Pocchetti 1982: 335, n30). This could only be relevant for an explanation of the voicing of the reflexes of the voiced aspirates as the result of a late process that took place specifically in Paelignian.

treatment of primary **-rs-* makes it difficult to assume a word-internal voicing in common Italic.

3.8.1.3 *The development of the PIE voiced aspirates in Paelignian*

<i>word-initial position</i>	<i>word-internal position</i>
<i>*bh-</i> no evidence	<i>*-bh-</i> > <F> /f/ ?[β]
<i>*dh-</i> > <F> /f/ [f]	<i>*-dh-</i> > <F> /f/ ?[β]
<i>*gh-</i> > <H> /h/ [h]	<i>*-gh-</i> no evidence
<i>*g^wh-</i> no evidence	<i>*-g^wh-</i> no evidence

3.8.2 *Marrucinian*

The territory of the Marrucini lay between that of the Vestini and the Samnite Frentani. The main evidence for Marrucinian is provided by the ‘Bronze of Rapino’ (MV 1), a short text of thirteen lines dating to the mid-third century BC, engraved on a small bronze tablet. The text appears to be a public decree of the Marrucinian people (*totai maroucai*), the details of which are somewhat obscure. There are also a few short inscriptions (MV 3, 4, 6, 8, 9),¹⁶⁷ which probably date to the second or first century BC.¹⁶⁸

Not surprisingly, the evidence for the treatment of the voiced aspirates is skimpy. For **bh-* we seem to have good evidence for <F> in *feret, ferenter* ‘carry’ (MV 1), from **bher-*, see Lat. *ferō* (Untermann 2000: 275f.), while for **gh-* we have the adjective *herentatia* (MV 6) derived from the stem of the goddess’s name attested in Pael. *herentas* from the root **gher-*. The position is less clear for **dh-*. The linguistic affiliation of *fec* ‘made’ (MV 3), cf. Lat. *fēcit* is often thought to be Latin (e.g. Durante 1978: 806), but could possibly be an abbreviation for a Marrucinian cognate *feced*, from **fak-yo-* (see O. **fakiiad** Cp 33) (see Untermann 2000: 259). As in Paelignian, *f* in MV 3 is probably the Latin abbreviation for *filius* ‘son’.

Thus we find <F> and <H> for **bh/dh* and **gh* respectively, presumably representing /f/ and /h/ respectively (voiceless [f] and [h] in word-initial position). /f/ is also found in *iafc* ‘this’ (MV 1), from **eyāns-ke*. Here /f/ is the outcome of the word-final treatment of **-ns*, as in Umbrian, and as is supposed also for Oscan (see e.g. Meiser 1987a: 110, with n40, after Rix 1986).

¹⁶⁷ MV 3 and 7 are probably Marrucinian rather than Paelignian (e.g. Wallace 1984: 100). Fr 12 may also belong here, if Wallace is correct in identifying the text as Marrucinian.

¹⁶⁸ For further discussion see Durante (1978: 804–7); Wallace (1984: 100–8).

3.8.3 Vestinian

The Vestini occupied a relatively large area from the Adriatic coast well into the mountains, bordered on either side by the Praetutti to the north and the Marrucini to the south. The evidence for Vestinian is meagre and consists of a very few short inscriptions (MV 2, 5, 7, 10–12), and one dialectal Latin inscription (CIL I² 756, 58 BC, Furfo).¹⁶⁹ It is difficult to decide which language VM 9 represents. The inscription is too short and too obscure to allow for a decision on linguistic grounds. Furthermore, Scoppito, where it was found, lies on the border between Sabine and Vestinian territory. VM 9 is usually considered Sabine (e.g. Vetter 1953: 160; Durante 1978: 793; Wallace 1984: 72; Meiser 1986: 2; Rix 2002: 66), but has also been taken as Vestinian (e.g. Conway 1897: 397; Salmon 1982: 187, n107, Coleman 1986: 110).

This disputed inscription provides the only secure piece of inscriptional evidence for a voiced aspirate, *bh-, in Vestinian (or Sabine), in *flusare* ‘belonging to Flora’, cf. Lat. *flōrālī*, from **flōsā-* from **bhleH₃s-*, see O. *fluusaī* (e.g. Po 20).¹⁷⁰ Other words have been mentioned in connection with voiced aspirates, but I do not accept them as possible here:¹⁷¹ the form *fifeltares* (CIL I² 756) is too uncertain to be assigned a reliable etymology (the first three letters have been added by a later hand); *hiretum* (VM 9) is obscure in form and meaning (e.g. Untermann 2000: 326); as is *aunom* from the same inscription (Untermann 2000: 135).

Whether Vestinian or Sabine, *flusare* provides the only evidence for the development of *bh- before a liquid in the Minor Dialects. <F> may be taken to represent /f/, which was probably a voiceless fricative [f] in word-initial position.

3.8.4 Sabine

If VM 9 is Sabine, it is the only inscription attesting the language of the Sabini, a tribe which was traditionally thought to be of Umbrian origin, and which lived in central Italy to the north of the Aequi. Very little is known about Sabine.¹⁷² There are a number of glosses ascribed to the language (Bruno 1961/2), but while these forms do show features different from Classical Latin, it is difficult to be sure that these features are particular to Sabine. Some forms are given as Sabine in one gloss, but Latin (‘archaic’ or ‘rural’) in another, and certain characteristics

¹⁶⁹ For further discussion of Vestinian, see Durante (1978: 807–9); Wallace (1984: 74–6); Coleman (1986: 110–11).

¹⁷⁰ This form also occurs in the Vestinian dialectal Latin inscription (CIL I² 756). I do not assume that the similarity of phrasing across the two inscriptions assigns VM 9 to Vestinian. *flusare* could have existed in several varieties of Sabellic, not just Vestinian, cf. e.g. O. *fluusaī* (Po 20).

¹⁷¹ *aidiles* in MV 2 is pure Latin in an otherwise dialectal inscription (Durante 1978: 808).

¹⁷² For discussion, see e.g. Durante (1978: 792–3); Wallace (1984: 70–4); Coleman (1986: 114–17).

which the forms show are also found in non-urban varieties of Latin (see Wallace 1984: 71).

The inscriptional evidence for the treatment of the voiced aspirates in Sabine necessarily coincides with that for Vestinian. If VM 9 is Sabine, then *flusare* from **bhleH₃s-* shows <F> for **bh-*, and *hiretum* and *aunom* are to be rejected. The evidence from glosses do not offer much more. Two forms seem to show <H> for **gh-*. *hirpus* for *lupus* ‘wolf’ (Serv. *ad Aen.* 11.785; ‘Samnite’ *irpum* in Paul. Fest. 93L) may be from **gherk^wos*, to the root **gher(s)-* ‘be stiff, bristle’ (Pk 445; LIV 158), cf. Skt *harsate* (Coleman 1986: 116), but there is the problem of how to relate another (?)Sabine form *fircus* (Varro *LL* 5. 97; ‘archaic Latin’ Varro in Vel. Long. *Gramm.* 7.69.8.fr.77), which would result in Sabine showing a double treatment of **k^w*. There is no easy solution: either the two words are not cognate (Coleman loc. cit.), or *fircus* is dialectal Latin and not Sabine at all.¹⁷³ *hernia* for *saxa* ‘stone’ (Serv. *ad Aen.* 7.684; ‘Marsian’ Paul. Fest. 89L) is another possible derivative of the root **gher(s)-* if from **ghersnā-*; Bruno (1961: 529–30). Two other forms show <F> for **gh-*. *fēdus* for *haedus* ‘goat’ (Varro *LL* 5.97; also ‘archaic Latin’: Paul. Fest. 74L) is probably from **ghaidos*, cf. Got. *gaitis* (Pk 409), while as we have seen, *fircus* for *hircus* is ascribed both to Sabine, and also archaic Latin and may be from **gherk^wos*. *alpum* for *album* ‘white’ (Paul. Fest. 4L) may be related to Lat. *albus* (<**albho-*) but is probably to be regarded as a Latin loan with <P> for from Etruscan influence.

Thus Sabine may show <F> for **bh-*, and both <H> and <F> for **gh*. This apparent double treatment, that is the appearance of /f-/ for /h-/ in Sabine should probably be explained in the same way as that in Faliscan and dialectal Latin, that is, that these are hypercorrect forms in /f-/ perhaps from Latin influence, after a change of initial /f-/ to /h-/. It is uncertain to what extent an ‘f/h’ alternation really existed in Sabine, since of the three forms attesting the alternation only one (*fasēna/harēna* ‘sand’, of uncertain etymology) is not also ascribed to Latin. We might perhaps believe it did, given that the forms are given as Sabine by Varro, who was himself a native of Reate, in Sabine territory (cf. e.g. Joseph and Wallace 1992: 113). It is just possible that the alternation observed in dialectal Latin has its roots in Sabine (e.g. Coleman 1990: 4), but this cannot be established.

3.8.5 *Aequian*

The Aequi inhabited a large area in the centre of Italy, north of the Fucine Lake, but there is only one short second century inscription, known only from

¹⁷³ Yet another solution is to accept *fircus* as Sabine, and to assume that **k^w*>*k* in Sabine (e.g. Coleman 1986: 116).

a drawing, which attests the language (VM 8; Aequian dialectal Latin: Ve 228h, CIL I² 1831). There is no evidence for the treatment of the PIE voiced aspirates.

3.8.6 Marsian

There is little evidence for Marsian,¹⁷⁴ the language of the Marsi, a people who occupied the area south of the Fucine Lake. Marsian is mainly attested in a few short inscriptions from the third and second centuries BC: VM 3–7.¹⁷⁵ There are also a small number of inscriptions which show strong Latin influence (?dialectal Latin, Vetter 1953: 161f.): Ve 228a–g, Po 219–21, 223–4; see Letta and D’Amato (1975). It is doubtful whether there is any evidence for the PIE voiced aspirates in Marsian. One possible form, *fecront* ‘erected’ (Po 223) is usually taken to be Latin (*fēcērunt*), though it may be evidence for <F> for **dh-*, if an independent derivation from **fak-yo-* to the root **dheH₁-*, see O. **fakiiad** (Cp 33); (Untermann 2000: 259).¹⁷⁶ Similarly the gloss, *herna* for *saxa* ‘stone’ (Paul. Fest. 89L) is given as Marsian, and might show <H> for **gh-*, if the word is from **ghersnā*, but it may also be Sabine (see p. 123).

3.8.7 Hernican

The language of the Hernici was unknown until recent excavations at Anagnia (now Anagni), the main Hernican settlement, yielded a small number of inscriptions (Colonna and Gatti 1990; Colonna and Gatti 1993; Rix 1998). Most of these date to before the fourth century BC, and have been dealt with above under ‘Old Hernican’. The language of Hernican after the fourth century is attested in the form of one short vase inscription (early third century BC: He 3), and shows no evidence for the PIE voiced aspirates.

3.8.8 Volscian

At the end of the sixth century BC, the Volsci moved down from central Italy and occupied the plains of Latium to the south-west of Rome. Apart from one archaic inscription (discussed above under Old Volscian), there is only one Volscian inscription, the bronze tablet of Velletri (VM 2).¹⁷⁷ This dates to the

¹⁷⁴ For more discussion, see e.g. Durante (1978: 809); Wallace (1984: 61–9); Coleman (1986: 111).

¹⁷⁵ VM 3 (Ve 223) is taken by Vetter as Volscian, but it is included here under ‘Marsian’, since Antinum was in Marsian territory (e.g. Coleman 1986: 113–4).

¹⁷⁶ The abbreviation *f* in VM 4 is, as in other Minor Dialects, likely to be the Latin abbreviation for *filius* ‘son’.

¹⁷⁷ I do not follow Coleman (1986: 120f.) in assigning the Lapis Satricanus to Volscian, since it seems far more likely that this text is Latin (see discussion in Stibbe 1980: 36; Wachter 1987: 79). A small number of Latin inscriptions have been identified by Coleman as showing Volscian dialect influence (CIL I² 359, 360, 1511, 1531).

early third century BC, and seems to contain a religious text (see Rix 1992). The inscription is written in the Latin alphabet but with an extra sign noted here as <ç>. This represents the result of a palatalized velar stop *k before a front vowel, in *façia* < *fakyād, and suggests that Volscian, like Umbrian, showed an additional palatal fricative /š/ beside /f/, /s/ and /h/.¹⁷⁸

Again, the evidence for Volscian is necessarily limited, though we do find <F> for *bh- in *ferom* ‘carry’ from *bher-, see Lat. *ferō*, Marr. *feret* (MV 1) and also for *dh- in *façia* ‘should sacrifice’, cf. U. *façia* (Ila 17) from the extended root *dheH₁k-, see O. **fakiiad** (Cp 33). There is no certain evidence for the treatment of *gh. If *couehriiu* ‘gathering’ is a mistake for *couerhiuu it may be linked with the Oscan forms **verehasiúí** (Sa 1A11) and **verehias/vereias** (Cp 32, Fr 2) ‘military/political association of young men’, and may possibly go back to a stem with *-gh-, e.g. *ko-wergh-yo-; see Untermann (2000: 423), but see Rix (2000). I do not accept the name *tafanies* as possible evidence (e.g. Coleman 1986: 118), since the etymology of this word is not known.

Volscian provides evidence for the treatment of word-initial *bh- and *dh-, both of which appear as <F>, for /f/, which was probably realized as a voiceless fricative [f] in word-initial position. /f/ also occurs word-internally (*tafanies*), and in word-final position in *asif*, perhaps as the reflex of final *-ns, if this form is in the accusative plural. There is no secure evidence for the treatment of *gh. However note that the inscription does attest word-internal <H> in *couehriiu* and it shows <H> used to mark vowel hiatus, in *pihom* ‘godly’ < *pīyo-, cf. Lat. *pīus* (perhaps also in *atahus*, see Rix 1992: 42; see also Vine 1993: 373–4). This suggests that /h/ did once occur word-internally, probably as a reflex of *-gh-, but that in intervocalic position at least, /h/ ([h̠]) was lost during the historical period, motivating the use of <H> to mark vowel hiatus in general.

3.8.9 *The development of the PIE voiced aspirates in the Minor Dialects*

word-initial position

*bh- > <F> /f/ [f] (Marr.; Vest./Sab.; Vols.)

?later /f/ > /h/ in Sabine /f/ [f] is

hypercorrect for /h/ [h] (Sab.)

*dh- > <F> /f/ [f] (Pael.; Vols.)

*gh- > <H> /h/ [h] (Pael.; Marr.)

*g^wh- no evidence

word-internal position

*bh- > <F> /f/ ?[β] (Pael.)

*dh- > <F> /f/ ?[β] (Pael.)

*gh- no evidence

*g^wh- no evidence

Paelignian supplies the most evidence for the treatment in the Minor Dialects. Though scarce, that from the other languages points in the same direction,

¹⁷⁸ For a recent discussion of Volscian phonology and its representation, in particular the vowel system (see Rix 1992).

which is similar to Sabellic in general.¹⁷⁹ There is little evidence for pronunciation of the reflexes, but what little there is (from Paelignian) supports inferences made from the attested distribution of Oscan, that is that they were voiceless word-initially and voiced word-internally.

3.9 External evidence

The preceding sections have identified /f/ and /h/ as the main reflexes of the voiced aspirates in the Italic languages other than Latin, and I have considered their pronunciation by examining information drawn from the languages themselves ('internal' evidence). Another possible source of information about the pronunciation of these signs is to be found in 'external' evidence, that is the representation of the sounds as they appear in loanwords in other languages. This type of evidence is quite different, in that it can only give us rather indirect information, and is subject to all the reservations that must be applied when looking at the phonology of languages in contact (e.g. Romaine 1995: 51f.).

When a word is borrowed from one language into another, its phonological integration in the borrowing language will depend partly on the original phonological representation of the loanword, which in turn is constrained by the phonology of language from which it was borrowed, and partly on the phonology of the language into which it has become integrated.¹⁸⁰ There is often a mismatch between the two phonologies which is resolved by the compromise of sound substitution. As loanwords become more fully integrated, they will tend to conform more to the constraints of the new language. Occasionally unusual phonotactics will be tolerated or new phonemes will be used. When comparing dead languages, the interaction between different orthographies can be very useful in reconstructing phonological systems. The comparison of Sabellic and Faliscan native alphabet representations with those of Latin plays a large role in reconstructing the phonological inventories for these languages. However, at the same time we must be cautious. The process is one of deduction. For example, the correspondence of Latin <f> with Greek <ϕ> suggests that the Latin sound was voiceless and labial, but we could not arrive at a fricative without more information. Also, if there has been a long history of language contact, as between Italic and Etruscan, it can be difficult to discern the etymological development of a word and even its ultimate origin. Again, it may not always be easy to separate out what phonologically belongs to the language of origin and what to the borrowing language.

¹⁷⁹ I regard with caution Meiser's (1998: 103) suggestion of a possible conditioned change of *gh->∅ before a liquid in Sabellic, on the basis of the indirect evidence of Lat. *grāuastellus* ~ *rāuistellus* 'grey-haired', which he takes to be a loanword from Sabellic.

¹⁸⁰ These general considerations also apply to those learning another language and the development of 'foreign accents'.

With these cautions, I consider rather briefly whatever can be gleaned from looking at the two main languages which had a prolonged history of contact with Sabellic and Faliscan given their geographical proximity and historical connections: Etruscan and Greek.

3.9.1 *The evidence of Etruscan*

The Etruscan language is attested in a very large number of inscriptions which date from the seventh century until the first century BC. While the majority of these come from Etruria and the territory surrounding it, Northern Italy has yielded some, as has Campania in the South, and a very few have been found in Latium and Umbria, not to mention Liguria, Corsica and Tunisia (*see e.g.* Rix 1985). The Etruscans had varying degrees of contact with the speakers of the Italic languages during the historical period.¹⁸¹ The territory of the Umbrians bordered on that of the Etruscans, and certain cities, for example, Perugia, may well have been bilingual for a time (Rix 1985: 222). The Faliscan territory was within Etruria proper, and was subject to considerable Etruscan influence. The Etruscan expansion into Campania probably started in the seventh century, and lasted for two centuries, which would have brought the Etruscans into contact with the pre-Samnite yet Sabellic-speaking peoples who inhabited the region.¹⁸² The Samnites (Oscan-speaking) moved down into Campania during the mid-fifth century, which would again have provoked contact with Etruscan language and culture. The speakers of early Latin were also subject to a period of Etruscan influence during the Etruscan domination of Rome and Latium in the sixth century. Not surprisingly, given the opportunities for linguistic contact, Italic words, and particularly names, human and divine, were incorporated into the Etruscan language (*see e.g.* Rix 1963, De Simone 1991).

The traditional account of the consonantal phonemes of Etruscan, and the letters commonly used to represent them, is summarized in Table 3.7 (after Agostiniani 1992: 49).¹⁸³ Since we are primarily concerned with /f/ and /h/, we consider these two sounds in more detail.

3.9.1.1 */f/ in Etruscan*

The interpretation of the Etruscan signs transcribed <f>, the digraph <vh>, <hv>, and then the sign 8, is based primarily on the correspondence Etr. <f> ~ Lat. <F>, in for example, the name Etr. **fulni** = Lat. *Folnius* (both in Ar.1.9, a bilingual inscription); cf. for example, Lejeune (1966: 149). /f/ showed a defective distribution, only occurring in word-initial position, and word-internally next to

¹⁸¹ For a brief general introduction to the history of the Italian peninsula before 350 BC, *see* Salmon (1982). Meiser (1996) argues that the Etruscans first came into contact with an early form of 'Umbro-Sabine'.

¹⁸² For a discussion of the history of the area, *see e.g.* Frederiksen (1984: 134f.).

¹⁸³ For a slightly different account, *see* Rix (1985: 215f.).

TABLE 3.7 The consonants of Etruscan

	<>	//	<>	//	<>	//	<>	//
unmarked stops	p	p	t	t			c/k/q	k
marked stops	ϕ	p ^h	θ	t ^h			χ	k ^h
affricates			z	t ^s				
fricatives	f	f	s/š	s	σ/σ̣	ṣ̌	h	h
liquids			l	l	r	r		
nasals	m	m	n	n				
glides	v	w	l	j				

Notes

- 1 For the obstruent system in general the distinction of voice does not seem to have been relevant (see e.g. Agostiniani 1992: 47).
- 2 There is some debate about the nature of the sounds represented by the Greek voiceless aspirate signs <ϕ θ χ>. The traditional account (as here), is to take them as voiceless aspirated stops, mainly on the basis of their transcription into Latin as <PH TH CH>. Rix takes <ϕ> and <θ> as palatalized stops /p' t'/ and <χ> as a velar fricative; for discussion, and rejection, see e.g. Agostiniani (1992: 49–50).
- 3 The transcription of the Etruscan sibilants is extremely diverse; here I use the system adopted by Rix, according to which /s/ is represented by <s, š> (*sigma* in the south, *san* in the north), and the (?palatal /š/ is represented by <σ, σ̣> (*san* in the south, *sigma* in the north) (see Rix 1985: 213); this system is also used in his edition of the Etruscan texts (1991).
- 4 Rix (1985: 222) also argues for an additional labiovelar fricative /x^w/.

/r l n s š/.¹⁸⁴ /f/ contrasted with the labial stops /p p^h/ and with the labiovelar approximant /w/. The distinction between /f/ and /w/ was one of degree of approximation, /f/ being closer than /w/; neither continuant was phonologically marked for voice.

In word-initial position, /f/ is sometimes found written with <ϕ>, the sign for the marked labial stop; cf. e.g. **ϕaun** Cr S.1 beside **faun**. Many of the instances occur in late inscriptions from Volaterra, which may perhaps indicate a local variation in the pronunciation of <ϕ>, perhaps from /p^h/ to an affricate /p^f/, but this is very uncertain.¹⁸⁵ Intervocalic /f/ may either represent the result of an earlier cluster, for example, **cafate** (Cl.1.566) < *kafwate < *kapwate (Rix 1985: 221), or the medial /f/ of a loanword, for example in **afur** (AS.1.269) < Lat. *Afer* (Rix 1963: 276). As for the interpretation of the Italic native alphabet signs for /f/, the correspondence between Latin <F> and Etruscan <f> led to the assumption of the sound value [f] in all positions of the word.¹⁸⁶ Meiser (1986: 73, after Steinbauer 1979) argues that the traditional view should be modified. Three

¹⁸⁴ In third- to first-century texts from the area surrounding Clusium, /f/ shows a development to /h/ in word-initial position (Rix 1985: 221).

¹⁸⁵ The alternation of <f> and <p> in e.g. **θefarie/θeprie** may be the result of a change of /f/ > /p/ 'in the environment of *n* and *r*... [which] began in the fifth to fourth century' (Watmough 1997: 99).

¹⁸⁶ An alternative view assumes a bilabial pronunciation [ϕ]; e.g. Agostiniani (1992: 51); Mancini (1996: 228, fn. 46).

independent pieces of evidence suggest that in word-internal position at least Etruscan /f/ was, or could have been, pronounced as a voiced labial fricative.¹⁸⁷

In the Etruscan and Punic texts of the Pyrgi tablets (Cr.4.4, 4.5), dating to the end of the sixth century/early fifth century BC, a name appears in Etruscan as **Θefariei** and **Θefarie**, and in Punic as TBRJ'; the name is also found on an early inscription (690–660 BC) from Caere as **Θihearie** for **Θihvarie** (Colonna 1970: 645) (see De Simone 1991: 144). The correspondence of Etr. <f> and Punic points to a value [β] for Etruscan /f/.¹⁸⁸ Whether /f/ is originally Etruscan is disputed; an Italic derivation has also been suggested. For Szemerényi (1966 [1987]), **Θefariei** is of Etruscan origin, and [β] the result of a secondary voicing of a previously voiceless fricative *[f], with Punic representing 'the nearest approximation – or already the final stage *b'* (p. 126). While the name could be Etruscan, the secondary voicing proposed seems less likely, since there are no other indications for such a change in Etruscan. The later (third – first century BC) Latin transcriptions which use the voiced stop signs (generally for word-internal plain stops, but sometimes also for the marked stops), so for example, Lat. alphabet *Pabassa* (Cl.1.2546) beside Etr. alphabet **papaśá** (Cl.1.2543), are usually interpreted as indicative of a possible *fortis/lenis* distinction, rather than actual voicing; De Simone (1970: 181); Rix (1985: 220). An alternative etymology links **Θefariei** with Latin *Tiberius*, and takes the form as an early loan from 'Sabine' or Umbrian, perhaps from an original Sabellic **tifarios* [tiβarios].¹⁸⁹ The correspondence of Etr. <f> ~ Punic has been used to suggest that the fricative in the original Italic loan was voiced, providing more evidence for the existence of a voiced labial fricative intervocalically in the Sabellic languages. The proposed derivation is plausible as the Etruscan forms could indeed derive from an original Sabellic form, cf. the presumably Sabellic ethnics *Tifata*, *Tifernum*, although Etr. <θ> for Sab. *t- is odd (Colonna 1970: 648). But it seems difficult to argue from the Etruscan form that /f/ in the Sabellic stem was voiced [β]. While the Italic form could have been voiced, the voicing observed could equally be the result of phonetic processes within Etruscan itself, after the word was borrowed from Sabellic. Thus **Θefariei** shows that Etruscan /f/ may have been voiced word-internally, but it cannot be used to establish a voiced pronunciation of Italic /f/.

¹⁸⁷ The evidence given here is in the form of representations of Etruscan /f/ with letters usually used for sounds that were believed to be phonetically voiced in other sound systems. We note, however, that such evidence may be difficult to interpret; see, for example, the occasional Latin representations of Gk /p t k/ with <B D G>, e.g. Lat. *gubernō* for Gk. *κυβερνώ*, which are not generally taken as evidence that the Greek sounds were usually voiced (for discussion, see Biville 1990: 245f., 261f.). Our conclusions about the Etruscan sounds are therefore put forward with some caution.

¹⁸⁸ Punic is usually taken to represent a voiced labial stop [b] (cf. e.g. Friedrich and Röhlig 1970: 6).

¹⁸⁹ Meiser (1986: 73) refers to **Θefarie(i)** as 'der zweifellos italischem Namengut zugehörige Name des Stifters', while Colonna (1970: 648) and De Simone (1991: 145) are convinced that it is a 'Sabine' or Umbrian loan in Etruscan. Presumably those who argue for an Italic derivation do so from the possible cognates in *Tiberius* etc., and because intervocalic /f/ is unlikely to be Etruscan in origin.

More evidence that Etruscan <f> could be used to represent a voiced fricative [β] may be found in two later Etruscan forms, which clearly represent Italic loans. The first is that of the Etr. ethnic **mefanate**, attested at Clusium and Cortona in the fourth century BC and later (Co.1.28, Co.1.3, Cl.1.1428, 1429), which Meiser (1986: 73–4) argues is linked to the Umbrian names (preserved in Latin), *pagus Mefanus/Meflanus*, *Mefanas*, and derived from the name of an Umbrian town which occurs in Latin as *Mēuānia*. Again, a pronunciation of Etruscan /f/ as [β] is strongly suggested by the correspondence of Etruscan <f> beside Latin <V> which together point to a voiced labial fricative. The etymology of the word is not known, but the appearance of <-F-> in the Latin forms suggests that the original Umbrian form contained *-f- (rather than *-w-). It seems likely that **mefanate** continues a voiced fricative [β] in the Sabellic stem, although this cannot be ascertained from the Etruscan correspondence, for the same reason as for **Θefariei**, but rather from the Latin representation of the Umbrian name, *Mēuānia*, with <V> for *-f-.

The second later form which suggests that Etr. <f> could stand for [β] is the name **scefi(a)** (Pe.1.630, Pe.1.201; after c.450 BC), which Meiser (1986: 74), after Rix (1963: 244, n21), connects with Latin *Scaevius* (e.g. CIE 2722), Lat. *scaevus* 'left'.¹⁹⁰ The correspondence of Etruscan <f> (not <v>) with Latin <V> again points to the representation of a voiced labial fricative.¹⁹¹

3.9.1.2 /h/ in Etruscan

In the West Greek model alphabet taken over by Etruscan, <h> represented the aspirate /h/, probably a voiceless glottal fricative [h] (Allen 1974: 51). It is assumed that the Etruscan sound was similar. In Latin transcription, Etruscan <h> corresponds to Latin <H>, e.g. Etr. **hanua** (e.g. Cl.1.221) ~ Lat. *Hannossa* (CIE 1295; Schulze 1933: 266). Similarly, Etr. <h> was used to represent Greek /h/, for example, **Herecele**, **Heracle(s)** < Gk *Ἡρακλῆς* (De Simone 1968: 155). The distribution of <h> is limited almost exclusively to word-initial position. The appearance of word-internal <h> requires explanation: for example, in **ahi** (Pe.1.263) <h> is probably a sign of vowel length, used in the representation of an Umbrian word in which /k/ was being lost before /s/ (Rix 1985: 222). Thus we assume that Etruscan <h> represented a voiceless glottal fricative [h], which nearly always occurred in word-initial position.

3.9.1.3 Italic /h/ in Etruscan

Italic /h/ in word-initial position occurs in Etruscan as <h>, for example, **herini** (e.g. AV.1.19) for Oscan **heírennis** (Ve 115), cf. Lat. *Herennius* (e.g. CIL XI 1912).

¹⁹⁰ The name is also found spelt with <v>, e.g. **scevia**.

¹⁹¹ **rufvies** in the late seventh-century inscription (Fa.3.2), with Etruscan <v> for Faliscan /f/, cf. **rufia** (LF 3/Ve 243), could also suggest <v> for [β], though again it may only reflect Etruscan voicing of /f/, or alternatively may be an error for <vh>; Meiser (p.c.).

The same correspondence is found in word-internal position, so, for example, the above-mentioned **ahi**, or **marhies** (Cm 6.1; Ve 125, note), presumably for Oscan **marahieis** (Ve 125). The Etruscan representation further points to a voiceless glottal fricative [h] word-initially but cannot give us any particular information about the pronunciation in word-internal position.

3.9.1.4 *Italic /f/ in Etruscan*

The representation of Italic /f/ is more enlightening. As a general rule Etruscan <f> corresponds to Italic <f>. As there are no clear instances of specifically non-Latin forms with /f-/ in Etruscan, we may assume that the representation found for Latin /f-/ shows the norm, which is usually <vh> <hv> <f>: for example, Etr. **vhulvenas** (VS.1.100), **fulvenas** (VS.1.32) < *fulve, cf. Lat. *Fuluus*, *Fulvius* (Schulze 1933: 170). The appearance of Etr. <ϕ> for Latin /f-/ in **ϕapenas** (Cr.2.31), a name perhaps derived from a praenomen *ϕape (cf. Lat. *Fabus*, *Fabius*), and perhaps also **ϕlavienas** (= **flavienas**, Vs 1.55), which is probably cognate with Lat. *Flāvius*, may indicate that Latin /f/ could sometimes be identified more with the marked labial stop than Etruscan /f/ (De Simone 1991: 143).

Most instances of Etruscan word-internal /f/ must go back to words which are Italic, but not Latin, in origin. Word-internal /f/ is represented by Etruscan <f>, for example, Etr. **ruvfe** (e.g. AT.1.49) < Sab. *roufos, cf. U *rofu* (VII a.3), Lat. *rūfus*, or Etr. **aufle** (Pe.1.463), **afle** (Pe.1.114) beside Fal. **aufilo** (Ve 278b), cf. Lat. *Aufillius* (e.g. CIL V 7862), *Aufellius* (e.g. CIL X 2761) (Schulze 1933: 114). Since Etruscan <f> could represent a voiced labial fricative intervocalically, it follows that whenever we find Etruscan <f> for Italic <f> in this position, the pronunciation of the Italic sound could have been a voiced labial fricative. There are no cases where we can argue directly from the Etruscan representation of Italic /-f-/ that the Sabellic stem contained [β] (see discussion of **θefariei** and **mefanate** above). Nevertheless, the Etruscan representation does generally support the assumption of a voiced pronunciation [β] for Italic /-f-/ in word-internal position, as it is clear that Etruscan <f> could represent a voiced labial fricative from an early period. This in turn gives more weight to the same conclusion drawn from the Oscan orthographic evidence, namely that the regular correspondence of the Italic native alphabet <f> letters with Latin <F> does not exclude the use of these same letters to represent a voiced pronunciation of the fricative.

3.9.2 *The evidence of Greek*

It is not known exactly when the Greeks first encountered the Italic-speaking peoples, but archaeological finds point to the existence of Greek traders on the Italian peninsula from the early eighth century BC (Frederiksen 1984: 54f.). The

earliest colonies were Pithecusae and then Cumae on the Campanian coast founded during the eighth century BC; more were founded in Sicily, and along the coasts of Southern Italy ('Magna Graecia'). It is difficult to assess the degree of contact the more northerly speakers of the Italic languages (the earliest forms of Sabellic, Umbrian, Faliscan, early forms of the Minor Dialects, even Latin) would have had with the Greeks at this early period, but the Etruscans certainly had strong links, as is evident from the numerous words of Greek origin in the Etruscan language (De Simone 1968). Certainly we would expect the early Italic peoples inhabiting the mainland areas of Campania to have had some contact with the Greeks of Southern Italy, but the first recorded occasion is when the Oscan-speaking Samnites moved down into and took control of Campania, taking Cumae by force in 421 BC, and probably gaining political power in Neapolis shortly after. The later expansion of the Roman empire resulted in Latin becoming the Italic language best known by the Greeks. It is difficult to assess to what extent the Greeks of mainland Greece were exposed to Latin before Rome's campaigns brought her into conflict with the Macedonian rulers in the third century BC.

The term 'Greek' covers the various forms of the Greek language which came into contact with Italic. The Greek colonies of Italy and Sicily were as linguistically diverse as their founding cities in Greece. Many of the colonies of Sicily and Southern Italy spoke forms of Doric, while the main dialect of the Campanian cities was West Ionic.¹⁹² From the fourth century, and in some cases earlier (e.g. Ionic), the different dialects of Greece gradually declined, and were replaced by the Attic-based *koine*,¹⁹³ and these changes also took place in the Greek of Magna Graecia and Sicily.¹⁹⁴ To a large extent the consonantal systems of these forms of Greek shared basic characteristics,¹⁹⁵ which are summarized, together with the corresponding letters of the Ionic alphabet (in general use from the fourth century BC) in Table 3.8.¹⁹⁶

By the second century AD the voiced and voiceless aspirate stops in many forms of the *koine* had become fricatives. The scattered evidence of a fricative pronunciation of some stops in inscriptions of certain dialects makes it likely

¹⁹² For detailed discussion of the characteristics of the Greek of Magna Graecia and Sicily see e.g. Thumb and Kieckers (1932), and Thumb and Scherer (1959); for a summary, see e.g. Biville (1990: 24f.).

¹⁹³ The extent and rate of adoption of the *koine* by the various communities differed greatly; many dialects still continued to be attested for several centuries; for recent discussion see e.g. Brixhe (1993).

¹⁹⁴ In the absence of research, the exact details remain obscure. Bubenik's (1989) interesting study of the decline of the dialects and the spread of *koine* in Greece also looks at the different regional forms of *koine* which developed across the Macedonian empire (e.g. in Egypt, Syria etc.), but does not include any discussion of the Greek of Italy and Sicily.

¹⁹⁵ For detailed discussion of the pronunciation of Greek (based on Classical Attic), see e.g. Allen (1974), also Teodorsson (1974). For the phonology of the *koine*, see e.g. Bubenik (1989).

¹⁹⁶ The Ionic script replaced the epichoric alphabets during the late fifth/early fourth century BC throughout the Greek-speaking area, including Magna Graecia and Sicily (see e.g. Jeffery 1990: 267, with n4.).

TABLE 3.8 The consonants of Greek

	<>	//	<>	//	<>	//
vless stops	π	p	τ	t	κ	k
vd stops	β	b	δ	d	γ	g
vless aspirates	φ	p ^h	θ	t ^h	χ	k ^h
vless fricatives			ς	s	η	h
(vd fricatives)			ζ	z)		
liquids	λ	l	ρ	r		
nasals	μ	m	ν	n		
(glide)	Ϝ	w)				

Notes

- 1 From the fourth century BC on, <ζ> could represent the voiced fricative /z/, which continued the earlier voiced affricate /zd/; cf. e.g. Lejeune (1972: 115–16) (Biville 1990: 62; 99).
- 2 The Ionic alphabet did not have a sign to represent /h/, since the East Ionic dialects, for which the script was originally developed, had lost the sound, and <h> was subsequently used to represent the open vowel /ē/. After the adoption of the Ionic alphabet most dialects ceased to represent /h/, but for some this was not satisfactory, and an adapted form of the <h> sign Ϝ was used (e.g. in the Heracleian Tables, Buck 1955: no. 79).
- 3 /w/ was lost at an early stage in East Ionic and Attic and so the sign did not occur in the Ionic alphabet. When this alphabet was taken over and used by dialects which did still have /w/, <Ϝ> was added to the script. In Magna Graecia and Sicily <Ϝ> commonly appears, e.g. in the Tarentine Greek of the Heracleian Tables, although it seems to have been lost even in these dialects from the end of the fourth century BC onwards (see Buck 1955: 46–52).

that this process began several centuries earlier, at least in some varieties of Greek (see Lejeune 1972: 54f.). But this does not seem to have happened in Classical Attic-Ionic where indications of a fricative pronunciations are paltry (see e.g. Teodorsson 1974). Nor is there good evidence for fricatives in the *koine* before the first century AD; Lejeune (1972: 55f.).¹⁹⁷ It is probably safe to assume that in general Greek /b d g p^h t^h k^h/ were usually realized phonetically as stops until the turn of the millennium, and probably for some time after.

Since it is unlikely that Gk /p^h/ became /f/ before the first century BC, we assume that during the period of contact between Greek and the Italic languages other than Latin, Greek did not have a labial fricative /f/. Greek did show the phoneme /h/, which only occurred word-initially, and was probably realized as a voiceless glottal fricative [h] (Allen 1974: 51). Before the adoption of the Ionic alphabet, /h/ was represented in most scripts with <h>. Although subsequent inscriptions in Ionic script do not usually represent /h/, the sound was still pronounced, as is shown by Greek loanwords into languages including Italic, where /h/ was written, for example, Lat. *historia*.

¹⁹⁷ The first clear evidence of a fricative pronunciation for the aspirates is for <φ>, in Pompeian inscriptions from the first century AD, such as *Dafne* for Gk Δάφνη; for the early Latin evidence for fricatives in the *koine* (see e.g. Biville 1990: 189f.). Joseph (p.c.) suspects nevertheless that fricative pronunciations may have occurred somewhat earlier.

3.9.2.1 *The representation of Italic in Greek*

An obvious source for the representation of Italic words in Greek inscriptions is the large number of Greek inscriptions from Southern Italy and Sicily.¹⁹⁸ In fact, although there is a large number of Greek inscriptions from Rome from the imperial period which contain Italic names,¹⁹⁹ the number of Greek inscriptions before the first century AD which show Italic forms is very small.²⁰⁰ Fortunately, thanks to the enterprising spirit of some Italian merchants, we do have a small corpus of inscriptions which can be securely dated to a period when Oscan (probably the relevant language) was still spoken and these are the Greek inscriptions containing Italic names found on Delos.

3.9.2.2 *Italic /h/ in Greek*

The main problem when considering the representation of Italic /h/ in Greek inscriptions written in the Ionic alphabet is that most do not use the sign <h>. The sound could not be represented, even word-initially, where we know it did exist in Greek. The island of Delos was no exception where the Ionic script was adopted fully by the end of the fifth century BC, and no sign for <h> was created.²⁰¹ Italic names beginning with /h/ are found beginning with the following vowel in Greek, for example, Ital. *Heius* as Gk *HIOΣ* (?second/first century BC, Roussel and Launey 1937: 1754). In the coin inscriptions from **Hyria* (Sambon 293–306, Ve 200 A 7), the only inscription to represent word-initial /h/ is in Greek alphabet and language, but an Oscan letter <h> is used: *HVPIETEΣ*.²⁰² In literary texts Italic initial /h/ is represented by the spiritus asper. There is no clear example of the rendering of Italic intervocalic /h/. Thus <H> in the name represented in Latin as *Sehius* but in Greek as *ΣHIOΣ* (150–125 BC, Roussel and Launey 1937: 1732) may only be graphic.

¹⁹⁸ Kaibel (1890) gives the main collection, and is updated by SEG, and the new series of *Iscrizioni Greche d'Italia* which so far only covers certain inscriptions from Rome (Sacco 1984) and Naples (Miranda 1990), but for Sicilian inscriptions, see also Dubois (1989). There is also a new series presenting archaic Greek inscriptions from Italy and Sicily, *Iscrizioni Greche Arcaiche di Sicilia e Magna Grecia*; see Arena (1989) for inscriptions from Megara Hyblaea and Selinunte, and Arena (1994) for inscriptions of the Euboean colonies. Another possible source is the representation of Italic place and personal names in the geographers and historians, such as Ptolemaeus (Untermann, p.c.). My discussion here is largely restricted to inscriptional evidence.

¹⁹⁹ See e.g. Kajanto (1963) whose corpus dates from the mid-first century BC.

²⁰⁰ The lack of a complete up-to-date corpus of Greek inscriptions from Italy (and the absence of dates in Kaibel's collection) makes it very difficult to give a definite number.

²⁰¹ See Jeffery (1990: 297). This is not at all clear from the editions, e.g. Durrbach (1921), or even Roussel and Launey (1937) where the texts are always given in lower case forms complete with spiritus asper, e.g. *Hios*.

²⁰² Rutter dates these coins to 405–400 BC, which makes them the earliest examples of Hyrian coinage (Rutter 1979: 159f.).

3.9.2.3 *Italic /f/ in Greek*

The Greek letter which regularly represents Italic /f/ is <ϕ>. So, for example, in the Delian corpus we find Italic *Ferus* as Gk ΦΕΡΟΝ, *Ofellius* as Gk ΟΦΕΛΛΙΟΝ (both on an inscription dating to 100 BC, Roussel and Launey 1937: 1688), or *Aufidius* as Gk ΑΥΦΙΔΙΟΣ (end of the second century BC; Roussel and Launey 1937: 1754). The Greek inscriptions from Italy and Sicily also regularly use <ϕ> for /f/.

If we look at loans in the other direction, that is Greek loans with /p^h/ in the Italic languages other than Latin, and in fact only in Oscan,²⁰³ we find that Greek /p^h/ is represented with either <p> (e.g. **puinik** ‘Phoenician’ Cp 1 ~ Φοίνιξ, or **diumpaís** ‘nymphs’, Sa 1A7 ~ Νύμφη), or with <ph> (e.g. the name **aphinis**, Po 40 ~ Αφίνιος). The digraph with <h> is only used from the second half of the second century BC (Sironen 1987: 114). The Oscan representation of Gk /p^h/ confirms that in the Greek with which Oscan speakers were familiar <ϕ> was pronounced as a voiceless stop, and not a fricative. It also shows that the Oscan letters for <f> could not be used to note the sound of <ϕ>, and thus that Oscan /f/ was something other than /p^h/.

This last point is perhaps rather obvious, but it is important for our purposes, since it indicates that the Greek use of <ϕ> (/p^h/) for Italic /f/ was only an approximation for the actual sound value.

If the representation was rough, why was <ϕ> chosen to represent Italic /f/? In general most forms of Greek did not possess a labial fricative, so the possibilities for rendering the Italic labial fricative were limited. Greek <π> and <β> denoted the stops [p] and [b] and were needed for Italic /p/ and /b/. The only other labial obstruent in Greek was [p^h], rendered by <ϕ>. Given the lack of labial fricative or approximant (and hence signs for either), the only available option for Greek for representing Italic /f/ was <ϕ>. (<F>, which represented [w] was not an option, since it was only available—and then only for a short period—in the inscriptions of the few dialects that retained the sound. In those dialects where /w/ still was pronounced, for example, Tarentine Greek, <F> was used to represent Italic /w/; see for example, the coin inscriptions from Vibo with FEI, FEIII, but later ΕΙΠΠΩΝΙΕΩΝ (Ve 200 F, note; Conway 1897: 4). In those dialects where /w/ did not occur, the digraph <ov> was used.²⁰⁴ <β> is only used for /w/ considerably later, pointing to a fricative pronunciation of Italic /w/ and perhaps also Greek /b/.²⁰⁵

²⁰³ See e.g. Lejeune (1970: 307–8); Prodocimi (1976); Sironen (1987).

²⁰⁴ The earliest evidence for this occurs in third century coin inscriptions from Neapolis, where the Oscan name *Villius* appears, abbreviated, as OYIA or YOIA (Sambon 458–9). This is the usual transcription which occurs for /w/ in the Greek inscriptions of Italy and Delos, e.g. Italic *Vibius* as OYIBIOS (second/first century BC; Roussel and Launey 1937: 1687).

²⁰⁵ See Lejeune (1972: 55). An examination of the corpus of Greek inscriptions from Naples in Miranda (1990) reveals that <β> for Italic /w/ only occurs from the first century AD.

The Campanian coin inscriptions: While the regular Greek representation of Italic /f/ was with <ϕ>, the earliest Greek inscriptions to contain Italic (Oscan) names, use both <ϕ> and <β>. This strongly suggests that Oscan /f/ was pronounced as a voiced labial fricative intervocally (e.g. Rix 1957: 142). The evidence is in the form of a set of Greek inscriptions on coins minted for a number of Sabellian communities in Campania during the last decades of the fifth and the first decades of the fourth century BC.²⁰⁶ Rutter (1979: 96f.) has convincingly argued that all the coins were minted and engraved in one mint, probably based at Neapolis. He also argues that the minters and engravers were probably Greeks, even though the Sabellian ethnics on some of the coins are written in Oscan (sometimes using the Greek alphabet). In general the coins present a complex orthographic picture: while the Oscan alphabet renders Oscan language alone, the Greek alphabet is used to render both Greek and Oscan forms. Some coins even show a mixture, with letters from both alphabets. The coinage of two of the six communities is of interest. In the Greek versions of the Sabellian ethnics we find a difference in the representation of Oscan /f/ according to position in the word.

Fistelia*:²⁰⁷ The coins of **Fistelia* are dated by Rutter (1979: 83) to 405–400 BC. Most bear inscriptions on one side only, in Oscan (Sambon 826–9, 831–6, 838–43; nSi 3): **fistluis (also left to right), **fistlus** (left to right), **fistulun**, **fistulis**, **fituu**, **fistlui**, **fistelú**, **fistlúis**; possibly also **pist...is** (Rutter 1979: 84) (for examples, see Figure 3.10). There is also a group of ‘bilingual’ coins, with inscriptions on both sides, showing Greek on the obverse, and Oscan on the reverse (Sambon 835–6). Of the inscriptions in Greek script, one is Greek: *ΦΙΣΤΕΛΙΑ* (?also *ΦΣΤΕΛΙΑ*), while two are uncertain (?Oscan in Greek characters: *ΦΙΣΤΕΛΛΑΔ*, *ΦΙΣΤΕΛΛΑ*). Thus we find corresponding to Oscan word-initial <f>, Greek <ϕ>.

Allifae: The Sabellian ethnic mostly occurs in Greek script and Greek language, although the earliest coin type contains a mixed script inscription (Sambon 818). The majority of the coins are later,²⁰⁸ and mainly contain Greek forms of the ethnic (Sambon 820–2, 825; Ve 200 B 2abde). For a couple of examples, see Figure 3.11: *ΑΛΛΙΒΑΝΟΝ* (N is sometimes retrograde, A upside down), *ΑΙΙΒΑΝΟΝ*, *ΛΑΒΑΝΟΝ* (B is retrograde), *ΑΛΛΑΕΙ* (retrograde); Vetter also has *ΑΛΛΙΒΑΝΩΝ*. There are also two mixed inscriptions (Sambon 821, 824): *ΑΛΛΙfΑΝΟΝ* (<f> = Oscan 8), *ΑΙΙΒΑ* (Oscan <1>). Only once does the ethnic

²⁰⁶ These were for the ‘Fenserni’, and the people of Nola, **Fistelia*, *Allifae*, **Hyria*, and *Capua* (the ‘Campani’—following Rutter 1979: 81f). For discussion of the relationship of these inscriptions to the origins of the Osco-Greek alphabet, see Cristofani (1998).

²⁰⁷ The location of the town for which the coins were minted is not known, but assumed to be close to *Allifae*, on the border of Samnium and Campania (Rutter 1979: 84).

²⁰⁸ Rutter (1979: 181) dates them to 375–50 BC, but Colonna argues for a later date, towards the end of the fourth century; (1984: 235, nn45 and 49).



FIGURE 3.10 Selection of coins from Fistelia from Friedländer (1850: Plate V: Phistelia)



FIGURE 3.11 Three coin types from Allifae, from Friedländer (1850: Plate V: Allifae)

occur in Oscan (Sambon 819): **alifa**. In those inscriptions which are clearly Greek (*AAAIBANON*—also *AAIBANON*, *ΛΑΒΑΝΟΝ*, *AAAIBANΩΝ*, *AAAIfANON*), we find that Greek <β> regularly corresponds to Oscan <f>, and thus that Greek <β> is used to represent intervocalic Oscan /f/. We can only suppose that the Greek engravers were reluctant to use <φ>, which we know was an option from the coins of *Fistelia, and turned to <β> as the only letter at their disposal to represent a voiced labial obstruent. It seems likely that <β> was an attempt to represent a voiced sound, most probably a voiced labial fricative.²⁰⁹

Taken together, the Greek representation of Oscan /f/ with <φ> word-initially and <β> intervocalically on coins from the same mint, dating to a similar period, clearly points to a differentiation in the pronunciation of the Oscan labial fricative according to position in the word: word-initially it was voiceless, intervocalically it was voiced.²¹⁰

²⁰⁹ It is difficult to know what this usage implies for the pronunciation of the Greek <β>. Either <β> represented a voiced labial stop [b] and was used as a rough approximation for [β], or Greek /b/ actually showed a fricative variant [β] which prompted this spelling.

²¹⁰ For a different interpretation of this evidence, see Colonna (1984: 235).

Greek Σάυνιον: In literary texts, /f/ is represented by <φ> in all positions in the word. There is however an interesting exception in the Greek word for *Samnium*, Σάυνιον. Greek Σάυνιον provides another earlier link in the chain of evidence for a voiced realization of /f/ in Oscan intervocalically. The significance of Σάυνιον (and derivatives such as Σαυνίται) arises from Rix's interpretation of the form, which he discusses together with the group of Italic cognates found in Lat. *Samnium*, *Samnītēs*, *Sabīnī*, and *Sabellī*, O **safinim** (e.g. Sa 4; Rix 1957).²¹¹ The earliest inscriptional evidence for the Greek form is probably the Doric ΣΑΥΝΙΤΑΝ on silver coins found in Samnium, but probably struck by Tarentum, dating to c.330 BC (Sambon 1903: 110, no. 171). The first manuscript attestation is Σαυνίτης, -ιδος, in Polybius, 3.90.7 (second century BC).²¹²

Rix's article offers an explanation for the historical and linguistic relationships of the group of names, clearly cognate, for the Sabine and Samnite peoples and their territory (see most recently, Rix 2000). He argues that Greek Σάυνιον and Latin *Samnium* continue Oscan **saβnyom* (> Oscan **safinim**), a derivative from the stem **saβeno-*. **saβeno-* was an ethnic used to denote the Sabine peoples, and is also the basis for Lat. *Sabellī* < **saβen-lo-*, and Lat. *Sabīnī* < **saβeno-*, with an analogical lengthening of *-i- arising from vowel weakening, after forms such as *Gabīnī*, *Hirpīnī*, etcetera. That Latin continued two names for the Samnites, *Sabellī* and *Samnītēs*, was the result of two loans from the same stem but at different periods. Rix dates both Lat. *Samnītēs* and Gk Σάυνιον to the mid-fifth century BC when the Samnites first came into contact with the Greeks in their conquest of Campania. Both Gk Σαυνίται and Lat. *Samnītēs* are derivations independent to Greek and Latin on Σάυνιον and Latin *Samnium* respectively.²¹³

This explanation of the relationship of Greek Σάυνιον = Latin *Samnium* = Oscan **safinim** is significant for the Greek representation of Italic /f/. The assumption that the Greek and Latin words for the homeland of the Samnites were borrowed from an original Oscan name */safnyom/ [saβnyom], means that we must recognize that Oscan *[aβ] is represented in Greek with <av>. Rix's observation that Gk <v> cannot represent [f] must be correct; the Oscan fricative must have been voiced [β] in this position. Greek Σάυνιον gives us more evidence that Oscan /f/ was realized as a voiced labial fricative in word-internal position, this time for the period immediately before our first written evidence for Oscan. It also confirms that Oscan /-f-/ was voiced in all voiced environments word-internally: the Oscan evidence attests /-f-/ between vowels and adjacent to a liquid; Σάυνιον shows that /-f-/ was also [β] adjacent to a nasal.

Greek λίτρα: There is one more case, which although not directly relevant to Italic /f/ and /h/, will be discussed briefly here as it again concerns the possible

²¹¹ We may now add the South Picene forms in *safin-*, e.g. **safinús** Sp TE.5.

²¹² The form Σάυνιον occurs in Zonaras' Epitome of Dio Cassius, which dates to the twelfth century AD.

²¹³ Greek Σάμνιον, Σαμνίται are later loans based on Latin *Samnium*.

Greek representation of an Italic word. The word concerned is Greek *λίτρα* ‘a silver coin of Sicily’, which may be cognate with Latin *libra* ‘pound’, and which was probably borrowed into Greek in Sicily, perhaps from Sicel (Lejeune 1993a: 2).²¹⁴ As we saw in Chapter Two, Schulze (1895) was the first scholar to discuss *λίτρα* in connection with the PIE voiced aspirates in Italic. He proposed that Gk <τ> represented Italic */θ/, given the Greek representation of Iranian /θ/ with <τ> in *Μίτρα* for Av. *Miθra* ‘Mithras’. His assumption was that the Greeks borrowed the word directly from a proto-Italic form which existed in Sicily at that time. If the loan did take place in this way, Schulze’s conclusion that the Proto-Italic form contained a voiceless reflex of *-dh- is quite reasonable. Szemerényi (1952/3 [1987]), however, following earlier scholars such as Bonfante, suggested that the word was in fact not of Italic origin, but belonged to the Sicel-Ausonic group, a branch of Indo-European represented indirectly through words in Greek and Italic, and in which the voiced aspirates became voiceless stops. According to his argument, accepted by Leumann (1977: 171), Gk *λίτρα* was loaned from an original Sicel-Ausonic form with *-t-, and not from Italic. While we cannot know whether Szemerényi is right in proposing this particular branch of PIE, it is now recognized that there was probably more than one non-Greek language spoken in Sicily (see for example, Zamboni 1978). If one or more of these languages as PIE, the island may have known several different forms of a cognate of Lat. *libra*, any of which could have been the source for the Greek word. In the circumstances, we should probably see *λίτρα* as a Greek representation not of a Proto-Italic form, but rather of a cognate from a PIE language of Sicily in which original *-dh- was continued by a voiceless sound, most plausibly a dental fricative or stop.

The Greek evidence clearly confirms that of Oscan. The Greek letter regularly used for non-Latin /f/ is <φ>, but the earliest Greek inscriptions containing Italic forms use <φ> word-initially and <β> intervocally. This suggests an attempt to represent the different allophones of Oscan /f/, voiceless [f] in word-initial position, but voiced [β] in word-internal position, and at a relatively early date—the late fifth/early fourth centuries BC. The coins were minted for Samnite communities only a few decades after the Samnite conquest of Campania. It seems reasonable to assume that the pronunciation found in the Greek coin texts is representative of the pronunciation in the Oscan of Campania and Samnium. This seems assured by the evidence of Gk *Σαύνιον*, which clearly points to [β] as the allophone for /f/ between a vowel and /n/, before the earliest Oscan texts.

If Greek was capable of representing the different voiceless and voiced allophones of Italic /f/ at an early stage, why in all later Greek texts is only the ‘voiceless’ <φ> used? I suspect that the generalization of <φ> for /f/ was probably motivated by several factors: (1) <φ> (= [p^h]) was the most suitable

²¹⁴ For detailed discussion of the evidence for *λίτρα*, and a brief summary of proposed etymologies, see Lejeune (1993a).

Greek sign to represent a labial *fricative*. (2) When representing Italic, Gk <β> was already required for the voiced stop /b/. (3) The use of two signs for one phoneme would break the usual one-to-one correspondence observed in the Greek representation of Italic sounds. (4) At the time of the coin inscriptions, the influence of Rome was still restricted to her surrounding territory. Italic words only start being attested more frequently in Greek inscriptions somewhat later, and these are usually Latin.²¹⁵ The general use of <φ> for Italic intervocalic /f/ even where the Italic pronunciation was current (e.g. in the inscriptions of the Campanian bankers at Delos) is probably a result of Latin influence. In Latin <f> represented a voiceless sound, for which <φ> would have been entirely appropriate (see Lejeune 1972: 61, n2).

3.9.3 External evidence: Summary

The internal evidence suggested that the traditional account of Italic /f/ and /h/ as [f] and [h] should be changed. This review of the possible external evidence also points in the same direction. Little more can be said for /h/, which in Etruscan and Greek only occurred word-initially, where it was [h]. The situation for /f/ is different. Here we have good evidence from Greek that Oscan /f/ was a voiced fricative in a voiced context word-internally (between vowels, and adjacent to a liquid or nasal) from before our earliest texts, and in Samnium, the heart of Samnite territory, from where the conquest of Campania and southern Italy originated. The Etruscan evidence lends more support to the notion that the native alphabet letters used to represent /f/ were probably used for [f] and [β]. This allows us to extend the pronunciation observed in Oscan, and also Umbrian and hinted at in Paelignian and South Picene, to all the Italic languages other than Latin: thus I assume that the main word-internal reflex of *-bh-, *-dh-, and *-g^wh-, /f/, was pronounced as a voiced labial fricative [β].

3.10 The Italic reflexes: Summary

This chapter has given a thorough, critical review of the evidence for the Italic development of the PIE voiced aspirates, considering for each language first what constitutes reliable lexical evidence, and then moving to a phonological and phonetic interpretation of the reflexes. After a brief account of the Latin development, the main discussion concentrated on the languages other than Latin. In this way I have established the Italic reflexes for the PIE voiced aspirates. We are also in a position to answer the three questions posed at the beginning of the chapter.

²¹⁵ The first Delian inscription to contain an Italic name dates to 193 BC; Durrbach (1921 no64).

- 1 *It seems more than likely that the reflexes for the PIE voiced aspirates in all the Italic languages showed a split distribution, voiceless in word-initial position, voiced in word-internal position.* All the Italic languages show /f/ for word-initial *bh-, *dh-, and *g^wh-. In Latin this was pronounced as a voiceless fricative [f], and this was probably also the value in the other Italic languages as well (explicitly for Oscan). Word-internally, Latin shows voiced stops /b/ and /d/ for *-bh- and *-dh- and /w/ for *g^wh-. The other Italic languages together show /f/ for all three voiced aspirates. Our consideration of the evidence suggests that the once traditional interpretation of this sound must change: word-internally Italic /-f-/ was pronounced as a voiced labial fricative [β]. The strongest evidence exists for Oscan, but there are also indications, if late, for Umbrian, and hints to the same effect are found in South Picene and Paelignian. Drawing the evidence together with the conclusion that the letters for Oscan and Etruscan /f/ could clearly represent both [f] and [β], we may assume that in the Italic languages other than Latin, /f/ was pronounced as a voiced fricative in a voiced context word-internally. The main Italic reflex for *gh is /h/ (only Faliscan diverges with /g/). Indirect evidence suggests that this too was voiceless word-initially and voiced word-internally, at least before its loss between vowels which is attested in most Italic languages.
- 2 *A number of conditioned treatments of the PIE voiced aspirates are attested across the Italic languages, both by place of articulation of the original stop,²¹⁶ and by its position in certain clusters: following a nasal; following a sonant nasal; and in clusters with *s or *t.* In both Umbrian and Latin the development following a homorganic nasal was to a voiced stop, but another change in Umbrian suggests that this development was not shared. It seems likely however that following a nasal the reflexes of the voiced aspirates retained their voicing. The treatment following a sonant nasal seems to have been either to stop or fricative (Oscan), but this depended on the place of articulation of the voiced aspirate concerned. Voiced aspirates in clusters with *s/*t show voiceless reflexes which probably go back to conditioned treatments in common Italic.
- 3 *It is not easy to assume a common Italic voicing of fricatives word-internally in a voiced context.* If the Italic reflexes were voiced word-internally in the historical period, do they continue an earlier voiceless fricative stage (as Ascoli), or do they continue inherited voicing (as Rix)? That Lat. /b/, non-Latin /f/ can also continue reflexes of *-s-/*-ss- in certain environments shows that it is certainly possible for these sounds to continue earlier voiceless fricatives (as Ascoli). If they do, we would need to assume a process of voicing to account for the historical reflexes. Late language-specific voicing

²¹⁶ There is only evidence in Latin (for *dh, *gh, and *g^wh) and possibly Oscan (if the development of *gh to Oscan /g/ after *ŋ is conditioned by the place of articulation of the voiced aspirate).

seems unlikely, so we would require a common Italic voicing, preferably a voicing of all (single) fricatives in a voiced context in word-internal position. The treatment of PIE *-s- in the Italic languages shows that we can assume such a process intervocally, but that we cannot do so for fricatives adjacent to a liquid. Given that the reflexes for the voiced aspirates occur both intervocally and adjacent to a liquid, any theory which assumes an early Italic voiceless fricative stage must also assume a two-stage voicing: the first (intervocalic), which took place in common Italic and which was shared with *-s-, and the second (adjacent to a liquid), which was language-specific, and which in most languages was shared with *-s-, but not in Umbrian, where the reflexes were voiced but *-s- was not.

We are now ready to begin evaluating the explanations for the development of the PIE voiced aspirates in Italic, which will be the subject of the next chapter.

The Traditional Arguments Reviewed

Now that the Italic evidence has been established, we are in a position to consider which, if either, of the two current explanations is the most appropriate. I begin by looking carefully at the arguments and evidence which tend to be used to support or reject either scenario. To recap, the two routes are outlined in Figure 4.1 (called here *Ascoli* and *Rix*), which incorporates the findings from Chapter Three, namely that the reflexes of the voiced aspirates in word-internal position were voiced in all Italic languages. (For the purposes of this discussion, I retain the label *Ascoli* to refer to the revised version of Ascoli's original proposal which includes a revoicing of fricatives in word-internal position, originally provoked by Rix 1957). *Ascoli* now requires devoicing of the voiced aspirates, then a change to fricatives, with revoicing in word-internal position. According to *Rix* the voiced aspirates become voiced fricatives which are then devoiced in word-initial position. The distribution of the Italic reflexes make a third account possible (Figure 4.2), which would assume devoicing and change to fricative in word-initial position, but a retention of voicing and change to fricative in word-internal position.

All accounts require a fricative stage. In previous discussions of the Italic development according to *Ascoli* and *Rix*, a key function of the traditional argumentation has been to establish that at some point in Proto-Italic this fricative stage was either voiceless or voiced in all positions in the word. The arguments which have been put forward fall into certain types or rest on certain types of evidence.

In this chapter I present a critical discussion of the traditional arguments, starting with those based on evidence referring to factors which are connected to the Italic languages themselves ('internal'), and then moving to those based on more general linguistic considerations ('external'). The arguments are further grouped together according to the criteria on which they are based. The order of the groups is arbitrary and does not imply anything about the relative importance of the evidence in establishing or rejecting a theory (there is some variation in the literature in the degree of importance attached to the evidence put forward). The conclusions of the review are negative. It becomes clear that arguments of this type are inconclusive and recourse to alternative criteria is advisable.

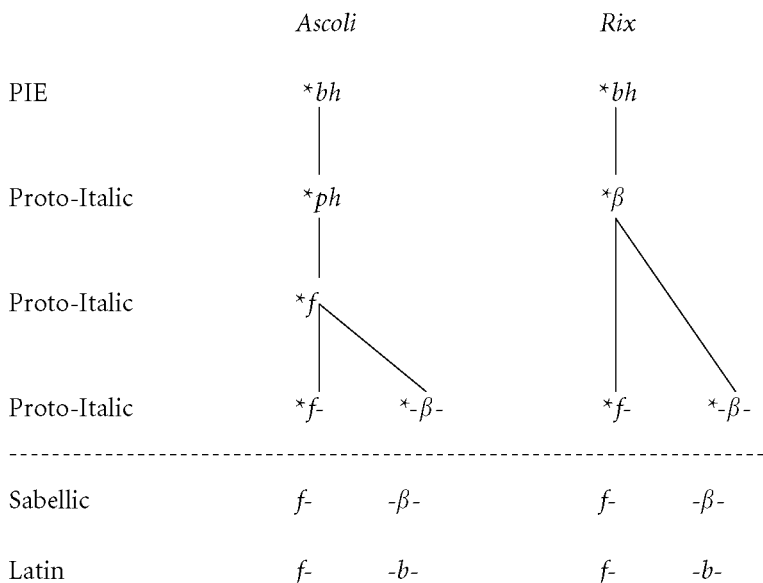


FIGURE 4.1 The revised *Ascoli* and *Rix* explanations for the main Italic development of the PIE voiced aspirates after a review of the Italic evidence. ($*bh$ is taken to represent the series as a whole. $f-$ indicates word-initial; $-\beta-$ indicates word-internal.)

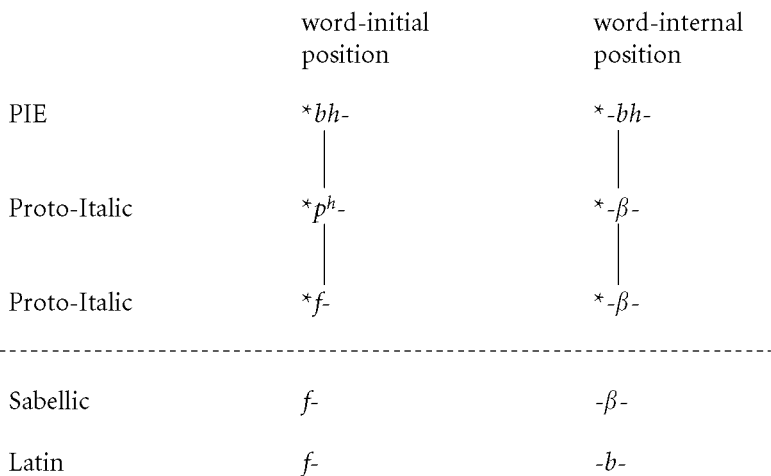


FIGURE 4.2 A third possible explanation for the Italic development of the PIE voiced aspirates

4.1 The traditional arguments—internal

The arguments which I consider to be based largely on reference to Italic, and therefore factors internal to the language group, may be grouped into four categories: the Italic reflexes; loanwords; conditioned changes; and the treatment of *-s-.

4.1.1 The Italic reflexes

From the earliest discussions of the Italic development, the nature of the Italic reflexes themselves has been important in determining the nature of the explanation which was put forward, with voiceless reflexes being used to point to *Ascoli* and voiced reflexes to *Rix*.

Until recently it was assumed that the Sabellic and Faliscan fricatives were voiceless in all positions in the word. It is therefore not surprising that it was assumed that the Proto-Italic fricative stage was also voiceless.¹ While this view has changed, this does not render *Ascoli* redundant, since it is possible—though not easy given the evidence of the treatment of *-s- (see Chapter Three)—to reconstruct a common Italic voicing of voiceless fricatives in word-internal position.

Rix (1957) was the first to suggest that Oscan /f/ might have been pronounced as a voiced fricative word-internally early in the historical period, and he took the historically attested voicing of /-f-/ as [β] in the Campanian coin inscriptions as direct evidence for the retention of earlier Proto-Italic voiced fricatives.² This was followed by Untermann (1968: 485), and Steinbauer (1979) and Meiser (1986: 73f.), who added the later South Oscan evidence and some indications for a similar interpretation for Umbrian respectively.

Rix's point that the presence of voiced fricatives in Oscan made *Ascoli* more difficult was reasonable, since at that time *Ascoli* had not been reformulated to allow for word-internal voiced fricatives in Sabellic. However, it is more difficult to argue that these reflexes are evidence for an earlier Proto-Italic voiced fricative stage in all positions in the word, since we know that PIE *s was voiced in word-internal position during the history of Italic. The Sabellic evidence simply pulls these languages into line with Latin for which a word-internal voicing had always been assumed within *Ascoli*. Word-internal voiced reflexes can be achieved in all the Italic languages by either explanation. The question is rather how plausible such a common Italic word-internal voicing might be.

¹ See e.g. *Ascoli* (1868: 250); (1869: 426); Buck (1928: 97f.); Szemerényi (1952/3 [1987]: 645); Allen (1958: 102/3); Leumann (1977: 164). The importance of this argument for *Ascoli*'s theory is also noted by supporters of *Rix*: 'Hauptstütze': Untermann (1968: 485); 'stärkster Beweis': Steinbauer (1979: 41); Meiser (1986: 75, n1).

² For Rix, the coins were direct evidence for /-f-/ as [β], that of Σάβιου was indirect (see pp. 147–50).

A similar type of argument is found in Pisani (1940: 362/3), who argued that the presence of voiced stops word-internally in Venetic points to original Proto-Italic voiced fricatives. While Venetic is generally thought to show voiced reflexes for the PIE voiced aspirates (e.g. Lejeune 1974), the disputed position of Venetic itself hardly allows the treatment to be used to decide matters for a reconstructed stage in Italic.

Pisani (1940: 363f.) also argued that PIE **-gh-* became */-g-/* in Latin, and that this was evidence for the continuation of earlier voiced fricatives.³ Even if Pisani is right, and this seems unlikely as the regular Latin treatment of word-internal **-gh-* was */-h-/*, this sort of evidence presents the same difficulties as that of the word-internal voiced fricatives in Sabellic.

In many cases the actual reflexes of a reconstructed sound can be a good indication of the stages that preceded them, but here, the distribution of the Italic reflexes, word-initial voiceless fricatives and word-internal voiced stops or fricatives, is not helpful for establishing the general voiceless or voiced common Italic fricative stage required by *Ascoli* or *Rix*. A better way to account for the Italic reflexes would be the third scenario given in Figure 4.2, which assumes a split development from the beginning.

4.1.2 *Loanwords*

Loanwords have played an important role in the debate, and in particular in support of *Rix*. The loans are either Italic words in other languages, whose spelling is taken as reflecting an earlier stage of Italic phonology when there were generally voiced or voiceless fricatives, or are words from other languages borrowed into Italic, which, it is argued, can only be explained if we assume that the Italic sound system had (voiced) fricatives at the time of the loan. The languages concerned are usually foreign, Greek, Illyrian or Etruscan, but loans within Italic, between Latin and Sabellic, have also been presented as evidence.

The first loanword to be used was Greek *λίτρα* (cf. Lat. *libra* ‘pound’), which Schulze (1895: 223f.) interpreted as a loan from an Italic dialect spoken on Sicily, with Gk <τ> for Proto-Italic **-θ-* (cf. Gk *Μίτρα-* for Av. *Miθra* ‘Mithras’). Schulze argued that *λίτρα* was proof of a common Italic voiceless dental fricative stage for the development of **-dh-*. The argument was quickly adopted as firm evidence for a voiceless fricative stage and is still given in handbooks today (see e.g. Brugmann 1897: 535; Sihler 1995: 139).

Objections against the validity of *λίτρα* in establishing a common Italic voiceless fricative stage were soon raised (e.g. Bonfante 1934: 79f., 91–2; Maniet 1954: 110). It was argued that the word was probably not borrowed from an Italic

³ Meiser (1986: 73) also gives the voiced word-internal reflexes in Latin as evidence for an earlier voiced fricative stage, together with initial */g-/* <**gh-* before **l/*r*.

dialect at all, but rather from an IE language of Sicily, Sichel-Ausonic, in which the voiced aspirates become voiceless stops. Thus *λίτρα* could say nothing for the Italic treatment of the voiced aspirates.

The suggestion that the word could be a loan from Sichel-Ausonic was later redeployed to the advantage of *Ascoli* by Szemerényi (1952/3 [1987], followed by Leumann 1977: 171). Szemerényi used *λίτρα*, together with a number of other words (e.g. *Αἴτνη*, *Rutulī*), to argue that in Sichel-Ausonic the voiced aspirates became voiceless stops, and, since he assumed this change also for Latin and Sabellic, he claimed that Sichel-Ausonic was in fact an IE language closely related to Italic. The devoicing of the voiced aspirates in Sichel-Ausonic lent more weight to the assumption that the voiced aspirates devoiced in Latin and Sabellic, since devoicing is rare in the Indo-European languages, and so must have happened at a time of ‘common Italic’ unity, shared by Latin, Sabellic and Sichel-Ausonic.

It seems likely that *λίτρα* was borrowed into Greek in Sicily, and that <τ> represents a dental stop or fricative in the original word, which may be cognate with Lat. *libra*, and so from an IE language. The identity of the source language is uncertain though an Italic dialect seems unlikely. The language could have been Sichel, as Szemerényi suggested, but again this is not necessarily so. There were a number of non-Greek languages spoken on Sicily, but their remains are too scanty to allow proper classification. Some of these may have been IE and they may have shown a devoicing of *-dh-. Any of these could have been the source for *λίτρα*. It is difficult to move from here, as Szemerényi, to argue that the devoicing of this Sicilian language is in any way significant for the Italic development (Steinbauer 1979: 6).

A Greek loanword has also been used as evidence for a voiced fricative stage in Proto-Italic. This is Gk *Σάβνιον*, which Rix (1957) suggested represents Sabellic **saβnyom*, cf. O. **saβnim** (e.g. Sa 4), Lat. *Samnium*, with Gk <υ> noting a voiced labial fricative [β], the realization of Oscan word-internal /-f-/ (see Chapter Three). He took this form as indirect evidence that voiced fricatives had existed in Sabellic, and hence that the voiced aspirates became voiced fricatives in common Italic (also Meiser 1986: 73). Rix was adamant that *Σάβνιον* and the early evidence of the Campanian coins, which both attest voiced fricatives for historical Oscan or just before, gave the missing evidence required to establish that the voiced aspirates became generally voiced fricatives, and not voiceless fricatives, in Italic.

Rix’s interpretation of *Σάβνιον* seems right, in that it may well represent a voiced fricative for Oscan just before our written texts. Used as evidence for a general voiced fricative stage, however, it is subject to the same reservations expressed above towards arguments which stated that voiced reflexes support the reconstruction of Proto-Italic voiced fricatives in all positions in the word. It seems likely that Oscan, and indeed Sabellic and Faliscan, all showed voiced fricatives in word-internal position. However, while these could continue earlier

Proto-Italic voiced fricatives, they could equally result from the voicing of earlier voiceless fricatives.

Etr. **Θefariei** (Cr 4.4, 4.5) is given as an Italic loan in Etruscan, cognate with Lat. *Tiberius*, which supports an earlier voiced fricative stage (Steinbauer 1979; Meiser 1986: 73). The representation of the name on the Pyrgi Tablets, with Punic ~ Etr. <f>, clearly points to a voiced labial fricative [β], and it is implied that this represents the original voicing of the fricative in the Sabellic form. There is some uncertainty as to whether **Θefariei** is of Italic origin (Szemerényi 1966 [1987]). Even if it is, it cannot be used to argue that the pronunciation of early Sabellic /-f-/ was [β]. The Pyrgi representation does point to a voiced fricative, but, while this could have been the pronunciation of /-f-/ in the Italic form, the voicing could also be the result of phonetic processes within Etruscan after the word was borrowed.

Loans in the other direction, that is, of foreign forms into Italic (Latin), have also been put forward to support a change of voiced aspirate to voiced fricative (e.g. Pisani 1940: 358–9). Words such as Lat. *Faunus* (cf. Lat. *Daunus*), or Lat. *fascinum* ‘witchcraft’ (cf. Gk βάσκανος) are taken as prehistoric loans from Illyrian. The words were borrowed when both languages had voiced fricatives—Illyrian *β was taken over into Italic as *β, which then became *f*- regularly. The point of the argument is that Italic must have had voiced *β and not voiceless *f, otherwise the Illyrian sound would have been represented by a voiced stop, as in Lat. *Daunus*.

Lat. *d*-/Gk β- in Lat. *Daunus*, Gk βάσκανος may indeed be explained by assuming that the words are Illyrian loanwords. The words could have been borrowed into Latin from Illyrian (or possibly Thracian) forms which showed voiced stops (*d*-, *b*-) from PIE voiced aspirates (Leumann 1977: 167). This explanation is speculative, however, since our knowledge of Illyrian, let alone Illyrian phonology, is scanty (cf. e.g. Cowgill 1986: 55–6). The argument that *Faunus* and *fascinum* were borrowed from Illyrian when Italic had voiced fricatives is more difficult, since it is impossible to establish that the Latin words are not just Italic cognates, which developed regularly.⁴ The evidence cannot be used to support a common Italic voiced fricative stage.

Certain Italic words have also been interpreted as loans, and used to support a voiced fricative stage for common Italic, but here the borrowing was seen as taking place within Italic. Two words are usually mentioned. The first is Lat. *nebrundinēs*, which Pisani (e.g. 1940: 362–1) argued was a loan from a Sabellic dialect when both Sabellic and Latin had voiced fricatives, otherwise Latin would show *-f-* not *-b-*. The second is the Latin river name *Tiberis* (also *Tibur*), which is taken as a loan in the other direction, from Latin into Sabellic, cf. Sab. *Tifernum*. Lat. *β- was then devoiced to *-f-* in Sabellic (Pisani 1940: 362).

⁴ For Szemerényi, the forms are loans from Illyrian, but at a stage when the voiced aspirates were still retained, e.g. **dhaun-* (1952/3 [1987]: 638–9; also, 685, n1).

It is difficult to accept these forms as evidence for earlier voiced fricatives in Italic, mainly because all show regular treatments of the voiced aspirates for the language concerned. If continuing voiced aspirates, /b/ in both *nebrundinēs* and *Tiberis* could be the result of either a voiceless or voiced fricative stage ('nicht beweiskräftig': Rix (1957: 140, n.63) (on *nebrundinēs* see Szemerényi 1952/3 [1987]: 640).

Most of the loanwords put forward in support of Rix are difficult. The most reliable is *Σαύμιον*, but this can hardly be taken as evidence that the voiced aspirates became voiced fricatives in the first instance. *λίτρα* is often cited for *Ascoli*, but as we have seen, this too does not help to establish a voiceless fricative stage for Proto-Italic. The evidence of loanwords is inconclusive.

4.1.3 *Conditioned changes*

An argument which has been important for some (e.g. Szemerényi) is the treatment of the voiced aspirates in a certain phonetic environments, which is then taken to indicate that the development as a whole followed a route via voiced or voiceless fricatives. The treatments concern the clusters **-sdh-* [-zdh-], **ghl-/ghr-*, and following a nasal.

4.1.3.1 *The treatment of *-sdh- [-zdh-]*

The PIE cluster **-sdh-* was assumed to be phonetically **-zdh-*. The development of this cluster, via a voiceless aspirate stage **-sth-*, is taken to the most plausible development for the Latin words *hasta* 'spear', *custōs* 'guard', and *uastus* 'empty, waste' which are all assumed to go back to PIE forms with the cluster **-sdh-* (Szemerényi 1952/3 [1987]: 645f.); Meiser (1998: 101).⁵ *aestus* 'heat', *aestās* 'summer' are also mentioned, assuming that /-st-/ comes from an earlier **aizdh-*, although here **-zdh-* must be derived from an earlier **-d^zdh-* < **-ddh-*, from **-dht-* (see e.g. Leumann 1977: 168; see pp. 151–2). The devoicing of **dh* in these words is taken as evidence that there was a general change to voiceless aspirates as per *Ascoli* ('eines der stärksten Argumente': Meiser 1998: 119). Conversely for Rix words were found which required the opposite development of the same cluster, that is a voicing of **-sdh-* [-zdh-] to **-zd-* which then became Lat. /-d-/. Of these, *audiō* 'I hear', if from **awisdheH₁-* would show an original cluster **-sdh-* (so Steinbauer 1979: 89–90, 95), while *crēdō* 'I believe' would continue the reconstructed stage **-zdh-* from earlier **-d^zdh-* (so e.g. Pisani 1940: 358). Again, a voiced outcome was argued to demonstrate a Proto-Italic voiced fricative stage. In each case the etymologies of the words for the alternative development were either rejected (against **-sdh-* [-zdh-] > /-d-/, Szemerényi 1952/3 [1987]: 650f.;

⁵ Szemerényi (ibid. 653–4) also gives *uespa* 'wasp', with /-sp-/ < **-ps-* < **-bhs-*.

against **-sdh-* [-zdh-] > /-st-/, Steinbauer 1979: 84f.), or were changed to fit (*crēdō*, Szemerényi 1952/3 [1987]: 65of.; *aestus*, *uespa*, Steinbauer 1979: 86–8, 9of.).

The strength of this evidence is compromised to a large extent by the unreliability of the etymologies of the words concerned (see e.g. Rix 1957: 143). The best evidence for the outcome /-st-/ for **-sdh-* seems to be *hasta*, although even this can be derived from a form without a voiced aspirate (**ghasto-*, e.g. Maniet 1954: 111). The derivation of *aestus* from **aidh-tu-* on the other hand is relatively secure, but here we have the problem that **-zdh-* is an assumed stage in the development from **-dht-*, unsupported by any comparative evidence, and so is really evidence for a change of **-dht-* > /-st-/, which always shows a voiceless outcome. The evidence for **-sdh-* to /-d-/ is equally problematic: the etymology of *audiō* is far from certain, and *crēdō* like *aestus* only shows **-zdh-* as a reconstructed stage, this time from **-ddh-*.

Even if any of the forms can be shown to go back to PIE **-sdh-* [-zdh-], as perhaps *hasta*, there is a more fundamental problem with this type of evidence. In all cases the change of **-dh-* occurs in a particular environment, following **s*. Both explanations make it clear that the development is conditioned by the preceding **s*, since in neither case a fricative stage is assumed: either **-sdh-* [-zdh-] > **-sth-* > /-st-/ (Szemerényi 1952/3 [1987]: 648), or **-sdh-* [-zdh-] > **-zd-* > /-d-/ (Steinbauer 1979: 90). We cannot use a conditioned development involving a single voiced aspirate in one phonetic environment, to ascertain the main treatment of the voiced aspirates.

Before we put this evidence aside, we need to deal briefly with an associated issue, namely Bartholomae's Law in Italic. Bartholomae's Law refers to a voicing assimilation by which clusters of the shape **-bht-*, **-dht-*, etcetera (Bartholomae clusters), became **-bdh-*, **-ddh-*, etcetera (for discussion with references, see Collinge 1985: 7–11). There is good evidence for this process only in Indo-Iranian, but despite this, the change has been assumed for Indo-European,⁶ and is commonly given as such in handbooks on Latin or Italic (e.g. Leumann 1977: 164; Buck 1928: 86). In Italic all possible Bartholomae clusters are continued by voiceless reflexes. These are all usually explained as having gone through the voicing process of Bartholomae's Law, followed by analogical reformation which accounts for the voiceless outcomes.⁷ The cluster **-dht-* always becomes /-s(s)-/, like the treatment of 'dental + dental',⁸ with the exception of *aestus*, where we find /-st-/.⁹ The usual change is only found in **-to-* participles (e.g. *iussus*

⁶ See e.g. Mayrhofer (1986: 115–16); Szemerényi (1989: 109) rejects Bartholomae's Law outside Indo-Iranian.

⁷ Words containing these clusters do not show any signs of the vowel lengthening found in **-to-* participles (and related forms) formed to roots with etymological plain voiced stops, described by Lachmann's Law: cf. e.g. *agō* 'I do/act', perf. pass. part. *āctus* (<**ag-to-*), beside *faciō* 'I do/make', perf. pass. part. *factus* (<**fak-to-*) (see e.g. Leumann 1977: 114); (see also Collinge 1985: 105–114).

⁸ See e.g. *passus* 'suffered' <**pat-to-*, *scissus* 'cut' <**scid-to-* (e.g. Leumann 1977: 197).

⁹ U. *ufestne* (IV 22) if from **-bhedhto-* might be an other example.

‘ordered’, *gressus* ‘went’), and so it has been assumed that *aestus* shows the regular treatment, and the participles as a whole show an analogical reshaping of the earlier cluster (e.g. Leumann 1977, 168; Meiser 1998: 124). Whether /-st-/ or /-s(s)-/ was the ‘regular’ development remains uncertain (even ‘dental + dental’ sometimes yields /-st-/, e.g. *comēstus* ‘consumed’ < **-ed-to-*; Sihler 1979: 164), though assuming analogical reformation for the participles is perhaps easier to accept than ad hoc instances for individual words.¹⁰ It is further claimed that /-st-/ in *aestus* from **aidhtu-* can only be explained from a stage **-zdh-* (cf. the original cluster **-sdh-* [-*zdh-*] > /-st-/ in e.g. *hasta*), and it is here that Bartholomae’s Law must be invoked, since it is assumed that **-zdh-* can only come from **-d^zdh-* from an earlier voicing (**-ddh-*) of **-dht-*.

It is difficult to assume the operation of Bartholomae’s Law in (or before) Italic from the point of view of the Italic evidence.¹¹ The clusters **-bht-*, **-ght-* both show voiceless reflexes, which presume a common Italic **-pt-*, **-kt-*. If we do not assume a conditioned deaspiration and devoicing of these voiced aspirates before **t* (as e.g. Meiser 1998: 124) every form must be explained by analogical reformation (so e.g. Leumann 1977: 196). The double outcome of **-dht-* as /-s(s)-/ and /-st-/ is awkward, but is not necessarily helped by assuming the process of voicing required by Bartholomae’s Law. The assumption that /-st-/ can only arise from **-dht-* via the stages **-zdh-* < **-d^zdh-* < **-ddh-* is based itself on the observation that otherwise /-st-/ only derives from inherited **-sdh-* [-*zdh-*], hence the need to construct a route to achieve **-zdh-*. It might be more appropriate to admit that **-dht-* became /-st-/, like **-sdh-*, and that the two developments may be related, but that we do not really know at what stage the reflex of **-dht-* fell together with that of **-sdh-*. Assuming the operation of Bartholomae’s Law in Proto-Italic in order to achieve the outcome of this single cluster seems awkward (and is probably phonetically unnecessary, *see further*, Chapter Six).¹²

4.1.3.2 *The treatment of *ghl-/ghr-*

The Latin treatment of **gh-* to /g-/ word-initially before a liquid, in for example *gradior* ‘I walk, go’ < **ghredh-*, or *glaber* ‘smooth’ < **ghladhros*, has been given as more evidence that the voiced aspirates became voiced fricatives generally in

¹⁰ The alternative is to assume that in Italic before **t* the dental voiced aspirate fell together with **t* and **d*, and that **dh* shared the general development of ‘dental + dental’, for which the regular outcome was /-s(s)-/. /-st-/ for **-s(s)-* would then be explained by analogy. For example, /-st-/ in *aestus* could be the result of analogy after /-st-/ in *aestās* if from **aidhto-tāt-s*, where **-dht-* became **-s(s)-* and /-st-/ was the resulting cluster after internal syncope.

¹¹ For a critical discussion of the Latin evidence, *see* Sihler (1979: 163f.).

¹² It may also be suspect typologically. The outcome of Bartholomae’s Law is a cluster with a voiced aspirate. Assuming that this voicing took place in Proto-Italic means assuming that voiced aspirates were continued as such phonetically in Proto-Italic, in these clusters at least.

Proto-Italic, on the principle that a voiced reflex indicates a previous voiced fricative (see e.g. Steinbauer (1979: 94–5); Meiser (1986: 74); Meiser (1998: 101)). The treatment has also been given by supporters of *Rix* as a weakness in *Ascoli* on the grounds that the voicing of *χ- before */*r can only be explained by an ad hoc voicing of the velar fricative, since the labial fricative was not voiced, and remained *f- in this position (e.g. *flōs* ‘flower’, *frāter* ‘brother’) (e.g. Steinbauer 1979: 53). If a conditioned voicing of the velar is not acceptable (e.g. Sommer 1914a: 52), then a special explanation could be assumed alongside the *Ascoli* changes, such as Walde’s dissimilation rule (Walde 1906), according to which the sequence ‘voiced aspirate + Liquid...voiced aspirate’ became ‘voiced stop + Liquid...voiced aspirate’, so *ghradh- > *gradh- (Szemerényi 1952/3 [1987]: 638).

The dissimilation proposed by Walde is uncertain and is rejected by Steinbauer (1979: 53). The voicing of the velar fricative might seem difficult for a voiceless fricative stage, but the appearance of a voiced reflex is not in itself proof that the voiced aspirates generally became voiced fricatives (see our discussion of the Italic reflexes on pp. 146–7). Moreover, the accusation that Lat. /g-/ can only be explained by an ad hoc voicing of the velar in *Ascoli* can be countered by the observation that *Rix* requires a similarly ad hoc process for the labial fricative, given that we find *fl-* and not **bl-*. Clearly, it is possible to achieve the Latin reflex via a voiced or a voiceless fricative stage. A more serious problem with the evidence is that it clearly reflects a conditioned change, limited only to the velar voiced aspirate, and so it can have no bearing on the main development.

4.1.3.3 The treatment of voiced aspirates following a nasal

After a homorganic nasal the voiced aspirates appear as voiced stops in Umbrian and Latin. While we might expect these stops to be the result of a Proto-Italic conditioned change of the voiced aspirates following a nasal (cf. e.g. Meiser 1998: 102), other changes in Umbrian phonology make this a difficult assumption.

In Umbrian inherited clusters of ‘nasal + stop’ became assimilated, so for example *ponne* ‘when, if’ (VIa 59) < **pon-de* < **k^wom-de*; Meiser (1986: 93–5). Moreover, the evidence of Umbrian *umen* ‘nail’ (e.g. Ila 19) < **omben* < **ong^wŋ*, cf. Lat. *unguen* (Meiser 1986: 77), shows that this assimilation process was still taking place after the labialization of the PIE labiovelars, and thus in common Sabellic. The outcome of the sequence ‘nasal + voiced aspirate’ is ‘nasal + stop’, cf. for example *cringatro* ‘belt’ (VIb 49) < **krenghatro-* and there is no evidence of assimilation of this cluster. If we accept the evidence of *umen*, we have to conclude that the voiced aspirates cannot have shown a conditioned change to plain voiced stops after a nasal in common Italic, since if this had happened, the resulting sequence should have become assimilated along with the inherited

clusters. While phonetically counter-intuitive, we must assume that the voiced aspirates changed to something other than a stop following a nasal, and a voiced fricative is a likely possibility. The assumed change to voiced fricative after a nasal is given as evidence for the general change of voiced aspirate to voiced fricative assumed by *Rix* (Meiser 1986: 77).

Meiser's explanation for the Umbrian stops is plausible, but the change in this position is clearly conditioned (the dental stop retains its place of articulation). The reflexes cannot be used to argue for a voiced fricative stage. Furthermore, it would be plausible to assume a preservation of voice conditioned by the preceding nasal alongside the main devoicing proposed within *Ascoli* (fully voiced stops are often produced with prenasalization).

Considerable importance has been attached to the evidence given by words showing developments of the voiced aspirates in particular phonetic environments, and implications drawn from these have been extended to argue for a general voiced or a voiceless fricative stage for common Italic. Beside other problems, this evidence is subject to a general difficulty, namely that it relies on conditioned treatments. These changes cannot be regarded as representative for the main development of the voiced aspirates, and so are inconclusive for any discussion of how this took place.

4.1.4 The treatment of PIE *-s-

Parallels with the treatment of PIE *-s- have figured prominently in defence of *Ascoli*. These consider the change of word-internal *-s- and the particular Latin treatment of *-sr- to /-br-/.

Ascoli himself supported the Latin voicing of the common Italic voiceless fricatives with the parallel voicing of *-s- to /-r-/ between vowels or resonants in Latin (1868: 251). This view was followed by others, such as Sommer (e.g. 1914a: 54, n1), but is rejected by Leumann (1977: 170), on the grounds that *-s- was also voiced in Sabellic, where /f/ is voiceless. The parallel is not weakened by the additional evidence that Sabellic and Faliscan /-f-/ was voiced.

However, the consideration of the Italic treatment of word-internal *-s- in the last chapter shows that while we may assume a common Italic voicing of *-s- intervocally it is not possible to assume common voicing of fricatives adjacent to a liquid. Thus if an explanation is put forward which proposes a voiceless fricative stage, this must also assume either a two-stage voicing process, partly shared with *-s- (intervocally), or a single-stage process which was not shared with *-s-, since *-s- is not voiced adjacent to a liquid in Umbrian. Thus this apparent parallel turns out not to be as useful for *Ascoli* as it might appear.

If we step back, it may even be a mistake to try to link the development of the voiced aspirates with the behaviour of *-s- at all. Other examples of the voicing

of fricative systems show that /s/ may or may not be included. For example, Verner's Law in Germanic includes /s/, while the voicing of intervocalic fricatives in Old Icelandic does not (Krahe 1963; Arnason 1988).

The change of PIE **-sr-* to Lat. /-br-/ which, like the change of **-dh(r)->* Lat. /-b(r)-/, assumes a change of dental to labial place of articulation, has also been given as evidence of a voiceless fricative stage (see e.g. Leumann (1977: 171); Sihler (1995: 139–40)). This is largely based on the assumption that the change of place of articulation can only be achieved at a voiceless fricative stage, which is not correct. But Leumann provides a further reason. If **-sr-* became voiced to **-zr-* (or **-ðr-*), this would have resulted in 'longvowel + r', since **-s-* regularly voices and assimilates to a following voiced consonant, which is then simplified with compensatory lengthening (Leumann 1977: 204). When **-sr-* does not become /-br-/, it is found as /-r-/, cf. e.g. *dīruō* 'overthrow' < **dis-ruō*.

It seems likely that the regular treatment of **-sr-* is to /-br-/, and not to 'longvowel + r' as the latter change is limited to compounds where the prefix ends in **-s* and the root begins in **r-*, and can be explained by analogical extension from forms of the prefix where **-s-* was regularly lost with lengthening, for example *dīdō* 'distribute' < **dis-dō*, cf. *iūdex* 'judge' < **ious-dik-* (see e.g. Buck 1933: 149). While the change of **-sr-* to Lat. /-br-/ (and to Sab. /-fr-/) may have been linked with the merger of the dental fricative (< **-dh-*) with the labial fricative (< **-bh-*), it cannot be used to argue for a particular state of voicing for these fricatives.

The treatment of PIE **-s-* in Italic tells us little about the development of the PIE voiced aspirates, other than to remind us that voiceless fricatives could become voiced in Italic.

4.2 The traditional arguments—external

Alongside arguments for and against each theory based on considerations drawn from observations of the Italic languages, their historical development and interaction with other languages, we find from the earliest discussions, other types of argumentation being used which refer to various external factors.

4.2.1 *Phonetic plausibility*

When Ascoli put forward his explanation, he did so explicitly 'so braucht kein abnormer lautwandel mehr angenommen zu werden' (p. 250).¹³ Statements of

¹³ See, for example, Ascoli's discussion of previous theories to explain the Italic reflexes which he dismisses largely because they seem to propose phonetically implausible sound changes, e.g. Curtius' direct change **bh->*It. *f*. (Ascoli 1868: 246).

phonetic plausibility rest on general assumptions about which sound changes are plausible and possible. These assumptions are mainly based on observed or known parallel changes, but sometimes seem to be simply a matter of belief. In discussing the various arguments, we divide them into those which overtly refer to parallel changes, and those which are given as statements of fact (though they may rely on unstated knowledge of parallels).

4.2.1.1 *Stated parallels*

Ascoli (1868) himself was most careful to justify the changes he had proposed with parallel changes from Italic or other Indo-European languages. A more extensive discussion of the changes of the voiced aspirates from Proto-Indo-European into the Latin reflexes with reference to parallel changes is given by Allen (1958), who states his aim 'to provide a reasonable basis for the Latin developments in terms of phonetic probability, that is, with due regard to what can and does happen in other IE languages'; p. 101. Allen's discussion mainly concentrates on the developments subsequent to the devoicing of the voiced aspirates, since he regards this change as unproblematic.¹⁴ Here we consider briefly the use of parallels with regard to aspects of the main development assumed by each explanation.

The main parallel which supported the assumption of an Italic devoicing of voiced aspirates to voiceless aspirates was the reconstructed devoicing of the PIE voiced aspirates into voiceless aspirates in Greek. Further parallels with developments in Romany and Indic were also put forward. Ascoli's presentation begins with the treatment of the Sanskrit voiced aspirates, during which he points out that these show an independent devoicing to voiceless aspirates (or stops) in Romany. This provides an important parallel for the first stage of his explanation. The second, that of voiceless aspirates to voiceless fricatives, is given by reference to the history of the Greek reflexes. For Allen (1958: 100) too, the parallels for devoicing of Old Indo-Aryan voiced aspirates to voiceless aspirates in Romany and Indic establish the phonetic plausibility of the devoicing assumed by Ascoli.

There has been little mention of parallel changes in defence of *Rix*, which has mainly been supported by evidence internal to Italic. Nevertheless, one aspect of the theory as it was first presented caused alarm, namely the devoicing of voiced fricatives to voiceless fricatives word-internally in Sabellic (e.g. Cuny 1917: 259). A let-out was given by Maniet (1954: 114), who admitted that while such a change was unlikely, it is paralleled in the history of Spanish. Steinbauer (1979: 95) also expressed concern about the initial devoicing of the voiced fricatives required by

¹⁴ See also Wallace and Joseph's (1993) discussion of the plausibility of the reconstructed change $*-\gamma- > g$ in Faliscan by reference to parallel changes in Germanic (in response to Picard 1993).

Rix, which he took as ‘die größte Schwierigkeit’, since this change is so rarely attested.

4.2.1.2 General beliefs about phonetic plausibility

General views about the phonetic plausibility of sound change have played a significant role in the maintenance of *Ascoli* as standard. See, for example, Leumann’s (1977: 171) discussion where three of the five arguments given for *Ascoli* rest on phonetic plausibility. Either the changes given by *Rix* are thought to be unlikely or impossible, or the changes given by *Ascoli* are more plausible.

A general rejection of the steps required by an explanation assuming voiced fricatives, $*bh > *β > *f$ is found in Cuny (1917: 256), which he describes as requiring ‘l’évolution vraiment compliquée, sinieuse, et peu conforme aux enseignements de la phonétique générale’. More common has been the objection to *Rix* on the grounds of the phonetic implausibility of the assumed change $*ð > *β$ to account for Lat. /-b-/ , Sab. /-f-/ from $*-dh-$. This is said to be phonetically ‘quite unlikely’: see Szemerényi (1952/3 [1987]: 645), after Leumann (1928: 136); see also Leumann (1977: 171); Sihler (1995: 140). The change of $*zr > *βr$ to account for the similar change of $*-sr-$ to Lat. /-br-/ is regarded as even less credible: ‘phonetically simply impossible’: Szemerényi loc. cit.; see also Leumann loc. cit.; Sihler (1995: 139–40). The claimed impossibility of $*ð > *β$ is correctly rejected by Allen (1958: 103); also Steinbauer (1979: 6).

At the same time, *Ascoli* is also believed to contain stages which are more phonetically plausible. For example, Steinbauer (1979: 94–5) mentions the assumption of the voicing of the word-internal voiceless fricatives in Sabellic and Latin which he regards as more likely than the word-initial devoicing required by *Rix*. The change of word-internal $*-gh-$ to voiceless /-h-/ is also taken to be better explained by *Ascoli* which presumes a Proto-Italic voiceless fricative (e.g. Leumann 1977: 171), but this is rightly rejected by Steinbauer (1979: 6). This reflex does not presuppose an earlier voiceless fricative stage. Moreover, the fact that Italic word-internal /-h-/ was probably voiced makes the point irrelevant.

The general consensus which emerges from arguments of phonetic plausibility, whether based on parallel changes or statements of belief, is that *Ascoli* presents changes which are more likely than those of *Rix*. At the same time, however, we note that these arguments are largely inconclusive. While parallels have been found for *Ascoli* virtually nothing has been presented in support of the changes proposed by *Rix*, largely because the evidence which has been put forward has not resorted to this type of evidence. The statements about the phonetic likelihood of *Ascoli* are for the most part incorrect. Furthermore, most of these arguments are concerned with changes which took place after the original development of the voiced aspirates. There has been little discussion of the phonetic plausibility of the initial changes which are assumed.

4.2.2 *Miscellaneous arguments*

Four more arguments appear in the literature which do not fit neatly into the above categories. We consider them briefly below. Nothing compelling emerges.

Graeco-Italic unity was one of the main factors behind the presentation of Ascoli's account. Although this view was abandoned early (cf. Rix 1957: 139; but see Szemerényi's conclusions 1952/3 [1987]: 685), *Ascoli* was maintained, mainly because it seems clear that the change to voiceless aspirate could have occurred independently in each language (cf. e.g. Maniet 1954: 110; Allen 1958: 100).

A common Italic voiced fricative stage found support relatively early in Meillet's (1916) interpretation of the Latin word for 'ant', *formīca* < PIE **morm-*, cf. Gk *μόρμηξ*, which he argued should be explained as the result of a dissimilation of **morm-* to **βorm-*, with subsequent devoicing to *form-*. His point was that the nasal should dissimilate to a voiced fricative, and that it did, showed that common Italic had voiced fricatives. While the argument is ingenious, it does not establish that the voiced aspirates became voiced fricatives as Meillet claimed. Even if such a dissimilation took place, which is disputed (e.g. **morm-* > **bhorm-*: Szemerényi 1952/3 [1987]: 636), it does not tell us anything about the status (voiceless/voiced) of the fricative which **m-* became. There was only one fricative which **m-* could have become and the realization of this could have been voiced or voiceless. Even if **m-* had become a voiced fricative **[β-]* in the first instance, as there was no contrast of **β* and **f*, the sound would have assimilated to the voicing of the existing labial fricative (whatever that was). Thus the voicing of the dissimilated **m-* actually depends on the labial fricative with which it merged, and cannot be used in reverse, to determine the voicing of this fricative.

Pisani (1940: 360) argued that the PIE voiceless aspirates became voiceless fricatives, and since the reflexes of the voiced aspirates did not fall together with those of the voiceless aspirates, the development of the voiced aspirates must have been to voiced fricatives. The argument is difficult because voiceless aspirates tend not to be reconstructed for PIE, but even those who have done reject Pisani's suggestion (see e.g. Szemerényi 1952/3 [1987]: 642–4).

The final argument to be considered is that of 'economy'. The one advantage granted to *Rix* by Leumann (1977: 170) is that the proposed development is shorter (cf. also Untermann 1968: 485: 'einfacherer Weg'). Economy alone does not seem to be a particularly good reason to adopt a theory (cf. Elbourne 1998), and is not regarded as a useful argument here.

4.3 Summary and conclusions

This brief review of the traditional arguments used in defence of *Rix* and *Ascoli* is revealing. A number are simply inconclusive. Those which might be more useful,

for example, the Italic reflexes, or the notion of phonetic plausibility, either suggest another explanation, or require further exploration. I suggest that a possible way forward is to remain with the evaluative criterion of phonetic plausibility. In Chapter One I suggested that this could be defined in terms of 'phonetics' and 'parallels', that is, by comparing phonetic predictions for change drawn from applying a phonetic model of sound change to the sounds assumed for the starting point, with attested parallel changes. The next chapter is devoted to just this.

Phonetics, Predictions, Parallels

Until now I have argued (briefly) for a PIE starting point (voiced aspirates) and established as far as possible the Italic end point. These are connected by the two possible routes or pathways of *Ascoli* and *Rix*, though the distribution of the Italic reflexes opens up a third way. The usual arguments and evidence for the two usual explanations do not allow a conclusive decision for one or the other. We are still left wanting to know what the most plausible reconstruction for the route between PIE and Italic should be, and whether this is provided by the existing accounts.¹

If we accept that the initial mechanism of sound change is phonetic, and moreover that such an assumption is sensible for the Italic development, where the main changes result in the change of phonetic content of phonemic categories, it seems appropriate to define plausibility as ‘phonetic plausibility’. The problem is that if we use this criterion in its usual way, that is, by turning to our intuitions about how we think voiced aspirates might develop phonetically, or indeed have changed in the past, we run into difficulties. This is not surprising if we have little knowledge of the historical phonology of Indo-Aryan and little or no personal experience of these sounds. Even if we had such knowledge, applying it informally still might not be very helpful as it would not necessarily be comprehensive and systematic. For example, knowing that /bh/ may be pronounced as [β] in, for example Bengali, suggests that the first stage of *Rix* is possible, but without knowing the full scope of possible variation, we could not go on and declare *Rix* most plausible. Similarly, the fact that voiced aspirates became devoiced in Romany establishes the first stage of *Ascoli* as possible, but not necessarily more plausible than any other route. In both cases we would need to know the full range of possible variation and parallel changes against which to consider the proposed reconstructions. But there is a further, theoretical, problem with this approach. While diachronic changes frequently look as if they reflect synchronic variation, variation is not change. If we want to include phonetic variation as a source of evaluating phonetic plausibility, we need a theoretically-informed way of doing this.

In Chapter One, I outlined a current phonetic theory of sound change which offers a motivated connection between synchronic variation and possible sound change (e.g. Ohala 1993). The mechanism for the origins of sound change in

¹ I take it for granted that the changes reconstructed for both routes are possible.

Ohala’s model lies in the potential misinterpretation by the listener of unintended variation from the speaker which in turn arises from universal constraints on the speech production and perception system. Thus, following Ohala, it is possible to demonstrate what might be perceptually ambiguous for the listener as a result of articulatory, acoustic or perceptual constraints, and then to predict possible ‘mini’ sound changes (variation), and hence the potential scope for changes to the sound system (sound change).² The model allows one to take the sounds reconstructed as the starting point of the Italic development, and to consider systematically their phonetic characteristics and the likely constraints on their articulation, acoustic output and perception, and from there, to predict the potential variation which could become misparsed and result in sound change. In this way it is possible to predict the range of possible changes that these sounds could undergo against which I compare the first stages of the explanations for the Italic development. But I do not stop there. Having predicted possible variants which could arise, I immediately confirm these against reported synchronic variation, from either instrumental or auditory analysis. This two-stage process gives the pool of phonetic predictions for change. I then consider how well the phonetic predictions fare when compared against the attested parallel changes of voiced aspirates throughout the history of Indo-Aryan. The results of this chapter will provide the body of information that is needed to assess phonetic plausibility in the next.

5.1 Phonetics and predictions: The phonetics of ‘voiced aspirates’

In Chapter Two, I accepted the traditional reconstruction of the PIE starting point for the Italic development, assuming that the sounds in question were a series of ‘voiced aspirates’, that is stop consonants similar to those of Sanskrit. Contemporary descriptions of the Sanskrit ‘voiced aspirates’³ suggests that these sounds were similar to, or the same as, the sounds transcribed <bh> etcetera found in contemporary New Indo-Aryan languages such as Hindi, which are variously called ‘voiced aspirates’ (also ‘voiced aspirated’), ‘breathy voiced

² While an informal approach and that of Ohala may appear superficially similar, what distinguishes Ohala’s from the former is that the starting point for predicting variation (and hence sound change) are the constraints on speaking and perceiving speech common to all speaker—listeners.

³ The main sources are the *Prātiśākhya*s, phonetic treatises on the pronunciation of the four Vedas, the *Sikṣas*, general treatises on pronunciation, Pāṇini’s *Aṣṭadhyāyī*, and Patanjali’s *Mahabhaṣya*, all from the first millennium BC. The grammarians distinguished between aspirated and plain stops (both voiced and voiceless): aspirated stops were *maha-prāṇa* ‘big breath’, and plain stops *alpa-prāṇa* ‘small breath’. They also recognized different states of the glottis: open and closed, which produced ‘breath’ and ‘voice’ respectively, and intermediate, which was used in the voiced aspirates, which produced both ‘breath and voice’ together; see Allen (1953: 33f.).

stops', or 'murmured' stops.⁴ Hindi voiced aspirates are stop consonants which contrast with voiceless aspirates and plain voiced and voiceless stops and which give an auditory impression of 'voice' (some vibration of the vocal folds) and 'aspiration' (some 'breathiness'). Our approach to the evaluation to the Italic development requires a strongly realist stance on the nature of the PIE voiced aspirates (cf. e.g. Lass 1997: 27of.). What follows is based on the assumption, that: *the PIE voiced aspirates were phonetically similar to or the same as the voiced aspirates of Hindi and other New Indo-Aryan languages spoken today*. If Elbourne (1998) is right in resurrecting the voiceless aspirates for PIE, this restores the reconstruction of the voiced aspirates as an exact parallel to the series found in Sanskrit and most New Indo-Aryan languages.

The next step is to consider the phonetics of voiced aspirates. However, like their reconstructed counterparts, voiced aspirates in contemporary languages have been the subject of considerable phonetic debate. While the sounds are often called 'voiced aspirates', there has been some doubt as to whether they are produced with either 'voice' or 'aspiration' according to the usual definitions of these terms. The problem has been aggravated by the difficulty of providing an adequate phonetic description for the processes involved.

The dilemma is better understood if we look at the various processes involved in the production of 'voiced aspirates'. These may be illustrated by studying the production phases of a bilabial voiced aspirate [bh] between vowels (see Fig. 5.1):

- (1) The lips are open and the vocal folds vibrate 'normally' to produce voice for the vowel.
- (2) The lips come together to form the closure for the bilabial stop. The vocal folds continue to vibrate close together.
- (3) At some point during the closure the vocal folds move apart, but still vibrate.
- (4) The lips part to release the closure, and the vocal folds remain apart, still vibrating. A rush of air emanates from the lips. The auditory impression is of 'voice' and 'breath'. This is the 'breathy voice' or 'aspiration' phase.
- (5) The vocal folds move back together still vibrating, and return to 'normal' vibration for the following vowel, the lips still parted since the release of the stop.

The phonetic events are complex. Problems are presented by the co-occurrence of two recognized phonation types (cf. Catford, e.g. 1977: 93),

⁴ The term 'voiced aspirate' is a direct translation of the Latin *media aspirata*, given to the Indian stops by eighteenth-century Western missionaries. The sounds were seen as 'aspirated' versions of plain voiced stops. In their terminology, inherited from classical antiquity, aspirated stops were *aspiratae* and voiced stops were *mediae*. It is unlikely that the term was intended to give an accurate phonetic description of the sounds.

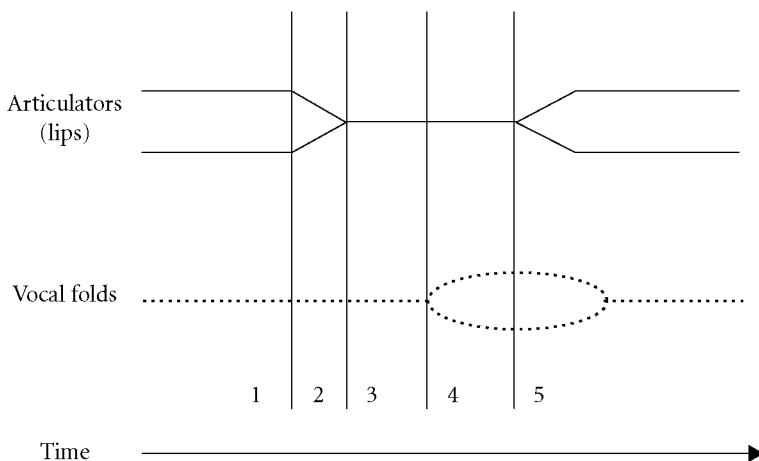


FIGURE 5.1 Schematic representation of the production of a bilabial voiced aspirate in intervocalic position (after Ladefoged 1993: 146; Dixit e.g. 1989)

'modal voice'⁵ and 'breathy voice' or 'murmur', and by the presence of high air flow, characteristic of 'aspiration' but accompanied by vocal fold vibration, during the 'breathy voice' phase. It is also difficult to describe the precise actions and configuration of the vocal folds, in particular during phase 4, and the timing of the glottal action with regard to the supralaryngeal articulations.⁶ Finding suitable terminology for the voiced aspirates has been central in the phonetic literature and elements also appear in discussions of the PIE voiced aspirates (cf. e.g. Salmons 1993: 56). Given this, I offer a very brief summary of three main approaches, noting that this is a discussion of terminology.

One approach is to refer to the sounds as 'murmured' or 'breathy voiced' stops (e.g. Ladefoged 1993: 139f., 2001: 129; Ladefoged and Maddieson 1996: 48f., 59f.). The rationale is as follows. The phonetic phenomena that occur on closure, particularly on release of the stop, do not fit neatly into the traditional definitions of 'voice' or 'aspiration'. 'voice' usually refers to a state of the glottis when the vocal folds are held close together (adducted) and vibrating quasi-periodically. However, during the release phase of a voiced aspirate, the vocal folds are apart when vibrating. 'aspiration' is often defined as a 'period of voice-lessness after the release of an articulation' (e.g. Ladefoged 1993: 292),⁷ which clearly excludes the voiced aspirates, since the period of airflow on articulatory release is

⁵ By 'modal voice' (after Laver 1980), I refer to 'regular' voicing, i.e. quasi-periodic vocal fold vibration with the vocal folds adducted.

⁶ For detailed discussion of the physiology of the larynx, and associated terminology, see, among others, Laver (1980: 99f.), Sawashima and Hirose (1983), Stevens (1998: 5ff.).

⁷ Note that the definitions in Ladefoged and Maddieson (1996: 48–50) are slightly different. 'aspirated' is defined in terms of airflow and the position of the arytenoids (without reference to

not voiceless. If we redefine aspiration in terms of voicing lag or (positive) Voice Onset Time (VOT), that is, onset of voicing after release of closure, voiced aspirates are 'aspirated', in that they show positive VOT values, since there is a clear time between release and return to modal voicing (e.g. Ladefoged *et al.* 1976: 162).⁸ However, there is a complication since voiced aspirates show both voicing lead and voicing lag (e.g. Poon and Mateer 1985). Moreover it is difficult to use such a measure to separate these stops from other series.⁹ These considerations led Ladefoged to prefer a different term for the phonation type during the 'aspiration' phase, hence 'murmured' or 'breathy voiced' stops.¹⁰

The approach of Catford (e.g. 1964), followed largely by Laver (e.g. 1994: 184f.) results in the term 'whispery voiced stops'. Within this framework, the entire possible range of phonatory settings and their combinations are described, and then language-specific examples are classified accordingly. Catford's (1964) first presentation identified four main stricture types (breath, whisper, voice, creak). 'breath' and 'whisper' are defined according to size of glottal area and associated airflow, with breath produced with the glottis wide open and low velocity turbulence (auditory 'hushing') and whisper produced with the glottis constricted to a quarter of the maximum area and consequently turbulent airflow. 'voice' refers to quasi-periodic vibration of the vocal folds under pressure from above or below, resulting in a quasi-periodic sound; the glottal area is small. Stricture types may co-occur, and the two of interest are 'breathy voice' and 'whispery voice'. Glottal configuration also plays a role. In 'breathy voice' the glottis is said to be relatively wide open with turbulent airflow and vibration of the vocal folds, which 'do not meet at the centre line. They simply flap in the breeze' (Catford 1964: 32), resulting in a 'sigh-like' mixture of breath and voice. In 'whispery voice', the glottis is narrowed for whisper and the vocal folds are vibrating 'but not occluding'. Catford (1977: 99) revised his definition to include the two different glottal configurations identified by Ladefoged (1993), one during which the 'arytenoid cartilages are somewhat separated, so that there is a whisper-generating chink at the posterior end of the glottis, while the vocal folds . . . are vibrating normally' and another where there is 'no localized chink, but the vocal folds are relaxed and vibrate without ever closing completely'. In (1988) Catford returned to a single configuration. Catford (1964) suggested that the phonation

vocal fold vibration), while modal voice refers to 'regular vibrations of the vocal folds at any frequency within the speaker's normal range'. 'breathy voice' is defined in terms of vocal fold vibration without appreciable contact, with the arytenoids further apart than in modal voice, and with a higher rate of airflow than in modal voice (500 ml/s).

⁸ Note that the original proponents of VOT, Lisker and Abramson (1964) did not expect VOT to be useful for characterizing voiced aspirates.

⁹ An alternative attempt to address this problem is made by Davis (1994), who uses acoustic data from Hindi stops to propose a new measure, 'noise offset time' to distinguish the four stop series.

¹⁰ The term 'murmur' seems to have been used first by Bell (1867: 46), when describing a particular state of the glottis during which 'whisper and voice [are] heard simultaneously; a vocal murmur modified by breath-friction in the super-glottal passage'.

type of the voiced aspirates was 'whispery voice (or possibly 'breathy voice'). In 1977 (also 1988: 55) he revised this to 'whispery voice', noting that 'whispery voice' is 'often referred to in the literature as 'murmur' or (incorrectly) [within his terminology] as 'breathy voice' (p. 100). His claim is refuted by Dixit (1987a: 147), who argues that the glottal opening actually found during the production of voiced aspirates is 'twice as wide as required [by Catford] for such a phonation'. Observations would point to 'breathy voice' as more appropriate.

Laver's definition (e.g. 1980) largely follows that of Catford, although he goes further in suggesting that muscular tension is also a factor in distinguishing 'whispery voice' from 'breathy voice'. He begins by identifying a 'neutral' mode of vibration of the vocal folds which is 'periodic, efficient, and without audible friction', and which he labels 'modal voice'. This is contrasted with other modes of vibration such as 'breathy voice' where the vibration is 'inefficient and with slight audible friction', or 'whispery voice' where there is 'strongly audible friction' (p. 95).¹¹ Laver (1980: 133) acknowledges that it is difficult to discern 'breathy' and 'whispery' voice from an auditory point of view, since both 'involve the presence of audible friction; to [this] extent . . . the transition from breathiness to whisperiness is part of an auditory continuum and the placing of the borderline between the two categories is merely an operational decision'. He claims that there is a clear physiological distinction between the two, however, namely in muscular tension, since 'breathy voice' is characterized by 'extremely weak medial compression', while 'whispery voice' requires 'moderate to high medial compression'.¹² In fact 'medial compression' itself forms a continuum, so by Laver's own admission it is not a useful distinction. Like Catford, Laver gives 'whispery voice' rather than 'breathy voice' as the phonation type of the voiced aspirates. Similarly his term provokes the same objection that the glottal opening actually found during the production of voiced aspirates is larger than that given by the definition for 'whispery voice'.

The third approach is to return to the original term. Dixit's substantial body of instrumental observations of Hindi voiced aspirates forms the basis of his claim, alongside a redefinition of 'aspiration' (Dixit 1982) in terms of 'noisy breath', that is, breath which is made audible or noisy at the glottis, as a direct result of a high rate of air flow through the glottis such that the flow is turbulent. Thus aspirated stops, both voiced and voiceless, differ from their plain counterparts in that they show a higher rate of air flow (cf. now Ladefoged and Maddieson 1996: 48). Dixit's data show that more than one phonation type occurs during the production of a voiced aspirate. During closure regular voicing is observed, while 'breathy voice', 'murmur' or 'voicy aspiration' is only

¹¹ Laver follows the same definitions as Catford for 'breath' and 'whisper'. In (1980) he gives only one glottal configuration for whispery voice, that with the triangular gap between the cartilaginous glottis, but both configurations are admitted in (1994).

¹² 'medial compression' refers to the muscular tension required to adduct the vocal folds at a point roughly halfway between the thyroid and arytenoid cartilages.

found on release of the closure. Hence 'voice' can be applied to these sounds. Dixit (1987a: 148) goes on to argue that while the stops should perhaps be more accurately called 'voiced murmured' or 'voiced breathy voiced' stops, the traditional term 'voiced aspirate' is 'not only phonetically adequate but also produces a symmetrical matrix of classificatory values, and is capable of capturing phonological generalizations'.¹³ Dixit's solution is neat, but still not ideal. For now we are left with a term, which, while perhaps phonetically adequate does not capture the special phonation type found on articulatory release.

There is no clear answer to this debate, since solutions depend so heavily on definitions and their relationship to phonetic phenomena, which themselves depend on the viewpoint (and data) of the phonetician concerned. For my purposes, the term 'breathy voiced stop' adopted here follows Ladefoged, admitting some importance to the phonation type on release of the stop closure (cf. Ladefoged and Maddieson 1996: 57: 'breathy voice is most readily audible as a distinguishing characteristic of stops only during the release of a closure'), 'voiced aspirate' remains a useful phonological label.

I continue now with the main task of this chapter, an examination of the phonetics of breathy voiced stops with particular emphasis on the possible constraints on their production and perception and the variation that may be expected (and is actually found). From this, I predict how the sounds could be perceptually ambiguous to the listener, and hence in what directions they could change. The discussion is organized under the usual headings: phonation, articulation, aerodynamics and acoustics. Although they are dealt with separately, given that the events interact in real time there is inevitably some overlap. I also look at cues recognized as perceptually important, and at the roles of stress, word position, place of articulation, and vocalic environment. Breathily voiced stops are most frequently found in languages of the Indian subcontinent, and there in the New Indo-Aryan (NIA) languages.¹⁴ Since the majority of instrumental and experimental work has been carried out on NIA stops, the following observations are largely based on studies of these sounds (for brief summaries, see, e.g. Ladefoged and Maddieson 1996: 57–60; Stevens 1998: 474–7).¹⁵

5.1.1 *Breathily voiced stops: Phonation*

The phonatory processes involved in the production of breathily voiced stops are complex: modal voice gives over to voicing with larger glottal opening (during

¹³ Stevens (1998: 474f.) uses a similar term, 'voiced aspirated stop consonants'.

¹⁴ We exclude from the discussion any reference to stops produced with 'slack' or 'lax' voice (cf. e.g. Henton *et al.* 1992: 72f., 84; Ladefoged and Maddieson 1996: 63f.).

¹⁵ The only set of experimental results for the stops in West African Igbo (Ladefoged *et al.* 1976) shows that they are somewhat different from those in languages of the Indian subcontinent.

articulatory closure), and then to breathy voice on release (the 'breathy voice' or 'aspiration' period).

During the production of modal voice, the vocal folds are adducted, the pressure below forces them apart and the air flows through the constriction, speeding up as it does so by the Venturi tube effect. This in turn causes a local drop in pressure between the folds (the Bernoulli effect), which are sucked together. For vibration of the vocal folds to occur, there must be a sufficient pressure drop across the glottis to force the folds apart (3 cm H₂O, 300 Pa; Catford 1977: 98).

The action of vocal fold vibration when the vocal folds are apart, as in the production of breathy voice, is not clearly understood (there is no formal description in the phonetic literature), but it is assumed it is the result of a similar set of processes and forces (e.g. Sawashima and Hirose 1983: 14; for general discussion of models of vocal fold vibration under different conditions, see e.g. Stevens 1977, 1998: 56ff.). The vocal folds are held apart and air flows between them. The air passes through the constriction at the glottis, and speeds up by the Venturi tube effect. This causes the Bernoulli effect to occur, and the folds are sucked together. The elastic properties of the folds themselves, however, cause the folds to come apart again.¹⁶

During the production of breathy voice, the Bernoulli effect is responsible for sucking the vocal folds together, and the elasticity of the abducted folds causes them to come apart again, like a spring. The effect is to provoke a spring-like action of the folds which results in a more simple wave, in other words, in a wave whose fundamental harmonic shows relatively more energy than those at higher frequencies (e.g. Ladefoged, Maddieson, and Jackson 1987).

During breathy voice there is a relatively high volume of air flow with a relatively slow particle velocity. The ease of vibration depends not only on the air flow, which is determined by the pressure drop across the glottis, but also on the stiffness of the vocal folds. If they are slacker, they will respond more easily to the Bernoulli effect. Thus, slack vocal folds will help maintain voicing even when the rate of airflow is slower. If the vocal folds are slacker, then they will vibrate more slowly, simply on the basis that slacker bodies resonate at lower frequencies than stiff bodies, all other things being equal. The reduced rate of vibration will result in lowered pitch.

Vowels following voiced aspirates do show a markedly lower F₀, which is probably the starting point for the development of the tonal developments found in languages such as Panjabi. Hombert *et al.* (1976) argue that other factors, such as lowered larynx position and a drop in subglottal pressure on release are also responsible for the observed pitch lowering.¹⁷

¹⁶ This assumes that during breathy voice the vocal folds are vibrating in a horizontal plane (i.e. in and out) rather than vertically (up and down); the actual motion is more complex.

¹⁷ See also Hock's (1991: 98f.) discussion of tonogenesis with reference to F₀ data from Hindi voiced aspirates, where he points out that the frequency lowering is greater for initial position than

Breathy voiced stops are often observed to show periodic vocal fold vibration throughout both closure and aspiration period without any break (Dixit 1975; Kagaya and Hirose 1975; Yadav 1984; Dixit 1989). Incomplete velopharyngeal closure may help maintain voicing in Sindhi breathy voiced (and voiced) stops; Nihalani (1975*a*). For further discussion of the contribution of velic opening during the voicing of the closure period of plain voiced and voiced aspirated stops (see Rothenberg 1977: 90ff., especially 99–106).¹⁸

Breathy voiced stops show a characteristic pattern of glottal activity (Ladefoged and Maddieson 1996: 59). Fiberoptic data (film: Nihalani 1975; Kagaya and Hirose 1975; Benguerel and Bhatia 1980; Yadav 1984; photoelectroglottographic (PEG): Dixit 1975; 1989) show that for a variable part of the stop closure, the glottis is closed and vibrating 'normally'. At some time during the stop closure (usually after half the duration), the glottis opens (still vibrating), reaching a maximum after articulatory release, and then closes some time after release, resuming modal voicing.¹⁹ The time between articulatory release and closure of glottis ranges from approximately 70 ms (Yadav 1984) to 130 ms (Benguerel and Bhatia 1980). The size of opening appears to be roughly equivalent to that found during voiceless stops (Kagaya and Hirose 1975), that is half that of voiceless aspirates, which show the largest opening during stop production.²⁰ The timing of the articulatory release is usually set to precede maximum (or near maximum) of glottal opening. This pattern of synchronized activity creates the conditions required for the airflow which results in 'aspiration'.

In many cases modal voicing occurs for at least half of the closure duration. The rate of vibration during the closure tends to slow down, given the reduction of the transglottal pressure drop due to the oral constriction. This is reflected in the voice signal traces in Figure 2 in Dixit and Brown (1985), where the waveform for initial and medial /bh/ is clearly different from that for /b/. The vocal folds also come apart during the later phase of the closure period, partly due to the active opening gesture, but also as a result of the changing aerodynamic conditions. For discussion of the effects of oral constriction on glottal state and vocal fold vibration, see Bickley and Stevens (1986); see also Stevens (1977); Stevens (1998: 92ff.).

medial position, and suggests that the relative differences in pitch could have led to the development of Low tone (initial) and High tone (medial) (see on Panjabi below p. 189).

¹⁸ Dixit (Dixit and Shipp 1985: 72) reports fiberoptic data for velopharyngeal closure which reveals 'tiny lateral openings', in descending order 'b, bh > d, dh > g, gh'.

¹⁹ Due to differences in phonetic environments used for experiments we can only compare glottal activity intervocally. Here the data in Benguerel and Bhatia (1980) and Yadav (1984) show the glottal opening occurring at or near articulatory release, while in Kagaya and Hirose (1975) and Dixit (1989) opening occurs during the articulatory closure. Furthermore, the figures in Kagaya and Hirose (1975) show that the time of opening varies from token to token.

²⁰ Kagaya and Hirose (1975) note that in the case of [fi], the size of the opening affects glottal vibration, and that the wider the glottis opens, the less likely the folds are to vibrate (presumably because they are stiffer).

The timing (and occurrence) of the glottal opening gesture is crucial for the production of aspiration. If the gesture does not occur at the correct time, or is too small, aspiration will not be produced (or will be negligible), and a voiced stop will result. If the glottis opens after articulatory release, the aspiration will be delayed.

The glottal configuration often observed for breathy voice during breathy voiced stops is that of an upside down Y, that is, with an opening in the posterior (cartilaginous) part of the glottis, with the anterior (ligamental) portion closed and vibrating (Nihalani 1974; Dixit 1975; Yadav 1984). We also find breathy voice produced when the vocal folds are apart along their whole length (cf. Catford's 'breathy voice') (see e.g. Yadav 1984).

The exact muscular activity of the laryngeal muscles behind this pattern of glottal opening is not clearly understood. There are only data from three sets of electromyographic (EMG) experiments (Dixit 1975; Kagaya and Hirose 1975; Hirose 1977). It is generally accepted (e.g. Sawashima and Hirose 1983) that during the production of voiced and voiceless stops the posterior cricoarytenoid (PCA) and interarytenoid (INT) show reciprocal activity; during voiced stops (adducted glottis) the INT is active and PCA suppressed, and during voiceless stops (abducted glottis) the PCA is active and INT is suppressed. Given the glottal activity of the breathy voiced stops, where the glottis is first adducted, then abducted, we expect the following pattern: activity of INT followed by suppression with reciprocal activity of PCA.

The clearest results are those for the PCA and INT, which give the predicted results. Only Hirose (1977) was able to obtain results from the PCA, which shows a suppression in activity followed by a peak of activity after articulatory closure, as predicted. The activity of the INT from all three experiments showed an action reciprocal to this, that is, a period of activity followed by sharp suppression. Kagaya and Hirose and Dixit also looked at the activity of the other 'adductors', the lateral cricoarytenoid (LCA), thyroarytenoid (TA), and that of the vocalis muscle (VOC), whose activity seems to help control the stiffness of the vocal folds (Sawashima and Hirose 1983: 12). The LCA showed early suppression of activity, while the TA showed generally lower activity for the aspirated stops; the VOC also showed a tendency towards suppression.

The vocal folds themselves seem to be relatively relaxed during the production of breathy voice, but the exact muscular activity behind this is not clear.²¹ Presumably the suppression of the VOC contributes to this (as well the suppression of the other adductors). It is also possible that suppression of CT activity could also help 'loosen' the vocal folds.²²

²¹ The structure of the vocal folds is complex; so too is the way that they become 'relaxed'. According to Hirano's 'cover-body' model, the body of the folds may be stiff while the cover is loose; see Sawashima and Hirose (1983: 12).

²² If Dixit is correct that cricothyroid, CT, activity contributes to voicelessness; the results for the CT from Kagaya and Hirose are far from clear.

As far as timing is concerned, all experimenters found that there was good agreement between the pattern of muscular activity of INT (and PCA) and actual glottal dynamics (although muscular activity precedes glottal gestures, as might be expected). If we think of muscular activity in terms of neural commands, we could see the production of the glottal gestures for voiced aspirates in terms of a glottal adduction gesture followed by a glottal abduction gesture (Kagaya and Hirose 1975; Benguerel and Bhatia 1980). However, such a description would be oversimple: the actual gestures, configuration and tension of the vocal folds for the production of breathy voiced stops is based on a complex balance of muscular activity of the many laryngeal muscles.

This muscular activity is responsible for the correct timing and magnitude of the glottal opening gesture. If this is not synchronized properly with the supralaryngeal movements, either aspiration will not occur, or it will be delayed.

5.1.1.1 *Phonation: Predictions for change*

For the production of the 'aspiration' of a breathy voiced stop, the glottal opening gesture must be sufficiently large and correctly timed to occur just after articulatory release. If the glottal gesture is late, the aspiration will be delayed and subsequently separated from the stop, resulting in a plain voiced stop. If it is too early, or too small, the aspiration will not occur, and either a lightly (voiced) aspirated or an unaspirated voiced stop will result. In both cases, we would predict plain voiced stops as possible variants for voiced aspirates, particularly during running speech. Another possible outcome would be a stop followed by slack voiced offset, assuming that a lightly aspirated stop would effectively be a stop followed by slack voice (i.e. vocal folds vibrating more loosely than during modal voice and with higher airflow than for modal voice but less than that for breathy voice). Breathily voiced phonation results in slower vibration and thus lower F_0 (which is compounded by other factors), and so tonal developments are also possible.

Together with voiced fricative variants, plain voiced stops are the most common allophonic variants of voiced aspirates in intervocalic position (e.g. standard Bengali: Chatterji 1942; Ferguson 1960; Awankari variety of Lahndi: Bahri 1963), and word-final position (e.g. Hindi: M. Ohala 1983). Acoustic investigations of breathy voiced stops show that following vowels do exhibit lower F_0 (see below p. 178).

5.1.2 *Breathily voiced stops: Articulation*

Voiced aspirates occur at the following places of articulation: bilabial, dental (or alveolar), retroflex, and velar.²³ I shall concentrate on bilabial, dental/alveolar

²³ Voiced aspirates described as 'palatal' are usually affricates, and will not be discussed here.

and velar, since stops at these places of articulation are reconstructed for Proto-Indo-European. A labiovelar (labialized velar) voiced aspirate /g^wh/ is also reconstructed. Though this occurs in Igbo, there is no detailed discussion of its production in Ladefoged *et al.* (1976).

The production of breathy voiced stops includes a period of complete articulatory closure. At each place of articulation, closure is achieved in the same way as for stops with other phonation types (e.g. plain voiced stops), in other words the articulators come together (the lips—bilabial), or the lower articulator is held against the upper (the tongue tip/blade against front teeth/alveolar ridge—dental/alveolar; the tongue back against soft palate—velar).

The stop closures of breathy voiced stops are subject to the same elasto-inertial constraints as for plain voiced stops, which can lead to articulatory 'undershoot'. If the rate of speaking is increased, or if the gesture has a target opposite from the segments before or after it, the articulatory position may not be achieved as well as when more time is devoted to the gesture. The shorter stop closures of voiced stops lead to the possibility of incomplete closure, which results in fricatives (Ohala 1989: 179f.). Fricativization of voiced stops intervocalically is a common change, for example the development of the Latin voiced stops into voiced fricatives in several Romance languages, or the distribution of voiced obstruents in Spanish (stops word-initially, fricatives intervocalically). Breathly voiced stops are even more likely to become fricatives than voiced stops, as they have particularly short closure durations.

As in the production of other plosives (voiced, voiceless, voiceless aspirate) during closure air pressure builds up behind the constriction, which is then released once the articulators part. Experimental data (Dixit 1975; Kagaya and Hirose 1975; Benguerel and Bhatia 1980; Yadav 1984; Dixit 1989) have repeatedly shown that closure durations of breathy voiced stops are shorter than those of voiced stops, which are in turn substantially shorter than those of voiceless aspirate, and then plain voiceless stops. This makes sense in view of what is happening at the larynx. During closure, the glottis opens, allowing more air to pass through. A shorter closure duration allows vibration to be maintained throughout the entire closure, even when aerodynamic forces threaten to extinguish vibration. The short closure duration of breathy voiced stops ensures that the closure remains fully voiced, and increases the likelihood of intervocalic fricativization caused by undershoot. Fricativization itself helps to maintain voicing; the possible devoicing of the stop closure of a voiced stop may be avoided by 'unstopping the stop' (Ohala 1983: 198). The greater airflow of breathy voiced stops during closure could help provoke the release of stop closure in order to maintain voicing intervocalically.

The aspiration duration of breathy voiced stops tends to be roughly the same as that for voiceless aspirates (Kagaya and Hirose 1975: 60/70ms; Dixit 1989: stressed initial: 56ms; medial 48ms; cf. also Hussain and Nair 1995). That both

voiced and voiceless aspirates show similar duration of aspiration means that were the closure period of the voiced aspirate not to be perceived to be voiced, for example, in word-initial position, or if prevoicing were actually short, the listener could perceive the sound as a voiceless aspirate. Confusion of a voiced aspirate for a voiceless aspirate would also presuppose that the listener was not attending to pitch changes during the stop production, or to the presence of voicing during the aspiration period.

5.1.2.1 *Articulation: Predictions for change*

Breathy voiced stops are even more likely to become fricatives intervocalically than plain voiced stops, and so we may predict that voiced aspirates could show fricative variants intervocalically. That the aspiration phase of voiced and voiceless aspirates is similar in duration also allows the prediction that voiced aspirates could become devoiced.

Voiced fricatives are reported as intervocalic allophonic variants of voiced aspirates: in Standard Bengali [v] [β] occur for /bh/ (Masica 1991: 103), and [ð] for /dh/ (Chatterji 1921; Ferguson and Chowdhury 1960; Ghatage 1962); in Eastern Hindi [β] is found for /bh/ (Pathak 1980); we find [bh], [ðh] and [gh] reported for Gujarati (Firth 1957; [β ð γ] for /bh dh gh/ word-medially, Masica 1991: 103), and a general report of fricative pronunciation is found for Western Hindi (Bloch 1965). Fricative pronunciation of voiced aspirates also occurs in the Munda languages. In Banerjee's approximate guide to the pronunciation of Kharia, /bh/ is given as 'like v' (Banerjee 1982). Perceptual experiments show that voiced aspirates can be confused with voiceless aspirates word-initially, but this may depend on the stop closure being devoiced to a certain extent (see below pp. 179–80).

5.1.3 *Breathy voiced stops: Aerodynamic factors*

The supraglottal articulations synchronize with the opening gesture of the glottis to create conditions which lead to certain aerodynamic results. The stop closure causes an air pressure build-up in the oral cavity. This build-up is augmented by the glottis opening during the closure, allowing even more air to pass through. When the stop closure is released the glottis is usually open (as much as will still allow vocal fold vibration), so the air rushes out of the oral cavity, drawing air from below the glottis through the folds and out through the unobstructed vocal tract. This causes high rates of air flow (in both particle and volume velocity), which are sufficient to enable vocal fold vibration to continue, and also for turbulence to occur at the glottis (giving the characteristic noisy sound, the 'breathiness', to the airflow, or 'aspiration'). The volume of air passing into the

oral cavity is higher than that during modal voice production.²⁴ The processes described here could have some important consequences.

As the larger volume of air passes into the supraglottal cavity, other things being equal, pressure may build up there, causing the pressure drop across the glottis to be reduced. The result of this is to slow down the speed of the air flow through the glottis. When the rate of air flow is slower, the Venturi tube effect will be less pronounced, and similarly the Bernoulli effect, which means that the resulting vibration will be slower. This means that pitch of breathy voice should be lower than that of modal voice.

When an obstruction is present in the supraglottal tract, there is a possibility that the oral pressure will become equal to the subglottal pressure, thus cancelling the transglottal pressure drop, and with it vocal fold vibration. This possibility exists for modal voice (Ohala 1983: 194; 1989: 177), but even more so for breathy voice. The larger volumes passing into the oral cavity could cause a critical build-up very quickly. I conclude from this that the vibration of breathy voice would be likely to stop more quickly during an oral constriction than that of modal voice.

In other words, as a result of these aerodynamic constraints, breathy voiced stops are likely to devoice during both stop closure and voiced aspiration period. The stop closure of breathy voiced stops is usually very short, but if it is prolonged, voicing is likely to cease. The voicing during the aspiration period is largely dependent on high rates of airflow through the glottis. If the airflow is impeded by a pressure build-up caused by a constriction in the supra-laryngeal tract, for example by the tongue configuration for a high vowel, devoicing will occur.

Voiced aspirates do cluster phonotactically with consonants which are produced with some degree of articulatory stricture, for example, stops, fricatives. In this case, either there must be a slight delay before the formation of the stricture for the next sound (to allow for the air to escape and hence the aspiration), or, if there is no delay, the air will not be able to escape, and the result will be 'deaspiration' of the stop. If the stops precede laterals or /r/ type consonants the aspiration may escape during the production of the consonant to a certain extent.

Although it has been suggested (e.g. Chomsky and Halle 1968) that aspirated stops could be distinguished from unaspirated stops by the presence of higher subglottal pressure, experimental data have shown that this is not the case (*see* the discussion in Ohala and Ohala 1972). Slight rises are observed, but these

²⁴ The air flow is the result of the pressure drop across the glottis. We should note that degree of glottal constriction and subglottal pressure (P_s) are important in determining this pressure drop. It is now generally thought (Dixit and Shipp 1985; Ohala 1976) that subglottal pressure is constant over the course of an utterance; this means that different pressure drops are attained not by increasing subglottal pressure, but by varying glottal resistance (degree of glottal constriction), oral resistance, and oral cavity volume.

are not significant (Dixit and Shipp 1985). There is a sharp drop in subglottal pressure immediately on release of aspirated stops (Ohala and Ohala 1972; Dixit and Shipp 1985).²⁵ This drop is predictable from what actually happens: the pressure which has been trapped is released and air below the glottis is sucked into the oral cavity leaving (for a moment) less air below the glottis, and hence less pressure. That increased subglottal pressure is not found suggests that ‘aspiration’ is the result of changes in glottal and supraglottal resistances, and not due to increased respiratory activity (e.g. Ohala 1976). The drop in subglottal pressure could lead to lowered pitch in the following vowel (Ohala 1978).

Voiced aspirates show greater peak magnitudes of oral air pressure than plain voiced stops, and voiceless aspirates show significantly higher peaks than voiced aspirates (Dixit and Brown 1978). The oral air pressure measure is that of air pressure within the oral cavity (above the glottis). If we consider that during the closure period of breathy voiced stops the glottis opens (still vibrating), it is to be expected that the oral air pressure is higher than that of voiced stops (Stevens 1998: 476). Moreover, since the glottal opening of the voiced aspirates is only half that for voiceless aspirates, less oral air pressure for the voiced aspirates than for the voiceless aspirates is also expected.²⁶ Interestingly, the voiced aspirates show roughly the same size opening to that of voiceless stops, but the oral air pressure for the voiceless stops is considerably greater. These differences may result not only from the presence of vocal fold vibration in voiced aspirates, but also from the different timing of the glottal gesture in voiced aspirates as opposed to voiceless stops, and perhaps too in differences in compliance of the vocal tract walls.

During the closure phase of the stop, air pressure is built up to be released on articulatory release, and maximal airflow is made possible by the accompanying glottal opening. The voiced aspirates show a short closure duration, which allows voicing to be sustained during the closure period. Prolonging articulatory closure would lead to devoicing of a breathy voiced stop, loosening the closure would help to maintain voicing.

Data show that in NIA languages aspirated stops show higher volumes of oral air flow than their unaspirated counterparts (Nihalani 1975; Dixit and Brown 1985). Breathly voiced stops tend to show lower rates than voiceless aspirates (Nihalani 1975; Dixit and Brown 1985). That voiced aspirates show higher rates than voiced stops but lower than voiceless aspirates is predictable from the oral air pressure results.²⁷ However, the main factor influencing airflow—the size of the glottis on articulatory release—is also important. Note that, for example, voiceless stops show higher oral air pressure than voiced aspirates, but lower

²⁵ See also the pressure results from Stevens’ (1998: 476) model.

²⁶ We might also expect less oral pressure from the velopharyngeal leakage which occurs during voiced stops (recorded for Hindi and Sindhi) to help sustain voicing.

²⁷ Glottal pulsing during release, and the degree of glottal opening, may account for less air flow for voiced aspirates than voiceless aspirates.

airflow. This is because on articulatory release of voiceless stops the glottis is closed. Hence the 'difference in flow could be said to be primarily controlled by the degree of resistance at the glottis' (Dixit and Brown 1985: 232).²⁸

5.1.3.1 Aerodynamic factors: Predictions for change

While plain voiced stops are subject to aerodynamic constraints on voicing, breathy voiced stops are more so, because the open glottis allows more airflow into the supralaryngeal tract (during both closure and the aspiration period), and so, if pressure is allowed to build up, there is a greater likelihood of pressure equalization, and hence devoicing. Thus we expect to find variants with partially voiced stop closures, in the case of prolonged closure duration. If the vocal tract is constricted immediately following articulatory release, for example, as during the configuration for a high vowel, we would predict that aspiration period would be devoiced. Since the aspiration period is the same duration for both voiced and voiceless aspirates, there is a strong likelihood that a voiced aspirate token which shows devoiced aspiration would be perceived as a voiceless aspirate. Similarly, a voiced aspirate with a partially voiced closure might also lead to confusion with a voiceless aspirate. If the stricture for a following consonant is formed before the release of aspiration, the stop will be deaspirated.

In several NIA languages when voiced aspirates occur as the first element in consonantal clusters, deaspiration takes place and plain voiced stops remain Hindi (M. Ohala 1983), Bhojpuri (Tiwari 1960), Awankari (Bahri 1963). If deaspiration does not occur then the aspirated consonant has 'quite an audible release' (M. Ohala 1983: 50–1, on Hindi). Acoustic analyses of voiced aspirates reveal devoicing during closure (towards the end) and devoicing of the aspiration period; perceptual experiments show that voiced aspirates can be confused with voiceless aspirates in word-initial position (*see* below pp. 178–80).

5.1.4 Breathily voiced stops: Acoustics

The complex pattern of articulatory and glottal activity is reflected in the acoustics of breathily voiced stops, which may be illustrated if we consider two spectrograms and waveforms from Davis' (1994) observations of the Hindi velar breathily voiced stop /gh/ (*see* Figure 5.2). We typically observe a number of phases of differing patterns of acoustic energy: the voicing bar, low frequency energy associated with voicing during the stop closure; the burst, a brief burst of energy across the spectrum; then the aspiration phase, during which acoustic energy representative of quasi-periodic vibration together with aperiodic noise

²⁸ Dixit and Brown reject oral pressure as a factor influencing airflow rates, though it seems likely that it does play some role.

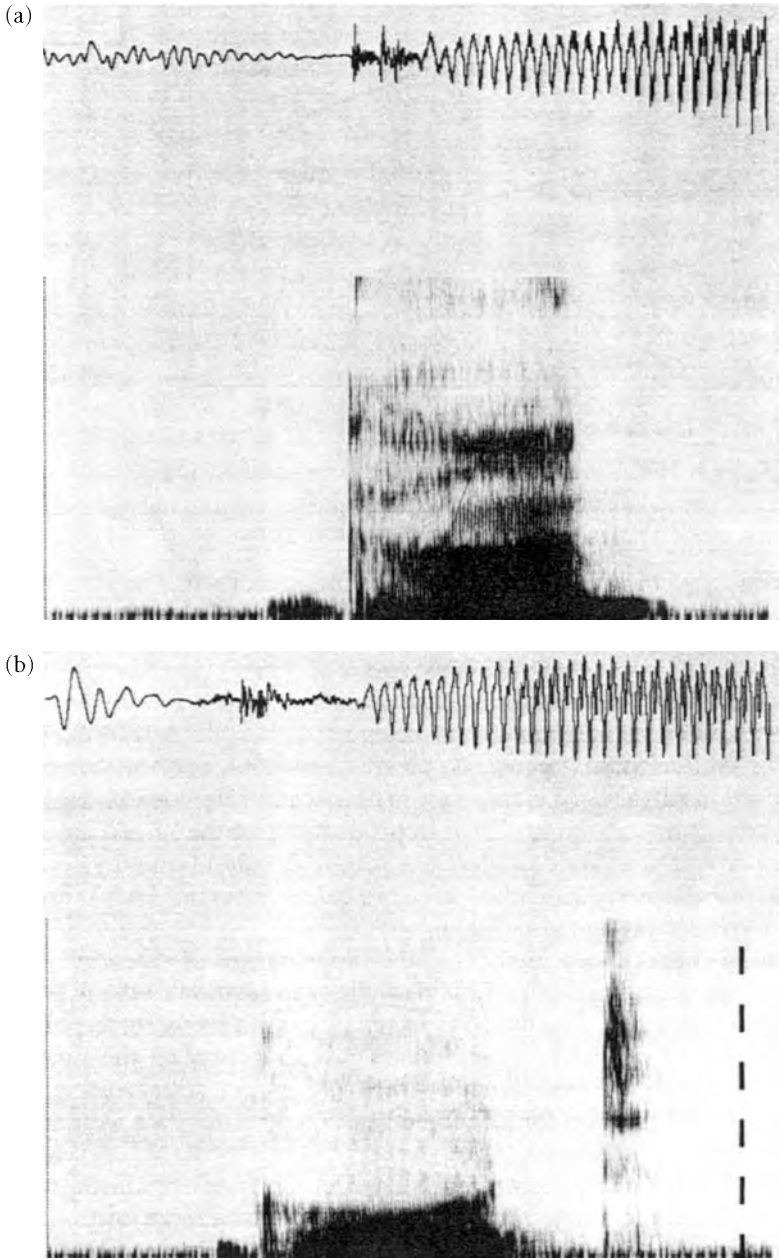


FIGURE 5.2 Spectrograms and waveforms of /gh/ productions (a) with and (b) without voicing during aspiration. The spectrograms show energy from 0–8 Hz; the waveforms show an expanded portion at the time of the stop release (from Davis 1994: 186)

appears as fuzzy striations across the spectrum, but particularly at low frequencies, and at the formant frequencies of the following vowel. The aspiration period then gives way to the vowel proper, which shows higher intensity energy at low and formant frequencies, with no evidence of the previous aperiodic noise.

During the aspiration phase voicing is usually observed as relatively weak, low frequency energy—but not always. Sometimes voicing during the first part of aspiration is weak or non-existent (*see* Fig. 5.2b and Davis 1994; *see also* Schiefer 1992; Stevens 1998: 477 with Fig. 8.74). Similarly, voicing during the closure period is not always observed. Poon and Mateer (1985) report that seven out of ten subjects did not show voicing lead, while Schiefer (1992) found this tendency in two of her four subjects (also noted in Davis 1994: 182). The spectrogram of word-initial Urdu /bh/ in Hussain and Nair (1995: 207, Fig. 1d) shows devoicing towards the end of the closure period and that the aspiration phase begins with a period of voiceless aspiration. Visual inspection of their scatter plot in Figure 2 also shows that a percentage of the tokens were produced with only 15–30% voicing during closure (*cf.* Ladefoged and Maddieson 1996: 59). All the studies which report devoiced closures or voiceless aspiration considered word-initial voiced aspirates. Schiefer, moreover, analyzed her data according to place of articulation and following vowel. She found that breathy voiced stops with voiceless aspiration were determined by place, occurring usually for velar stops, and before high vowels, especially /i/ (1992: 301), but that tokens without voicing during closure were determined by place and also by speaker, with two out of her four subjects frequently lacking prevoicing. The devoicing during the aspiration period observed before high vowels was predicted above. We might well expect breathy voiced stops which show little or no voicing during closure, and/or voiceless aspiration to be perceived as voiceless aspirates.

We do not expect to find a period of (positive) VOT in the usual sense of the term (*e.g.* Schiefer 1986). Voiced aspirates, when described in terms of VOT, show two values, both voicing lead, and voicing lag (for Hindi and Marathi, *see* Lisker and Abramson 1964; for Nepali, *see* Poon and Mateer 1985). Moreover, as we have seen above, recent acoustic studies have reported that voicing lead is not always present in breathy voiced stops.

When we compare the spectral energy of breathy voiced stops with that of voiced stops or voiceless aspirates (*see e.g.* the spectrograms in Dixit 1975, 1987; *see also* those in Hussain and Nair 1995), we find similarities. Both voiced and breathy stops usually show a clear period of closure accompanied by voicing (although that of the breathy stops is shorter). The breathy voiced stops show a similar pattern of acoustic energy to the voiceless aspirates during the aspiration period, with energy concentrated roughly in the regions of the formant frequencies of the following vowels (the breathy stops also show energy at the lower frequencies). The data in Hussain and Nair (1995) for Urdu show clearly that the duration of the aspiration period for voiced and voiceless aspirates is similar

(measured in terms of ‘noise offset’ after Davis 1994, i.e. the onset of the second formant after the burst). We should also note the obvious acoustic similarity of the ‘aspiration’ period to [f]. If the aspiration period of the breathy voiced stop did not occur, or were negligible, or were not perceived for some reason, we could predict confusion with a plain voiced stop. If the voiced stop closure were not perceived, or were actually devoiced, and/or the aspiration period was devoiced, we would expect confusion with a voiceless aspirate. Confusion with [f] is also a possibility.

The F_0 of breathy voiced stops tends to drop during closure (by *c.* 45 Hz), and then rise (by the same amount) during the aspiration period. They show substantially lower F_0 on release than voiced stops: breathy stops show 120 Hz on release, while voiced stops show 154 Hz (Kagaya and Hirose 1975). The drop in F_0 during stop closure is predictable from glottal activity among other things: the glottis opens and vibration slows down; the vocal folds are relatively relaxed and so vibrate more slowly; the sudden pressure drop on articulatory release also affects the vibration.

Earlier studies on the effect of breathy voice on vowels (F_0) (e.g. Ohala 1979) showed significant influence of breathy stops on vowels, particularly on following vowels. Schiefer (1986) continued this work, looking at average F_0 of the ‘breathy portion’ and of the steady state portion of the vowel, and found that F_0 was affected by the preceding stop, both according to the place of articulation and also vowel quality. The F_0 of the breathy portion differs significantly from that of the steady state and seems to reflect vowel height. Low vowels showed lower F_0 than high vowels; there was also a correlation between place of articulation and F_0 , with lowest frequencies for /bh/ rising to highest frequencies for /gh/. Vowel height also seemed to condition the average F_0 of the steady state of the vowel: the F_0 of high vowels showed significant influence of preceding stops. Schiefer argued that since the duration of the breathy portion is less for high vowels, the effects of the stop carry over into the steady state. The F_0 trajectory (over the first 6 pitch periods) was also examined, and again vowel height (from low to high) appeared to be the most important factor in determining this.

5.1.4.1 *Acoustics: Predictions for change*

The extent to which we may use acoustic information to determine perceptual cues may be limited. It is well known that acoustic images are not the same as what is presented to the brain for decoding (e.g. Johnson 1997). Nevertheless, we can deduce possible perceptual confusion. The acoustic energy patterns of breathy voiced stops are such that we may predict confusion with [f], plain voiced stops, or voiceless aspirates. The markedly lowered pitch observed following breathy voiced stops could allow readjustment of the perceptual cue from that of breathy voice, to pitch changes in the neighbouring vowel.

5.1.5 *Breathy voiced stops: Perceptual cues*

Obvious perceptual cues for the breathy voiced stops are the presence of voicing during closure (voicing lead) and a voiced period of aspiration (friction noise with quasi-periodic vibration). Other cues are lowered F_0 on articulatory release and probably also short closure duration and change in voicing (leading to lower F_0) during closure. Ladefoged and Maddieson (1996: 60) also suggest a possible cue of vowel length after Maddieson and Gandour's (1977) observation that vowels before breathy voiced stops are slightly longer than before plain voiced stops. The small amount of work on the perception of breathy voiced stops that exists concentrates on the role of F_0 perturbation and the interaction of voicing lead and duration of aspiration.

In the second half of her 1986 article, Schiefer presents the results of perceptual tests which look specifically at the importance of F_0 for the perception of breathy stops as breathy. She removed all other characteristics of breathy phonation except a low-rising F_0 trajectory, creating a perceptual continuum from breathy to voiced by changing F_0 onset and trajectory. The subjects were presented with a forced choice test (breathy/voiced). (Given this I exercise some caution in considering her results, since it is possible that some stimuli marked as 'breathy' did not sound breathy at all, but also did not sound voiced.) Schiefer observed that a basic low-rising F_0 can sound breathy, but the continuum which provoked the most breathy responses was that of F_0 duration with a categorical boundary at durations of around 50 ms and less. Her results show that a low-rising F_0 is an important cue for breathy voiced stops. It is interesting to note that breathy voiced stops do not actually need to be 'breathy' to be recognized as such. This finding is in line with earlier predictions from phonatory constraints (with the proviso that F_0 lowering does not result from phonatory processes alone).

The results of a perceptual experiment yielding a confusion matrix showed that word-initial voiced aspirates are likely to be confused as voiceless aspirates, thus confirming predictions made earlier from aerodynamic factors and acoustics. Ahmed and Agrawal (1969) tested all Hindi consonants in word-initial and final positions. In word-initial position, the first error for labial and velar voiced aspirates was the corresponding voiceless aspirate (the alveolar was usually confused with the retroflex stop).

Another perceptual experiment gave similar results. Schiefer (1992) investigated the interaction of voicing lead and (voiced) aspiration duration, by creating stimuli that varied along both parameters, ranging from no aspiration/voicing lead to maximal (observed) aspiration duration/lead. Interestingly, a number of stimuli emerged as ambiguous, in that they could be perceived either as voiced aspirates or as voiceless aspirates. Most ambiguous were those stimuli which showed maximal aspiration duration but no voicing lead, although

stimuli with short lead and short aspiration duration could also be taken either way. Thus it appears that ‘trading relations exist between the duration of the voicing lead and that of the breathy voiced vowel portion’; Schiefer (1992: 310). The ambiguity of Schiefer’s stimuli, which could be perceived as voiced aspirates or voiceless aspirates, like the results of the earlier confusion experiment, suggest that there is a strong likelihood that word-initial voiced aspirates could be perceived as voiceless aspirates.

Hussain and Nair (1995) report the results of a perceptual experiment which also investigated voicing lead and aspiration duration, but this time the stimuli were fixed. Recordings of the four Urdu stops /p ph b bh/ in word-initial position were cross-spliced at the burst, yielding 16 stimuli. The results showed that prevoicing is necessary to identify voiced stops while at least 45 ms aspiration duration provokes the identification of aspirated stops. There is no discussion of errors, though overall the identification is described as ‘very accurate’. This does not seem surprising given the stimuli shown in their Figure 4 (p. 210). The stimulus for /bh/ shows prevoicing for the majority of the closure duration, and thus we would expect cross-splicing to result in the response /bh/ or /b/ (with or without aspiration). I suspect that had one of the tokens with much less prevoicing been used, /ph/ would also have been identified. These results confirm the assumption made earlier that misinterpretation as voiceless aspirates may be more likely when tokens show some devoicing of the closure period.

5.1.5.1 *Perception: Predictions for change*

The predictions for perceptual confusion made from earlier observations are confirmed by the results of perceptual experiments. The considerably lowered F_0 does seem to serve as a cue for breathy voice; we would expect the development of variants of breathy stops as plain voiced stops followed by vowels with lowered pitch, and this is found in some NIA languages. Also confirmed is the predicted confusion of voiceless aspirates for voiced aspirates, although this is only found in word-initial position, and may be aided by devoicing of the closure phase of the stop.

5.1.6 *Breathy voiced stops: Stress*

In several experiments Hindi breathy voiced stops were stressed. According to Dixit (1975) Hindi lexical stress is realized by higher F_0 and increased intensity and duration. Breathy voiced stops which were stressed (i.e. #’CV) showed: greater glottal opening (Kagaya and Hirose 1975; Dixit 1989); longer duration of aspiration (Dixit 1975; Dixit 1979); higher oral pressure (Dixit and Brown 1978); and higher airflow (Dixit and Brown 1985). Higher subglottal pressure was not

found for voiced aspirates preceding stressed vowels, although the vowels themselves did show higher subglottal pressure.²⁹

5.1.6.1 *Stress: Predictions for change*

Hindi voiced aspirates when stressed are realized as breathy voiced stops with longer closure and at the same time more aspiration. Higher airflow would cause a greater tendency for devoicing of both closure and aspiration (probably in all cases except before low vowels). Since the phonetic correlates of stress can vary from language to language, these results are only useful for making predictions for languages where the realization of stress is similar to that of Hindi.

5.1.7 *Breathy voiced stops: Word position*

We only have indications that word position in Hindi could affect the phonetic realization of voiced aspirates from one set of experiments (Dixit and Brown 1978). There the medial syllable was stressed and breathy voiced stops in this position consistently showed the highest peaks of oral air pressure. However what also emerged from the results was that after stops in medial position, those in initial position showed higher peaks than those in final position. This suggests that word-initial position (even when unstressed) may have some influence on their production.

5.1.7.1 *Word position: Predictions for change*

The data do not give much, and this is clearly an area for further research. The effects on sounds from position in the word (or syllable) are often confounded with the effects of stress. Nevertheless, there are indications that stops in word-initial position tend to show longer closure duration and to retain aspiration, while medial stops tend to become voiced to varying degrees (Henton *et al.* 1992 after Keating *et al.* 1983; *see also* Turk 1993; Lavoie 2001).

Breathy voiced stops are the most common allophonic variants for voiced aspirates in word-initial position. In Standard Bengali, where fricative variants are found intervocally, breathy voiced stops occur initially (Chatterji 1921). In Eastern Bengali breathy voiced stops only occur in initial position (Chatterji 1942). In medial position, the most frequently found variants are plain voiced stops or voiced fricatives (*see e.g.* the variation in Gujarati, Masica 1991: 103).

²⁹ The stress-related increase in subglottal pressure seems to be the result of increased glottal resistance rather than of respiratory activity (for discussion, *see* Dixit and Shipp 1985: 71f.).

5.1.8 *Breathy voiced stops: Place of articulation*

Different places of articulation affect the production of voiced aspirate stops. This is not surprising since the size of the cavity behind the different articulatory closures differs from stop to stop (that of [bh] is the largest, [gh] the smallest), and hence the pressure built up during the closure, and the resulting airflow, will vary.

The peak magnitudes of oral air pressure increase from labial to velar (Dixit and Brown 1978) and the duration of closure period is shorter for [gh] than [dh bh] (Benguerel and Bhatia 1980), presumably to avoid pressure equalization and the loss of voicing, a tendency which already exists for plain voiced velars (Ohala 1983: 195).

From the oral pressure results we might expect [bh] to show the most volume, and [gh] the least (but at a faster rate given the greater pressure build-up). Surprisingly, however, there seems to be no systematic effect of place on oral air flow rates: Nihalani (1975) found lowest rates for [gh], then [bh], then [dh], while Dixit and Brown (1985) found lowest for [bh], then [gh], then [dh]. Presumably this is the result of some over-compensation achieved by differing degrees of glottal resistance or varying oral cavity size during release.

The duration of the aspiration period seems to be longest for [gh], then [dh], with the shortest for [bh] (Schiefer 1986). Both [bh] and [dh] show a 'burst + voiceless portion' which is minimal (approx. 10ms), but that for [gh] is over 60 ms. Again, Schiefer (1992) points out that breathy voiced stops realized with voiceless aspiration usually occur for /gh/, most often before high vowels, especially /i/. We may wonder whether the breathy voiced stops with voiceless aspiration frequently observed by Davis (1994) were not also the result of place of articulation (and perhaps vowel height), as her study was on velar stops.³⁰ We may also note that here voiced aspirates appear to be similar to voiceless aspirates, where velars typically show longer VOT than at other places of articulation.

The reason for the long burst and voiceless period in velars may be due to greater glottal opening for velars than other stops, which might inhibit voicing, or alternatively Schiefer (1986: 56) suggests that the production of both velar and high vowels involves high larynx position and thus activity of the extrinsic laryngeal muscles, which could perhaps 'inhibit a sustained breathy phonation'. The delay in resuming voicing before /i u/ may also be due to the fact that the constriction delays the reduction in oral pressure necessary for the resumption of vocal fold vibration (*see* Ohala 1983: 205).

³⁰ Note though that the exemplar in Stevens (1998: 477) is dental and also shows considerable devoicing of the aspiration period.

5.1.8.1 *Place of articulation: Predictions for change*

The velar voiced aspirate shows the shortest closure duration and so is most prone to articulatory undershoot. While all breathy voiced stops are likely to devoice, we may predict that the velar is most likely to do this, although that this seems to be linked to phonetic context (before high vowels), suggests that it is difficult to consider place of articulation alone.

5.1.9 *Breathy voiced stops: Vocalic environment*

Voiceless stops before high vowels are said to show greater aspiration than before low ones (e.g. Henton *et al.* 1992: 86, after Ohala, e.g. 1981: 112). This is probably because on release it takes longer to reduce the oral pressure built up when a high vowel follows rather than a low vowel. Since voicing requires a minimum transglottal pressure drop, there will be a delay before voice onset can occur if a high vowel is following. The observations (Schiefer 1986; 1992) of breathy voiced stops with voiceless aspiration before high vowels, particularly /i/, is consistent with this. Davis's (1994) data may not contradict these findings. She presents evidence for voiced aspirates before a non-high vowel set /ə o a:/ and yet still reports tokens with voiceless aspiration (*see also* the example in Stevens 1998: Fig. 8.74 p. 278). The stop investigated is the velar stop, which is the most likely to devoice. While she does not analyse these results according to vowel context, note that the spectrogram/waveform presented (here Fig. 5.2(b)) to demonstrate voicelessness during breathy voiced stops shows /gh/ before /o/, the highest vowel of her set.

If we consider the extent of aspiration of voiced aspirates in terms of volume of airflow or duration of aspiration, we find that longer durations were found for low and mid vowels than high vowels (Schiefer 1986). Before the low vowel /a/, we also find greater volume of airflow (Dixit 1975), and the largest drop in subglottal pressure (Dixit and Shipp 1985). With the tongue relatively low on articulatory release the air may rush out unimpeded.

5.1.9.1 *Vocalic environment: Predictions for change*

Breathy voiced stops are most likely to be maintained before low vowels; before high vowels we may predict a tendency for devoicing.

5.1.10 *The phonetics of breathy voiced stops: Predictions for change*

Breathy voiced stops are like voiced stops, usually with voiced closure and the presence of quasi-periodic vocal fold vibration throughout, but also like voiceless aspirates, particularly in showing a period of noise following articulatory release of similar duration and patterning. On the other hand they are different.

They show typically a glottal opening and closing gesture accompanied by vocal fold vibration whose maximum coincides with articulatory release. This gives rise to the short closure duration, quasi-periodic vibration during aspiration, and the characteristic fall and rise in the fundamental frequency.

I have identified a number of possible variants arising from articulatory, aerodynamic, acoustic and auditory constraints. Variants are often likely to occur as a result of more than one constraint: for example, intervocalic breathy voiced stops are subject to elasto-inertial constraints which lead to undershoot and fricativization, but this is aided by the short closure duration, required for aerodynamic reasons, which may also provoke fricativization in order to maintain voicing. Together they conspire to present the listener with a voiced fricative variant.

Similarly confusion could arise from a number of constraints acting together. For example, it was shown that breathy voiced stops were frequently perceived as voiceless aspirates in word-initial position. This could be either because the listener did not perceive the voiced closure, and so mistook that aspiration for that of a voiceless aspirate, or because the actual token was in fact partially devoiced during closure or aspiration period, due to aerodynamic constraints.

Our findings predict the following variants for voiced aspirates, and hence possible directions for change:

- *plain voiced stops*, in general, and as the first member of a consonant cluster
- *plain voiced* or *voiceless stops accompanied by tonal development* in the following vowel
- *voiceless aspirates*, especially word-initially, and before high vowels
- *voiced glottal fricative*, in general
- *voiced fricatives*, especially in intervocalic position
- *plain stops with slack voiced offset*, in general

We may also predict that when *stressed* (with phonetic correlates of higher pitch, increased intensity and duration) voiced aspirates would show more devoicing during closure and heavier aspiration which is more likely to devoice. In *word-initial* position voiced aspirates are more likely to retain closure and aspiration, while in *word-medial* position they are more likely to retain voice and become fricatives. With regard to *place of articulation*, the velar stop is the most likely of all the stops to devoice. In terms of *vocalic environment*, voiced aspirates are more likely to become devoiced before high vowels, whereas they are more likely to be maintained before low vowels.

5.2 Parallels: The diachronic behaviour of voiced aspirates

We now have a set of predictions for change from phonetics. Our next task is to assess them by comparison with known parallel changes. Attested parallel

developments provide the only independent evidence for how voiced aspirates may change. At the same time, given that the full range of possibilities for how voiced aspirates might change has been considered, we are also in a position to evaluate the reconstructed changes assumed for the PIE voiced aspirates in the daughter languages.

5.2.1 Attested parallels: Voiced aspirates from Old Indo-Aryan into New Indo-Aryan

We are limited to the Indic languages for documentary evidence of attested parallel developments of voiced aspirates. I consider here briefly several developments from Old Indo-Aryan—as represented by Vedic and then Sanskrit—into the New Indo-Aryan languages. The observations presented here are drawn from a number of sources (for general overviews see Bloch (1965), Bubenik (1996), Chatterji (1942, 1983), Masica (1991)).³¹

In Old Indo-Aryan (OIA), the series of voiced aspirates /bh dh ḍh gh/ contrasted with plain voiceless, plain voiced, and voiceless aspirate stops, at labial, dental, retroflex and velar place of articulation (cf. Kobayashi 2000). The sounds were for the most part reflexes of the PIE voiced aspirates, although in some cases they could arise from sandhi.³² As in Proto-Indo-European, they did not occur word-finally. Even within Old Indo-Aryan the voiced aspirates were not kept intact; in the earliest texts (Rgveda) we find examples of /bh/, /dh/ > /h/, in word-initial and internal position, for example, *hita-* / *dhita* ‘put’, *gṛhnāti* / *gṛbhnāti* ‘he seizes’ (Kobayashi 2000: 82f.).³³

The languages which developed from Old Indo-Aryan between c.600 BC and c. AD 1000 are known collectively as the Middle Indo-Aryan languages (MIA). Following Chatterji (1983) we can define within Middle Indo-Aryan several different chronological periods during which some significant changes occurred.³⁴

³¹ When looking at Indic languages we must bear in mind that several different linguistic varieties often existed at the same time, which differed in social prestige. Sanskrit was and still is seen as the literary language as its name implies, *samskṛtam* ‘refined tongue’. As well as Classical Sanskrit we find various Prakrits (*prākṛtam* ‘vulgar tongue’), which later became regarded as literary languages in their own right. The existence of more than one variety can present a confusing picture when we are considering sound change, and in this case we also have to be aware of the influence of Sanskrit on the later forms of the Middle Indo-Aryan and New Indo-Aryan languages.

³² As a result of the sandhi rules we find voiced aspirates deriving from voiceless stops, if, for example, they were followed by initial /h-/ (for this and other sandhi laws, see Allen 1962).

³³ It is clear, both from the sandhi law mentioned above, and from the ancient Indian descriptions of /h/, deriving from the PIE voiced aspirates, that the sound was [ɦ]; there are strictures against pronouncing the sound with ‘excessive breath or similarity to a voiceless sound’ (Allen 1977: 238–9).

³⁴ For a brief summary see Masica (1991: 166f.) (for more details see Bubenik 1996). Both assume that the weakening of intervocalic voiced aspirates took place with an intermediate fricative stage, e.g. /bh/ > /βh/ > /fi/.

During the Early/First Middle Indo-Aryan Period to Transitional Period (600 BC–AD 200),³⁵ Chatterji (1942: 84–5; cf. also Masica 1991: 180f.; Bubenik 1996: 56) claims that intervocalic single voiced aspirates developed a fricative pronunciation, arguing on the basis of inscriptional orthography and manuscripts which waver between writing a stop, <h>, or nothing.³⁶ Hinüber (2001) presents more conclusive evidence for the spirantization of /-bh-/ and /-dh-/.³⁷ This appears specifically in the Middle Indo-Aryan dialects of North Western India attested in ‘Gāndhārī’.³⁸ Here we find the sequence <-vh-> and the single letter <-v->,³⁹ beside the expected <-bh-> and <-h->, both in texts and inscriptions. Presumably the development was [-bh-]>[-β-]>[-v-].⁴⁰ Later inscriptional evidence from the eighth century from the same region shows similar representations.⁴¹ Additional evidence for [-dh-]>[-ð-] is suggested by the representation of /-dh-/ with <s> as in GDp *masu* for Skt *madhu* ‘sweet’.⁴² Hinüber does not, however, regard the Gandhari development as indicative of an intermediate stage of the development of the voiced aspirates to /-fi-/, but rather as a separate development.

The coincidence of <-vh->/<-v-> beside <-bh-> and <-h-> may be interpreted in two ways:

- 1 They show two different developments, one [-bh-]>[-fi-], the other [-bh-]>[-β-]>[-v-], with a subsequent generalization of [-fi-] from the former.
- 2 They show several stages of one development, [-bh-]>[-β-]>[-v-]>[-fi-].

³⁵ The evidence for the Early Period is in the form of Prakritic forms in Vedic, Pali (the Sinhalese canon) and early inscriptions. For the ‘Transitional’ Period the Aśokan and Brāhmī inscriptions provide the bulk of the evidence. The majority of the inscriptions are written in the Brāhmī script, but those from North Western India (‘Gāndhārī’), are typically written in the Kharoṣṭhī script. (For discussion of early Indian scripts, see e.g. Dani 1963); (for particular discussion of the Kharoṣṭhī script, see Dasgupta 1958).

³⁶ This does not necessarily point to a *fricative* stage. The use of <h> alongside <bh> and <Ø> shows that the change has occurred but is probably not complete.

³⁷ Bloch (1965: 65ff.) provides some evidence from Pali for fricative pronunciation of voiced aspirates in medial position: *anavhīto* for *anabbhīto* ‘not restored’, *-vho* / *-vhe* for *-dhvam* (2 pl. mediopassive ending), but states that such a pronunciation was rare. Nevertheless he too assumes a ‘transitory’ fricative stage which would have preceded the later development of the voiced aspirates to /-fi-/.

³⁸ The term refers loosely to a collection of inscriptions from North Western India which are linguistically related to the fragmentary textual evidence of the Niya Documents and the *Gāndhārī Dharmapada* (GDp); see Hinüber (2001: 34, 95f.) for a discussion of the sound changes.

³⁹ Hinüber (2001: 101) reads <-vh->, <-v-> as [β].

⁴⁰ e.g. GDp *pravha* ~ *-prava* (also *-prabha*) for Skt *prabhā* ‘light, splendour’; Gand.Niya *avhīṇanu* < Skt *abhijñāna* ‘remembrance, recollection’.

⁴¹ *dharmavānaka* for *dharmabhānaka* ‘preacher, law-expounder’.

⁴² We see the same phenomenon in an Aśokan inscription, with *sasumata* for *sādhumata* ‘well-thought of, highly prized’ (GDp), and a later (seventh century) inscription with *nirvānasātau* for *nirvānadhātau* ‘the region of Nirvāṇa’.

It is in fact impossible to decide which is the appropriate interpretation. The most we may say from the Gandhari (and Pali) evidence, is that in some areas of India at least the Old Indo-Aryan voiced aspirates became voiced fricatives in intervocalic position. Chatterji assumes that during the Second Middle Indo-Aryan Period (AD 200–600)⁴³ /bh/, /dh/ and /gh/ became /-fi-/ intervocalically. As we have seen from earlier evidence this change could have been underway for some time.⁴⁴

During the Third Middle Indo-Aryan Period (AD 600–1000) we find the emergence of a new form of language, Apabhramśa ('aberrant'), which seems to have been based on the earlier literary Prakrits. All the evidence in Apabhramśa reflects the changes as described above. We also find evidence here for the sporadic aspiration and deaspiration of consonants which is also found in the later NIA languages, so, for example, /b/ > /bh/ in *bhisa* < Skt *bisa*- 'lotus stem'. The cause of this aspiration is often obscure, although the presence of /-s-/ seems to be a common factor.

In Middle Indo-Aryan, therefore, voiced aspirates remained unchanged in word-initial position, but generally became /-fi-/ intervocalically. In the North-Western dialects there are indications of a development to voiced fricatives in intervocalic position.⁴⁵ Clearly voiced aspirates developed differently according to their position in the word.⁴⁶ It is commonly agreed that the Middle Indo-Aryan period was characterized by a change in the nature of the word accent from the free pitch accent (found in Vedic and reconstructed for late Proto-Indo-European) to a stress accent, similar to that of English, which was probably fixed on the first long syllable from the end of the word.⁴⁷ The assumption of a stress accent is mainly on the grounds of changes observed in the vowels, for example, the loss of a short vowel before or after a stressed syllable, for example, *údaka* > *ud'ka* > *okka*. If there was a change to a stress accent it is possible that the consonant changes were related to this, but it is not a prerequisite.

5.2.2 Attested parallels: The New Indo-Aryan languages

Not surprisingly over such a vast area, dialectal variations are found before c. AD 1000, but it is only after this period that the separation and establishment of

⁴³ The evidence for this stage is in the form of the literary Prakrits found in Sanskrit drama.

⁴⁴ e.g. /-bh-/ > /-fi-/: *gardabha* > MIA *gaddaha* 'ass'; /-dh-/ > /-fi-/: *vadhū* > MIA *vahū* 'wife'; /-gh-/ > /-fi-/: *megha* > MIA *meha* 'rain'.

⁴⁵ In clusters of stop or /r/ + voiced aspirate, or voiced aspirate + /r/, /y/, /v/ geminate stops developed: e.g. OIA *dugdha* > Pkt *duddha* 'milk'.

⁴⁶ The changes of the voiced aspirates form part of a set of changes which affected all intervocalic single consonants bar the retroflex series (e.g. Masica 1991: 180f.).

⁴⁷ See e.g. Bubenik (1996: 62). Bloch (1965: 51) has reservations about the exact nature of the new accent but admits that a stress accent is likely.

different geographical and social dialects as early forms of the New Indo-Aryan languages are recognized. The New Indo-Aryan languages are noted for their preservation of the PIE voiced aspirate stops. As we have seen, however, any medial voiced stop which corresponds to the same sound in Sanskrit cannot be a direct reflex of an intervocalic PIE voiced aspirate. The frequent occurrence of such correspondences are usually explained as Sanskrit loans, for example, *madhya-* in *Madhyadēśa* ‘the central country’. Languages (or language groups) which show voiced aspirates include Nepali, Bihari, Assamese, Oriya, Sindhi, Bengali*, Eastern and Western* Hindi, Gujarati*, Lahndi, and Marathi.⁴⁸ Romany and Sinhalese do not continue voiced aspirates and are discussed separately below. The changes involving the voiced aspirates from Middle Indo-Aryan to the New Indo-Aryan languages (other than Romany and Sinhalese) can be summarized as follows:

- 1 Simplification of Middle Indo-Aryan geminate clusters leaving single voiced aspirates, sometimes with compensatory lengthening of a preceding vowel.⁴⁹
- 2 Development of clusters of nasal + voiced aspirate; these show a variety of treatments: assimilation of voiced aspirate to nasal, loss of nasal with lengthening of preceding vowel, loss of nasal with nasalization of preceding vowel, retention of nasal.⁵⁰
- 3 Sporadic aspiration of voiced stops to voiced aspirates.⁵¹
- 4 Devoicing of voiced aspirates to voiceless aspirates, in the northern dialects of Kalasha (Morgenstierne 1973: 196).⁵²
- 5 Deaspiration of voiced aspirates, which can be divided into ‘simple’ and ‘complex’ (/h/ usually shares these developments):

‘simple’ deaspiration: *voiced aspirate* > *voiced stop*. Except in Western and Eastern Hindi, deaspiration of non-initial (especially final) voiced aspirates is very common, and probably more extensive than the orthography shows (e.g. Bloch 1965: 63; Turner 1921: 508). Word-final deaspiration is common in Marathi, Gujarati, Nepali, and Western Bengali. Languages which are identified as having resisted this deaspiration are the standard dialects of Western

⁴⁸ Asterisks mark languages where further developments of voiced aspirates are taking place (see below).

⁴⁹ e.g. stop + stop: Pkt *duddha* > Mar./Guj. *dūdh*, Nep. *dudh* ‘milk’; dental + /y/: Pkt *sanjñhā* > Nep. *sājñh*, Mar. *sāmñh* ‘evening’; /r/ + stop: Pkt *ubbha* > Mar. *ubha*, Nep. *ubho*, H. *ūbha* ‘erect’. Panjabi and Lahnda retain geminate clusters.

⁵⁰ e.g. Skt *randh-* > Ben. *rān* ‘subdue’; Skt *janghā-* > H. *jāgh*, Mar. *jag*, Pan. *jangh* ‘thigh’.

⁵¹ e.g. Skt *gunthana* > H. *ghū* ‘veil’; Skt *gar-gara* / *ghāgrā* > Mar. *ghāger* ‘water pot’.

⁵² e.g. N.Kalasha *thum* = Skt *dhūmahī* ‘smoke’.

and Eastern Hindi (Chatterji 1942: 105). Aspiration in general seems to be associated with the prestige dialects,⁵³ and this is no doubt due to the status of Sanskrit (which is fully aspirated) and Standard Hindi which also happens to preserve aspiration.

'complex' deaspiration: voiced aspirate > voiced (or voiceless) stop with an accompanying tonal or glottal development on neighbouring vowels.: This development has been observed so far in Panjabi, Haryvani (Hindi), Eastern Bengali, and Gujarati and deserves special attention.

Voiced aspirates in Panjabi developed to voiceless stops in initial position, and to voiced stops in medial and final position, but these are differentiated from other voiceless and voiced stops by the development of a distinctive tone on the neighbouring vowel (e.g. Gill and Gleason 1963, Bhatia 1975; Bhatia 1993). The development is not reflected in the orthography, the North Indian Gurmukhi script, which continues to use the signs <bh>, <dh>, <gh> for these sounds.⁵⁴ /h/ is also subject to a similar change which leads to a change in the tone on a neighbouring vowel. The developments are conditioned by position in the word and word stress, so that (in short), word-initial voiced aspirates became plain voiceless stops followed by a vowel with low tone, whereas as word-medial/final voiced aspirates became plain voiced stops with High tone on the preceding stressed vowel (unless the word stress falls on the following syllable, in which case the development is as word-initial).⁵⁵

Similar developments to those observed in Panjabi are noted in an oral dialect of Hindi, Haryanvi, by Singh (1983). Here the voiced aspirates become voiced stops with a tone (which is not described) on neighbouring vowels. The treatment does not differ according to position in the word.

The developments of the voiced aspirates in Eastern Bengali noted by Chatterji (1942) involve a change to plain voiced stop followed by a glottal closure.⁵⁶ If the former aspirate is in medial or final position the glottal closure appears directly after the stop of the initial syllable. These changes are not reflected in the North Indian Bengali script. The resulting stops are labelled 'recursives' by Chatterji, who describes them as being similar to the Sindhi implosives.⁵⁷

⁵³ To such an extent that in Standard Bengali the pronunciation of aspiration word-finally is regarded as an affectation (Chatterji 1942).

⁵⁴ The voiceless aspirates remain unchanged. This is interesting because 'simple' deaspiration affects both voiced and voiceless aspirate stops.

⁵⁵ e.g. H. *bhūkh*, Pan. <bhukkh>, [pūkkh] 'hunger'; Pan. <baddhā> [bádd:ə] 'bound'; Pan. <bāgh> [bág] 'tiger'. Low tone is accompanied by some laryngeal constriction (Wells and Roach 1980; Stuart-Smith and Cortina-Borja 1997).

⁵⁶ The Standard form of Bengali is Western Bengali.

⁵⁷ In fact the Bengali sounds as described by Chatterji do sound as if they are much like the Sindhi implosives (for discussion of the phonetics of these, see e.g. Nihilani 1974).

A similar development is noted in Gujarati. Again the North Indian Gujarati script does not show any indications of the changes.

It seems likely that the developments in Bengali and Gujarati may be precursors of a tonal development of the kind which we find in Panjabi. At present systematic phonetic investigation of these developments, both of the new tonal contrasts, and the reported stops with glottal closure, is lacking. Tonal development in general is discussed by Singh (1983). He states that although voiced aspirates remain in some New Indo-Aryan languages, those in the dialects of the standard languages are at present undergoing change.

There are two other developments in New Indo-Aryan languages which deserve comment. In Armenian Romany the Old Indo-Aryan voiced aspirates became voiceless aspirates generally, but in European Romany this development only occurred in word-initial position.⁵⁸ In Palestinian Romany the voiced aspirates remained voiced and merged with the voiced stops: for example, Skt *ghāsā* > Eur./Arm.Rom. *khas*, but Pal.Rom. *gas* (see e.g. Turner 1959; see also Bloch 1965: 64f.). A different development is found in Sinhalese, where the voiced aspirates became plain voiced stops. Chatterji (1926: 15) notes that this change had occurred before the earliest form of Sinhalese Apabhram̃śa, Elu.

These changes may be summarized as follows:

- 1 In certain (prestige) languages, especially Eastern and Western Hindi, voiced aspirates are preserved intact.
- 2 There is a tendency in New Indo-Aryan languages towards 'simple' deaspiration of non-initial voiced aspirates. They are replaced by plain voiced stops. 'Simple' deaspiration seems to be conditioned by position in the word.
- 3 There is a tendency towards 'complex' deaspiration, which may be spreading in non-standard dialects. Voiced aspirates develop into plain voiced or voiceless stops, with a tonal development on neighbouring vowels.
- 4 This tonal development may or may not be linked to the other form of 'complex' deaspiration where the plain voiced stop resulting from the voiced aspirate is accompanied by glottal constriction.
- 5 The cluster of an original nasal + original voiced aspirate leads to various outcomes in the New Indo-Aryan languages. In several languages the voiced aspirate is preserved in contrast to intervocalic voiced aspirates which become /-h̃-/.

⁵⁸ Allen (1958: 101), following Aichele (1957), gives this limited change for both European and Armenian Romany. (For rejection of this possibility, see e.g. Turner 1959: 491).

5.2.3 Attested parallels and phonetic predictions

In the history of the Indo-Aryan languages the voiced aspirates show a number of developments. If they were not retained they became:

- plain voiced stops
- plain voiced or voiceless stops accompanied by vowels showing distinctive tones and/or glottal constriction
- voiceless aspirates (word-initially, and in all positions in the word)
- voiced glottal fricative (intervocalically)
- voiced fricatives (intervocalically)

Many changes are restricted by position in the word. These attested changes match almost exactly the predictions for change resulting from the phonetic examination above. Importantly, no changes occurred which were not predicted. This finding is a striking confirmation that Ohala's model is constrained, and hence of the underlying assumption that the origins of sound change lie in the misinterpretation of synchronic variation arising from universal phonetic constraints.

5.2.4 Reconstructed parallels: The PIE voiced aspirates

The most usual development of the PIE voiced aspirates was to voiced stops. This is found in Albanian, Iranian, Balto-Slavic, and Celtic (Szemerényi 1989: 55f.; Schrodtt 1976). In Greek, the voiced aspirates became voiceless aspirates, while in Tocharian and Hittite they are represented by voiceless stops (for the Hittite development, see Melchert 1994: p. 60; 92ff.). Apart from Italic, three language groups show different developments: Armenian, Germanic, and Indo-Aryan.

Classical Armenian, attested in texts dating from the fifth century AD, is usually regarded as showing a consonant shift from the PIE system during which voiced aspirates became voiced stops, voiced stops became voiceless stops, and voiceless stops became voiceless aspirates (Pisowicz 1976). Thus in Classical Armenian voiced stops are the regular reflex of the voiced aspirates (in initial position and partially in intervocalic position), otherwise voiced fricatives are found; for example, *berem* < **bher-*, *dnam* < **dheH₁-*, *bani-w*, where *-w* is from **-bhi*, cf. Gk *-phi* (Pisowicz 1976: 7f.). The exception to this are the PIE palatals which became affricates, as did the labiovelars before front vowels (with loss of the labial element).

In two groups of contemporary Armenian dialects (I—East, and II—North, according to the classification in Pisowicz 1976: 10), a series of stops is found which is sometimes referred to as 'voiced aspirates' and written in Roman

orthography as <bh> etcetera, occasionally occurring where PIE voiced aspirates are reconstructed, for example, dial. *bherem* = Cl.Arm. *berem*. From Pisowicz's description (1976: 13f.), these sounds do not seem to be phonetically voiced stops with breathy voiced release but rather voiceless stops with breathy release (see Hayward 1989; Allen 1950).⁵⁹ More recently Pisowicz (1998) is at pains to emphasize that these sounds are not phonetically similar to those of Indic, and suggests that they be called 'voiceless murmured stops', noting that the murmur is produced with relatively weak airflow (we would probably want to classify them as stops with slack voiced offset).

This is the traditional account of the treatment of the voiced aspirates in Armenian. The appearance of the dialectal 'voiced aspirates' has led to the suggestion that these dialects at least preserve the original PIE stop system (e.g. Gamkrelidze and Ivanov 1995). (The 'voiced aspirates' occur together with plain voiceless and voiceless aspirates in the dialects of group II 'North'.) According to this theory the 'voiced stops' of Classical Armenian would also have to be interpreted as 'voiced aspirates'.

There appears to be no evidence to establish the pronunciation of the Classical Armenian 'voiced stops', which could help to settle the issue. Support for the theory must rest on the evidence of the dialects and their developments from Classical Armenian. However the dialectal stop systems are extremely complex, as are their various developments from the Classical Armenian system. While it could possibly be argued that in the two groups of dialects where 'voiced aspirates' occur there is evidence for retention of the PIE stops, the same cannot be said for the other stop series (PIE plain voiced and voiceless). If we look at the evidence for the stops series for the ten dialect groups, we find that nine of these show some form of aspirated reflex, and so it is possible that the phonetic realization of the Classical Armenian 'voiced stops' involved 'aspiration' of some description (?slack voiced offset), but in the absence of evidence about the pronunciation of these, we cannot say much more. From the developments of the dialectal stop series as a whole, it seems highly unlikely that the PIE voiced aspirates were preserved 'intact'.⁶⁰

In Old Indo-Aryan for the most part, the voiced aspirates were preserved intact (see above p. 185; Kobayashi 2000), though we may note three major changes. The PIE palatal stop **ǵh* became /h/, as did the plain velar **gh* and labiovelar **g^wh* before front vowels. Bartholomae's Law took place, by which the sequence 'voiced aspirate + plain voiceless stop' became 'voiced + voiced aspirate stop', and Grassmann's Law of dissimilation had operated, by which the first

⁵⁹ Allen observes that the phonetic realization of the stops depends on their distribution: in initial position they are generally voiceless, intervocally they are either voiced stops or voiceless, and in final position they are either voiced stops, lightly aspirated voiceless stops, or voiced stops with voiceless release.

⁶⁰ See Pisowicz (1976) for a full discussion of this problem, and full bibliography.

of a sequence of two aspirates was deaspirated to a plain stop. This last development also took place in Greek, but separately from that of Indic.

Unlike the Armenian consonant shift, there is usually no doubt that a general consonant shift, described by 'Grimm's Law', took place in Proto-Germanic (Collinge 1985). During this shift voiceless stops became fricatives (Lat. *pater*, Eng. *father*) and voiced stops became voiceless stops (Lat. *dēns*, Eng. *tooth*). The development of the PIE voiced aspirates is not quite so straightforward, since the Germanic reflexes here are voiced stops and voiced fricatives. Moreover there is some dispute as to the 'correct' interpretation for the development, and several exist (see, e.g. Coetsem 1970 for a good discussion; see also Hock 1991: 602ff.).

One explanation, which may be seen as going back to Grimm, for example, Vennemann (1984: 4), is that the PIE voiced aspirates became voiced stops generally, which developed into voiced fricatives in certain positions (intervocally and word-finally). Another, found in Streitberg (1896), and Krahe (1963), states that the voiced aspirates became voiced fricatives generally, which then reverted to voiced stops in initial word position and word-internally after nasals. A strong advocate of this explanation is Schrodtt (1976). He reviews all the earliest Germanic evidence for the change (Gothic, Old Norse, Old English, Old Frisian, Old Saxon, and Old High German), and concludes from this that the evidence points to a general change to voiced fricative. If one looks carefully at his evidence, however, it is clear that while there is good evidence for voiced fricatives intervocally and in word final position, there is little evidence for voiced fricatives in word-initial position (one disputed proper name in Gothic, and <z> [z] in Old English, Old Frisian, Old Saxon and Old High German, which could have become a fricative by palatalization), and none for voiced fricatives after nasals (*but see* Hock 1991: 603). This evidence points to a development conditioned by phonetic environment, and Schrodtt (1976: 43f.) himself admits that this option cannot be ruled out, although he favours a general change to voiced fricative.

5.2.5 Reconstructed parallels and phonetic predictions

Alongside the retention of voiced aspirates in Indo-Aryan, the reconstructed developments for the PIE voiced aspirates propose changes to: plain voiced stop; voiceless aspirate (in all positions in the word); voiced fricative (intervocally); stop with slack voiced offset. All of these changes were predicted by the phonetic review, and all but one have attested parallels (stops with slack voiced offset were not reported in the historical developments of the Indo-Aryan voiced aspirates). The high degree of correlation between phonetically-predicted changes and attested parallel changes, and those reconstructed for the PIE voiced aspirates provides an important independent confirmation of the traditional reconstruction.

While this result may appear the result of circular argument, I emphasize that it is not. I began with the assumption that the starting point was a series of voiced aspirates realized as breathy voiced stops similar to those of Hindi. This assumption was motivated by the apparent appearance of such sounds in Sanskrit and the belief that these protoforms could yield the expected reflexes. Then I took similar sounds in contemporary Indo-Aryan languages and analysed them phonetically in order to assess the variation that might be expected, and hence the sound changes that they might show. These were checked against reported synchronic variation. I also considered the changes that the Old Indo-Aryan voiced aspirates underwent during the progress to Middle Indo-Aryan and on to New Indo-Aryan. The range of possible changes of ‘real’ voiced aspirates that emerged from phonetic predictions and attested parallels happens to coincide more or less exactly with the changes which have to be reconstructed to get from the PIE assumed forms to the earliest attested IE reflexes.

5.3 Phonetics, predictions, and parallels

In this chapter I moved to an independent method of assessing how we might expect voiced aspirates to change. I applied the principles of a phonetic model of sound change to the case in question: I examined the phonetic characteristics of voiced aspirates realized as breathy voiced stops and made a number of predictions for change. These predictions were confirmed from observations of attested parallel developments in the history of Indo-Aryan. A number of important results emerge from the chapter:

- 1 Ohala’s model of sound change is a reliable and constrained predictor of possible sound change.
- 2 The traditional reconstruction of the PIE voiced aspirates as breathy voiced stops is phonetically the most plausible option.
- 3 There now exists a body of reliable and independent information—phonetically-predicted changes supported by parallel developments—against which the routes for the Italic development may be assessed.

It is now possible to evaluate the routes assumed by *Ascoli* and *Rix*. In fact, the new results taken together with the Italic reflexes point to a third explanation as most likely.

A Phonetic Explanation for the Italic Development

6.1. *Ascoli* and *Rix* reviewed

It is now possible to evaluate the phonetic plausibility of the two current explanations for the development of the PIE voiced aspirates in the Italic languages. Note that the review is in terms of phonetic plausibility because the review of other types of evidence or criteria, for example, conditioned changes, loanwords or the development of PIE *s, demonstrated that these are not helpful in deciding between the two. The main stages assumed for each explanation are repeated in Figure 6.1.

Both explanations assume a general development of the PIE voiced aspirates in all positions in the word, in *Ascoli* there is devoicing then fricativization, in *Rix* fricativization. The distribution into the attested split of voiceless allophones word-initially and voiced ones word-internally occurs at a later stage of Proto-Italic. Both theories share the reconstruction of a Proto-Italic fricative stage, which is included as a part of any account of the Italic evidence. Not only does this provide the most phonetically plausible account for the Latin conditioned development of *-dh- to /b/ (see below p. 204), but without it we would have to split Latin from Sabellic and Faliscan at a stage which may be inappropriate.

I begin by considering *Rix*. According to this account (Rix 1957; Meiser 1986), the PIE voiced aspirates became voiced fricatives in all positions in the word in Italic. During a common Italic stage, these voiced fricatives developed voiceless fricative allophones word-initially, but remained voiced in a voiced environment word-internally. In Sabellic and Faliscan this distribution was preserved, but in Latin, before the time of our written evidence, the word-internal voiced fricatives generally became stops.

If we compare the first stage of *Rix* against the information gathered in Chapter Five, a problem arises. The explanation assumes a phonological change from voiced aspirate to voiced fricative. These voiced fricatives are assumed to be realized phonetically as voiced fricatives in all positions in the word. Phonetic predictions and parallel developments indicate that a phonetic change to voiced fricative is unexceptional intervocalically. A phonetic change of breathy voiced

	Ascoli	phonemic	Rix	phonemic
PIE	*bh	*/bh/	*bh	*/bh/
Proto-Italic	*p ^h	*/p ^h /	*β	*/β/
Proto-Italic	*f	*/f/		
Proto-Italic	*f-	*-β- */ʔf/β/	*f- *-β- */ʔf/β/	

Sabellic	f-	-β- /f/	f- -β- /f/	
Latin	f-	-b- /f-; -b-/	f- -b- /f-; -b-/	

FIGURE 6.1 The revised *Ascoli* and *Rix* explanations for the main Italic development of the PIE voiced aspirates

step to voiced fricative in word-initial position emerges as much less likely.¹ Thus *Rix* begins with a change which is phonetically less likely, and so according to the criteria of phonetic plausibility being applied here, the account is phonetically less plausible. At the same time, note that when putting forward his account *Rix* was not attempting to satisfy explicitly the demands of phonetic plausibility. The reconstructed route proposed from PIE voiced aspirates to Proto-Italic fricatives is essentially phonological and was aimed to account for the Italic reflexes, in particular intervocalic voiced fricatives in Sabellic. As such, *Rix* is of course plausible. It is only when considered specifically under the terms of phonetic plausibility given here, that a difficulty arises.

Ascoli also assumes a general development of the voiced aspirates in all positions in the word, but this time of devoicing then fricativization. The voiceless fricatives subsequently become voiced word-internally in a voiced environment remaining as such in Sabellic and Faliscan but changing to voiced stops in Latin.

Phonetic predictions together with supporting parallels suggest that voiced aspirates (especially velar stops) are likely to devoice, particularly in word-initial position and before high vowels. There are good attested parallel developments for devoicing of voiced aspirates—both limited (word-initial position only), and general (all positions in the word). There is also the reconstructed parallel of general devoicing of Indo-European voiced aspirates into Ancient Greek which

¹ Such a change could be explained in terms of a generalization of fricative variants from intervocalic position to word-initial position, which is of course possible.

necessarily must bear less weight. *Ascoli* emerges as more phonetically plausible than *Rix*. But is it the most adequate explanation to account for the attested Italic reflexes?

The Italic evidence shows voiceless fricatives word-initially, and voiced fricatives (stops in Latin) word-internally. Our phonetic review observed that devoicing of a voiced aspirate is most likely to occur when the sound is word-initial. In *Ascoli* a voiceless aspirate, then fricative, stage is also assumed for word-internal position. These word-internal voiceless fricatives must then be revoiced in order to become the attested Italic reflexes. Close consideration of the voicing of PIE *-s- in Italic (Chapter Three), which was given by *Ascoli* himself as a supporting argument, does not work as well as it might. PIE *-s- does appear to become voiced intervocally in all Italic languages and hence also in Proto-Italic. However, adjacent to a liquid, *s is voiced in all languages bar Umbrian, which suggests that there was a language-specific voicing of *s in this environment. The fricative/stop reflexes of the voiced aspirates occur intervocally and adjacent to a liquid, and the evidence points to a voiced pronunciation in all languages in both environments. Thus, if we follow *Ascoli* we also need to assume either that the voicing process of the fricatives arising from the voiced aspirates in the Italic languages was not shared with that of *s, or if it was that there was a two-stage process, of which the second stage—adjacent to a liquid—was not shared. (We could assume either entirely independent processes for *s and the reflexes of the voiced aspirates, or assume shared voicing intervocally in Proto-Italic, but language-specific voicing adjacent to a liquid.) This in itself does not render *Ascoli* impossible, since more general observations of the treatment of /s/ show that /s/ does not always share in voicing processes noted in other fricatives (Chapter Four). However it adds another layer of complexity, particularly when the distribution of the Italic reflexes themselves points to a split development of the voiced aspirates from the earliest stage of Proto-Italic.

6.2 A phonetic explanation for the Italic Development

What emerged from the review of phonetic predictions and attested parallels in Chapter Five is that voiced aspirates may show changes which are limited to particular phonetic environments, for example, according to position in the word. The Italic reflexes show a split distribution according to position in the word. When we consider the Italic reflexes against the information gained from phonetics and parallels, the most phonetically plausible account for the Italic development would seem to be one that assumes a split treatment according to position in the word from the earliest stage of common Italic (see Figure 6.2). In word-initial position the Italic voiced aspirates devoiced and then became fricatives, but in word-internal position they remained voiced, developing into fricatives.

	word-initial position	word-internal position	phonemic
(1) PIE	*bh-	*-bh-	/bh/
(2) Proto-Italic	*p ^h -	*-β-	/ʔp ^h /
(3) Proto-Italic	*f-	*-β-	/f or β/

Sabellic	f-	-β-	/f/
Latin	f-	-b-	/f-/ /-b-/

FIGURE 6.2 An 'early split' explanation for the Italic development of the PIE voiced aspirates

The idea of a split development is less novel than it might sound. Phonetic predictions for change for the voiced aspirates assumed differences according to position in the word, and these were borne out by auditory and instrumental observations. Moreover the development of the voiced aspirates from Old Indo-Aryan into Middle and New Indo-Aryan (and ongoing) varied according to position in the word. General observations of the synchronic and diachronic behaviour of stops often demonstrate predictable differences between word-initial and word-internal position. Other stops in other language groups have shown split developments, for example, the treatment of Latin voiceless stops in Vulgar Latin and later in certain Romance languages, where voiceless stops are retained word-initially but voiced word-internally (e.g. Väänänen 1981: 57f.).

There is one aspect of the split explanation that might cause anxiety, and I shall deal with it here. The new explanation essentially has three reconstructed stages, that of PIE, that of Proto-Italic that immediately precedes the historical reflexes (and reflects the distribution of Sabellic), and one in between. Few would query the first and third stages phonetically or phonologically. (The phoneme assumed for stage 3 would probably be given as /f/ following the usual convention of categorizing according to the word-initial allophone, but it could equally be /β/.)² However, the second stage could be considered awkward. Here I reconstruct a phonemic category with voiceless aspirate allophones in word-initial position but at the same time voiced fricative allophones in word-internal

² There are other reasons too, for example, the typological consideration that a system /p b f/ is reported far more frequently than /p b β/ (Maddieson 1984), though reference to typology can be problematic in itself (see below).

position. I have given this category a queried label */?ph/, which incidentally provides a typologically unexceptional system /p b ph/ and makes the explanation look phonemically the same as *Ascoli*. (Assuming the alternative label /β/ gives the less usual system /p b β/ and looks like *Rix*.) The question here is, the diachronic reconstruction is phonetically plausible but am I coincidentally reconstructing a synchronic stage which is phonologically implausible? Can we accept the reconstruction of a phonemic stop category whose allophones differ in voice and manner?

I suggest that a glance at the phonetic content of contemporary phonological categories more than supports such a reconstruction. It is well known that English stops show differing allophones according to position in the word (see e.g. Ladefoged 1993; Wells 1982). Voiced stops in many varieties of English commonly show devoiced or voiceless stops with short lag in word-initial position but voiced stops or taps word-medially. Voiceless stops also vary substantially according to position in the word. English /t/ provides a particularly good example, with word-initial allophones ranging from strongly- to weakly-aspirated with differing degrees of affrication and/or frication, while word-medial allophones may be plain voiceless stops with or without release, voiceless affricated stops or fricatives, plain voiced stops, voiced approximants, glottal stops (often a few creaky pulses).³ In general fine-grained acoustic analysis of synchronic variation is revealing a greater complexity of variation than previously admitted from auditory analysis (e.g. Docherty and Foulkes 1999; Lawson and Stuart-Smith 1999; Lavoie 2001; Lavoie 2002). The variation just described is not always indicative of sound change. Most (?all) accents of English tolerate relatively stable variation in consonant realization which is usually conditioned by position in the word (amongst other factors). In turn the degree of variation depends on many factors including type of speech (citation forms, connected speech, read speech), accent of English, and so on.

Such variation is increasingly challenging for phonological representations and phonological theory (e.g. Docherty and Foulkes 2000). For example, working class speakers of Glaswegian typically realize underlying /t/ as some form of stop word-initially but as some form of laryngealized vowel (glottal stop) word-medially (post-stress). For many speakers this distribution is categorical and stable (e.g. Stuart-Smith 1999). Such a distribution does raise a question as to the appropriate phonemic symbol for this category. Typically and traditionally it is given as /t/, which gives the phonetic impression that this phoneme is usually some type of alveolar stop (and simultaneously obscures any other type of realization), but we could equally use /ʔ/, which would give a very different impression of the same phonetic distribution. (/ʔ d/ also gives a very

³ These are the possibilities which can be easily 'labelled' or transcribed. It is also possible to encounter variants (particularly from acoustic analysis) which are not easy to categorize phonetically (Docherty and Foulkes 1999).

different typological impression from /t d/ which is directly relevant to our previous discussion of assigning an appropriate phonemic label for stages 2 and 3. It is clear that reference to synchronic typology can be circular in such a process since phonemic inventories do not (and cannot) express the allophonic variation behind them.

These observations from ‘stable’ variation allow two points to be drawn which are pertinent to our reconstruction: (a) there are numerous good examples of stop phonemes which vary in phonetic realization in voice and/or manner (and place) according to position in the word; (b) the phonemic representation for such arrays of variation is usually conventional and can often fail to capture a substantial proportion of the variation (which may be limited to a particular phonetic environment).

Both points are further strengthened by considering the nature and degree of variation in consonants undergoing change. A good example is presented by the consonant /hw/ in Glaswegian (see Fig. 6.3; Stuart-Smith and Tweedie 2000; Stuart-Smith, Timmins and Lawson (in prep)).

In many middle-class (Standard Scottish English) speakers, /hw/ is typically realized as a voiceless labial-velar fricative [ɸ], with a fringe of other variants. However, in working-class speech, particularly that of working-class adolescents, /hw/ shows a very different pattern of variation, with a substantial proportion of variants realized as voiced labial-velar approximants or as sounds auditorily (and acoustically) inbetween [ɸ] and [w]. Comparison of these data with earlier reports such as that by Macafee (1983), and later findings (e.g. Torrance 2002) suggest that we should interpret this pattern of variation diachronically as a

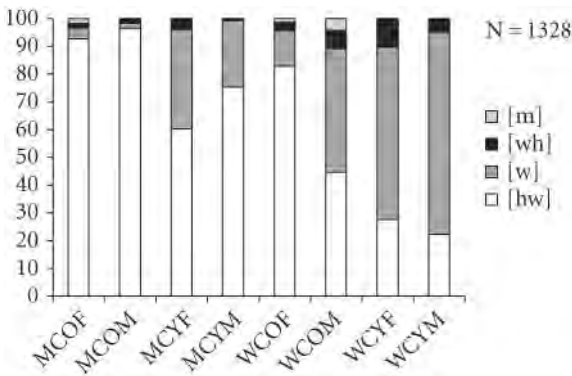


FIGURE 6.3 The realization of /hw/ in Glaswegian in spontaneous speech (Stuart-Smith, *et al.* in prep). [wh] represents variants which sound ‘inbetween’ [ɸ] and [w], and which show a distinctive acoustic pattern of an abrupt start to formants without preceding friction. [m] represents a miscellaneous group of variants

change in progress from /hw/ to /w/. However, synchronically these data are difficult to assign to any particular phonemic category. Whatever is assumed means accepting a range of variation which is not typical of a phoneme which is not undergoing change. The important point here for our purposes is that consonants undergoing change may show—in synchronic snapshot—quite unexpected patterns of variation.

Thus not only is our reconstruction acceptable in terms of usual stable variation for consonants, it could also reflect the transition stage of a consonant category undergoing change.⁴ I therefore assume that the reconstruction of stage 2, as a phonemic category with allophones differing in voice and manner according to position in the word is unproblematic; for what follows I shall give it the phonemic label /ph/. At the same time I note that the explicit reference to the phonetic distribution in the reconstruction of this stage results in a route which includes a variable or ‘fuzzy’ category. As we have seen, such categories are typical of contemporary language, but they are less often represented in historical phonological reconstruction (*see* Lass 1993: 181).

The following sections present an account of the proposed route, giving first the main development, then discussion of certain conditioned changes. Comments are then made regarding word-position, word-stress, and the changes as a system. For the purposes of description it is assumed that the stops all showed a homogeneous development, regardless of their place of articulation. So whether labial or velar, in word-initial position, it is proposed that each first devoiced, and then became a fricative. However, a description of this sort is considerably over-simplified. Breathily voiced stops at different places of articulation have had different phonetic characteristics which would have affected both how and when they changed. Documented shifts from stop to affricate or fricative, such as that of the Second German Sound Shift, show that the uniformity of treatment which is eventually observed, is often the result of non-uniform developments, particularly in terms of relative chronology and geographical distribution (for discussion and data, *see* Pagliuca 1982: 83f.). Hence while the stops at each place of articulation are assumed to have undergone essentially the same changes, nevertheless these may well have occurred at slightly different times, and that the role of certain phonetic constraints may have been different at different places of articulation. Again, for the purposes of the discussion, I take the labial voiced aspirate as generally representative of the development for all four places of articulation (labial, dental/alveolar, velar and labiovelar), reserving specific points for particular places of articulation for separate discussion.

⁴ Providing examples of the range of variation for the third stop (?/ph/) as part of a system /p b ph/ (the examples above refer to two-way contrasts) is more difficult given that phonological (and even many phonetic) reports tend to focus on majority allophones (with little discussion of possible variation).

6.2.1 *Word-initial position: e.g. *[bh-] > *[p^h-] > [f-]*

The voiced aspirates devoiced to voiceless aspirates, and then became voiceless fricatives. The change probably began before the high vowels **i/*u*, and may have started with the velar stop.⁵

**[bh-] > *[p^h-]*: Breathy voiced stops are subject to devoicing, both during stop closure and during the aspiration period, particularly if there is a constriction in the vocal tract, as for the production of a high vowel. From general observations of voiced and voiceless stops in word-initial position, we can expect that in word-initial position breathy voiced stops will show, among other characteristics, longer closure duration and more ‘aspiration’—in other words, longer aspiration duration and higher rates of airflow. Both characteristics would contribute to the devoicing of the stops in this position. (The role of word-stress in this stage is unclear; *see below p. 218.*)

Perceptual experiments have shown that in word-initial position voiced aspirates are very likely to be perceived as voiceless aspirates. This misperception may be caused both by the occurrence of partially-voiced tokens, but also by the similar length of the aspiration duration of voiced and voiceless aspirates. If the voicing during closure is not perceptible or perceived, a voiceless aspirate will be ‘heard’. Such a confusion is probably also possible even if some voicing is actually present during closure and aspiration period.

The velar voiced aspirate is more likely than any of the other voiced aspirates to devoice, and recent acoustic studies report breathy voiced stops with voiceless aspiration as particularly frequent realizations for the NIA voiced aspirates. It seems likely that the devoicing could have started here. Attested parallels show a limited development to voiceless aspirate in word-initial position in European Romany.⁶

**[p^h-] > [f-]*: The subsequent change of word-initial voiceless aspirate to voiceless fricative is assumed to be primarily acoustically driven, as a result of the aspiration ‘noise’ (and that of the burst) being misinterpreted by the listener as ‘frication’ (on frication and aspiration in voiceless stops (*see Stevens 1998: 460f.*)).⁷ This could be provoked by actual frication noise in the signal deriving from partially affricated tokens, particularly before high vowels. The aspiration period of voiceless aspirates shows a similar acoustic pattern to the voiceless

⁵ We may note here that alongside the predicted devoicing before /i u/, Lachmann’s Law of vowel lengthening in connection with consonantal devoicing in Latin appears to have been inhibited when the PIE root contains the high vowel /i/.

⁶ Most varieties of European Romany show plain voiced and plain voiceless stops. Some, e.g. the Welsh variety, are reported also to show voiceless aspirates, although it is not known to what extent these have merged with the plain voiceless stops; Turner (1959: 34).

⁷ This change is often explained in articulatory terms, *but see e.g. Foulkes (1997: 250–1, with n2).*

fricative at the same place of articulation. Hence we could expect the aspiration of [p^h] to be misinterpreted by the listener as the frication of a labial fricative. Affricated variants for voiceless aspirates could also participate in the change. Hock (1991: 666) reports that the voiceless aspirate /p^h/ may be realized as [p^{h̥}] in many NIA languages. Alternately the affricate could be [p^f-].⁸ Affricates are more likely to develop before high vowels, where the high velocity airflow on release of the stop lasts longer (Ohala 1983: 204).

This explanation is also valid for the other places of articulation, although note that admitting affricated variants as a part of the process presumes a dental articulation for the dental/alveolar voiceless aspirate, which is in line with the usual assumption for the phonetic realization of PIE **dh* as a dental stop. An alveolar would affricate to [t^s], resulting in the fricative [s]. A dental affricate [t^θ], however, would give rise to [θ]. Velar stops are more likely to show affricated or partially affricated tokens than labial or dental/alveolars, because of the nature of the channel created as the tongue back moves away from the velum.

The change of stop to fricative is particularly likely in word-initial position, given that here we would expect higher airflow (rate and volume), and hence more aspirated stops, in other words, stops with an aspiration period with more intense acoustic energy and of longer duration. Longer VOT (and hence longer aspiration) is also found (and is to be expected) before high vowels. It could be argued that the change from stop to fricative might occur particularly in utterance-initial position, since in this position the stop closure could be interpreted by the listener as a property of the preceding pause, leaving the frication alone.

The change of voiceless aspirate to voiceless fricative is well attested in, for example, the change from Ancient to Modern Greek. The change [p^h] > [f] is often reconstructed as a stage between [p] > [f], or [p] > [h] (see Foulkes 1993, 1997 for discussion and extensive parallels).

6.2.2 Word-internal position: *[-bh-] > [-β-] (>Lat. [-b-])

The voiced aspirate became a fricative which was preserved in Sabellic; only in Latin did the voiced fricatives subsequently become stops intervocalically and adjacent to a liquid. After a nasal, however, the Proto-Italic voiced fricatives became stops in all the Italic languages, but this is attested only in Umbrian and in Latin.

PIE *[-bh-] > Sab./PrLat. [-β-]: The change of voiced aspirate to voiced fricative in intervocalic position may be explained in terms of articulatory

⁸ See e.g. Pagliuca and Mowrey (1987) on [p] > [p^f] > [f]; although they do not admit perceptual considerations.

undershoot, which occurs as a result of elasto-inertial constraints. Breathy voiced stops are particularly likely to be subject to undershoot because of their short closure duration. Fricativization would also contribute to the maintenance of voicing. We might expect the velar voiced aspirate to fricativize earlier than the stops at other places of articulation. The constraints on the voicing of the velar voiced aspirate mean that the closure duration is extremely short and hence the stop is particularly vulnerable to the effects of articulatory undershoot. Again, if voicing is to be maintained, the velar voiced aspirate is the stop most likely to become a fricative.

Intervocalic voiced fricative allophones for voiced aspirates are frequently found in the North Indo-Aryan languages. Attested parallel developments of voiced aspirate to voiced fricative are limited to intervocalic position (Sanskrit into North Western dialects of Middle Indo-Aryan). Reconstructed parallels for this change are also limited to intervocalic position (PIE into Armenian, Germanic).

*The Latin 'fortition'—PrLat. *[-β-] > Lat. [-b-]:* A change of voiced aspirate to voiced fricative is assumed here for both Sabellic and the 'common' stage of Latin and Faliscan. In Latin the voiced fricatives merged with the inherited voiced stops. Proto-Latin *[-β-] (word-internal allophone of /f/) merged with inherited /b/ intervocalically, and in the environment of a liquid.

The assumption of a sequence of changes 'stop > fricative > stop', which includes a 'fortition' of fricative to stop, might be considered unlikely in intervocalic position, because the change stop to fricative is considered more natural than that of fricative to stop. I argue, however, that not only is the reconstruction of a fricative stage for Latin necessary, but more importantly, the fortition proposed here is not problematic.

We need to postulate an early (unattested) fricative stage for Latin for two reasons. The first concerns the conditioned development of PIE *-dh- to /b/ in Latin. This change of place of articulation is most plausibly explained at a fricative stage, that is, *-dh- > [ð] > [v] > /b/, because [ð] and [v] are more perceptually confusable than [dh] and [bh]. Secondly, the assumption of a direct change in Latin of medial voiced aspirate to voiced stop separates the developments of Latin from Faliscan, and indeed the other Italic languages generally, where we find <f> ([β]) intervocalically.

Pagliuca and Mowrey (1987) argue that strengthening or reinforcement of an articulation would be unlikely in intervocalic position, where we would expect precisely the opposite effect. Our own discussion of the change of [bh] to [β] assumes that phonetic constraints work towards fricativization in this position. Despite this, we should probably not regard fortitions as unnatural (phonetically or phonologically implausible).

The fortition in question involves a phonological merger of the voiced allophones of the phoneme /f/ with the inherited voiced stop phoneme /b/ in

intervocalic position.⁹ The change may or may not have been ‘phonetic’. If we want to avoid suggesting an actual phonetic strengthening the change could be explained by assuming that in Latin the voiced stop series, which are assumed to have been fully voiced, had voiced fricative variants in intervocalic position. The voiced fricatives resulting from the voiced aspirates could have been confused with these, and hence misinterpreted as voiced stops. An orthographic confusion of this kind is found in Latin inscriptions dating from the first century AD (Leumann 1977: 139, 159), with <V> for and for <V> (presumably both trying to represent [v] or [β]). Alternatively it is possible, as Hock suggests (1991: 85) that the voiced stop allophones which resulted from the voiced aspirates regularly after nasals, were generalized to all positions word-internally.

The claim that fortitions are unlikely or unnatural is partly based on the phonetic observations mentioned above, and partly on the frequent assertion that fortitions are rare. It is certainly true to say changes from stop to fricative are far more frequently observed in language change than the reverse. Lavoie’s (2001) survey of consonant strength from a sample of 147 languages from 67 language families reveals 39 instances of fricativization as opposed to only 8 instances of occlusivization. Probably the best-known example of fricativization of stops are the changes described by Grimm’s Law in the history of Germanic, where the PIE voiceless stops became voiceless fricatives, thus accounting for correspondences such as Eng. *father* beside Lat. *pater* (see e.g. Collinge 1985: 63–76). But a closer look at, for example, the history of West Germanic reveals clear cases of ‘fortitions’ where we find voiced fricatives arising from Verner’s Law becoming voiced stops, for example, OHG *sibun*, beside OLG *siβun*, Eng. *seven* (cf. Lat. *septem*); (for details of the Second German Sound Shift, see e.g. Paul 1969: 78 ff.).

One characteristic of the Germanic intervocalic fortitions is that the change from fricative to stop only seems to occur when the sound is voiced (see e.g. the change of /θ/ > /ð/ > /d/; Paul 1969: 82). This could give us a clue to a possible phonetic mechanism behind fortition, at least in this position. Voiced fricatives are mainly distinguished from voiced stops by their longer duration, as well as the presence of accompanying friction noise. Note, however, that the friction noise of voiced fricatives is considerably less than that of voiceless fricatives, mainly because of the aerodynamic constraints on the simultaneous production of voicing and friction, to the extent that the ‘noise component of nonsibilant voiced fricatives [β v ð γ] is so weak as to be barely detectable’ (Ohalá 1983: 202). Given this, if the duration of a non-sibilant is reduced by the demands of increased speech rate, confusion of voiced stop and voiced fricative would be expected. In short, we could explain the change as due to the auditory confusion of voiced fricatives for voiced stops, perhaps assisted by the existence of intervocalic fricative variants of the voiced stop phonemes. It could also have been helped by the presence of stopped fricatives. Lavoie (2001: 123–4) reports that

⁹ We ignore the fact that PIE */b/ is problematic.

24% of /ð/ and 7% of /v/ were realized as stops in her analysis of English consonants in intervocalic position. Phonetic strengthening to stop may be less common than weakening, but it does occur.

Why Latin and Faliscan alone show the fortition, and only for *gh, is unknown. Note, however, that similar dialectal variation in the change from fricative to stop is also found in the High German Shift, so that certain dialects showed the change, while others retained the fricatives. I cannot discuss fortitions further here, though it is an area that deserves further research, both in terms of phonetics and attested changes.

6.2.3 *Specific changes for the labial voiced aspirate*

*[p^h-] > *[ϕ-], or *[p^h-] > *[f-]: The explanation given for the change of voiceless aspirate to voiceless fricative was vague as to the phonetics of the resulting fricative. If the resulting fricative was [ϕ], rather than [f], it was probably quickly changed into the more common fricative [f]. Bilabial fricatives are rare beside labio-dental fricatives, and if only one labial fricative occurs in a system, it is labio-dental. Maddieson (1984: 46) suggests that phonetic processes may 'generate' [ϕ], but once this exists it is 'rapidly transformed into something else'. Whether there was ever a 'stage' with an allophone [ϕ] is impossible to say.

*[-bh-] > *[-β-], or *[-bh-] > *[-v-]: While the development is referred to here as one of bilabial breathy voiced stop to bilabial voiced fricative, in Sabellic (and in Proto-Latin/Faliscan) the voiced fricative could also have been labiodental [v]. (There are no difficulties with the change [v] > [b]; (see Allen 1958: 113). A specific stage of [-βh-] is not proposed, although I acknowledge that breathy fricatives could occur as the result of the fricativization of breathy voiced stops. If breathy voiced fricatives did result, they might be interpreted as plain voiced, given the likely 'masking' effect of the fricative noise on the breathy voice quality. There is little perceptible difference between breathy and plain voiced fricatives, and the former are not found as a distinctive category in any language.

Faliscan [f-] > [h-]: The further change of [f-] to [h-] in Faliscan may well have started before the vowel /u/. [fu-] > [hu-] may be explained as the result of the listener interpreting the labial articulation of [f] as a property of the following [u], leaving [hu-], so [fu-] = /hu-/ > [hu-] (see Foulkes 1993, 1997).

6.2.4 *Specific changes for the dental/alveolar voiced aspirate*

*[θ-] > [f-]; *[-ð-] > [-v-]: In word-initial and word-internal position the reflexes of the PIE dental/alveolar voiced aspirate merge with /f/, which was the reflex of *bh and *g^wh, and *gh before *u or *w. The change of place of

articulation, from dental/alveolar to labiodental is best explained at a fricative stage, hence the assumption of a dental fricative for Proto-Italic.

This change is probably the result of an auditory confusion of the two fricatives, in favour of the labiodental. Such confusion is well documented: 'the distinctions between /f/ and /θ/ and between /v/ and /ð/ are among the most difficult for listeners to hear and it seems likely that in most natural situations the differentiation depends more on verbal context and on visual observation of the talker's lips than it does on the acoustic difference' (Miller and Nicely 1955: 347 (see also Allen 1958: 111)).

The reason for the auditory confusion lies in the similar acoustic patterns of the two sounds (Ohala 1989: 182). Borden and Harris (1980: 189) suggest that the low intensity noise of both fricatives provokes the confusion. The asymmetry, always in favour of the labiodental, however, suggests that the confusion cannot be based just on acoustic similarity of the segments, otherwise we might expect the reverse change, [f] > [θ], to occur (Pagliuca 1982: 125f.; Pagliuca and Mowrey 1987: 469). While in general the tendency to the labial fricative may be the result of 'the physical structure of the sounds themselves and how the human perceptual system processes them' (Ohala 1982: 235), the importance of the acoustic effects of coarticulation from sounds involving lip-rounding should probably not be ignored. This particular change would have taken place across phonetic environments where either actual lip rounding (e.g. from a following /u/) or perceived lip-rounding (lowered second formant frequency of /r/ or /l/ (see below p. 213), might have resulted in the increased likelihood of the perception of the dental as a labiodental fricative. An often-observed parallel for this confusion is that found in Cockney English, which involves both voiceless and voiced dental fricatives in other dialects appearing as labiodentals in Cockney (Wells 1982: 328f.).

prIt. *[-ð-] > *Lat.* [-d-]: In Latin *[-ð-] regularly changed into a stop, and merged with /d/. There was a confusion of [-ð-] with [-β-] in Latin, but only in certain environments, namely after /u/, before or after /r/ and before /l/. I assume that the development to *[-ð-] was regular. This view was challenged by Serbat (1968), who argued that the change to /b/ should be seen as regular, and that to /d/ as conditioned by a preceding nasal, and in the environment of /i/. It is taken here that the development of [d] following a nasal was conditioned (during the history of Proto-Italic). Furthermore, while it is possible that an adjacent /i/ could have helped inhibit the change of [-ð-] to [-β-], it seems very difficult to argue that the evidence does not point to a clearly defined conditioning environment for the change to [b].

6.2.5 Specific changes for the velar voiced aspirate

*[x-] > [h-]: The Italic reflex of the velar voiced aspirate in initial position is <h>, probably the voiceless glottal fricative [h]. I assume that the development

of the velar stop is the same as for all the stops, that is it devoices, and then becomes a velar fricative, and from there develops into a voiceless glottal fricative.¹⁰ Velar fricatives, produced at the back of the mouth, show weak fricative noise, whose resonances may be considerably affected by configurations for the following vowels (Hock 1991: 131). As such, [x] is similar to [h], which may be regarded as a voiceless vowel. The change of velar fricative to glottal fricative is therefore probably acoustically driven, and certainly aided by variants produced with insufficient approximation to produce frication clearly perceived as characteristic of the velar region. It is difficult to know how long the velar fricative stage lasted, since it may reasonably be assumed that [h] variants probably existed at an early stage. For a general discussion of parallel changes of [x] and other fricatives to [h], see e.g. Lass (1976: 156f.); Hock (1991: 131f.).

*[k^h-]>[h-]: Although the change from voiceless velar aspirate to glottal fricative could have been 'direct', particularly given the frequent attestation of the change /k/ or /k^h/>/h/, I argue here that it in fact took place via a velar fricative stage. This is based on the phonetic observations given above, the supporting parallels, and also on the possible demands made on the changes by the system.

*[-ɣ-]>[-fɪ-]: As in word-initial position, I propose that intervocally the Proto-Italic velar fricative lost its articulation and in Sabellic and Latin became a glottal fricative, although in this position it was voiced [-fɪ-]. (In Faliscan *[-ɣ-] merged with the inherited velar stop /g/.) Further articulatory undershoot (leading to open approximation) of the voiced velar fricative would eventually result in [-fɪ-]. Acoustic similarity of the velar fricatives, or approximants and [fɪ] would also have contributed to the change, which is exactly paralleled in Czech (Allen 1958: 104) and reconstructed for Uralic (Lass 1978: 257).

Although there are no phonetic objections against a 'direct' change from [-gh-] to [-fɪ-] for the Italic development, a velar fricative stage must be reconstructed, if the Faliscan reflex [-g-] beside [-fɪ-] in the other languages, and particularly Latin, is to be explained adequately.

*The Latin treatment of */-gh-/: [-fɪ-] or [-g-]:* The regular change of intervocalic *-gh- is usually taken to be to [-fɪ-], with [-g-] as the result of analogical extension from related forms where [g] occurs regularly after a nasal.

Neither change is difficult phonetically (i.e. *[-ɣ-]>[-g-], or *[-ɣ-]>[-fɪ-]). The development to [-fɪ-] is easy to explain, and systemically patterns with the development of the labiovelar to [w] between vowels. On the other hand, that to [-g-] is unproblematic, occurs in Faliscan, and again matches the developments of labial and dental voiced aspirates to stops between vowels. This leaves us with

¹⁰ The phonetic nature of [h] is problematic. [h] is often used to transcribe a sound (e.g. fricative or approximant) which is very weakly articulated, see e.g. Pagliuca and Mowrey (1987). (For a full discussion of /h/, see Foulkes 1993.)

three possibilities:

- (a) *[-ʏ-]>[-fi-] is regular, and [-g-] is analogical or borrowed
- (b) *[-ʏ-]>[-g-] is regular, and [-fi-] is analogical or borrowed
- (c) both arose regularly from *[-ʏ-]

Of these three, (c) seems the most unlikely, since there appears to be no reason for a split treatment, nor can one reflex be the result of, for example, an incomplete sound change. (a) and (b) are both phonetically plausible. The decision must be made from considering the evidence; (a) seems more attractive than (b), particularly given that the words with [-fi-] are difficult to explain away by analogy, or borrowing from Sabellic.

That we find both [fi] and [g] as co-occurring reflexes of a velar in two languages as closely related as Faliscan and Latin, should not be inherently worrying. [fi] and [g] do co-occur, for example in the Galician 'geada' (the pronunciation of either [g] or 'h', phonetically [fi] [h] [x] [χ], word-initially and intervocalically by speakers according to geographical and social variety). Most explanations of the 'geada' suggest that it originates from a regular development of [-g-] to [-fi-], leaving both [-g-] and [-fi-] as possible realizations for /g/ intervocalically, and subsequent generalization of one or the other according to dialect (e.g. Santamarina 1980; Schrotten 1980). By referring to the 'geada', I do not suggest that the Latin situation was the same. There is no evidence to suggest geographical or social factors behind the appearance of [fi] or [g], nor did the sounds originate in the same way. It merely provides evidence for the existence of variation between [fi] and [g] as reflexes for an earlier velar.

Loss of /h/: In some cases /h/ (initial [h-], intervocalic [-fi-]) was 'lost'. For a full discussion of the phonetics of this process, see Lass (1976: 156f.), who argues that [h] and [fi] are prone to loss because the sounds are perceptually less distinct than other sounds resulting from the articulatory characteristic that they have no inherent location in the supralaryngeal cavity. [h] is likely to be lost prevocally, as perceptually it could be interpreted as a voiceless onset to the vowel; intervocalic [-fi-] too may become interpreted as a fringe element of the two vowels, particularly during fast speech, when the realization could be reduced to little more than a few periods of voiced aspiration (see also Allen 1958: 103f.; Hock 1991: 131f.).

6.2.6 Specific changes for the labiovelar voiced aspirate¹¹

*[x^w-]>[f-]: The labiovelar fricative became a labiodental fricative, and merged with /f/. I assume that the change is primarily due to an auditory

¹¹ * /ghw-/ seems to have merged with the labiovelar early, and shows the same development. So too does the sequence * /ghu-/, where the lip-rounding of the vowel must have been sufficiently pronounced to cause labialization of the velar.

confusion. During the production of a labiovelar fricative, turbulence is produced simultaneously at the two constrictions, labial and velar. For several reasons, which are based in the physical properties of the resonances and the nature of airstreams produced (Ohala and Lorenz 1978: 143–4), the labial noise tends to dominate, and the fricative place of constriction may thus be interpreted by the listener as being entirely labial. A study of the behaviour of labiovelars (synchronic and diachronic) reveals that if they become fricatives, they show themselves primarily as labials (Ohala and Lorenz 1978).

In Latin before **u*, the plain velar also becomes [f-], so **[gh^wu-] > *[k^{hw}u-] > *[x^w-] > [f-]* (^w represents labialization). Note that the Italic development of **[x-]* can contribute more information to current discussions concerning the development of [x] to [f] (e.g. in Browman and Goldstein 1991). The change which accounts for [f] in Eng. *cough*, *laugh* etcetera, was, until recently, thought to be the result of the acoustic similarity of [x] and [f]. Recent work however (Browman and Goldstein 1991; after Pagliuca 1982) explains the change in terms of ‘assimilation’, as the result of labialization of the velar frication by coarticulation from the labial offset of the preceding diphthong. What we find from the Italic development, if it is right to reconstruct a stage **[x-]* (before [h-] and [f-]), is that in Latin **[x-]* changes to [f-] only in a labialized environment, otherwise we find [h-]. In other words, this lends more weight to the observation that the change of [x] to [f] is not due to acoustic similarity of the segments alone; the immediate phonetic environment plays an important role.

**[-g^wh-] > *[-ɣ^w-] > Sab. [-β-]; Lat. [-w-]:¹²* The voiced labiovelar aspirate became a voiced labiovelar fricative, which then merged with the labial fricative ([-β-]), as in word-initial position.

In Latin, the labiovelar fricative becomes [-w-], merging with /w/, which partly continues inherited PIE **w*, and is also the result of the inherited plain voiced labiovelar **g^w*. The development may be explained as the result of articulatory undershoot in intervocalic position, leading to a more open approximation of the velar constriction, and finally complete loss. This change would probably be provoked by the acoustic tendency for the ‘labial resonances’ to dominate; a stronger perception of the labial would reinforce the articulatory loss of the velar constriction.

The intervocalic reflexes of both velar and labiovelar voiced aspirates suggest a tendency to articulatory undershoot between vowels, resulting in [-f-] and [-w-]. This is not the case for the labial and dental, where we find voiced stops (see above p. 206).

¹² In Latin, there is evidence for the sequence **/ghw/* also appearing as /w/ intervocalically, e.g. *breuis* < **mreghwi-*, and hence we may assume a merger with the inherited labiovelar.

6.2.7 Conditioned changes

There are a number of changes observed in the Italic development which are conditioned by an adjacent phonetic segment. Observations from phonetics may help account for some.

6.2.7.1 Voiced aspirates after a nasal

It is tempting to explain the appearance of voiced stops for voiced aspirates following nasals as a conditioned deaspiration in early Proto-Italic (e.g. Allen 1958: 109; Meiser 1998: 104). Certainly such a development would be phonetically well motivated. The tendency for nasals to prevent fricativization—and provoke/maintain occlusivization—is well-known (see Allen loc. cit.; Lavoie 2001: 42). However, as long as we accept U. **umen** ‘nail’ (e.g. Ia 19) < **ong^wŋ*, we must also assume that the voiced aspirates were kept distinct from the voiced stops in this position until after the split of common Italic.

6.2.7.2 Word-initial *gh before *r,*l

The development of word-initial PIE *gh in Latin before *r,*l is to /gr-, gl-/. While there is no evidence for this treatment in the other Italic languages, it is possible that it may have taken place generally in Italic. I suggest that the word-initial velars deaspirated before *r,*l. The change may have been caused by the following liquids blocking the escape of the airflow required for the production of aspiration. Coarticulation of the velar closure with the following *r/*l, causing the back of the tongue to be raised and retracted during the initial stages of the production of these sounds, could have blocked the release of airflow into the supralaryngeal tract partially, or even fully, resulting in a weakly-aspirated or unaspirated voiced stop.

6.2.7.3 Word-internal PIE *dh after *s

In Proto-Indo-European, word-internal obstruent clusters agreed in voicing, which was determined by the second element, so, for example, PIE **-gt-* was [-kt-], and PIE **-sd-* [-zd-]; Szemerényi (1989: 106). This also applied to the voiced aspirates, and hence the sequence **-sdh-* would have been *[-zdh-]. Latin and Umbrian are the only languages to show evidence for the treatment of the cluster, and show [-st-] for PIE *[-zdh-], although the status of the evidence is quite uncertain. If the change did take place, we may perhaps regard it as one which was common to Italic generally.

The change has been used as one of the central pieces of evidence in favour of a general devoicing of the voiced aspirates in all positions in the word. In Chapters Three and Four it was suggested that the reflexes are clearly the result of a conditioned development in this environment. Phonetic considerations

support such a view. The change of *[-zdh-] to [-st-] may be explained by the inadvertent occurrence of a cluster [-st-] arising during the production of *[-zdh-], which the listener perceives as the intended cluster.

The aerodynamics of voiced fricatives are complex. For voicing to occur, there must be less air pressure above the glottis than below it (to ensure the airflow required for vocal fold vibration), on the other hand, the production of frication requires higher air pressure behind the constriction than in front of it (the amount will vary according to the size and shape of the constriction). During the production of a voiced fricative, the aerodynamic requirements are in conflict; the more voiced the fricative is, the weaker the frication can be, the more frication which is produced, the less voicing can be sustained; Ohala (1983: 201–2).

If we consider the production of the cluster [-zdh-], we see that the production of a fully voiced [z] would be accompanied by less frication noise. This could lead to the listener's misinterpretation of the resulting weakly-fricated voiced fricative as part of the following stop, with subsequent loss of the fricative. Alternatively, as is assumed for the change here, the tendency could have been towards the production of frication, in which case [z] would have partially devoiced ([z^s]). The higher air pressure in the supralaryngeal cavity behind the constriction (which caused the devoicing), would also have inhibited initiation of voicing for the voiced aspirate, particularly once the articulatory closure was formed, since this air could not be released. During closure, voicing could only have been initiated by means of substantially increased subglottal pressure. Hence the voiced aspirate would have become partially devoiced in the initial phase of its production ([^td]). The result of this would have been the inadvertent production of a voiceless cluster [st] between [z] and [dh], which may be represented [VzstdhV], with superscript [st] for the epenthetic voiceless cluster arising from aerodynamic constraints. The sequence could then have been misparsed by the listener as [VzstdhV], in which the voiced fringe elements [z] and breathy [dh] were attributed to coarticulatory voicing from the preceding or following vowels, with /st/ as the distinctive centre of the cluster. (The breathiness of [dh] might also be attributed as a feature of breathy vocalic onset on release of the dental stop.)

6.2.7.4 Word-internal *bh/gh/g^{wh} before *s/t

I assume that before *s/t the labial, velar and labiovelar voiced aspirates became voiceless stops generally in Italic.¹³ The changes show a neutralization of

¹³ The development of the cluster *-dht- is uncertain. The evidence points to regular /-st-/ (with /-(s)s-/ explained by analogical extension). Given the changes of the other voiced aspirates in the same environment, we would assume that devoicing also took place in this cluster. Other clusters of 'dental + dental' give /-(s)s-/, but assuming the regular outcome /-st-/ for *-dht- means that the two developments were separate. Just why is difficult to say phonetically, although I suspect that the aspiration of *dh is important here.

distinctions, not only of voice, but also of aspiration and labialization. Phonetically the process can be described in terms of deaspiration, the release of aspiration being blocked by the following obstruent, followed by devoicing of the mixed voice cluster, for example *[-gt-], *[-gs-]. While for descriptive purposes we may view the change as two discrete steps, given the phonotactic constraints on voicing in Proto-Italic obstruent clusters, it seems more likely that both would have occurred simultaneously.

The labiovelar voiced aspirate also lost its lip-rounding, a change which is found in the development of the plain voiceless and voiced PIE labiovelars before consonants in Latin (Leumann 1977: 148), and which can probably be assumed for Italic generally. The loss of labiality in this position may have occurred for perceptual reasons, perhaps to avoid merger with labial stops; an unreleased labialized velar would be difficult to distinguish from a labial stop in the same position.

6.2.7.5 *Word-internal *gh before *l*

The development of the PIE word-internal velar before *l is to [g] in Latin. There is no evidence for Faliscan or Sabellic, but it is possible that the change took place in all the Italic languages. The development may be explained by deaspiration of the voiced aspirate, provoked by coarticulatory velarization of the following *l, as was suggested for the PIE velar in word-initial position. The following velarized lateral could also have helped prevent articulatory undershoot, by effectively prolonging the velar closure gesture. The explanation given here assumes that the change was common to all the Italic languages. Again, as for the development in word-initial position the suggestion must be tentative given the state of the evidence.

6.2.7.6 *Word-internal conditioned development of PIE *dh in Latin*

The regular development of PIE *dh in word-internal position in Sabellic and Faliscan was to /f/ ([β] or [v]) and to /d/ in Latin. The explanation for these reflexes assumes fricativization of *[-dh-] to a common Italic *[-ð-], which in Latin became a voiced stop, but which in Sabellic and Faliscan became generally confused with the labial fricative.¹⁴ The appearance of [b] in Latin is usually explained by a confusion of *[-ð-] with *[-β-], such as occurred generally in Sabellic and Faliscan. As we have seen, such a confusion resulting in a labial fricative is predicted by phonetic theory, and well-attested. Latin however only shows this in specific phonetic environments, namely after *u, before or after *r, and before *l (there is no evidence for the treatment after *l).

¹⁴ In what follows, 'labial' refers to bilabial and labiodental fricatives, and [β] is used for [β] and [v], unless explicitly stated.

Apart from the preceding **u*, which would have caused coarticulatory lip-rounding on the dental fricative, making it almost perceptually indistinguishable from the labial, the other environments (of adjacent liquid) do not seem to share a labial characteristic, and so it has been difficult to explain the change in terms of shared place of articulation.¹⁵

A phonetic explanation is given by Allen (1958: 110–14). He saw the development in word-internal position (following *Ascoli*'s account of general devoicing) as one of three processes: a general merger of [θ] > [f]; voicing of word-internal fricatives in Latin; and a change of fricative to stop in Latin. He suggested that the effect of the conditioning environment was to enable an 'early' merger of [-θ-] to [-f-], before the voicing process began. This was caused either by labialization (after /*u*/), or by devoicing caused by the liquids, which meant that [-θ-] remained in this position and so could join in the merger of [-θ-] > [-f-]. This account assumes that: (a) the change from dental to labiodental fricative prefers voiceless fricatives, and (b) the voicing was purely Latin (on the basis that Sabellic word-internal /*f*/ was [-f-]). If the dental fricatives in the environment of the liquids could remain voiceless (or be labialized early), then the dentals could take part in the merger.

The Sabellic intervocalic fricatives are now thought to have been voiced. Even if we keep to an *Ascoli* account of general devoicing and assume that the place merger only included voiceless fricatives, we must explain why the dental fricatives in Latin did not merge with the labial fricatives. If, on the other hand, we assume that the place merger could have occurred when the fricatives were voiceless or voiced, we return to the original problem of explaining the distribution we find in Latin.

As mentioned above, the confusion of dental with labial fricatives occurred in Sabellic, and is phonetically unproblematic. Why should this change have happened only in a few particular environments in Latin, and not generally? If we look again at the environments, we find that they do in fact share a phonetic similarity which could have caused the dental fricative to be perceived as a labial fricative, but this similarity is acoustic, not articulatory. The coarticulatory effect of the preceding labial vowel /*u*/ is labialization, which in acoustic terms is a lowering of the second and third formants. A 'dark' or velarized lateral or rhotic could have had a similar acoustic effect (for the term 'dark', see, e.g. Jones 1956; Kelly and Local 1986: 304), as would an /*r*/ accompanied by actual lip-rounding, as in English (Brown 1981; Foulkes and Docherty 2000). Even a nonlabialized rhotic could have had this effect.

Hence, just as coarticulatory labialization could have made the dental friction sound labial (see above p. 210 for dominance of labial friction over friction produced further back in the vocal tract), so the acoustic effects of a dark /*l*/, or a dark,

¹⁵ The liquids of the Italic languages in general are assumed to have been pronounced as an alveolar lateral for /*l*/ and an apical trill for /*r*/.

lip-rounded, or 'plain' /r/ could equally have resulted in the perception of labialized fricative (see the discussion of acoustic assimilation in Lass and Higgs 1984: 104). That /l/ and /r/ could have altered the perception of the neighbouring fricative in this way is not surprising. It is recognized that the resonance effects ('clear', 'dark' etc.) of laterals and rhotics 'have a domain of dominance of usually considerably more than one syllable in extent'; Kelly and Local (1986: 305), and their observations have been substantiated by perceptual experiments (West 1999).

So it would seem that in Latin, the tendency for the dental fricative to be confused with the labial fricative became manifest in an acoustic environment which sounded labial (whether or not it was actually labial). Certain questions arise if we assume such an explanation. Does this really explain the data, or are there exceptions? Why should Latin show this treatment and not Sabellic? And does the assumption of such phonetic values required by the account fit in with what we know about Latin?

If we look first at the data, for example, as it is presented in Serbat (1968), we find that of the forms whose etymologies are accepted, there is only one case where *[-ð-] did not become *[-β-] in a 'labial' environment: *uidua* 'widow' < **widoua* < **widhewā*, cf. OCS *вѣдова*, Got. *widuwō* (Leumann 1977: 167). That this form shows no labial development is not necessarily surprising, since the preceding [i] could have had acoustically the opposite effect of the [w], that is the second and third formants would have been kept high, and hence the possible perception of labialization could have been avoided. In fact it is noticeable that several of the forms which show /d/, also show (or showed) /i/ or /j/. This led Serbat to the suggestion that /d/ was conditioned articulatorily by /i/ or /j/. I do not want to claim with Serbat that /d/ only occurred in this specific environment, but I do note that /i/ and /j/ might have played some part in the retention of the dental fricative, which was perhaps linked to the clear/dark variation found in Latin /l/.

We should consider the implications for the phonetic values of early Latin *l and *r which are required for this explanation to hold. It is generally agreed that Classical Latin showed an allophonic distribution of clear and dark /l/ similar to that of Received Pronunciation English, so that clear /l/ occurred before vowels, and dark /l/ occurred elsewhere. This is proposed mainly on the basis of grammarians' descriptions of the sounds. Prehistoric vowel changes, involving retraction of front vowels before dark /l/, show that this situation also existed early in the history of Latin; and furthermore that, at this earlier stage, /l/ could also be dark before non-front vowels (see Allen 1978: 33–4). In this change, the evidence for **-dh-* before /-l-/ is restricted to a number of words formed with the suffix **-dhlo-*, *-dhlā-*. As the majority of the case-endings would have shown a non-front vowel, we would expect a dark variant of /l/ in this position.¹⁶

¹⁶ Presumably the development of the related suffix **-dhli-* to **-bli-*, cf. e.g. *flēbilis* (Leumann 1977: 349) could also be explained by analogical extension from the suffix **-blo-* < **-βlo-*.

The pronunciation of Latin /r/ is described as a tongue-tip trill, with probable tapped and fricative variants (Allen 1978: 32–3). Lindau's study of the pronunciation of /r/ across a number of languages, shows that rhotics which are described as trills, are often also produced as taps or approximants (Lindau 1985). Lindau also reports that within languages whose primary realization of /r/ is an apical trill, some speakers may use uvular trills (with tapped and approximant variants). One early description of Latin /r/ is like the growling of a dog (in Allen 1978: 32), which could suggest an uvular trill. Hence it is possible that both apical and uvular trills were realizations of /r/ in Latin. The observed variability in the pronunciation of rhotics in languages generally should make us prepared to accept a similar situation for Latin, and Italic too (for the pronunciation of Old English /r/, see, e.g. Hogg 1992: 40; for the extensive variation for Glaswegian /r/, see Stuart-Smith 2003). Variants of prehistoric Latin /r/ which could have given the auditory effect suggested here, could either have been dark, that is velarized in some way, or rounded, or 'plain', in other words, there was no specific secondary articulatory feature which caused 'extra' formant lowering, but the articulatory configuration was such that the formant lowering which did occur was sufficient to provoke the perception of labialization.

If we assume that prehistoric Latin /r/ showed dark variants under the same conditions as /l/, then the evidence for a dark /r/ for this development is quite strong: when /r/ preceded *[ð], it could have been dark, similarly when /r/ followed *[ð], the following vowels */o/ or */ā/ could have given rise to dark variants. However, while it is quite possible that /r/ showed dark variants here, there are two general problems with this suggestion. First, there does not seem to be any other evidence for positing a clear/dark variation for Latin /r/. Secondly, and more important, /r/ seems to have had a 'labializing' effect on a fricative in another change, where the assumption of a dark variant of /r/ (resulting from neighbouring vowel quality) is difficult.

This involves the cluster *-sr-. One Latin word attests the treatment in word-initial position, *frīgus* 'cold' < *srīgos, cf. Gk *ψίγος*, showing *sr->[fr-]. In word-internal position both Latin and Sabellic show a similar development of the cluster *-sr-. In Latin the cluster becomes [-br-], presumably via *[-βr-]. In Sabellic the cluster, in the one example, secondarily arising from *[-psr-], becomes [-βr-]. The change is often discussed in connection with the development of the dental voiced aspirate, and explained by *-s- becoming a dental fricative, which then merged with the labial (e.g. Allen 1958: 111). It is not, however, necessary to assume a dental fricative stage for this change. If the friction of *-s- (or *[z] medially) sounded labial, from actual or perceived labialization from the following rhotic, it too could have been confused with the labial fricative. Here, the assumption of a dark variant of /r/ as the reason for the labializing effect on the fricative is difficult as the single example in initial position occurs before /ī/.

In Sabellic the evidence for the medial change, for example, U **tefra** ‘burnt offerings’ (IIa 27) (<**tessro*-<**tepsro*-, cf. Lat. *tepor*, Skt *tapas* ‘heat’) could point to a dark /r/, but in Latin, many of the forms for this change are from the suffix *-ri-, -ro-, and so in several case-endings the /r/ would not have been dark. It would be odd to postulate a dark variant of /r/ for Sabellic, purely on this evidence (and no other), and yet admit that Latin (which is known to have had such a variation in /l/) would not necessarily have shown dark /r/ in these forms.¹⁷

Perhaps the reason for the ‘labializing’ effect of /r/ is to be sought elsewhere—in a general characteristic which was shown by both Latin and Sabellic /r/. It is quite possible that this was lip-rounding. /r/ sounds are often accompanied by lip-rounding: see Brown (1981), Foulkes and Docherty 2000, for rounding on British English /r/, and the discussion of Lass and Higgs (1984: 96) on American English /r/, who note that lip-rounding occurs ‘regardless of tongue shape or place of primary stricture’. If Latin and Sabellic /r/ was accompanied by a degree of lip-rounding, the coarticulatory effect would have been sufficient to cause ‘labialization’ of the fricative in question (either *[-ð-] < **-dh-* or *[-z-] < **-s-*).

Alternatively, it is possible that the Latin and Sabellic /r/ variants were neither dark nor articulatorily labialized, but that their general acoustic pattern was such that they could trigger a perception of labialization for the fricatives in question. Whether they were trills, or taps or approximants, apical or uvular, we would expect the second formant (if not the third—which is relatively high in alveolar trills; Lindau 1985: 166) to be lowered. We could then assume that this lowering was sufficient to cause an acoustic labializing of the fricative—and hence the change.

The history of English provides a parallel case for defining the pronunciation of /r/ from the effects it had on neighbouring sounds diachronically (see e.g. Lass and Higgs 1984). A specific example for this is in Old English, where the fact that /r/ before a consonant was one of a set of conditioning environments for vowel ‘breaking’ (or ‘u-breaking’), has led to the assumption that in the pronunciation of this sound, ‘the body of the tongue must have been considerably raised to promote some degree of velarization and so permit breaking to occur’ (Hogg 1992: 40). Even if we cannot ascertain the exact articulatory nature of /r/ here, we may assume that the change itself points to the existence of a pronunciation, which was either labialized or which sounded labialized.

This discussion of the nature of /r/ leads to another question: why did Latin not merge *[-ð-] with *[-β-] everywhere, as in Sabellic? In Latin it seems that only heavily labialized environments triggered the change, while other environments did not, and /i/ or /j/ may even have had an inhibitory or preservative effect on the dental fricative. We have already noted that in prehistoric Latin the lateral showed a clear/dark variation, a feature which was not shared by Sabellic.

¹⁷ Katz’s derivation (1998) of Lat. *orbis* and U **urfeta** from **H₃orgh-* also suggests that the reflex of **-gh-* became ‘labialized’ after **r*, but again where it is difficult to reconstruct a ‘dark’ variant which could arise from the quality of the following vowel.

It is tempting to wonder whether the distribution of the fricatives found in Latin was somehow also connected with this. How /r/ fits into this is uncertain; perhaps it 'sounded' dark, and so was regarded as a dark environment.

This account of the Latin conditioned development of PIE *-dh- to /-b-/ raises several other questions which deserve further attention, but which cannot be tackled here. It would be interesting to see how well this account fits in with the general pattern of sound change observed in the development of Latin from Indo-European. The phonology of the treatment is also of interest, particularly if it is considered in terms of features. Since the change seems to be governed by acoustic factors, it can only be properly captured using features which take acoustic factors into account, such as those of Jakobson, Fant, and Halle (1963), and as such could be seen as further evidence for the argument against distinctive features which are primarily defined in terms of articulation (e.g. Chomsky and Halle 1968). Furthermore, the assumptions made about the effect of /l/ and /r/ on the dental fricative could be investigated by means of perceptual experiments.

6.2.7.7 *Word-internal *gh/g^wh before/after *r*

The evidence for the Latin treatment of *-g^wh- before *r is difficult, but seems to point to a labial stop before *r. (<f> in *nefrundinēs* and *nefrōnēs* may represent [-f-] or perhaps [-β-].)

[b] (and ?[-β-]), may represent a regularly conditioned reflex before [r] for Latin, where we suggest the following development: *-g^whr- > *[-γ^wr-] > *[-βr-] > [-br-]. The regular development of the PIE labiovelar voiced aspirate intervocalically was to [β] in Sabellic and to [w] in Latin. This was explained by proposing fricativization of the voiced aspirate; in Sabellic the labiovelar fricative *[-γ^w-] became [-β-], while in Latin more open approximation of the fricative between vowels by articulatory undershoot led to [-w-]. The development of *[-γ^w-] to labial fricative is expected, since in labiovelar fricatives the labial friction is likely to be more prominent than the velar. In Latin the articulatory configuration for the following /r/ may have helped maintain the fricative, blocking the change to [w] found between vowels.

A similar process can be imagined for the development of *-gh- after *r in Italic generally, where we find [-β-] in Sabellic (Umbrian) and [-b-] in Latin beside regular /h/ between vowels. In this case we also have to assume that /r/ provided a labializing environment which led the voiced velar fricative to merge with [-β-], see 6.2.6.6.

6.2.8 *The role of word-stress in the Italic development*

It is widely accepted that the Italic languages developed a stress accent from the inherited Proto-Indo-European pitch accent (for a brief but up-to-date

discussion of accent in Proto-Indo-European and this change, *see* Salmons 1992).¹⁸ The change in accent is reconstructed on the basis of vowel changes, such as weakening, syncope, and apocope. While these together point to a word-initial stress accent, the variation between the Italic languages suggest that the accent probably varied in intensity (and hence effect) in different languages. It is not known when or why the accentual change occurred, nor how long the period of initial stress accent lasted. It may have still existed in the historical period in the Sabellic languages, and possibly also in early Latin, although by the Classical period, Latin had changed over to the fixed penultimate stress accent system.

Etruscan also shows evidence for an initial stress accent, but this seems to have developed during the historical period, with the early texts unaffected. If the Italic development occurred at the same time as that of Etruscan, this might argue for a relatively late date. Some, such as Salmons, on the other hand link the innovation of an initial stress accent in Italic with similar developments in Germanic and Celtic, and hence propose a very early date, soon after the split of Indo-European.

We may ask whether the ‘early-split’ development, of word-initial devoicing and word-internal fricativization, proposed here, was linked with the change to, or period of, initial stress accent. In attempting to answer this question, we may first make some observations from the Italic evidence. There are no indications that the change is in any way related to the position of lexical stress in Indo-European, as, for example, in the case of Verner’s Law for Germanic. The major developments are clearly conditioned by position in the word, that is, whether the sound was word-initial, or word-internal. Given that the change of accent is to word-initial stress accent, it is not possible to tell from the evidence whether the changes are the result of the effects of the accent alone, or word-position alone, or from a mixture of the two.

The results of phonetic research unfortunately do not yet shed much light on this problem.¹⁹ The experimental work carried out to date on breathy voiced stops of Hindi has paid some attention to effects of stress placement, but none to those of word-position. Since Hindi has a stress accent, it is very difficult to identify the effects of word-position separately from those of stress. The results show that stressed voiced aspirates show greater glottal opening, longer aspiration duration, and higher rates of airflow than unstressed counterparts.

If we look at studies on stops across languages generally, we find that the effects of stress and word-position tend to be confounded (e.g. Henton *et al.* 1992; after Keating *et al.* 1983): word-initial stops tend to show or retain

¹⁸ By ‘stress accent’ I mean a lexical accent whose phonetic correlates were similar to those of English, e.g. raised pitch, increased loudness, and duration, variations in vowel quality.

¹⁹ Nor do parallel changes: in the development of Old Indo-Aryan into Middle Indo-Aryan voiced aspirates remained word-initially, but became fricatives or /h/ word-medially. There was at the same time a change from pitch accent to stress accent, but there is no direct evidence to suggest that the change in accent gave rise to the changes observed in the voiced aspirates.

aspiration, while medial stops may become voiced or fricativized to varying degrees; but in many cases stress plays a role in this behaviour. In her survey of previous work on the effects of word-position and stress on English consonants, Turk (1993: 14f.) formally separates the two, but her summaries reveal very similar effects. Stressed and word-initial consonants are likely to show longer closure and aspiration durations, as well as tighter articulatory closures, with more muscular activity, than unstressed or non-initial consonants. Similar results are found by Lavoie (2001) who also separates stress and position in word.

If we extend these results to breathy voiced stops it is reasonable to suggest that the effects of stress and word-position could be similar. Thus, we might expect a stressed, or word-initial breathy voiced stop to show longer closure duration and greater aspiration than an unstressed or word-medial stop. An unstressed, word-medial stop would tend towards showing a shorter closure duration, being more voiced, and possibly less aspirated, depending how far away it was from the stressed or initial syllable. Aerodynamic constraints on stressed or word-initial stops would give rise to partial devoicing, while unstressed or word-medial stops would be particularly vulnerable to the effects of articulatory undershoot.

Although phonetic considerations may not allow us to identify stress or word-position as a particular motivating factor behind the Italic development, they do support the account given here of a positionally-conditioned devoicing and fricativization of voiced aspirates. If we take position in the word alone, we could predict that breathy voiced stops in word-initial position would be likely to devoice, while those in medial position would be likely to remain voiced and fricativize. These effects would probably be compounded if the word-initial syllable were also stressed, but this does not mean that word-initial stress must be assumed to explain such a development. It is still far from clear to what extent the observed effects of word-position on consonants rely on concomitant lexical stress, however that stress might be realized phonetically. Only more research in this area may enable us to understand these phenomena better.

In summary, we conclude that we cannot know whether the change to the initial stress accent played a part in the distinctive Italic development of the PIE voiced aspirates. The phonetic characteristics of breathy voiced stops in different positions in the word may alone account for the initial devoicing and medial fricativization assumed here. The existence of stress on the initial syllable might have compounded these effects, but is not required to explain the results.

6.2.9 *The Italic development as a system*

I conclude my account by considering briefly the Italic development from a systemic perspective (assuming a phonemic representation). In

Proto-Indo-European the series of voiced aspirates is reconstructed together with two (or three) other series of stops, plain voiced and plain voiceless (and voiceless aspirated). All four series are reconstructed at five places of articulation, labial, dental/alveolar, palatal, velar and labiovelar. The Italic languages, however, show two different systems corresponding to the PIE categories. I focus on the main changes as they affected the original contrasts of voicing and place of articulation.

How the changes might have taken place across the PIE stops and *s is shown in Figure 6.4. I make a few observations about this representation (and those of Figs. 6.5 and 6.6). I show only the main development, that is the positionally-conditioned changes ([s-] refers to word-initial [s], [-s-] to intervocalic [s]). Again, the labial series is taken as generally representative of all places of articulation (but see below for the word-internal labiovelar). */s/ is included to show the complete fricative system. The insertion of [z] as a voiced intervocalic allophone of */s/ at the stage PrIt.2 is arbitrary. This allophone may have developed earlier in Italic. (In Sabellic */s/ merged with /r/ in Umbrian and possibly Faliscan.) The reconstruction of PIE */b/ is not regarded as problematic.

If we exclude *ph which is assumed to have fallen together with *p at an early stage, the resulting three-way distinction of PIE *p b bh is maintained intact into Italic, with the feature keeping the voiced aspirates distinct from the other stops, ‘aspiration’, becoming ‘friction’. I have already noted that the positional allophones, voiceless word-initially, voiced and fricated word-medially, are not

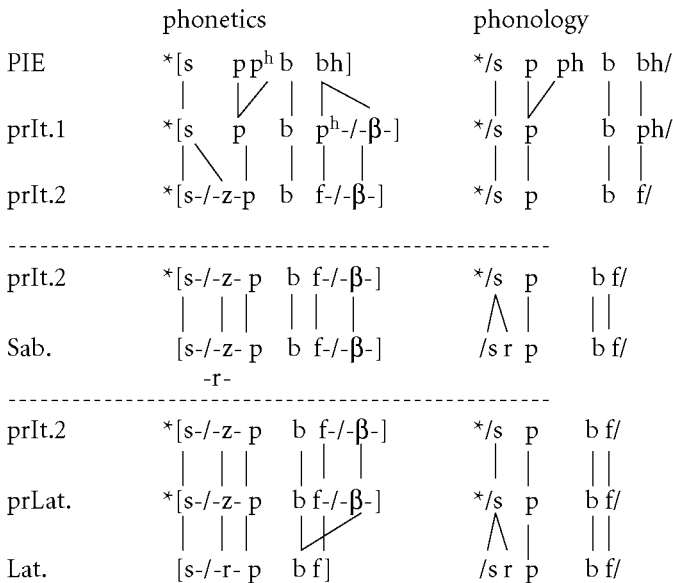


FIGURE 6.4 The early-split development and the development of the PIE stops and *s in general

problematic for */ph/. The voiceless initial and voiced medial fricative allophones for the fricative phoneme are equally acceptable. Only Latin shows a merger, where the voiced medial allophone of the fricative merges with the inherited voiced stop. Note again that a phonemic representation of the early-split development is forced to opt for one or other symbol as a ‘cover’ symbol for all the allophones, despite the phonetic split conditioned by word-position.

Note that */s/ developed a voiced allophone intervocally during the early history of Italic. Exactly when this voicing took place is unknown, but we can reconstruct it as a process shared by all the Italic languages. The voicing of /s/ observed adjacent to a liquid in a number of the Italic languages must have taken place after the split of common Italic, since Umbrian does not appear to have shared this innovation.

There are a number of other systemic aspects of the change which arise from the changes of the labiovelar voiced aspirate in word-medial position, and also from the ‘conditioned’ changes:

- 1 The word-internal treatment of the labiovelar voiced aspirates was different in Sabellic and Latin. In Sabellic, the labiovelar became a fricative, which then merged with the labial fricative, maintaining the contrast between the stop phonemes:

PIE*	/-k ^w -	-g ^w -	-g ^w h-	/
Sab/	-p-	-b-	-f-	/

In Latin, the reflex of the voiced aspirate merged with that of the inherited plain voiced labiovelar stop *-g^w-:

PIE*	/-k ^w -	-g ^w -	-g ^w h-	/
Lat	/-k ^w -	-w-	/	

It is sometimes assumed that inherited *-g^w- became a fricative *-ɣ^w-, which then merged with that from *-g^wh- (e.g. Allen 1958). Since I have suggested that *[-ɣ^w-] (< *-g^wh-) became *[-β-] and then [-b-], before [r], this also predicts the outcome [b] before [r] for the plain voiced velar. It might be better to assume that inherited *-g^w- became /w/ ‘directly’ (phonetically by the same route as for *[-ɣ^w-] > [-w-]) and that the merger occurred at this stage.

- 2 After a nasal in Latin and Umbrian the reflexes of the voiced aspirates merged with the inherited voiced stops.
- 3 Word-initially in all Italic languages voiced velar aspirates before *l, *r merged with inherited *g; this may also have happened in medial position before l.

- 4 Before *s,*t, the velar and labiovelar voiced aspirates merged with the plain voiceless velar stop *k.

The development according to place of articulation is demonstrated in Figures 6.5 and 6.6. In Figure 6.5, *gh = [gh] in the first stage represents both palatal and velar voiced aspirates, which fell together in Italic. *s is included to

	phonetics	phonology
PIE	* $\left[\begin{array}{c c c c c} s & bh & dh & gh & g^{wh} \\ \hline & & & & \\ s & p^h & t^h & k^h & k^{wh} \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & bh & dh & gh & g^{wh} \\ \hline & & & & \\ s & p^h & t^h & k^h & k^{wh} \end{array} \right]$
PrIt.1	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x/h & x^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
PrIt.2	* $\left[\begin{array}{c c c c c} s & f & \theta & x/h & x^w \\ \hline & & & & \\ s & f & \theta & x/h & x^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & f & \theta & x & x^w \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
PrIt.3	* $\left[\begin{array}{c c c c c} s & f & \theta & x/h & x^w \\ \hline & & & & \\ s & f & \theta & x/h & x^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & f & \theta & x & x^w \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$

PrIt.3	* $\left[\begin{array}{c c c c c} s & f & \theta & x/h & x^w \\ \hline & & & & \\ s & f & \theta & x/h & x^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & f & \theta & x & x^w \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
Lat. Sab.	[s f h]	/s f h/

FIGURE 6.5 The early-split development according to place of articulation in word-initial position

PIE	* $\left[\begin{array}{c c c c c} s & bh & dh & gh & g^{wh} \\ \hline & & & & \\ s & \beta & \delta & g & \gamma^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & bh & dh & gh & g^{wh} \\ \hline & & & & \\ s & p^h & t^h & k^h & k^{wh} \end{array} \right]$
PrIt.1	* $\left[\begin{array}{c c c c c} s & \beta & \delta & g & \gamma^w \\ \hline & & & & \\ s & \beta & \delta & \gamma & \gamma^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
PrIt.2	* $\left[\begin{array}{c c c c c} s & \beta & \delta & g & \gamma^w \\ \hline & & & & \\ s & \beta & \delta & \gamma & \gamma^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
PrIt.2	* $\left[\begin{array}{c c c c c} s & \beta & \delta & g & \gamma^w \\ \hline & & & & \\ s & \beta & \delta & \gamma & \gamma^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
Sab.	[z β h]	/s f h/

PrIt.2	* $\left[\begin{array}{c c c c c} s & \beta & \delta & g & \gamma^w \\ \hline & & & & \\ s & \beta & \delta & \gamma & \gamma^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
PrLat.	* $\left[\begin{array}{c c c c c} s & \beta & \delta & g & \gamma^w \\ \hline & & & & \\ s & \beta & \delta & \gamma & \gamma^w \end{array} \right]$	* $\left[\begin{array}{c c c c c} s & p^h & t^h & k^h & k^{wh} \\ \hline & & & & \\ s & f & \theta & x & x^w \end{array} \right]$
Lat.	[r b d h w]	/r b d h w/

FIGURE 6.6 The early-split development according to place of articulation in word-internal position

show the complete fricative system. In Figure 6.6, the insertion of [z] as a voiced medial allophone of */s/ at the stage PrIt.2 is arbitrary. */s/ could have developed this allophone earlier.

In word-initial position, the distinctions in place of articulation are reduced from four to two in the fricatives, as the result of the merger of dental and labiovelar with labial. All the systems reconstructed are phonetically and phonologically unproblematic. In Sabellic we find the same reduction of distinctions as word-initially, also as a result of a merger of the dental and labiovelar fricatives with the labial fricative. Latin, on the other hand, retains all four places in this position. At the labial, dental and labiovelar places of articulation, the reflexes of the voiced aspirates in Latin merge with those of the inherited voiced stops. As for word-initial position, all the intermediary systems reconstructed for the development are unproblematic. Conditioned developments in Latin cause both the reflexes of the labiovelar voiced aspirate before /r/, and those of the dental voiced aspirate after /u/, before /l/ or before or after /r/, to merge with the labial voiced stop.

Concluding Remarks

All that remains is to review briefly what has been done and reflect on the extent to which it has been successful. My aim was to demonstrate the usefulness of phonetic theory in solving an old problem of Italic philology. The systematic application of a phonetic theory of sound change made it possible to consider afresh the development of the PIE voiced aspirates in Italic, to evaluate the two competing explanations, and to offer resolution to the debate by way of a third, phonetically-motivated account. At the same time phonetic theory also confirmed the reconstruction of voiced aspirates as breathy voiced stops for Proto-Indo-European as the phonetically most plausible reconstruction. In this case the explicit integration of phonetics with philology has proved a powerful combination.

Using philological methods I established and confirmed the Italic reflexes of the PIE voiced aspirates. An integrated account of the Italic evidence, and in particular for the languages other than Latin, now exists. What emerges is just how few PIE lexemes are responsible for providing the bulk of the evidence. The main distribution of the reflexes is coherent across the languages, with voiceless reflexes word-initially and voiced ones word-internally. The work on the Italic evidence dominates the discussion overall, but this is as it should be when considering a reconstructed sound change whose outcome occurs in dead languages which are attested in largely fragmentary and obscure inscriptional texts. The survey also revealed that the diachronic behaviour of PIE *s in Italic does not parallel that of the reflexes of the voiced aspirates as closely as is usually thought, and certainly not in a way which helps a reconstruction of a common voicing of Italic fricatives word-internally, which is needed if one adopts an explanation which begins by devoicing voiced aspirates in all positions in the word. Philology too allowed the assumption of the reconstructed starting point, the PIE voiced aspirates, though in far less detail.

After it became clear that traditional philological arguments do not allow a decision between the two existing explanations for the Italic development, I turned to phonetic theory for a methodology with which to evaluate and identify an appropriate pathway from Proto-Indo-European to Italic. I worked with the criterion of ‘phonetic plausibility’, evaluating this in terms of a body of information about how voiced aspirates might be expected to change gathered afresh from two sources: (a) the systematic application of John Ohala’s phonetic

model of sound change to voiced aspirates, breathy voiced stops, to yield phonetic predictions for sound change, and (b) comparison and confirmation of these predictions by consideration of the attested developments of what are assumed to have been similar sounds in the history of Indo-Aryan.

This approach had three useful results. First, the material gathered allowed confirmation of the phonetic model of sound change itself. The finding that there were no attested changes which were not predicted by phonetics demonstrates that Ohala's model is a constrained and reliable predictor of sound change. Secondly, the earliest attested reflexes in the IE daughter languages of the PIE 'voiced aspirates' match almost exactly the changes of actual voiced aspirates predicted by phonetics and attested in the history of Indo-Aryan. This provides an important confirmation of the phonetic plausibility of the traditional reconstruction of the PIE starting point as a series of voiced aspirates realized as breathy voiced stops.

The third outcome enabled me to fulfil the explicit task of the book, namely to provide the most plausible reconstruction for the stages between the PIE voiced aspirates and the Italic reflexes. An evaluation of the two existing explanations in terms of phonetic predictions and attested parallels revealed *Rix* to be less plausible than *Ascoli*. However the same information motivates a third possible route as the most phonetically plausible. According to this account, the voiced aspirates showed a split development according to position in the word from the earliest stage of Proto-Italic. While both *Ascoli* and *Rix* assume changes that affected the voiced aspirates in all positions of the word at the same time, my route assumes that the historical distribution of the reflexes reflects a split treatment such that word-initially the voiced aspirates were devoiced and then became fricatives, but word-internally they remained voiced developing into fricatives. Readjustments in Latin and Faliscan led to voiced stops word-internally before the historical period. Phonetic theory predicts that voiced aspirates will show different treatments according to position in the word, and developments from Indo-Aryan give attested parallels. Synchronic observations of the range of allophonic variation of consonants which are either stable or undergoing change offers further support for my proposal that position in the word was a factor from the earliest period of Proto-Italic.

Thus the combination of phonetic and philological methods has been very fruitful. By comparing systematically obtained phonetic predictions with attested parallel changes, I offer a constrained and reliable method for evaluating the phonetic plausibility of reconstructed sound changes, which could be applied to other reconstructed sound changes. It is now the challenge for others to continue this integration of phonetics and philology in pursuing more plausible explanations for reconstructed sound change.

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