Syllable and Segment in Latin

RANJAN SEN

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Philology and phonology

1.1 Approaches to Latin phonology

The phonological evolution of Latin from its Proto-Indo-European roots to its separation into the Romance languages has been the subject of impressive scholarship by an illustrious register of researchers. Alongside works devoted to specific areas of phonology, such as Graur (1929) on geminates, Bernardi Perini (1974) on stop + liquid and final /s/, and Devine and Stephens (1977) on consonant clusters, several handbooks are wholly or substantially devoted to the phonology of Latin: Lindsay (1894), Niedermann (1997[1906]), Sommer and Pfister (1977), Meiser (1998), and perhaps most thoroughly, Leumann (1977), to name but a few. This book focuses upon isolating the precise phonological conditions for five recalcitrant developments in Latin, which have hitherto resisted explicit and comprehensive formulation. However, I furthermore seek to motivate why those conditions existed and were instigators of change in the language, accounting for the directions and idiosyncrasies witnessed in the phenomena. The role of synchronic phonological structure in guiding and constraining sound change, versus phonetic pressures alone, is much debated (§1.2); consequently a continuous thread in this book consists of an evaluation of a key aspect of structure in the context of the developments: the syllable. I argue that syllable structure played an important role in most of the changes investigated, by conditioning surface variants, but was on the whole a step removed from the essential core of the developments, which can be formulated with reference to phonetics alone without allusion to phonological structure.

The syllable was recognized as a phonologically relevant unit in antiquity. The Latin grammarians frequently used the term *syllaba* without further elucidation; for example, there are 59 occurrences in Servius' commentary on Vergil's *Aeneid*, and 76 in Quintilian's *Institutio Oratoria*.[1] Many facets of the syllable that are discussed today were identified in antiquity by grammarians of Latin, Greek, and Sanskrit (see Allen 1973: 27, 29–30, 32–4, 53–7): syllabification and syllable-internal phonotactics

[1] Counts taken from Perseus for Servius and the IntraText Digital Library for Quintilian, both accessed on 28 May 2009.

(e.g. Herodian *G.G.* 3.2.393–406), syllable-internal structure identifying the necessity of the nucleus (e.g. Dionysius Thrax *G.G.* 1.11–12, 16), the distribution of glides and high vowels according to syllable structure (e.g. Priscian *G.L.* 2.13), syllable weight distinctions (e.g. Dionysius Thrax *G.G.* 1.17–20), and the relevance of the syllable in metrics (e.g. Longinus *Proll. Heph.* p. 83). Latin scholarship has continued to develop these observations, invoking the syllable with reasonable regularity in analyses of phonological developments. Some recent studies have been devoted to Latin syllable structure, principles of syllabification, and the syllable's role in certain diachronic and synchronic phenomena (e.g. Marotta 1999; Lehmann 2005; Cser 2001; 2012).

Most previous research on Latin phonology has focused on building upon the insights of the Neogrammarian school of the 19th century by employing the comparative method, and its principle of the regularity of sound change, to chart the phonological development of Latin throughout its history. Scholars primarily use evidence from (i) Indo-European cognates, (ii) orthography in Latin inscriptions, (iii) manuscripts of Latin authors, (iv) the statements of Latin grammarians in antiquity, and (v) the development of the Romance languages. The establishment of synchronic and diachronic characteristics of Latin phonology in this way remains a most worthwhile enterprise in the light of constantly emerging inscriptional evidence and new interpretation in reconstruction.

Alongside this approach, however, another technique for advancing our knowledge has developed, especially in recent decades. This method considers Latin phenomena from the point of view of the insights of contemporary phonetics, the phonetic and phonological typologies of the relevant processes, and the analyses of different phonological theories. In particular, some scholars have cast a spotlight on phonetic and phonological plausibility in reconstruction, a concept that is only occasionally considered in traditional approaches. For example, the development of PIE voiced aspirates */b^h d^h g^h g^{wh}/ in the Italic languages has been the subject of a great deal of debate, and given rise to variant histories, based on their ultimate outcomes in different phonetic environments in Latin, Faliscan, Oscan, Umbrian, and other languages of the Italic branch. However, by investigating the plausible non-contrastive phonetic aspects of the phonemes in different contexts and positions, Stuart-Smith (2004) provides an account of their development which is consistent with our knowledge of voiced aspirates in modern languages and phonological processes such as devoicing, fricativization and fortition.

This line of attack has always been present in traditional scholarship; the comparative method after all depends upon informal notions of phonetic similarity and plausibility. An early example of the success of employing contemporary typological evidence is Corssen (1858–9), who reconstructs for archaic Latin fixed initial-syllable stress on the basis of evidence from vowel reduction, syncope, and the typology of such processes in modern languages. But the approach gathered momentum with works aimed at reconstructing the *pronunciation* of Latin, notably Sturtevant (1940)

and Allen (1978). A crowning achievement of this period is Allen (1973), which investigates several aspects of Latin prosody and phonetics from the perspective of contemporary linguistics; thus he investigates vowel length, syllable weight, syllable structure and syllabification, the prosodic word, and the nature and position of the accent. To illustrate the approach in one detail, Allen draws a strict distinction between vowel length and syllable weight, reporting that their confusion 'is still unfortunately encountered in some modern handbooks' (1973: 54). Work of a similar nature is seen in Pulgram (1970; 1975) and Zirin (1971), although the focus of these studies is firmly on the theory and reconstruction of prosodic systems, rather than on diachronic problems in Latin phonology, or on applying evidence from contemporary phonetics.

Since that time, studies in Latin phonology have continued to draw upon phonetics and phonological theory, but the main body of work continues along traditional lines. Sihler (1995) offers several comments on phonetic plausibility, usually in explanatory notes rather than the main text (as to be expected in a comparative and historical grammar of this kind). For example, in his discussion of Latin rhotacism (intervocalic */s/ > /r/), Sihler (pp. 172–3) comments that 'a change of *s* to *r* may appear extreme, phonetically, but is observed in many languages', and then provides examples from Proto-Germanic to West and North Germanic, the Eretrian dialect of Ionic Greek, and Sanskrit. In the domain of synchronic typology, he states that 'very little is known of PIE phonotactics', but 'still, typologically speaking, the assumed phonotactics are not exotic' (p. 169). Such a concern for establishing the phonetic and phonological likelihood of a purported explanation through invoking parallels is, admirably, often seen, but the main difficulty is that phonetic plausibility is commonly insufficiently constrained in the tradition, as it is not of foremost relevance to the comparative historical enterprise, as Yu (2006: 526) observes.

> While one of the crowning achievements of historical linguistics is arguably the discovery of ways to reconstruct the history of languages via the comparative method, the comparative method *per se* has nothing to say about why certain sound changes should be more prevalent than others, nor can it explain why asymmetric directionality effects of sound change exist. The comparative method simply does not require the linguist to understand why languages are structured as they are or behave as they do . . . it is often implicitly assumed that the posited reconstructed forms and the accompanying sound changes must also be within the bounds of the plausible, where plausibility is generally determined inductively, that is, by what the linguists have previously encountered in other human languages. Historical linguists also often rely on the notion of phonetic plausibility. To this end, historical linguists generally turn to phoneticians for answers.

A stumbling block is of course that, unlike for modern languages, we are not in possession of native speaker intuitions and primary phonetic data. As these are lacking for Latin, we must look to other methods to build a coherent picture. Little work has investigated Latin in the light of experimental phonetic research, the

typological distribution of sound patterns and changes, and contemporary phonological theories, rather than merely acknowledging the possibilities afforded by these sources. The notable recent exception, mentioned above, is Stuart-Smith's (2004) monograph on the development of the PIE voiced aspirates in Italic in order to explain the many peculiarities. The previous confusion and Stuart-Smith's achievement is described in Clackson's (2006) review.

> Comparative philologists have known of these curiosities for well over a century, and they have striven to give a historical explanation … [Stuart-Smith's] account is certainly unlikely to be superseded in the near future. She examines the available evidence for Latin and all the other 'Italic' languages of Italy with a fine-toothed comb, including … assessment of rival etymologies for disputed words. She combines this work on Italic with a first-hand knowledge of modern phonetics, and she is able to put rival arguments to the test through comparison with what happens in modern spoken languages. She comes up with a convincing explanation for what actually happened phonetically to the sounds in the history of Latin and the other languages under review.

This volume aims in part to contribute to a methodology for systematically interpreting the recoverable phonetic and phonological data of any non-current language with sources of evidence similar to early Latin, influenced to a large degree by Stuart-Smith's steps, as identified by Clackson. Our methodology broadly consists of (i) a systematic examination of data in the language pertinent to each phenomenon, after 'cleaning' the data by detailed philological investigation, (ii) establishing the evidence from phonological typology regarding each phenomenon and its potential conditioning factors, (iii) employing the results of phonetic research, with cross-linguistic implications, to reconstruct the conditions in the dead language, and (iv) evaluating the roles of synchronic phonetic pressures and phonological structure in motivating and guiding the change. The book investigates five phenomena in Latin: vowel colouring before clear and dark /l/; inverse compensatory lengthening; vowel reduction before stop + liquid; vocalic epenthesis in stop + /l/; and diachronic assimilations. All appear to have been governed in some way by syllable structure, to judge from language-internal and cross-linguistic evidence. I demonstrate both how phonetic research and phonological theory can shed light on a dead language, and in turn how Latin evidence can continue to illuminate problems in phonological theory—e.g. the nature of features, the typology of compensatory lengthenings and vowel reductions, and the role of the syllable in diachronic phonology—as it has done throughout the history of linguistics.

1.2 Explanation in diachronic phonology

The five studies in this volume investigate sound changes in Latin. We not only focus upon isolating the precise phonological (and chronological) conditions for the

developments, but also motivate those conditions, accounting for why pressures towards change existed in the language. In doing so, we reconstruct aspects of causation in diachronic phonology, a much-disputed field. The core debate surrounds the role of synchronic phonological structure—speakers' mental linguistic systems at a point in time—in explaining diachronic phonological development. The relationship between synchrony and diachrony—a dichotomy introduced by de Saussure (1916)—remains a topic of vigorous discussion over 100 years after the scholar's death (see Honeybone and Salmons 2014).

It is uncontroversial that phonological change can be phonetically motivated; the constraints of speaking and hearing can explain the roots of most diachronic developments. However, whereas 'reductionists' (adapting Bermúdez-Otero's 2006 terminology) posit that such pressures alone guide sound change through language use, and deny the existence of autonomous principles of synchronic organization (e.g. Ohala 1992; Blevins 2004), 'non-reductionists' hold that change is constrained and explained by innate or universally constructed mental linguistic structure (Universal Grammar), in the form of possible grammars and markedness constraints (e.g. Kiparsky 2006; 2008; Bermúdez-Otero 2006; 2007). Although the present volume does not focus upon addressing this debate, the analyses offered are most in harmony with a reductionist account, with a focus on establishing the phonetic origins of each phenomenon (with one exception), and perceptually based motivations for phonologizations (interpreting phonetic effects as phonological), reanalyses (assigning innovative phonological structure to existing surface realizations), and their directions. However, the non-reductionist approach equally acknowledges that diachronic change can begin in phonetic implementation, before becoming structuralized synchronic rules. Therefore, our analyses can be interpreted as accounts of the actuation of each sound change, i.e. how the variant underlying the change came about and was prone to an unintended parse by the listener, rather than the life story of the change, encompassing its implementation across the lexicon, if lexically diffused (Wang 1969; Chen and Wang 1975), and its 'lifecycle' through successive rounds of input restructuring at progressively higher levels in the grammar (Bermúdez-Otero 2006; forthcoming). The exception is the investigation into vocalic epenthesis in Chapter 5, which I argue was an analogically driven process (with first morphological then phonological conditions), and displays a lexically diffused spread where most frequent forms are most resistant, corroborating our hypothesis. Synchronic morphological structure also played a crucial role in the archaic syllabifications seen in vowel reduction (Chapter 4) and assimilations (Chapter 6), but I argue that on the whole, morphology's influence was some steps removed from the solely phonetic conditions governing the sound changes themselves.[2]

[2] However, alternative repair strategies to regular assimilations, arising from root faithfulness, provides some evidence for the lifecycle of phonological changes (Ch. 6), as per Bermúdez-Otero (2006).

However, a key question throughout this volume remains motivated by the synchrony/diachrony dichotomy: what role did synchronic phonological structure, in the shape of *syllable structure*, play in guiding and constraining diachronic sound change? I hypothesize that the influences of this prosodic unit can broadly be divided into two categories: an indirect influence whereby syllable structure conditioned surface variants, which in turn resulted in phonetically driven sound change (syllable structure → phonetics → change), or a direct influence whereby the structural context for the change necessarily made reference to syllable structure, without any conditioning influence on surface phonetics (syllable structure → change). Indirect and direct influences might include phenomena such as the following.[3]

(1) Sample indirect influences of syllable structure on sound change
   a. Categorical surface variants (allophones) governed by syllable structure might result in a phoneme split and subsequently divergent histories.
      E.g. 'l-vocalization' in Latin *al.ba* 'dawn', *la.vaːre* 'wash' > French *aube*, but *laver*
   b. Categorical surface variants governed by syllable structure might gradiently colour adjacent segments through coarticulation, leading to the reinterpretation of those segments as different phonemes.
      E.g. vowel colouring before dark /l/ (Chapter 2); voice assimilation before syllable-initial sonorants (Chapter 6)
   c. Gradient surface variants due to the surrounding environments common in certain syllable positions (e.g. onset = pre-vocalic/word-initial, coda = pre-consonantal/word-final) might result in phonetic tokens which are reinterpreted as different segments.
      E.g. assimilations (Chapter 6); lenitions, fortitions, neutralizations
   d. Gradient effects in timing conditioned by syllable structure might render segmental contrasts difficult to perceive in settings of low duration, resulting in their neutralization.
      E.g. vowel reduction in open and closed syllables before TR (Chapter 4)
   e. Phonetic cues to syllable structure, such as gradient effects in duration, might lead listeners to interpret one structure (e.g. open syllable) for another (e.g. closed syllable) if external influences on duration provide conflicting cues.
      E.g. inverse compensatory lengthening (Chapter 3).

Direct influences are either those which are based in phonological universals, under a non-reductionist approach, or those which are due to the necessary invocation of

[3] We leave aside stress- and rhythm-related phenomena here, as they are plausibly metrically governed, rather than by syllable structure, although there is of course an interplay between the two, e.g. quantity sensitivity.

syllable structure in the conditions of the change, without phonetic motivations. This latter can be due to an analogical spread of an earlier phonetically based process, resulting from the listener attributing a phonological pattern to a certain structure, and therefore might be accommodated in reductionist models which preserve the Neogrammarian 'sound change' versus 'analogy' split (e.g. Blevins 2004).

(2) Sample direct influences of syllable structure on sound change
   a. Phonological rules might be restricted in their structural description to a particular syllable constituent.
      E.g. vocalic epenthesis in onset /kl/ (Chapter 5)
   b. Changes in permitted syllable structures, themselves possibly governed by higher-order changes in speech rhythm, might lead to insertions or deletions.
      E.g. possibly: stress-timed Latin with abundant CVC syllables > syllable-timed Spanish with predominantly CV (see Delattre 1966; Holt 1997); degemination in V:CC (Chapter 3)
   c. Changes in syllable-based phonotactic constraints might yield repairs such as assimilations, insertions, and deletions.
      E.g. possibly: vocalic epenthesis in onset /bl/ (Chapter 5); simplification of word-initial clusters, e.g. *stlocus* > *locus* 'place'; assimilations (Chapter 6) (but rejected)
   d. Fortition in onsets and lenition in codas, if not through phonetics, but rather cognitively controlled strengthening and weakening in positions of prosodic prominence and weakness respectively.
      E.g. possible onset devoicing in TR in prehistoric Latin (Chapter 6)
   e. No sound change requires all coda consonants to be voiced, despite plausible diachronic paths to such a change, due a universal markedness constraint on voiced codas, by a non-reductionist account (Kiparsky 2006).

The phenomena investigated here mostly fall under the 'indirect influence' category. Syllable structure, itself sensitive to morphological structure, governed categorical or gradient surface variants, yielding the phonetic tokens which were the roots of phonetically based change, through phonologization or reanalysis. A summary of the five phenomena and analyses illustrates this.

(i) Clear and dark /l/
   a. Ternary categorical surface contrast reconstructed in Latin /l/: clear, dark, and underspecified, or [– back], [+ back], [Ø back].
   b. Clear in geminate /ll/, dark in codas, underspecified in onsets, which were gradiently 'contextually darkened' by the following vowel.
   c. /l/-darkness gradiently coloured the preceding vowel through anticipatory coarticulation.

d. Colouring in preceding vowels was phonologized as a different vowel segment (e.g. */e/ > /u/).
e. Syllable structure → categorical surface variants → gradient phonetic realizations → sound change.

(ii) Inverse compensatory lengthening
a. *V:C > VCC sporadically in three phonetically motivated environments, e.g. 'high vowel + voiceless obstruent'.
b. In 'high vowel + voiceless obstruent', a *phonologically long* vowel which was intrinsically the *phonetically shortest* in an environment where it was still *phonetically shorter* was reinterpreted as *phonologically short.*
c. The following consonant comcomitantly lengthened because the *phonologically long vowel in an open syllable* was reanalysed as a *phonologically short vowel in a closed syllable* due to the expected (though typologically uncommon) vowel durations in open and closed syllables (Sen 2012b).
d. The only segment which could be causing syllable closure was the following voiceless obstruent, which was therefore lengthened with minimum aerodynamic difficulty.
e. Syllable structure and non-structural contexts → gradient phonetic realizations → sound change (including reanalysis of syllable structure).

(iii) Syllabification in vowel reduction before TR
a. TR was heterosyllabic by default in archaic Latin, but tautosyllabic if there was an immediately preceding transparent morphological boundary.
b. Closed-syllable vowel reduction before heterosyllabic TR, including where etymologically evident morphemes were not synchronically transparent.
c. Open-syllable vowel reduction before tautosyllabic TR, including greater environmental conditioning, such as constrained r-conditioning across the stop in TR.
d. Morphological structure → syllable structure → gradient phonetic realizations → sound change.

(iv) Vocalic epenthesis in Tl
a. Chronological extension of epenthesis contexts: /bl/ → /kl/ → /pl/.
b. Epenthesis in /kl/ was based upon /bl/-epenthesis through morphological analogy (/bl kl/-initial mediative suffixes), followed by phonological analogy (internal onset suffix-initial /kl/ → internal onset /kl/).
c. /kl/-epenthesis therefore affected the least frequent lexical items first, and the most frequent words either utterly resisted or were slower to adopt the change.

d. /pl/-epenthesis probably affected the most frequent items first and showed sensitivities to stress not seen in /kl/-epenthesis, indicating that it was phonetically based, and possibly spread from /bl/-epenthesis (same place of articulation).
e. Morphological structure → syllable structure → structurally based sound change in /kl/ (linear segmental sequence → gradient surface realizations → sound change in /pl/).

(v) Assimilations
a. Salience of perceptual cues in linear segmental sequence to featural contrasts governed diachronic assimilations in voice, place, continuance, and nasality (not syllable-internal position).
b. Surface voice specification of sonorants conditioned by syllable structure: [+voice] syllable-initially, [Øvoice] elsewhere (coda, TR onset).
c. Voice assimilation in TR was therefore sensitive to syllable structure via feature distribution, not directly.
d. Morphological structure influenced syllabification of TR.
e. Morphological structure → syllable structure → categorical surface variants → gradient phonetic realizations → sound change.

The investigations in this volume therefore corroborate the primacy of phonetic realizations in the actuation of sound change, as almost all the phenomena display sensitivity to gradient surface variants, and not simply the categorical phonological specifications that conditioned them. However, vocalic epenthesis in /kl/ also shows how a sound change may, after the event, appear identical to others in its near-regular outcome, but in fact may have resulted from very different, non-phonetic, motivations. Finally, I emphasize how a complete account of sound change needs to incorporate considerations of synchronically transparent morphology and synchronic phonological structure, as well as surface phonetics.

1.3 Sources of evidence

For the purposes of the investigations, I shall recognize six periods in the history of Latin: (i) prehistoric Latin, from the break-up of Proto-Italic to the earliest attestations in the 7th century BC; (ii) archaic Latin, from the 7th century BC to the beginning of the literary period in 240 BC, consisting of inscriptional and reconstructed evidence; (iii) early Latin, from 240 BC to the beginning of Cicero's career in 81 BC, consisting mainly of the works of the early playwrights such as Plautus and Terence; (iv) classical Latin, consisting of two sub-periods with abundant inscriptional and literary evidence: republican, from 81 BC until the death of Cicero in 43 BC, and Augustan, from 43 BC to the death of Augustus in 14 AD; (v) imperial Latin, from 14 AD to the death of Marcus Aurelius in 180 AD; and (vi) late Latin, to the 7th century

AD. This volume focuses upon changes which occurred in the archaic and early periods.

The data in this book constitute a synthesis of evidence drawn from various dictionaries, etymological dictionaries, digital corpora, handbooks dealing with Latin phonology, and specific studies on particular phenomena. The most comprehensive handbook is Leumann (1977); other extremely important works include Lindsay (1894), Niedermann (1997[1906]), Sommer (1948), Allen (1973; 1978), Sommer and Pfister (1977), Sihler (1995), Meiser (1998), and Weiss (2009). The main dictionaries and etymological dictionaries used are *OLD* (= Glare 1996), *LEW* (= Walde and Hoffmann 1938–56), *DELL* (= Ernout et al. 1985), and *EDL* (= de Vaan 2008). Digital corpora drawn upon are Perseus (= Crane 2009), and the IntraText Digital Library (2009). Some specific in-depth works and the chapters in this book to which they are relevant include Graur (1929, Chapter 3), Serbat (1975, Chapter 4), Bernardi Perini (1974, Chapter 4), and Wachter (1987, Chapter 5).

The sources of evidence can furnish us with a wide range of information about Latin phonology. In the following sections, we consider how these sources can be interpreted.

1.3.1 Indo-European reconstruction

Comparative evidence from Indo-European languages enables us to reconstruct forms in the parent language, Proto-Indo-European, providing a starting point for Latin. Similarly, other languages of the Italic family, such as Oscan and Umbrian, can allow us to reconstruct an intermediate Proto-Italic form. PIE morphological theory is sufficiently sophisticated for us to make judgements on the well-formedness of an etymology, even where comparative evidence is lacking; for example, a basic pattern in verbs is root + suffix(es) + ending, and these three elements combined in various accent and ablaut patterns to give the PIE paradigms (Rix 1992: 123).

1.3.2 Inscriptions

Within our corpus of Latin attested while it was a living language, inscriptional evidence has the advantage of directly representing the orthography intended by the composer, or at any rate the inscriber, without later revisions. However, we encounter not only relatively straightforward 'phonetic spelling' (including instances where Latin was rendered using the orthographic practices of another language, such as Greek or Oscan) but also numerous orthographic conventions indicating segmental quality and quantity which require interpretation.

Consonantal length was denoted by double writing in the vast majority of Latin inscriptions, the exceptions being from the archaic period, where they were written singly, e.g. FVISE from the mid-3rd century BC (*CIL* 1^2.9, epitaph of L. Cornelius Scipio). The first datable writing of a double consonant is from 211 BC (*CIL* 1^2.608),

where the name of a Sicilian town, Henna (Gk. Énna), is found as HINNAD (abl.). Double writing in native Latin words is first attested in the decree of Lucius Aemilius (*CIL* 1^2.614), which can be dated accurately to 19 January 189 BC , and includes the forms TVRRI, ESSENT, OPPIDVMQV, and VELLET, but also POSEDISENT beside POSSIDERE on the following line. Writing of double consonants did not become regular until around 100 BC, and inscriptions throughout the 2nd century have both single and double writing, often employing the former in conservative registers such as chancery language: e.g. the *Senatus Consultum de Bacchanalibus* (*CIL* 1^2.581) from 186 BC never uses double consonants.

During the last quarter of the 2nd and the first quarter of the 1st centuries BC, inscriptions occasionally indicated the long vowels /eː aː oː uː/ by their double writing, following the practice used in Oscan in texts in the Osco-Etruscan alphabet, e.g. **duunated** 'gave' (Untermann 2000: 194), and sometimes in Umbrian in texts in the Latin alphabet, e.g. *eetu* (Untermann 2000: 207). The first datable example of this practice is the form PAASTORES 'shepherds' (*CIL* 1^2.638) from 132 BC. The practice continued until later in the case of /uː/, especially in 4th declension nouns, and is occasionally even found in manuscripts.

The PIE diphthong */ei/ was retained in archaic Latin in all positions, thus inscriptional DEIVOS, NEI, and perhaps EINOM in the *Duenos* Inscription (*CIL* 1^2.4). This, along with [ei] developed from [oi] in final syllables, monophthongized during the course of the 3rd century BC to a close-mid long front vowel [eː], which was indicated by the spelling ⟨E⟩ in FALERIES < *-*eis* < *-*ois* from around 241 BC (Zimmermann 1986: 40), PLOIRVME < *-*ei* < *-*oi* from the mid-3rd century BC (*CIL* 1^2.9, epitaph of L. Cornelius Scipio) and DEVAS (*CIL* 1^2.975). This pronunciation is supported by the play on words at Pl. *Truc.* 262–4 between *iːra* [eːra] 'anger' < **eira* and *era* 'mistress'.

Subsequently [eː] raised to [iː], merging with inherited /iː/ in the middle of the 2nd century, as shown by PVRGATI (*CIL* 1^2.586) from around 150 BC, and the classical Latin forms. From around 150 to 70 BC, orthographic ⟨EI⟩ was used simply to indicate vowel length for all instances of /iː/ from whatever source. Note that this convention was used during this period instead of the double writing of ⟨I⟩, at the time when length in the other vowels was thus indicated. Examples of this non-etymological writing of the diphthong are TARENTEINVS (*CIL* 1^2.1458) and VEIVAM (*CIL* 1^2.1837) < **wiːwaːm-*.

Similarly, the PIE diphthong */ou/ monophthongized at the end of the 3rd century BC, probably initially to close-mid long back [oː] and thereafter raising to [uː]. Therefore, we see PODLOVQVEIQVE in the Dedication from Lavinium (*CIL* 1^2.2833) from around the mid-6th century BC, but LVCIOM in the otherwise archaizing epitaph of L. Cornelius Scipio (*CIL* 1^2.9). Thenceforth, the orthography with the diphthong could represent /uː/ of any origin, so COVR[AVERVNT] < **koisaː-* (Wachter 1987: 426) from the 2nd century.

At around 110 BC, the long vowel /iː/ came to be represented orthographically by a letter ⟨I⟩ which rose above the line of the other characters, known as the 'I-*longa*', supposedly arising by superimposing a second ⟨I⟩ above an ⟨I⟩. The use of this feature can be found alongside the other markers of vowel length discussed above, as at *CIL* 1^2.1221, containing FEIDA, NAATAM, and VIVA. Flobert (1990) shows how this device began purely as an indicator of vowel length, but in Augustan times came to indicate the vowel in initial position. In later imperial times, it also denoted the phoneme in consonantal function, whether initially or intervocalically. The life of this device seems to coincide on the whole with that of the *apex*, discussed below, and both were used until around the end of the 3rd century AD (see *CIL* 5.857). The use of the two devices was very sporadic (never in more than half of the long vowels in any of the given texts, and sometimes in much less than 20% of them), and hardly ever found more than once within a word.

The *apex*, a diacritic mark placed over the vowels ⟨E⟩, ⟨A⟩, ⟨O⟩, and ⟨V⟩, resembled a lopsided circumflex (e.g. V̂), sometimes little more than an acute accent, and seems to have been sporadically written over long vowels. It appeared towards the end of the republican period and even began to be used above the vowel ⟨I⟩ from the 2nd century AD. The first example is MV́RVM at *CIL* 1.679 from 104 BC. As with 'I-*longa*', this device was used solely to indicate vowel length in the republican period, but in imperial times it came to be used to indicate features such as the start and end of words, accented syllables, and any heavy syllable (Flobert 1990). The sporadic use of the device is explained to a degree by Quintilian (*Inst.* 1.7.2), who appears to indicate that regular repeated use of such devices was unpleasant to the eye: *longis syllabis omnibus adponere apicem ineptissimum est* 'to put the *apex* on all long syllables is most unseemly'. Quintilian goes on to say that the device should only be used for phonological contrasts, but in practice its use was clearly more widespread.

1.3.3 Manuscripts

The most abundant source for all that concerns the history of the Latin language is to be found in the manuscripts (MSS) of the texts of Latin authors. However, most of these date from a period much later than the author's autograph, and the processes of dictating, copying and misreading may well obscure the original text. Where all the MSS agree on a reading, we can usually be confident that this was the original version, but where they disagree, an editor must judge which form is most likely to be the one intended by the author. However, MSS which are deemed to be good may well have 'corrected' a non-standard but original form that the author in fact intended. Alternatively, a copyist may have written (and a dictator may have pronounced) a form present in the speech of his own time. Such concerns cloud the actual chronology of attested forms. Lindsay (1900: 1–12) provides a good discussion regarding Plautine MSS.

Metrical evidence from verse texts tells us clearly whether a syllable was light or heavy—our main reliable source of evidence for vowel length and syllable structure in Latin. In some later texts (and verse inscriptions), authors were not wholly comfortable with versification and regularly made errors, commonly placing an open-syllable short vowel in a metrically long syllable (notably when the vowel was stressed) and a closed syllable (including where closure was by a geminate) in a metrically short position.

1.3.4 Grammarians

Contemporary Latin grammarians commented on numerous aspects of Latin phonology, and also provided evidence for the chronology of developments by citing older forms or censuring newer ones. Evidence from grammarians is used throughout the investigations in this book, most notably when reconstructing clear, dark, and underspecified variants of Latin /l/ (Chapter 2).

1.3.5 Romance languages

Comparative evidence from the Romance languages allows us to identify the spoken late Latin form. This is useful for two reasons: first, we can verify a historical 'end-point' for the forms we are investigating, and secondly, we have independent evidence for spellings within Latin of which we should otherwise have been suspicious.

The contrastive vowel length of Latin was not retained by the Romance languages, nor was original consonantal length, except in central and southern Italo-Romance, and with /r/ versus /rr/ in branches such as Spanish, Portuguese, Catalan, and probably Old French (Lloyd 1987: 140–45, 242–3; Giannelli and Cravens 1997: 32–3; Cravens 2002: 67-8; Padgett 2009). At one extreme, Sardinian has lost vowel length distinctions without trace, with long and short vowels simply merging (Maiden 1995: 28); in Romanian, length has been neutralized only in the back vowels /o u/ and low /a/. The Romanian front vowel series shows the principle which is otherwise universal: distinctions of vowel quantity have been replaced by those of vowel quality, with the exception of /a/.

We infer (Allen 1973: 131–4) that Latin short vowels were pronounced with a more open articulation than their long counterparts, and the standard view is that in the vowel system of the Proto-Romance underlying the Western Romance languages and the central and southern Italian dialects, these aperture distinctions were enhanced in stressed syllables. Short /i u/ opened to close-mid vowels [e o], thereby merging with the reflexes of Latin long /eː oː/, also phonetically close-mid, after quantity distinctions had collapsed. These close-mid vowels were in contrast with original short /e o/, realized as open-mid [ɛ ɔ]. Long and short /a/ simply merged with no qualitative differentiation, as the two were already maximally open. This resulted in the seven-vowel system of Western Proto-Romance: /i e ɛ a ɔ o u/. In unstressed syllables, it

seems reasonable to infer that the aperture distinctions were less pronounced, but still present. Therefore, the short high vowels opened to [e o] as before, but these merged with both long and short mid vowels in the front and back series, thus /i eː e/ > /e/ and /u oː o/ > /o/, so establishing a five-vowel system.

Turning to the consonants, we find a number of major changes from Latin to the Romance languages, notably the phonemicization of the glides, the reduction of hiatus and glide formation from high vowels (with further repercussions), the simplification of consonant groups, and the emergence of palatal and affricate consonants. In the Western Romance languages (except Sardinian, and central and southern Italian dialects), a qualitative distinction has again arisen in the stop series, as in the vowels. Generalizing the developments, the long voiceless consonants came to be pronounced as singletons, merging with the 'strong' allophones of the singleton consonants found word-initially (after consonants and pauses) or post-consonantally. The 'weak' allophones found intervocalically voiced and merged with the 'strong' allophones of the voiced stops.

Careful interpretation of the sources of evidence above therefore provides a wealth of useful data to reconstruct Latin phonology over several centuries. We are not only able to chart the development of words and sounds diachronically, but also—having recovered segmental contrasts, phonotactic constraints, and prosodic structure—to establish synchronic systems at a given point in time.