ELSEVIER

English phonology and linguistic theory: an introduction to issues, and to 'Issues in English Phonology'

Philip Carr [a], Patrick Honeybone [b],*

[a] Département d'anglais, Université de Montpellier III-Paul Valéry, Route de Mende, 34199 Montpellier, France
[b] Linguistics and English Language, University of Edinburgh, 14 Buccleuch Place, EH8 9LN, Scotland, UK

Abstract

Data from the phonology of English has been crucial in the development of phonological and sociophonological theory throughout its recent past. If we had not had English to investigate, we claim, with both its unique and its widely-shared phonological phenomena, linguistic theory might have developed quite differently. In this article, we document some of the ways in which particular English phonological phenomena have driven theoretical developments in phonology and related areas, as a contribution to the history of recent phonological theorising. As we do this, we set in their context the other individual articles in the Special Issue of *Language Sciences* on 'Issues in English Phonology' to which this article is an introduction, explaining both their contents and how they relate to and seek to advance our understanding of the English phonological phenomena in question. © 2007 Elsevier Ltd. All rights reserved.

Keywords: English phonology; History of phonological theory; Sociophonology; Vowel shift; Lexical strata; Lenition; Tense–lax

1. Introduction

Is it still worth investigating the phonology of English? After all, English is probably the best studied of all languages, so we might wonder whether it can still provide data that is

---

* Corresponding author.
  E-mail addresses: philip.carr@univ-montp3.fr (P. Carr), patrick.honeybone@ed.ac.uk (P. Honeybone).

worth exploring. We believe – without question – that it can. We think that the articles collected in this volume on 'Issues in English Phonology' show, for many reasons, that English is still well worth investigating, just as it always has been, and we explain how this is so in this piece.[1] Furthermore, we show here how data from the phonology of English has been crucial in the very development of linguistic theory (in this case, in phonological and, to a lesser extent, sociophonological theory) throughout its recent past. If we had not had English to investigate, we claim, with both its unique and its widely-shared phonological phenomena, linguistic theory might have developed quite differently. And given this fact – that certain phonological phenomena of English have provided some of the keystones of the theories that are used today – we also think it clear that we must consider these phenomena constantly anew as these theories develop. As they have often been well described, these phenomena can be testing grounds for new theories, and, equally, fresh theories can hope to shed new light on old problems in English phonology, perhaps allowing us to understand them better.

But what do we mean by English? Whose English? There are certain 'classical' data sets connected with well known phenomena which recur again and again in phonological work (and it is typically these that theories have been devised to account for, in the way just described). These data sets either come from well described varieties, such as the reference accents RP and General American, or are shared among all (or at least most) varieties. We have in mind here such phenomena as the 'Vowel Shift' vocalic alternations, the patterns in word-stress assignment, postvocalic *r*-sandhi, tapping/flapping[2] and glottaling, and as we explain in this article, these are discussed in several of the pieces gathered in this volume (for these specific phenomena, see among others MCMAHON, FOURNIER, UFFMANN,

---

[1] The articles gathered in this Special Issue of *Language Sciences* are mostly developments of papers presented at the Toulouse Conference on the Phonology of English in the summer of 2002, which we organised. Those presented here are the ones which made it through a sometimes lengthy reviewing process, and we are grateful to all those who acted as reviewers for the volume and apologetic for the unavoidable delays in bringing the articles as a group to press. We are very pleased with the range of work represented in the volume, however. When we discuss it in this current piece, we use the convention of referring to the individual articles by giving the author's surnames in SMALL CAPITALS (followed by the article's name in that part of this article where we discuss the work in detail).

[2] The phenomenon in question here is known as both 'tapping' and 'flapping', with some authors favouring one name and some the other. It may be that 'flapping' is more favoured in the phonological literature and/or in American usage and 'tapping' in the phonetic literature (with some phoneticians making an articulatory distinction between a tap and a flap), and/or in British usage, but we have no real evidence to confirm this. A Google search gives 20 results for "tapping of t" and 77 for "flapping of t", so we henceforth follow the majority, and use 'flapping' and 'flap'. The two articles in this volume which focus on the phenomenon, discussed here in Section 2.4, also prefer 'flapping' (although both also use 'tapping', too). Both also use the IPA sanctioned transcription [ɾ] (as do we, following the IPA throughout and occasionally adapting others' transcriptions to fit this), rather than the [ɒ] of the 'American Phonetic Alphabet' (see for example Odden, 2005, for some discussion of such differences of transcription). Elsewhere in this article we do not draw attention to, or discuss any differences that exist in traditions of the transcription of English, although several well known such differences exist (for example, in the underlying transcription of the 'tense' vowels, such as the FLEECE and GOOSE vowels, which, among others, Jones, 1950, transcribes as /iː/ and /uː/, Trager and Smith, 1951, as /iy/ and /uw/, Abercrombie, 1964, as /i/ and /u/, and Chomsky and Halle, 1968, as /ē/ and /ō/). In Section 2.6, we discuss these vowels in detail, however, and some transcriptional issues arise there. See Abercrombie (1964) for a detailed (but pre-Chomsky and Halle) discussion of issues in the transcription of English.

CSIDES and STRAW and PATRICK, respectively). Only a small proportion of anglophones actually speak one of these reference accents, however, and there is fantastic diversity in the phonologies of the many Englishes spoken around the world, which is still often poorly described. In this way, the linguistic phenomenon (or phenomena) known as English can provide new data for phonologists, and several articles in his volume illustrate this, discussing novel or little-considered data from, among others, Tyneside English (ROWE), Fenland English (JOHNSON and BRITAIN), Barbadian English as spoken in Ipswich (STRAW and PATRICK), and Atlantan English (from Atlanta, Georgia) (HARRISON). English can also provide new data for phonologists from the way in which loanwords from English are adapted into other languages, which can tell us things about the phonology of both donor and recipient languages; such work is exemplified in this volume by KENSTOWICZ, who studies the adaptation of English loanwords into Fijian. Relatedly, WESTER, GILBERS and LOWIE introduce newly collected data on dental fricative substitution from the second language acquisition of English by native speakers of Dutch.

New data on the phonology of English can also be brought into discussion through the instrumental investigation of phenomenon which had previously thought to be understood, and which often turn out to be more complicated than was standardly thought, in the 'Laboratory Phonology' tradition. JANSEN introduces such data here for postlexical cross-word voicing assimilation, which has typically not previously been described for English, and STRAW and PATRICK also use instrumental acoustic analysis in their article, connecting instrumental and sociolinguistic work in a still quite novel manner. Other articles gathered here are based on the original investigation of material in pronouncing dictionaries, sometimes using computational methods of investigation, as in the contributions by FOURNIER, TREVIAN, SZIGETVÁRI and SCHANE. We feel that the volume as a whole represents a good cross section of the work that is currently being carried out on the phonology of English: while some of the work gathered here relies on instrumental investigation, other work relies on introspection and similar types of data; some work is qualitative, in the sense that it is interested in whether a phenomenon occurs in particular environments or not, and some work is quantitative, interested in how often a particular variant occurs in a particular environment. We feel that this variety adds to the volume's importance, as these diverse opinions meet too rarely.

We are, of course, hardly alone in arguing that English is still worthy of study, and the question at the start of this article is very much a 'general linguist's' question. There is no such doubt in the Anglicist tradition (by which we mean the linguistic aspect of that area of study known as *Anglistik* in German and similarly in many other languages, but hardly ever as 'Anglistics' in English – it is often known as 'English Language' in British Universities). There is, naturally, similar confidence in other language-specific or language-family-specific traditions of study (for example, among Germanists, Slavicists and Africanists) and we – of course – do not mean to suggest that English is 'special', or that its phonological phenomena are *more* worthy of study than those of other languages, despite our contention, set out below, that data from English has been crucial in the development of phonological theory. The crucial role of specific data from other languages or groups of languages in the development of phonology has been described elsewhere (see, for example, Goldsmith, 1992; Hyman, 2003, for the role of data from African Languages – in Firthian Prosodic Analysis and Autosegmental Phonology, for instance – and Yip, 2003, for the role of data from Chinese in the development of our understanding of tone and tonogenesis, among other things).

The reason why data from English has had such a substantial role in the development of phonology is surely largely because phonological theory as we describe it has largely (although not exclusively) developed during and since the 20th century, and English was the most widely spoken language, by linguists as well as lay folk, in this period. North America has been the main (although by no means the only) powerhouse of phonological theory, and it is surely no coincidence for our current concerns that English is the main language spoken there. Nonetheless, as we explain below, we believe it is a fact that English has played a major role in the development of phonology as we now know it. And a warning should perhaps be sounded here: for any theory of phonology which is embedded within Chomskyan assumptions about Universal Grammar as an innate module of mind, questions arise as to whether the theoretical constructs needed to analyse phenomena which happen to be specific to only one language, or to a small subset of human languages, should be reckoned to form a part of the phonological content of an innate module of mind. We return to this point below.

This article thus has three main purposes: (i) we document some of the ways in which certain English phonological phenomena have driven theoretical developments in phonology and related areas, and thus, more generally, in linguistic theory – in this way, the article itself is, we hope, a contribution to the history of recent phonological theorising, particularly (but not exclusively) within the generative tradition; (ii) we show how new data from instrumental and computational investigations, from under-researched varieties of English (including second language varieties) and from the adaptation of English loanwords can extend our understanding of language in general and of English in particular; and (iii), as we do (i) and (ii), we set the other individual pieces in the volume in their context, providing the normal, descriptive summaries of articles expected of an introduction.

The sequencing principle for the articles in this volume is simply alphabetical by the surname of the first named author. We have intentionally not adopted thematic or theoretical groupings, as these two organisational principles would conflict with each other, and because the papers interact with each other in multi-dimensional ways. The volume concludes with an obituary for a French phonologist of English, in whose shadow the conference at which the papers were initially presented took place, and to whom this volume is dedicated: Lionel Guierre.

This current article has two further sections: after an introduction, which very briefly sketches the history of phonological theory as we mean it here, the first six subsections of Section 2 take a series of the phonological phenomena of English and show both how they have driven the development of phonological theory (in part hand-in-hand with similar data from other languages) and how the articles in this volume contribute to our understanding of them, and then, in Section 2.7, we turn to issues in sociophonology and sociophonetics and their connection with English and the articles collected here. Section 2.8 brings in other issues connected with the phonology of English that are addressed in other articles gathered here, and Section 3 concludes.

2. English phonological phenomena and the development linguistic theory

In this section, we provide an overview of how data from English can be thought to have driven developments in phonological theory, with the thesis that certain theoretical ideas, which have subsequently gone on to be applied fruitfully in the analysis of the

phonology of other languages, may not have developed in the way they have if English did not have the phonological characteristics that it has. Most of these phenomena are discussed in the other articles in this volume, as we show here, although not all to the same extent. We thus discuss here several major developments in the (mostly recent) history of phonological theory. We do not, however, claim that this offers anything like a full description of the history of the discipline.[3] The history that we discuss here involves the long pre-20th century development of ideas, such as the development of articulatory description and transcription, which would crystallise in the early and mid years the 20th century to form phonology, with its various strands of thought. That century subsequently saw (i) the development of Standard Generative Phonology, as exemplified in Chomsky and Halle's (1968) landmark work *The Sound Pattern of English* ('*SPE*'), (ii) subsequent developments within generative phonology which share *SPE*'s mentalistic approach and which can be called 'autonomous phonology', such as Lexical Phonology, nonlinear representational work, Government Phonology and Optimality Theory, and also (iii) work which rejected a purely autonomous orientation and sought to include sociological information in phonological description, such as the Labovian quantitative sociolinguistic paradigm. Other, not incommensurable, frameworks also arose in the wake of *SPE*, such as Dependency Phonology (mainly in Britain and Holland), and that of Lionel Guierre in France (about which, more below).

As a first point to illustrate the connection between the development of the discipline and key sets of data from particular languages, we note here that, in *SPE*-related Standard Generative Phonology, the agenda was clearly driven primarily by the phonological problems of English, and this was maintained to a considerable extent in Lexical Phonology (as is clear in such foundational texts as Kiparsky, 1982, and in the influential summary in Kaisse and Shaw, 1985, where virtually all examples are from English). Data from English, most specifically from the history of English, was also fundamental in the initial development of Dependency Phonology (in such work as Anderson and Jones, 1977). This central place for English was lost in nonlinear work (such as Goldsmith, 1976), however, and the initial arguments for both Government Phonology (henceforth 'GP') and Optimality Theory (henceforth 'OT') were based on typological generalisations over data from a wide range of languages (see, for GP, Kaye et al., 1985, 1990, and, for OT, Prince and Smolensky, 1993/2004). As we explain below, however, English nonetheless also supplied important data for the development of aspects of these two frameworks, just as it did in early sociophonogical work (such as Labov, 1963, 1972a).

2.1. The (Great) Vowel Shift and Trisyllabic Shortening

The first of the phonological phenomena that we discuss here is the set of surface alternations that exist between (i) tense/long monophthongs or diphthongs on the one hand, and (ii) lax/short vowels on the other in such morphologically related forms as *divine~divinity*, *crime~criminal*, *serene~serenity*, *profound~profundity*, *cone~conical* and *sane~sanity* (where the orthographic representation of the segments concerned has been

---

[3] For more detailed discussions of aspects of the history of phonology, see Fischer-Jørgensen (1975), Asher and Henderson (1981) and Anderson (1985), and for some discussion of developments from recent years, Goldsmith and Laks (2000) and Bermúdez-Otero and Honeybone (2006).

underlined; the double descriptions 'tense/long' and 'lax/short' are scrutinised in Section 2.6, below). These are often described as 'vowel shift' alternations, and this name can been seen as a reference to both the historical origin of the surface segments in (i) as reflexes of aspects of the 'Great Vowel Shift' (henceforth 'GVS') of the Early Modern period, and to their treatment in *SPE*, where the segments in (i) are derived by a synchronic Vowel Shift Rule (henceforth 'VSR'), and those in (ii) are derived by a rule of Trisyllabic Laxing (also known as 'Trisyllabic Shortening', and henceforth referred to here as 'TSS').

We discuss the status of *SPE*'s VSR and TSS further below, but first we consider one result of the fact that both are synchronic reflexes of historical changes, and that the vowel shift alternations of current English are themselves due to the interaction of the two changes, through a complicated sequence of events (for some of the issues involved see Lahiri and Fikkert, 1999, and see MᶜMᴀʜᴏɴ's article in this volume for some further background to the historical GVS). This stretches far back to some of the earliest phonologists writing in or on English, and to the beginnings or precursors of what is sometimes called the 'English School of Phonetics' (see, for example, Firth, 1946; this includes Alexander Melville Bell, Henry Sweet and Daniel Jones, and should perhaps better be called the 'British School', as it includes Scottish as well as English scholars). The connection here is due to the enormous effect that the GVS had on the segments of English – altering the pronunciation of all long/tense vowels – and the fact that it occurred at a stage when the spelling of English had already begun to be conventionalised, and so the new diphthongs and raised monophthongs created by the GVS were not reflected in a change in the way that the segments are spelt, and this left English with some of its most notable sound-to-spelling mismatches.

The irregularities of English spelling have long been the subject of comment, and there are lengthy traditions of calls for spelling reform, including a steady stream from the middle of the 16th century onwards, such as Hart (1551, 1569), Smith (1568) and Bullokar (1580). As Firth (1946) explains "[t]his interest in the spelling of English is one of the main origins of what I have taken the liberty to call the English School" – it led to early and often impressive description of articulation and attempts at (proto-phonemic) transcription, to either provide a better spelling system for English, or help for those who had to learn the existing system. This tradition can be traced through such writers and works as Holder (1669), Walker (1791), Isaac Pitman and Alexander J. Ellis (e.g., Pitman, 1847),[4] and Bell (1867) to Sweet (1877), and these were fundamental in the development of still-current systems of phonetic and phonemic transcription, such as the IPA. In this way, internal historical changes in English, such as the GVS, coupled with the fact that they were not recorded in spelling, provided a clear impetus for the development of early phonological ideas which were to provide the indispensable foundation for phonology to develop upon. As Ohala (2004) explains, the kind of taxonomic work involved in naming, classifying and transcribing speech sounds is fundamental in providing the vocabulary for stating phonological generalisations, and, given this, the above illustrates for the first time here how data from the phonology of English played a key role in the development of

---

[4] This publication sets out the '1847 alphabet', which was the work of both Pitman and Ellis, and is recognised as a relatively direct ancestor of the IPA's first alphabet (see Kelly, 1981 and IPA, 1999).

phonology – had there not been the oddities of the English spelling system, such essential early phonological work might not have occurred.[5]

As we mentioned above, an awareness of the GVS and TSS and the alternations that they produced led, many years later than the work just discussed, to their encoding as the highly abstract representations and rules postulated in *SPE*, which contained the first fully elaborated model of generative phonology. This raised a host of explicit analyses founded on an equally explicit set of theoretical assumptions, many of which have since been queried, debated, rejected or reformulated. One of the debates, which receives little attention in present-day generative phonology, was the abstractness debate, at the centre of which, at its start, were the English Vowel Shift morphophonological alternations. Chomsky and Halle go so far as to claim that the contemporary VSR (in fact, VSRs, in the plural, also accounting for other similar alternations, as MᶜMᴀʜᴏɴ explains) plays a central role in the phonology of English, deriving the surface form of almost all tense/long vowels from differing underlying forms. In this way, this set of data from English was the starter for the 'abstractness' motor of debate in phonological theory. To exemplify the details: the alternating [aɪ] and [ɪ] in *divine~divinity* were both derived in *SPE* from an abstract underlying /iː/[6] via the putatively synchronic VSR (and connected rules), to yield [aɪ], and via TSS, to yield [ɪ] (just as the [iː] and [ɛ] in *serene~serenity* were derived from /eː/, along with similar derivations for the other alternations described above). One of the main objections that arose to this type of analysis was that this was internal reconstruction (and hence diachronic phonology) masquerading as synchronic phonology, recapitulating the historical GVS and TSS. Another objection was that such analyses, combined with the assumption of psychological realism with respect to phonological representations in generative phonology, were difficult to take seriously: how could the child have acquired a mentally represented /iː/ in such pairs without ever having been exposed to a phonetic [iː] in either member of the pair?

There are two striking features of the way the abstractness debate evolved. Firstly, in mainstream generative phonology, there was no explicit abandonment of such 'overly abstract' analyses by those (e.g., Dresher, 1981; Gussmann, 1980) who initially defended them against their detractors (such as Hooper, 1976; Kiparsky, 1968; Lass, 1984), and

---

[5] Of course, there are and have long been other irregularities in the spelling of English words which are not connected with the GVS, and which also contributed to these early phonologists' arguments for the necessity of a spelling reform, such as the initial 'silent letters' in *knee, knight* and *psychology, pseudonym*, which are due to the failure of English spelling to represent initial elision and loanword adaptation respectively. We feel it fair to give a special place in this to the vocalic mismatches between the surface sounds and the original latinate values of the letters used to spell them that are due to the GVS, however, and to the concomitant failure of height equivalence in the alternating segments in the morphologically related 'vowel shift' pairs such as *serᵉne–serᵉnity*, where, although the letter ⟨e⟩ is used to spell them both, [iː] alternates with [ɛ], rather than its height-mate [ɪ] (on which point see further Section 2.6), as they are so prevalent and frequent in the language. It is also fair to note here that there were similar works on spelling reform for other European languages produced at around the same time (from the 16th century, or even earlier), even for those languages whose graphemic to phonological mapping was not as complicated as English (see Tavoni, 1998). Our point, however, is that the British tradition of interest in spelling reform (necessary due to the effects of the GVS and other phonological changes not being reflected in spelling and certain other reasons) led in good measure to at least one of the phonological traditions which fed directly into the development of current practice in phonological description and transcription.

[6] We have adapted the transcriptions here from those of *SPE*, which in fact derives surface [āy] and [i] from underlying /ī/ and similar. For some discussion of issues surrounding such transcriptions, see Section 2.6.

some still defend such analyses unequivocally. However, many phonologists quietly abandoned analyses of the VSR type, and with it the assumption that each morpheme can only have one underlying form, with many practising generative phonologists (such as Harris, 1994, and see the discussion in Bermúdez-Otero and McMahon, 2006) now assuming that such 'alternants' are listed in the mental lexicon with a vowel corresponding to the phonetic value of the vowel in each alternant; this is the only option in approaches like Government Phonology where such abstract derivations are formally impossible. Secondly, some of the detractors of such analyses simply went their own way, abandoning many of the founding assumptions of generative phonology. A case in point is that of Joan Hooper (now Joan Bybee), whose work on Natural Generative Phonology rejected many of the assumptions made not only in *SPE*, but in generative linguistics as a whole. A striking feature of Bybee's work is her rejection of the competence/performance distinction in the form proposed by Chomsky (1965), and still upheld by him (albeit in a different form) in recent work, such as Chomsky (2002). Instead of downplaying the role of performance, and performance factors such as frequency of utterance, Bybee has argued for a performance-based view of phonology which stresses the importance of such factors in shaping phonological knowledge. She points out, for example, that phonetic change often progresses more quickly in words which have a high token frequency in usage. She notes a tendency in varieties of American English to lose a syllable in unstressed schwa + resonant sequences (as in *every*, *camera*) noting that the syllable loss is more advanced in words of higher token frequency, such as *memory* and *family*, than it is in words of lower token frequency, such as *mammary* and *homily* (Bybee, 2001, p. 11, and see SZIGETVÁRI's article in this volume for some discussion of the process involved here, if not the frequency effects).

Just as it is interesting to see which phonological phenomena are dealt with in the articles collected in this volume, it is also perhaps telling if few or none of the papers deal with certain points. The GVS, and its putative Present-Day English successor, the VSR, are discussed here in only one article – by APRIL MCMAHON ('Who's afraid of the Vowel Shift Rule?'). As she notes, there is little discussion of the synchronic vowel shift alternations in Optimality Theoretic work. MCMAHON suggests that the reason for this is that these kinds of alternation represent everything that is problematic for OT. Optimality Theorists, she suggests, have exercised considerable ingenuity in attempting to model these alternations; but their analyses involve either the abandonment of 'classical' tenets of OT, such as constraint innateness and universality, or the introduction of new constraint types and theoretical machinery, or indeed both. She argues that, rather than formulating increasingly baroque machinery to deal with alternations of this kind, it would be preferable to accept that OT is suited to certain phonological phenomena but not others. Rather than seeing this as an inherent weakness in the model, we can, she suggests, perceive it as a strength, if we accept an essential distinction between prosody, which she takes to be the heartland of OT, and melody. External and independent evidence for the prosody-melody distinction comes from areas as diverse as language impairment, brain lateralisation, and the vocal communication of non-human primates; together, these points, she claims, led to an evolutionary disparity in the development of prosodic and segmental phonology, such that the former is suited to analysis via innate and universal constraints, while the latter is not.

In this way, the *absence* of discussion of a particular set of data from English can also play a role in argumentation in the development of phonological theory, just as can the

positive discussion of particular data (although it should also be noted that there have been OT accounts of both VSR and TSS, such as that in Lee, 1996). In any case, we think it is clear that this specific set of alternations from English has in the past played an important role, in several ways, in the development of phonology, and that phonological theory could have developed differently (or, at very least, later), if there had not been this data to discuss.

2.2. The 'Germanic' and 'Romance' parts of the English lexicon: word stress and strata

Another key issue in English phonology, which has long been a major subject of phonological debate (in *SPE* and elsewhere) is the topic of word stress assignment, and its interaction with morphology. An assumption which has been at the heart of work in generative phonology since *SPE*, which is still present in analyses based on OT (such as that given by Hammond, 1999), and which allows us to set out the basic data in question here, is that word stress assignment in English crucially involves syllable weight (whether analysed in terms of morae or not). Typical statements are, for example, that content words in English which have final stress must be heavy, i.e. contain a tense/long (or bimoraic) vowel, as in *kangaróó*, or a lax/short vowel and a (non-extrametrical) coda consonant, as in *collápse* (for some discussion of these issues, and of those surrounding the tenseness/length distinction, see Section 2.6). Equally, it is standardly claimed that, if the penult is stressed in a noun, then it must be heavy (as in *potáto* and *agénda*), and that, if it is not heavy, then the antepenult is stressed (as in *cínema*). With this kind of approach, one can argue that cases such as *cálendar* contain a heavy penult, and are thus exceptions (the position adopted by Giegerich, 1992). Or one can argue that the penult in cases such as *cálendar* is not heavy, since it contains a schwa. But cases such as *cálendar* raise a question: is the penultimate syllable unstressed because it contains a schwa, or does it contain a schwa because it is unstressed? The other side of this issue is also addressed in this volume: are unreduced vowels always stressed, or can full vowels occur in syllables with no stress? Different authors have argued for different positions on these issues, as we shall see.

The connection with morphology comes when we consider the differences in the placement of the main stress in (i) morphologically related words such as *télegraph* and *tèlegráphic*, where the primary stress in the derived form is on what is an unstressed syllable in the underived word, and the derived form's secondary stress preserves the primary stress from the underived form (although it is demoted to 'only' a secondary stress), and (ii) in morphologically related pairs where there is no stress preservation (as in *télegraph* and *telégraphy*). It is clear that many of the words that feature in discussions of stress in English have been borrowed into the language, in several waves of borrowing, and this once again ties the history of phonological theory to historical developments in English, just as we saw with the GVS, although this time the historical changes are exogenously driven, through language contact, unlike the purely endogenous GVS. English has borrowed on a massive scale from Romance sources in particular, and this has influenced the way that English morphology and word stress assignment have evolved, as we discuss below.

It is striking that the fundamental assumption that word stress assignment in English is quantity-sensitive has gone unchallenged in generative phonology for four decades. This assumption is, however, challenged by one of our contributors, JEAN-MICHEL FOURNIER

(in 'From a Latin syllable-driven stress system to a Romance versus Germanic morphology-driven dynamics'), who works within the analytical framework established by the French phonologist Lionel Guierre, to whose memory this volume is dedicated. Guierre's framework (see, for example, Guierre, 1970, 1987), like certain generative frameworks, makes crucial appeal to the idea of resolution of conflict between word stress assignment principles. It also makes explicit appeal to morphological structure and syntactic category in word stress assignment (in this way, the framework is like such generative work as *SPE* and Hayes, 1982, for example, but unlike that of Hammond, 1999). But it also makes explicit appeal to spelling (unlike *SPE*, which, arguably, made *im*plicit appeal to spelling when, for example, it accounts for the penultimate stress in *vanílla* by assuming that the penultimate syllable is closed, and hence made heavy, by a geminate /ll/). For instance, the words *employee* and *kangaroo* are claimed by FOURNIER to both contain a V'V' (Co (e)) ending, which takes final stress (V'V' denotes two identical vowel letters, 'Co' means 'zero or more consonant letters', and 'e' denotes a grapheme, so that *kangaroo* ends in V'V', *seventeen* ends in V'V'C, and *papoose* ends in V'V'Ce). The notion 'ending' is thus graphemic, and will correlate, at times, with suffixes (as in *employee*), but at other times will not (as in *kangaroo*). FOURNIER gives an overview, backed up with abundant data, of how primary stress in English is calculated within the Guierre framework, and then goes on to propose a diachronic study of the Romance/Germanic conflict in English. He argues that Latin could not have been the underlying force in the historical evolution of the present-day stress assignment system. He further argues that an examination of affixes, more particularly in relation to neutral derivation (that is, stress preservation) and secondary stress positioning, puts paid to the idea that Romance stressing principles eventually supplanted the Germanic stressing dynamics of the English language.

FOURNIER concludes that English has inherited not *one* but *several* phonologies (an idea also present in the generative literature on 'co-phonologies'), whose workings are determined by morphology and word-length, but also by learned or foreign word characteristics, being thus the product of a merging process between Romance mechanisms, applying to borrowings and learned vocabulary, and the prevailing Germanic dynamics for more ordinary vocabulary, as borne out by the fact that most English suffixes actually entail stress preservation. This illustrates one of the ways in which the waves of loanwords that have been borrowed into English can have an effect on what is thought possible in phonological theory – the phonological characteristics of different parts of the lexicon are allowed to have separate derivations in different parts of a speaker's phonology.

This effect of Latinate loans into English also fed into a post-*SPE* development in generative phonology, namely Lexical Phonology (henceforth 'LP') (see, for example, Kiparsky, 1982, 1985), which has survived the transition from rule-based derivational models of phonological organisation to constraint-based, largely non-derivational models such as OT that much of contemporary phonology has undergone, in such work as Bermúdez-Otero (1999) and Kiparsky (2000).[7] It had been widely assumed in the traditions that gave rise to LP that the affixes of English fall into two categories, often called the Class I and Class II affixes, and, to connect this with the theme of this section, Class I affixes are typically of Latinate origin, and Class II are typically native Germanic morphemes (this thus

---

[7] Not all work in this, or other frameworks has embraced OT's rejection of the rule, of course – see Giegerich (1999) for an example of work in LP which defends a rule-based approach (and, indeed, the whole LP enterprise).

relates, non-directly, to the distinction that Fournier makes between Romance and Germanic word phonologies). The key idea (called the 'Affix Ordering Generalisation' in Selkirk, 1982) is that the Class I affixes must be closer to the base than the Class II affixes in words, so that, if *-ic* is a Class I affix, and *-less* Class II (as is typically assumed), this explains why *atom-ic*_I*-ity*_I and *atom-less*_{II}*-ness*_{II} are fine as words of English, as is *atom-ic*_I*-ness*_{II}, but **atom-less*_{II}*-ity*_I is not (as Giegerich, 1999, explains). One of the other main justifications for the distinction between the two classes of affixes was precisely the difference in their behaviour with regard to stress preservation versus stress shift that Fournier discusses: Class I suffixes, such as *-ity*, can induce a shift in the position of the stress on the underived form (as in *prodúctive → productívity*, and *frágile → fragílity*), while Class II suffixes, such as *-ness*, are stress preserving (as in *prodúctive → prodúctiveness*, and *frágile → frágileness*).

LP elaborated on these observations by proposing not just a division between word phonology (lexical phonology) and phrase phonology (postlexical phonology), but a formal division within the lexicon between different strata of word formation, with specific generalisations (initially, rules, now typically constraint rankings) being located at different strata. While there is disagreement about this in the literature, most LP theorists settled on there being two strata in the lexicon, mapping on to the two classes of affixes just described, as well as the module for postlexical phonology.[8] The initital interest of the model was that it made rule ordering follow from the overall structure of the grammar in many cases, and this was viewed as clearly desirable by Kiparksy and others, who felt that previously arbitrary stipulations as to rule order could be made to be derived from general principles (such as the Structure Preservation Condition, the Elsewhere Condition and subsequent versions of the Strict Cyclicity Condition) and the interaction between these and the postulated stratal structure of the grammar. Aside from the crucial distinction in affix class from English just described, other data from English were also used to support and develop the model, including a range of segmental processes – examples of this are the postlexical, non-structure preserving nature status of flapping in American English (which is a process that has featured often in phonological theorising, as discussed further in Section 2.4, below) as distinct from the lexical, structure-preserving status of TSS, for example, which was said to be located at Stratum 1 in the lexical phonology. However, just as data from English were used to support some of the central claims of LP, so were data from varieties of English used to falsify those claims, such as the data on dentalisation in Belfast English discussed by Harris (1989), and, in turn, to propose a radically revised model of the framework, in Giegerich (1999).

Given all this, it can again be claimed that data from English, specifically, has played a crucial role in the development of this aspect of phonological theory, and, indeed, we might question whether LP would have developed, at all, or in this way, had there not been this data. It is in this way that external historical events in the history of English, such as (i) the Norman Conquest, which brought English into contact with Norman French (later Anglo-Norman), and which was one of the main sources for Romance borrowings into Middle English, and (ii) the wave of learned borrowings from, especially, Latin into

---

[8] Some models assumed more lexical strata for English (e.g., Halle and Mohanen, 1985, who assume four), but most work agrees on two, and in any case our point here is not that LP may only assume two strata, following the two classes of English affixes, but that it assumes more than one stratum in part on the basis that there is more than one class of such affixes in English.

Early Modern English, can be seen to have had an effect on the development of phonological theory, just as they had a development on the history of English Phonology, because they provided the affixes which were to contrast in terms of their phonological behaviour with the native Germanic ones to provide the basis for the argumentation that lexical strata can exist in phonology.

This point goes further – as we have seen, LP in part relies on a theory about the distinct kinds of properties possessed by different phonological generalisations at different levels of the grammar, and much of the initial empirical support for this idea came from English. This was, of course, quickly followed up by data from other languages, notably Malayalam (Mohanan, 1986), but a general issue which arises from the emergence of LP in this way concerns its status with respect to universalism, and this impinges on our earlier point about universalism in phonology. If the postulation of strata was driven by the accidental historical fact that English has borrowed hugely from Latinate sources (and Malayalam from English sources), can these stratal phenomena be given by a supposedly innate, biologically-given module of mind? If we are to adopt Chomskyan assumptions concerning I-language, as distinct from E-language, to which, as Chomsky points out, factors such as the Norman invasion of Britain belong, then how could lexical strata, based on an E-language-induced distinction in the phonology of English and other languages with similar histories, belong to I-language?[9] It may, on the other hand, be that this is a co-incidence, and that the Romance/Germanic distinction in English phonology simply conveniently maps on to an aspect of a psychologically real UG which exists, and which would have been discovered by phonologists, independently of the points that we discuss here, but it is clear that this claim is controversial.

Three other pieces in this volume, aside from that by FOURNIER, also address aspects of stress assignment in English, focusing on issues other than those just addressed. The contribution by IVES TREVIAN ('Stress-neutral endings in contemporary British English, an updated overview') is, again, in the framework of Guierre, with its core notion 'ending', and focus on stress assignment. It attempts to account for current changes taking place in the behaviour of what are commonly taken to be stress-neutral endings in contemporary British English, that is, those which allow for 'strong stress preservation', with the primary stress on the same syllable as in the underived form. TREVIAN's study aims for comprehensive coverage, via a survey of Guierre's original database (which was initially compiled from the 12th edition of Daniel Jones' *English Pronouncing Dictionary*, 1964) and a systematic collation of all relevant items with the entries of current phonetic corpora such as the two editions (1990, 2000) so far available of *The Longman Pronunciation Dictionary*, and the thoroughly updated 15th edition of Jones' *English Pronouncing Dictionary*. TREVIAN argues that, in contemporary English, word stress is subject to variation and change to a much larger extent than is generally believed. For instance, stress-neutral endings are allegedly subject to very few irregularities (e.g. *ádvertise → advértisement* in British English), but little attention has been given to their evolution in more recent corpora. Stress shifts are commonly observed in conjunction with allegedly neutral (and very productive) suffixes such as *-ed*, *-ing*, *-ly*, *-atory* or *-able*. Whilst some of these shifts can be ascribed to

---

[9] We might even go so far as to wonder whether there would have been an LP had there not been the Norman Conquest of England. Some work, such as Bermúdez-Otero (in press), provides implicit arguments against this speculation, however, by developing a principled and independent rationale for the adoption of precisely two strata.

conflicting constraints, most are, TREVIAN claims, induced by a system of rules governed by word categories and the quality of the syllable to which these suffixes attach. TREVIAN argues for an extension of what Guierre once described as the *Normal Stress Rule* of English, whereby two-syllable words have penultimate stress, and words of three syllables (or more) have antepenultimate stress.

The contribution by SANFORD SCHANE ('Understanding English word accentuation') also deals with word stress assignment in English, but follows in the generative tradition rather than the Guierre tradition, in the sense that it involves appeal to the notion 'metrical foot'. SCHANE contrasts two ways of representing English word stress: (i) that exemplified by the *SPE* treatment (also found in the work of Garde, 1968) and maintained in a tradition of analysis since, and (ii) that found in many English-language dictionaries. In *SPE* and in Garde, full vowels are always stressed; for the dictionary makers, full vowels can be either stressed or unstressed. SCHANE argues for an analysis of English stress patterns along the lines of the dictionary treatments, claiming that the latter, with alternating accented and unaccented syllables, suggest a natural way of assigning foot structure to syllables. He argues further that feet can be ternary, binary, or unary, but that the latter are permitted only word finally, and that all syllables are assigned to some foot, with the exception that there are some word-initial syllables that remain unfooted (and by implication, unstressed). SCHANE claims that, for most English words, neither foot structure nor the location of stresses is part of the lexical entry. He then proposes a set of metrification rules for creating feet, and, on this approach, the location of the stresses is then easily derived from the generated foot structures. He shows how the rules apply to various kinds of morphologically simple (underived) words, and goes on to show that no additional mechanisms are required for morphologically complex forms. The metrification rules apply simultaneously to each morphological constituent, so this manner of forming feet is not cyclic in the usual interpretation of that concept, and is closer to the type of parallelism widely claimed for OT. SCHANE deals with the differences (of the type described above) that exist among morphologically related forms in terms of whether stress is preserved or not in derivation by proposing that the distinction between derived words with stress preservation, where the place of a stress agrees with its occurrence in the contained word (e.g. *télegraph, tèlegráphic*), and words without preservation (e.g. *télegraph, telégraphy*) is to do with the avoidance of stress clash. The proposed way of building feet elegantly accounts, he argues, for this difference, so that one of the most striking aspects of SCHANE's analysis is that, in fact, it requires no independent notion of stress clash, since the avoidance of adjacent stressed syllables follows automatically from the distributional restriction on unary feet.

While SCHANE simply assumes that full vowels need not be stressed, in order to focus on other issues, LUIGI BURZIO makes it the central issue in his article ('Phonology and phonetics of English stress and vowel reduction'), by focusing explicitly on the question of the relationship between word stress and vowel reduction. Working within a contemporary version of OT that makes appeal to the idea of the perceptual and articulatory grounding of constraints, BURZIO reformulates a claim made in his earlier work, *Principles of English Stress* (1994), where he had already argued against the traditional notion that there is a bi-directional relation in English between vowel reduction and stress assignment. BURZIO suggests, instead, that, while lack of stress is necessary for vowel reduction, it is not sufficient, so full vowels may occur in unstressed syllables, as SCHANE assumes. BURZIO postulates a link between the place of articulation of the coda consonants following unstressed vowels

and the possibility of reduction in such vowels. He argues that, since coronals, unlike labials and velars, are unmarked in terms of place of articulation, they can be viewed as 'pre-neutralised' for place, and that they are insensitive as to whether or not a preceding vowel provides good place cues. They thus permit reduction of the preceding unstressed vowel. BURZIO argues that his approach, based on vowel-to-consonant interaction, is more insightful than previous analyses which rely solely on lack of stress on the syllable in question, since those previous analyses fail, among other things, to capture the relationship between the distribution of vowel reduction and the structure of word-final consonant clusters. An important claim here is that the reason why long vowels do not reduce is because they are perceptually more salient than short ones, regardless of stress; vowels do not reduce in certain closed syllables because the energy level within them is critical to the perceptibility of the following consonant. A core, and radical, point here is that the weakening of perceptual properties that causes a vowel to neutralise to articulatorily neutral schwa will correspondingly drive a consonant dependent on that vowel to neutralise to the neutral oral closure [coronal].

As the four papers gathered here that deal with aspects of stress assignment show, this is a complex and crucial chunk of the phonology of English, where a range of issues meet. As the articles themselves and our discussion here show, the phenomena of English word stress have long had an important role in phonological discussion, to the extent that some of their facets have been a major driving force in the development of phonological theory; we could equally mention in this regard that the need to account for the facts of English word stress led to the introduction of the derivational cycle into phonology (see Chomsky et al., 1956, and *SPE*), and that attempts to better the *SPE* treatment of stress assignment in English led to other developments than those discussed above, too, such as the introduction of extrametricality in Liberman and Prince (1977), and its extension in Hayes (1982). Debates concerning these areas continue, as is clear in the articles gathered here, and as SCHANE and BURZIO show, aspects of the phonology of English stress are still empirically controversial, too.

2.3. Consonant elision and epenthesis in English phonology

The points discussed above are typically assumed to be relevant to all varieties of English,[10] but this is not the case for all of the interesting English phonological phenomena, of course, and we deal with two phenomena in this section which are restricted in their occurrence to specific varieties; they also have in common the fact that they can be argued to involve cases of the elision of consonants. One of the most striking points of divergence among varieties of English is between those that are rhotic (such as most Scottish and American varieties) and those which are non-rhotic (such as most Anglo-English and southern Hemisphere varieties, and some American varieties, such as Eastern Massachusetts and Afro American Vernacular English). The distinction is seen in phrases such as 'Where's the car?', which has no '*r*' sounds in non-rhotic varieties of English but has final surface '*r*' in both *where* and *car* in rhotic accents, as opposed to 'this car always annoys

---

[10] This is surely not the case, however – there is variation among varieties of English in terms of stress placement, and considerable variation among varieties as to the occurrence of vowel reduction, with some varieties featuring much less reduction than others, and it would be interesting to consider how this relates to the stress facts, as discussed here especially by BURZIO.

me', where an '*r*' of some sort will usually be pronounced by non-rhotic and rhotic speakers alike in *car* (the precise phonetic character of the segment differs between varieties, with at least [ɹ] and [ɾ] attested, but it always a rhotic, so we transcribe it henceforth as [r]). The occurrence of an [r] in non-rhotic accents in the latter phrase illustrates a phenomenon, 'linking *r*', which has been central to several important debates in the development of generative phonology. In the days of *SPE*, which allowed for rules of insertion and deletion, the question was whether to postulate an underlying /r/ which was deleted in certain contexts, or whether to postulate an insertion rule in the opposite set of environments, so that, although the phenomenon is unquestionably historically a case of elision, it could be captured synchronically as a case of epenthesis. In a quite unrelated development, this phenomenon also provided the empirical base for one of the groundbreaking studies in sociophonology, in Labov's work on New York City English (see, for example, Labov, 1972a), in work of the type that we discuss further in Section 2.7, below.

To return to autonomous phonological work, an argument in favour of conceiving of this phonological phenomenon as an insertion rule came from the existence of 'intrusive *r*' in non-rhotic accents, as in 'law [r] and order', with no etymological /r/. Since 'intrusive *r*' occurs in the same contexts as 'linking *r*', it was arguable that the simplest analysis is to postulate a single insertion rule to subsume both apparently distinct phenomena within a single synchronic generalisation (where necessary, below, we refer to these two processes of non-rhotic accents together as *r*-sandhi because they occur in cross-word or at least cross-morpheme environments – including such cases as *draw*[r]*ing*). The phenomenon of 'intrusive *r*' was also important during the days of rule-based derivational accounts of phonological change, since the apparent analogical extension of 'linking *r*' to 'intrusive *r*' could be characterised as a case of rule inversion (see Vennemann, 1972). But this left open the synchronic status of *r*-sandhi: is it possible to characterise the set of vowels which precede the [r] in question, namely [ɔː], [ɑː], [ə] (and derivatives of schwa such as [ɜː], [ɪə] and [ʊə]), in a phonological insightful way? In a rule-based generative phonology which uses distinctive features, the rule cannot be formulated unless the input set can be picked out using an appropriate feature characterisation. So the formulation of the rule, whether it be a deletion or insertion rule, again raised questions as to the relation between synchrony and diachrony: is the set of vowels in question the arbitrary result of a set of historical changes to the vowel systems of the non-rhotic accents of English, or does it form some kind of natural class (non-high vowels, perhaps), stateable as the input to a synchronic rule? And, if there is a synchronic epenthesis generalisation to be formulated here, the question arises as to why it should be [r], and not some other segment, which is inserted. These questions also fed into work which focused on non-linear representational issues in attempts to constrain phonological arbitrariness by deriving the sandhi [r] from its environment, such as Harris (1994), who argues that the [r] is a realisation of 'floating' melody which can only be connected to a skeletal slot when a word with an initial empty onset follows it (parallel to the 'latent' consonants in French liaison), and Broadbent (1999), who argues that the [r] can be derived from the subsegmental make-up of the vocalic segments which it follows. Recent claims that the epenthesis is synchronically arbitrary can be found in work by Hale and Reiss (2000) and McMahon (2000).

The phenomenon of *r*-sandhi in English has even been claimed to be a crucial piece of evidence in favour of or against whole phonological frameworks. Nespor and Vogel (1982) use it as their main evidence for the existence of the Utterance as a phonological domain, because they claim it occurs anywhere between words, as long as they are in the same

Utterance (see Section 2.8 for some problematisation of the idea of a phonological Utterance). Also, in one of the earliest papers in OT, McCarthy (1993), recourse was made to the idea of an arbitrary insertion rule which specifies the specific sound type of the inserted consonant. This analysis led to objections that this appeal to a rule undermined the non-rule-based character of OT, and Blevins (1997) proposed that OT must be extended to include language-specific rules as well as a universal set of constraints on this basis. Halle and Idsardi (1997) went so far as to claim that *r*-sandhi is fatal to the whole OT enterprise, when considered with OT's apparent inability to reproduce the opaque interaction of their rules of *r*-deletion, *r*-insertion (for they use both) and the rule of schwa insertion that they couple them with, to derive such forms as [fiːjə] *fear*, from /fiːjr/ (Orgun, 2001, however, shows that OT can cope with this, if extended to include the powerful machinery of sympathy theory).

The article by CHRISTIAN UFFMANN in this volume ('Intrusive [r] and optimal epenthetic consonants') joins these debates by arguing that the phenomenon is best understood as an insertion process, and goes on to claim that it is not synchronically arbitrary, arguing explicitly against Halle and Idsardi (1997) and aspects of Orgun (2001). Analysing the phenomenon from an OT perspective, UFFMANN outlines a new approach to consonant epenthesis, appealing to the idea of different markedness scales, based on the notion 'prominence', defined over different prosodic positions. The underlying aim is to try to explain why different segment types (such as [r], glottal stop, and glides) are inserted in different positions in English and other languages. UFFMANN argues, using cross-linguistic evidence, that /r/ can be seen as a natural hiatus filler. We see here how a phenomenon from English can feed into more general questions in phonological theory concerning issues such as derivationality, markedness, epenthesis and prominence.

Another issue in discussions of *r*-sandhi is that of how the environment should be stated. Given the treatment of the syllable in *SPE* as a segmental feature, any direct appeal to the position of a putative underlying /r/ in syllable structure was difficult to formulate. With the advent of non-linear models of phonological organisation, direct appeal to syllable structure became possible (again), so that non-rhotic accents could be described as disallowing [r] in coda position. A related feature of *SPE* was its failure to appeal to the notion 'foot' in the treatment of English phonology. With the subsequent advent of theories of Metrical Phonology, direct appeal to foot structure became common in generative phonology, and has remained so ever since. In the paper here by PHIL HARRISON ('The lost consonants of Atlanta'), the little discussed case of consonant elision which HARRISON describes for Atlantan English is said to be sensitive to the position of the consonant within the foot. HARRISON's paper is couched in the framework of Government Phonology, where one of the central claims is that what many take to be word-final consonants are in fact syllabified in an onset followed by an empty nucleus (see, for example, Kaye, 1990; Harris, 1994; Harris and Gussmann, 1998). A traditional analysis would involve postulating two contexts for consonant elision in Atlantan English: in word-internal onset position, and in word-final coda position. Given the assumption that the latter are better analysed as onsets, HARRISON argues that a single context for consonant elision in Atlantan English can be stated: it occurs to consonants in the onset of a syllable which is dependent within a trochaic foot. Thus, consonants which occupy the onset of the head of a foot will fail to undergo elision.

In this way, HARRISON argues that this data from (this variety of) English provides further evidence for the GP model of suprasegmental structure, just as Fudge (1969) focused for the most part on English in his defence of the syllable (after it had been rejected in

SPE), as an element in the inventory of theoretical concepts in phonology in an influential article (now 'officially' taken into the canon in Goldsmith, 1999), just as did Kahn (1976).

2.4. Lenition-like segmental processes in English phonology

The main phonological phenomena discussed above have, we argue (to a greater or lesser extent) played recognisable roles in the development of certain aspects of phonological theory by themselves. In these cases, then, it has been these particular phenomena, specifically as found in English, which provided the crucial data. There are other phenomena which could also be mentioned in the same breath as those discussed above (Canadian Raising is one which comes to mind, for example), but we think our point is made, and, as we mostly restrict ourselves in this article to the points discussed in the other articles in this volume, we turn now to cases where data from English has featured prominently in work which has driven phonological theory to new insights and assumptions, but only alongside data from similar phenomena in other languages. One case in point concerns a type of segmental process which must count among many phonologists' favourites: that group of processes which are often labelled as cases of lenition.

There have been many attempts to define what counts as lenition (see Brandão de Carvalho et al., in press, for a wide range of approaches to the phenomenon), and we do not try to provide any such definition here – rather, we take the easy way out (as many others have done in discussions of the phenomenon) and simply list the types of processes involved. It is common (for example, in Lass and Anderson, 1975, Lass, 1984 and Anderson and Ewen, 1987) to view spirantisation processes (such as t → s) and voicing (such as t → d) as cases of lenition (although they have been claimed to be lenition of different 'types' – 'opening' and 'sonorization' lenition, respectively, for example, in Lass, 1984), along with debuccalisation processes (such as s → h), which Lass (1984) also sees as a case of 'opening'.[11] Much of the discussion of spirantisation and voicing in work on lenition features data from languages other than English, but the interpretation of debuccalisation as lenition owes something to work on English, and other types of process have been claimed as cases of lenition on the basis of data from English, too. As we discuss here, these latter two points have, in fact, been crucial in the development of certain strands of phonological theory, particularly in work on subsegmental structure.

A great (but too often ignored) work on English phonology – Lass (1976) – introduced a way of conceiving of debuccalisation precisely as debuccalisation, that is, as the loss of oral phonological specification (and hence phonetic articulation). This was based in part on debuccalisation to [h], as in synchronic Scots /θ/ → [h] (as in [aeˈhĩŋk] 'I think' and [ˈevrɪhĩ] 'everything', to use Lass's own examples), and in diachronic developments such as Indo-European **/k/ >* Modern English /h/ (compare Latin *cord-* and *canis* with English *heart* and *hound*), but the focus for the most part is on synchronic debuccalisations of voiceless stops to [ʔ], often described as 'glottalling', or as 'glottal substitution' (for example, by STRAW and PATRICK) and common in Scots, London English and some other

---

[11] A different typology of lenition processes – that of Szigetvári (1999), also tangentially assumed in this volume by CSIDES – distinguishes between two types of consonant lenition processes (referred to as 'consonantal' and 'vocalic' lenition) in relation to the sets of environments in which they are claimed to be most likely to occur. This groups spirantisation and voicing together, to the exclusion of debuccalisation, which is grouped with other changes that involve a loss of place and with delaryngealisation (that is, a loss of laryngeal specifications).

varieties; Lass (1976) principally describes it for New York City English and Scots, including Scots [ˈwɔʔər] 'water', [ˈbʌʔn] 'button', [siʔ] 'seat' as examples. There is an unclear relation between (i) this 'full' glottalling, which affects /t/ most consistently across varieties, and affects /p/ and /k/ much less frequently, and (ii) glottalisation (also known as 'glottal reinforcement'), which typically affects all stops equally, and which results in segments which retain a buccal articulation but also have glottal closure, and are transcribed either as [ʔp, ʔt, ʔk] or [pʔ, tʔ, kʔ]. Glottalisation is very widespread in English, and is touched on here by IVERSON and AHN; glottalling features in JOHNSON and BRITAIN's discussion of Fenland English and is also mentioned in passing by JANSEN. STRAW and PATRICK briefly consider the relationship between glottalling and glottalisation in their work on Barbadian and Ipswich English, where glottal variants of underlying /t/ (or, to use the sociolinguistic convention, the variable (t)) are common and seem to pattern slightly differently in the varieties that they consider; they focus on glottalling and consider further in some detail how the precise phonological environment of a segment conditions the likelihood that it will be glottalled, a point which has been of considerable importance in theoretical phonological work on this data, too. We do not consider such environmental concerns here for glottalling (or these articles from the volume further either here, as they are discussed in more detail below), but focus, rather, on the effect on phonological theory of considering the 'structural change' effected in glottalling.

Lass (1976) proposed that the kind of debuccalisation found in English glottalling (and in debuccalisation to [h]) can best be understood as the deletion, or loss, of those aspects of specification which give the plosives concerned their oral articulation. For Lass, this meant that a phonological rule or the type t → ʔ erased the distinctive features concerned ([+coronal], [+anterior], etc.) from the make-up of the segment. Furthermore, he saw this as evidence for the principled 'grouping' of features into [oral] and [laryngeal] submatrices, so that, in fact, not the features, but only a whole submatrix could be deleted by a phonological rule. As well as prefiguring certain ideas of Feature Geometry, this idea was to be directly influential in the development of Dependency Phonology (see Anderson and Ewen, 1987, for an overview), and was also to prove influential in Government Phonology, particularly in such work as Harris and Kaye (1990) and Harris (1994), where it was proposed that all cases of lenition can be characterised as the loss of subsegmental material (in the terminology of GP, this involves element-loss, rather than feature-loss). Indeed, the theories of the internal structure of consonants developed in both Dependency Phonology and Government Phonology are built, at least in part, on the basis of data from lenition processes such as glottalling and debuccalisation to [h]; and in the case of GP, this also includes data from flapping.

The idea that 'voicing' is a type of lenition is widely held, as mentioned above (although, as we discuss in Section 2.6, what counts as phonological voicing is arguably more complicated than is usually assumed), but the focus on English flapping as a case of lenition, and its induction into lenition trajectories owes something to GP work such as Harris and Kaye (1990), Harris (1990, 1994, and elsewhere). This process occurs in several varieties of English, including most American, and some Irish and Southern Hemisphere varieties. It affects certain cases of intersonorant /t/ and /d/, conditioned by foot-structure and other factors too numerous and complicated to consider here, to produce the short, perhaps voiced [ɾ], in such words as (for /t/) *atom*, *pretty* and *mighty* and in such phrases as *see you tomorrow* and *at issue*, but not in *Tom*, *tomorrow* and *filter*, or in *grow tomatoes* and *a tissue*.

As already mentioned above, this is a process that has been well studied in phonological literature, and has been used as the empirical basis to make many points. Indeed, Bromberger and Halle (1989) use its interaction with Canadian Raising as the key piece of evidence in their defence of an entire model of phonology, with extrinsically orderable phonological rules and long derivations (and, in turn, Kaye, 1995, argues explicitly against their conclusions, by calling a crucial set of their Canadian data into question). The process still provokes controversy, perhaps most frequently in connection with how exactly its triggering environment should be described. It is discussed in this volume by both IVERSON and AHN and by CSIDES.

GREGORY K. IVERSON and SANG-CHEOL AHN (in 'English voicing in Dimensional Theory') discuss the process in some detail, including the phonetics of the resultant [ɾ] (or [ɾ̥] under certain circumstances) and argue, in fact, that the flapping itself—that is, the shortening of closure that is so characteristic of the resultant [ɾ]—is essentially a matter of phonetic implementation, rather than a phonological process proper. In a novel take on the phenomenon, they argue that the actual phonological process involved is the variable, speaker-dependent postlexical neutralisation of the contrast between /t/ and /d/ in its triggering environment (making such pairs as *matter* and *madder* identical on the surface). Thus separated out from the shortening which typically applies whether or not it is accompanied by the neutralisation, they call this process 'Coronal Lenition', because they formalise it as the loss of laryngeal specification (that is, delaryngealisation, as we might describe it) in /t/. This, in fact, fits in well, if unintentionally, with Harris and Kaye's (1990, and elsewhere) GP definition of lenition as the loss of any type of specification. This delaryngealisation renders /t/ phonologically identical to /d/ on the model of laryngeal phonology that IVERSON and AHN assume, and their discussion in this area is directly tied up with the concerns of Section 2.6, and so is considered in further detail there, but we note here that they consider several aspects of the environment in which this lenition occurs. Although they restrict themselves to word-internal cases of this type of lenition, they consider the role of stress, or foot-structure, of adjacent segmental melody, and also the famous cases of the "Withgott effect" (first noted by Withgott, 1982, and rediscussed by Steriade, 2000), in which [ɾ] may occur in *capiṭalistic*, but not in the prosodically identical *miliṭaristic*. As IVERSON and AHN explain, this distinction is often used as an important piece of evidence for paradigm uniformity effects (see, for example, Steriade, 2000 and Davis, 2005), on the basis that [ɾ] is allowed in *capiṭalistic* because it occurs in *capiṭal*, but is forbidden in *miliṭaristic*, because of the enforcement of a high-ranked Output–Output faithfulness constraint with *miliṭary*, where no flapping occurs as the /t/ is foot-initial. Jensen (2000) and Bermúdez-Otero and McMahon (2006) have argued against this, however, claiming instead that the preservation of the foot-structure of the underived words accounts for the difference, as is possible in derivational models, and IVERSON and AHN themselves favour an approach of this general type.

CSABA CSIDES (in 'A Strict CV approach to consonant lenition: bidirectional government in English Phonology') relies on flapping in General American and a detailed consideration of many of the environments in which it can and cannot occur (where /t/ is realised in other ways, such as [tʰ], for example), to provide the main evidence for his interpretation of phonological licensing and similar relations. CSIDES's work is squarely situated in the context of Government Phonology, where argumentation on the basis of lenition is common, as we have seen (and as SZIGETVÁRI demonstrates again, using a very similar GP framework to Csides, and also including some (brief) argumentation on the

basis of lenition data). Specifically, CSIDES argues within a recent development of GP – strict CV phonology, first discussed in Lowenstamm (1996) – which seeks to constrain prosodic structure even further than in standard GP, by assuming that the only suprasegmental structure that exists is strings of alternating Cs and Vs, so that any long segment or cluster must involve an 'empty' C or V position in its middle. On this model, much of phonology is seen as being due to explicitly formulated phonological forces which licence the existence of segments in a string, or licence an empty position to remain silent, or reduce a skeletal position's ability to retain its melodic content (and where this occurs, lenition results). These lateral relations between the skeletal C and V positions are typically known as licensing and government, and CSIDES develops a number of relational definitions to account for the occurrence of flapping in word-internal and cross-word environments, and for its partial absence in word-initial (and other) environments. He develops the established GP idea that skeletal positions, apart from the head of a domain, inherit their licence to govern other positions, and introduces the notion of 'bidirectional government', such that the government relation can proceed in both directions (from right-to-left among Cs and Vs, as well as from left-to-right). This helps link words together, and CSIDES develops a distinction between governing relations that are established in the lexicon and those established postlexically, which, put together with certain other theoretical machinery, can account for the distribution of flapping. In this way, CSIDES maintains a long tradition of using evidence from processes which are taken to be cases of lenition as crucial evidence in phonological theory, and, although lenition is wide-spread cross-linguistically, the crucial evidence here comes from English, as in Harris (especially 1994) and certain others before him.

2.5. The phonotactics of English

Generalisations over the lexicon that are widely held to be 'static' phonotactic statements are another long discussed area of English phonology, as they are also for other languages, and there have been many detailed studies in this area, such as Kruisiga (1943) and Hammond (1999). English tolerates quite a wide range of consonant clusters, but the language is not particularly unusual or enlightening by itself in this area of phonology as these clusters generally obey what Selkirk (1984) calls the Sonority Sequencing Generalisation. There are several well-known phonotactic oddities in English, such as the sC clusters of seemingly ternary onsets, the non-occurrence of /ŋ/ in onsets, and the absence of words of the type $[sC_1VC_2]$, where C is a labial (and near absence where C is a dorsac), but exactly the same or similar constraints on lexical structure exist in other languages, too, so it would be hard to make a case that the phonotactic facts of English in particular have driven phonological theory in this area, although it is clear that language-universal phonotactics motivated much representational work on syllable structure.

Despite all the existing, often very detailed material on the phonotactics of English, PÉTER SZIGETVÁRI (in 'Branching onsets and syncope in English') shows here that novel work can still be done in this area. He argues, indeed, that basic generalisations in the phonotactics of monomorphemic English words have been missed, specifically in connection with the relationship between different types of two-member consonant clusters, including those two-member clusters that are created through syncope (in such cases as *separate* [sɛp<ə>rət], giving [sɛprət]). Crucially for SZIGETVÁRI, who is working in a similar type of Government Phonology to the Strict CV version described for CSIDES above, cases of

syncope are accounted for in GP by assuming that there is an empty nucleus in the site of the schwa/zero alternation between the two consonants involved (the /p/ and /r/ in *separate*) which is pronounced as a schwa when it is phonetically realised, but which can also be licensed to remain silent (in cases of syncope) through a relation of government which exists in certain specific structural configurations. In Strict CV models, essentially the same situation is claimed to hold in all consonant clusters, with empty nuclei between all surface-adjacent consonants, except here the syncope (or, rather, the silencing of the empty nucleus) is not optional in these cases. This allows SZIGETVÁRI a rationale for his argument that the clusters derived through syncope pattern together with some cases of non-syncope clusters (such as those in *approve* [apruːv]), and that they can therefore be treated together in discussions of 'static' phonotactics.

SZIGETVÁRI's main point is linked to a distinction in the phonotactics of two-member clusters between (i) clusters which occur word-initially and word-medially but not word finally and are conventionally described as branching onsets, such as /pr/ and /kl/, which he labels 'onset clusters',[12] (ii) clusters which occur word-finally and word-medially but never word initially, such as /nt/ and /lk/, which he labels 'coda clusters', and (iii) clusters which only ever occur word-medially, such as /mb/ and /kn/, which he labels 'medial clusters' (in most of the article, he focuses on the subset of medial clusters with rising sonority, such as /tl/ and /kn/, which he labels 'bogus clusters', following Harris, 1994). Most standard syllabic theories consider bogus clusters to be coda-onset sequences, in part precisely because they cannot occur word-finally, and in standard GP this would make them exactly the same type of phonological object as coda clusters because the second element of such clusters is assumed (through independent argumentation) to be in a onset (as HARRISON argues) which is followed by a word-final empty nucleus. SZIGETVÁRI explains that this unification of bogus medial clusters and coda clusters is also assumed in certain work in Strict CV phonology, but then goes on to argue against this assumption, claiming instead that bogus clusters are essentially the same kind of phonological object as onset clusters. He proposes a series of arguments for this position, such as the distribution of the two types of cluster (which, apart from the word-initial absence of bogus clusters is very similar) and the fact that onset clusters have very similar properties to bogus clusters derived through syncope.

SZIGETVÁRI's approach to phonotactics is essentially one which uses static constraints on sequences on consonants (with silenced empty nuclei between them), although these constraints are conceived of as inviolable principles which govern lateral relations between skeletal positions. This approach thus continues the general current rejection of *SPE*'s approach to this aspect of phonology, which had been retained in much work in LP, and which sought to banish constraints entirely from phonological theory, relying instead on underspecified underlying representations and Morpheme Structure Rules. These rules did not passively state restrictions on sequences, but, rather, enforced them actively, through processes which repair any underlying structures which are not licit on the surface. SZIGETVÁRI is therefore closer to approaches which assume Morpheme Structure Constraints, and thus, of course, to work in OT, which returns to traditional grammar's practice of expressing generalisations about surface strings (although SZIGETVÁRI's GP differs from OT considerably in many other respects).

---

[12] Of course, Strict CV phonology does not literally allow for complex onsets (or indeed coda-onset sequences, or for codas at all), but these terms are often still used informally to refer to the surface strings and syllabic positions that they describe in other frameworks.

2.6. Characterising the difference between pairs of segments in English

In this section we turn to cases where data from English has played a role, in tandem with data from other languages which display similar characteristics, in the development of phonological debate in the subsegmental arena. The issue here is how contrasts between particular sets of segments should best be characterised in terms of distinctive units. We focus on two ways in which these concerns have been discussed in connection with English phonology: (i) the contrasts that exist in many varieties between such vowel segments as those in *beat–bit*, *get–gate*, *dot–dote* and *poot–put*, which are often thought to form 'pairs' of some sort in those varieties which feature them, and (ii) the contrast between the two series of obstruents which form well established pairs at practically all the places of articulation that they occur, as in the contrasts *pot–bot*, *sue–zoo* and *chill–jill*. These two points are linked, in fact, as the opposition between both sets of pairs (or 'series of segments') is sometimes characterised using the same feature-pair, i.e. tense ~ lax (at times expressed as [±tense]), at least for certain languages, as we discuss below (see de Groot, 1929, the influential work of Jakobson, such as Jakobson et al., 1952; Jakobson and Waugh, 1979; and, recently, Jessen, 1998). We deal here with the types of contrasts in (i) for the sake of completeness, and then turn to focus on (ii), which is the subject of two of the articles in the volume.

While some 'new' varieties, such as Kenyan English in fact lack the distinction completely (see Trudgill and Hannah, 2002), the vowels of most varieties of English are often argued to fall into two main groups. To use the lexical sets of Wells (1982), and General American as an example, this groups (A) the vowels of KIT, DRESS, TRAP, STRUT and FOOT, which are typically short on the surface and cannot occur without a following consonant in monosyllabic words (and are thus sometimes referred to as 'checked') into what Wells (1982) terms the vowel 'part-system A', against (B) all other vowels, whose distribution is not constrained in this way and are thus sometimes referred to as 'free' vowels, and which are consistently longer than those of (A) on the surface in most varieties. This difference in distribution between these two sets of vowels is often seen as justification for the idea that there are pairs of vowels in most varieties of English,[13] with one member from each set, which share exactly the same subsegmental specifications for height, rounding and front/backness, and differ only in terms of one feature, as in the keyword pairs KIT–FLEECE and FOOT–GOOSE, which are often transcribed to include a qualitative difference, such as /ɪ/ ~ /i/ and /ʊ/~/u/, in those varieties that feature them. The precise inventory of (A) differs from variety to variety, such that many southern Anglo-English varieties have six such vowels (adding /ɒ/ in LOT), many Scottish varieties have only three (/ɪ, ɛ, ʌ/, see Giegerich, 1992), and many new varieties do not have checked vowels, either at all (as mentioned above), or at certain points in the vowel space; this often includes the 'high vowels', so

---

[13] This tradition of analysis goes back at least to Bell (1867) and Sweet (1877), as Durand (2005) explains. See Durand's discussion also for a consideration of other approaches to the specification of the vowels of English, including a discussion of approaches which do not adopt this approach of simply assuming 'vowel pairs' at three heights, such as that associated with Jones (1917, and other work), and of privative approaches, such as those of Dependency and Government Phonology. The notion of 'pairs of vowels' leaves out of reckoning segments which have no partner to form a pair, of course, such as the 'wide' diphthongs which most varieties have in PRICE, MOUTH, CHOICE (that is, those segments that are sometimes called 'true' diphthongs, as in *SPE* and Giegerich, 1992). Some have also claimed that the types of 'vowel shift' alternations discussed in Section 2.1, above, are evidence for the existence of these two sets of vowels as phonologically real categories, because they always involve a member of set (A) alternating with a member of set (B) (see Lass, 1976).

(to explain the argumentation here) such varieties have the same vowels in KIT and FLEECE and in FOOT and GOOSE, and hence only have free vowels at these places of articulation (see, for example, Bolton, 2003, for Hong Kong English and Simo Bobda, 1994, for Cameroon English).

Similar oppositions between two series of vowels are commonly described for other languages, including European languages such as German and Dutch, and those languages which feature vowel harmony among two series of vowels, such that members of only one series may appear in any given word. An example of the latter is Tangele, where (to simplify somewhat), words contain vowels either from the set /i, u, e, o/ or /ɪ, ʊ, ɛ, ɔ/ (see, for example, van der Hulst and van de Weijer, 1995). Such harmony systems, common in many African language families, provide clear evidence for the existence of two series or sets of surface vowels in languages, and are often described as involving differences between pairs of vowels which sound very similar to the differences between the vowels which occur in most varieties of English in pairs such as KIT–FLEECE and FOOT–GOOSE (see, for example, van der Hulst and van de Weijer, 1995; Durand, 2005). In modern descriptions, these systems are typically claimed to involve harmony of values for the feature [ATR], but, equally, [ATR] in African languages is often claimed to be the 'same thing' as [tense] in European languages (if we ignore any possible complications due to the distinction between privative and equipollent features).

The use of [±tense] to describe the difference between these two series of vowels goes back to the cross-linguistic work of Jakobson, and was adopted in *SPE* to described the situation in English, and so became part of the phonological mainstream (as *SPE* phonology became the phonological mainstream) as the standard way to characterise the distinction between two such series of vowels in languages, along with the idea that there are, indeed, these two series. English has also provided some of the clearest evidence for those who have argued *against* the use of [±tense] to characterise such distinctions, however, such as Lass (1976) and Durand (2005), who both argue that length, or, rather, its nonlinear equivalents of mono- *vs* bimoriacity (or attachment to one or two timing slots) should be seen as the basis for the opposition (indeed, Lass, 1976, even argues that the whole conception of 'two series of vowels' is unpersuasive). Aspects of this disagreement in analysis are long-running, and arguably already inherent in some of the different transcription systems that have been proposed for English, at least for the high vowels, such as (i) the 'Edinburgh' qualitative system which contrasts RP's KIT–FLEECE and FOOT–GOOSE as /ɪ/~/i/ and /ʊ/ ~ /u/, as in Abercrombie (1967), which is reminiscent of an analysis based on tenseness *vs* (ii) Daniel Jones' quantitative system, which represents the RP contrasts as /i/~/iː/ and /u/~/uː/, as in Jones (1917), and Trager and Smith's simple/complex system which transcribes the same contrasts as /i/~/iy/ and /u/~/uw/, which are both reminiscent of an analysis based on length.

In favour of a tense–lax or qualitative system, as in (i), is the fact that it also fits unproblematically with accents where length does not correlate with tenseness, such as Scottish Standard English, where the Scottish Vowel Length Rule is at work so that length in the relevant vowels is predictable from the following consonant (see, for example, Aitken, 1981; McMahon, 1991; Giegerich, 1992; Scobbie et al., 1999, and, briefly McMAHON's article here). In favour of a moraic or quantitative system, as in (ii), speaks the stress-placement generalisations discussed in Section 2.2, where syllable weight seems to equate a single vowel of series (B) with a sequence of a vowel from (A) plus a following coda consonant, which thus both seem to involve two units of phonological time, or two

morae (and the fact that no really satisfactory definition of articulatory tenseness has ever been formulated). The correlation between these vowel series and length, such that (B) vowels are long and (A) vowels short, which fits with the weight-to-stress argument for (ii), and is accepted unquestioningly in much work, such as Hammond (1999), faces problems in the face of the Scottish Vowel Length Rule (and similar effects found in other varieties) unless phonological length can be clearly decoupled from phonetic duration. It may also face problems from work such as Lee (2003), which argues that there are cases in other accents, such as General American, where vowels of both groups surface as long and short, so that both tenseness and length must be independently phonological specifiable. The full arguments on either side of this debate need not all be rehearsed here, but they have driven theoretical debate as to the inventory of features needed to characterise the segments of languages (do we need a feature [±tense], for example?), in fair measure due to facts of the phonology of English.

In this volume, WOUTER JANSEN (in 'Phonological 'voicing', phonetic voicing, and assimilation in English') uses [±tense] consistently to describe the other contrast between pairs of segments described above – the laryngeal contrast between the two series of English obstruents (although he does this with the caveat that this does not imply that "tense and lax are useful concepts in dealing with phonetic substance"). JANSEN is following Jakobson and others here, as described above, in describing (A) the segments typically transcribed as /b, d, g/ as lax, and (B) the segments typically transcribed as /p, t, k/ as tense, rather than using the conventional [±voice], and he does this because the surface laryngeal behaviour of the obstruents of (most varieties of) English, as in certain other languages (such as German and Danish) is very poorly described using [±voice], as is well known: the segments in (A) are very often not voiced, and the segments in (B) are very often not just voiceless, but are distinctively aspirated or glottalised. To clarify, the segments of (A) are often described as not *actively* voiced, that is, they only reliably feature vocal fold vibration if they are in a voiced environment, such as between two vowels; they are therefore either voiceless in a voiceless environment (including when adjacent to a pause/utterance-boundary) or only ever *passively* voiced. This is different to what is found in the stops of languages such as Polish and Spanish, where those typically transcribed as in (A) are fully voiced, even if in utterance-initial and -final positions, and this correlates with the fact that the (B) stops of languages like Polish and Spanish do not feature aspiration.[14] Many languages which feature a contrast in stops of the types just described also

---

[14] Things are actually a little more complicated than this, as some speakers of English do produce fully voiced stops of the (A) type (see, for example, Lisker and Abramson, 1964, which is a classic study often cited in discussions of this type of cross-linguistic difference); the difference between languages in terms of (A) stops is arguably therefore whether full voice is required, as in Polish, or possible but not reliable, and therefore not the basis of the contrast. Lisker and Abramson in fact discuss the distinction in terms of differences of Voice Onset Time ('VOT'), so that English-type initial (A) stops have short lag VOT and (B) stops have long lag VOT, whereas Polish-type initial (A) stops have negative VOT and (B) stops have short lag VOT, but the point is essentially the same: aspiration = long lag VOT and full voicing = negative VOT. A further complication is that the observations discussed here only hold for most varieties of the languages mentioned in this regard (such as the English reference varieties RP and GA), so this is clearly one of the ways that varieties of English and other languages can differ phonologically from each other (some varieties of English from both Scotland and South Africa have been described as lacking aspiration in (B) stops and featuring full voicing in (A) stops, for example). The linguistic systems referred to in this system are therefore the 'reference varieties of' English, German, Spanish, etc.

have a contrast among series of fricatives, and sometimes affricates, too, of course, and one question that arises in this connection is whether the other series of obstruents of a language always pattern in the same way as the stops: do, for example, the fricatives differ in terms of active and passive voicing in a language in the same way that stops do?

Both JANSEN and IVERSON and AHN describe the just-mentioned facts of stop laryngeal behaviour in their articles in this volume (indeed, they are fundamental to their concerns), but the two pieces come to rather different conclusions as to their importance. There is no dispute here that there *are* two phonologically real series of segments here, which share exactly the same subsegmental specifications for place and manner, and differ only in terms of one feature (unlike the case of the two putative series of vowels just discussed, which are categories that some analysts reject) but there is disagreement as to which features (or similar types of subsegmental units) should be used to characterise the opposition underlyingly. Jakobson's point in describing the contrast in English as one of tense–lax ([±tense]) was, at least in part, that other languages, such as Polish and other Slavic languages, make the contrast using a different opposition: that of voiced–voiceless ([±voice]). This is crucial for IVERSON and AHN, who tie their article into the strand of work that has made this position renowned – that of Iverson and Salmons (1995, 1999, 2003 and elsewhere) – which, along with other work, such as Harris (1994), Jessen (1998), Avery and Idsardi (2001) and Honeybone (2005), argues that this basic insight of Jakobson is correct: there is a difference among languages with two series of obstruents as to how the contrast is made (and therefore, in fact, which underlying segments are involved). We call this position 'Laryngeal Realism' (henceforth 'LR'), following Honeybone (2005). There is disagreement within this tradition of analysis as to precisely how the contrasts in the two types of languages are implemented, and indeed about whether the contrast in a language need be made the same way among the different types of obstruents, but there is agreement, as IVERSON and AHN put it, that English, along with German and Danish, marks segments of type (B), but not the segments of (A), whereas Polish, along with Spanish and Hungarian, marks segments of type (A), but not the segments of (B). A further characteristic of the LR position is that it typically now assumes that the features involved are privative, thus this notion of phonological marking is straightforward. As IVERSON and AHN explain, much LR work has assumed that English contrasts stops specified with [spread] with nonspecified stops, whereas Spanish, for example, contrasts nonspecified stops with stops specified with [voice].[15] JANSEN represents the opposite position to IVERSON and AHN on this, which is that all languages with two series of such segments of the types mentioned above mark the contrast underlyingly in the same way. This is the 'conventional' position (henceforth 'CP'), against which the LR position defines itself, and adherents normally assume that the contrast is always made using [±voice]. This is the position of Hammond (1999), for example, and of *SPE*, which clearly characterises the obstruents of English using [±voice], both underlyingly (p. 177, for example), and in the formulation of phonological rules (although when Chomsky and Halle turn to discuss the surface nature of the stops of English and other languages, they invoke [tense], [glottal constriction] and [heightened supraglottal pressure], too).

---

[15] Such models also recognise that obstruents can be marked with a third feature, such as [constricted], which characterises ejectives, for example, and languages can also make a contrast between two series of obstruents using this feature, contrasted with nonspecification, too, as in K'ekchi – see IVERSON and AHN – but we do not consider this type of language further here.

IVERSON and AHN adopt Avery and Idsardi's (2001) Dimensional Theory of LR, and argue that this can provide a more economical model of English obstruent phonology generally than can the CP, and specifically in terms of the two processes that they focus on. These are (a) their model of flapping (described in Section 2.4, above), in which the coronal lenition process, if it applies (as it is optional), delinks the Glottal Width dimension (which is here, effectively, [spread]) from /t/, causing it to neutralise with /d/, and (b) their account of the English irregular plurals which involve the 'voicing' of fricatives, such as *wife–wives* and *thief–thieves*, which they also describe as a type of lenition, again involving the loss of Glottal Width (that is, [spread]) from the underlying fricatives in the base form (in these two cases, this is /f/).

As we have already seen, JANSEN uses [±tense] to characterise the contrast in English, as in all languages, in his article, but his underlying position is the same as Keating (1984), who he follows in assuming a version of the CP which posits that there is a distinction between 'phonological voicing' and 'phonetic voicing', with both languages like English and languages like Spanish having the same underlying specifications for phonological voicing, but differing in their use of phonetic voicing to implement the underlying phonological categories. JANSEN's article is a careful instrumental phonetic study which shows that, at least in low level postlexical processes, different aspects of the set of effects which are typically ascribed to the influence of laryngeal specifications (such as full voicing and 'pre-fortis clipping' of vowels before (B) type stops) need to be teased apart; it also brings into sharp relief that stops and fricatives can have different laryngeal behaviour.

JANSEN's study investigates whether there is any evidence for cross-word laryngeal assimilation in English, which is quite different from the cases of word-internal assimilation discussed by IVERSON and AHN. Descriptions of such postlexical assimilation are common from those languages which the LR position would call [voice] languages, such as Polish and Hungarian, but laryngeal assimilation in English is typically described as being very limited, and, as JANSEN explains, as being restricted to the influence of (B) type stops (in the 'devoicing' of weak *is* and the assimilation of the regular plural maker, for instance). JANSEN focuses on /t, d, s, z/ to see if they cause anticipatory assimilation of a preceding /k, g/. He recorded a number of utterances by several speakers of RP which juxtaposed combinations of these segments being final in one word and initial in another (for example, /kd/ was created in the phrase *patchwork duvet*). He also recorded phrases featuring sequences of /kr/ and /gr/, to provide a comparison for the two series of obstruents, as sonorants are often described as being laryngeally neutral. By measuring the period of vocal fold vibration and the duration of the two consonants, the duration of the preceding vowel and the effect of the consonants on the F_1 of the preceding vowel, he considered whether any of /t, d, s, z/ could be claimed to have an assimilatory effect. His set of results is intricate, but clearly indicates that previous descriptions of English are right in recognising that there is not neutralising cross-word assimilation, as consonant and vowel duration is very little affected, if at all. Equally, little effect is found in terms of the effect of the consonant following the /k/ or /g/ on the quality of the preceding vowel, although there is some small effect for /d/. However, some of the four measurements show clear effects on the /k, g/ due to the following /t, d, s, z/ – most specifically, /t, s/ lead to significantly less vocal fold vibration in /g/ than does /r/, and /z/ (but not /d/) leads to significantly more vocal fold vibration in /k/ than does /r/. JANSEN shows, therefore that we must recognise at least some sort of low level laryngeal assimilation for English, as well as for those languages where it has traditionally been described. However, it is not neutral-

ising assimilation, so he argues that it should be seen as a type of co-articulation, although still something that the phonological grammar needs to be able to model, teasing apart the several effects of particular laryngeal specifications.

JANSEN argues in favour of the CP way of analysing English on the basis of this (and other considerations), and it remains to be seen if this new data can be incorporated into LR models. Importantly, he shows that there are differences between the behaviour of the fricatives and stops of English in terms of their ability to cause assimilation of the type he discusses in preceding consonants – while both /t/ and /s/ in his [+tense] class (that is, our type (B) obstruents) are active in this regard, only /z/ is active among the [-tense] class (type (A) obstruents), and /d/ is inert. Jansen ties this to the difference between active and passive laryngeal states, in that /d/ is only passively voiced, whereas /z/ may therefore be assumed to be actively voiced. If JANSEN's results extend to be relevant to other types of inter-obstruent laryngeal interactions, they would be incorporable into LR models, but only if the fricatives of English are assumed to be specified differently to the stops.

2.7. Sociophonological variation in English

Not all of the papers in this volume fit within the approach to phonological theorising that we call, above, the mentalistic version of 'autonomous phonology' (and which has been tacitly assumed in much of our discussion thus far). By this description we mean an approach to phonological investigation based on the twin ideas of modularity and idealisation. A mentalistic and modular approach to phonology is based on the claim that linguistic knowledge constitutes a distinct, encapsulated, module of mind, and, additionally, the idea that this postulated module is itself modular, containing a syntactic sub-module and, crucially for our purposes, a phonological sub-module (most generative approaches, and hence most of the articles discussed above, assume this, overtly or covertly). By 'idealisation', we refer to the Chomskyan notion that it is valid to idealise away from factors involving use of language (as opposed to knowledge of language), such as factors relating to context of utterance (for example, the age, sex and social class of the speaker, and conversational factors such as pausing and turn-taking). These have often been referred to as performance (or 'E-language') factors in the history of generative phonology.

The validity of the idealisation and modularity assumptions has been brought into question, often by sociolinguists. The phonological phenomena of English provided some of the crucial data which was used in the establishment of the quantitative sociolinguistic paradigm, in such work as Labov (1963, 1972a) and much of the rest of the work described in Labov (1972b), and most work in this field has been carried out on English. A recent example of this general approach is a paper by Docherty et al. (1997) (see Carr, 2000 for discussion), who link many of our concerns here (phonology, sociolinguistics, English) in forcefully arguing that the data used by phonologists must be based on a sound empirical methodology which is sensitive to precisely the factors labelled as 'performance' factors within autonomous phonology. For example, if a given variant can be shown to occur pre-pausally, as they illustrate, using data from varieties of English, then 'pause', which is surely an aspect of language use, must be taken to play a role in phonological theorising, and the same is true for 'turn-final', and even 'utterance-final', as the Utterance is surely an E-linguistic concept (as opposed to the Sentence, perhaps); quite how these essentially E-language factors can be reconciled with most canonical assumptions in theoretical phonology remains unclear, and this throws into some uncertainty the precise status of those

phenomena discussed above (in Sections 2.3 and 2.6) which have appealed to the Utterance as a phonological domain.

This general approach is adopted here by MICHELLE STRAW and PETER PATRICK (in 'Dialect acquisition of glottal variation in /t/: Barbadians in Ipswich'). They take a synchronic look at sound change with respect to the sociolinguistic variable (t), focusing on glottal realisations of /t/ in the speech of Ipswich Anglo speakers and Ipswich Barbadians. They identify three main contexts for word-final glottal variants of /t/ in the varieties of East Anglian English spoken in Ipswich: Pre-Consonantal (PreC), Pre-Vocalic (PreV) and, connecting with concerns just mentioned, Pre-Pausal (PreP). They establish that there is an Ipswich pattern of glottal realisation in which PreV is the context in which such realisations are most common, with Pre-C and Pre-P showing roughly equal levels of frequency of occurrence of glottal variants. Their examination of glottal variants of (t) is carried out in the context of two widely-known approaches: sound change in the Labovian sense (Labov, 1994, 2001), and dialect contact in the sense appealed to by Trudgill (1986) and Chambers (1992). They find a previously-unreported sociolinguistic pattern in Ipswich, on the basis of which they challenge the Diffusion Pattern as a general prediction. They also formulate a hypothesis for further testing of the 'gravity' model of spatial diffusion (Trudgill, 1974; Britain, 2002).

As far as method is concerned, they apply instrumental acoustic analysis to the consonantal variables in question, which are generally studied impressionistically by sociolinguists. They also adopt a componential analysis of acoustic phonetic features for examining what is generally looked at as a discrete variable. They therefore use acoustic analysis to identify a range of different glottal variants, ranged along a continuum from glottal stop, through creaky voice, to modal voice, focussing on degree of glottal constriction and the relative timing of oral and laryngeal gestures. They argue that, for Anglo speakers in Ipswich, it is reasonable to merge all of these types of glottal feature into a single glottal variant. For Barbadians in Ipswich, however, they argue that glottal stop has to be distinguished from other glottal variants, since Barbadians in Ipswich exhibit an idiosyncratic pattern of variation in which the highest incidence of glottal stops occurs in the PreP context. They also find that Barbadian speakers exhibit a pattern peculiar to the local Anglo pattern: high occurrence of glottal variants in PreV position. Additionally, Barbadians exhibit a pattern common to British varieties of English: low occurrence of glottal stops in PreV position. The implications of their methods are to problematise the general conception of (t), the most-discussed phonological variable in urban UK sociolinguistic studies, thus raising questions about the generality of earlier sociolinguistic findings for (t). They also agree with the point made by Docherty et al. (1997), challenging the fundamental status of segmental or phonemic representations in sociolinguistic analysis.

WYN JOHNSON and DAVID BRITAIN's paper ('L vocalisation as a natural phenomenon: explorations in sociophonology') adopts an approach which, unlike STRAW and PATRICK and Docherty et al. (1997), seeks to combine a sociolinguistic approach to data collection with a generative (in this case, OT) analysis of that data, striving to establish an authentically sociophonological approach. They remark that the vocalisation of 'dark l' is widespread and on the increase in various dialects of English, in particular in those dialects which have developed a clear–dark allophony for the /l/ phoneme. The phenomenon has traditionally been characterised in terms of a linguistic feature spread but JOHNSON and BRITAIN claim that, provided the requisite linguistic conditions pertain, this language change is both natural and to be expected. They draw on historical, child language and

cross-linguistic data to support their claim that *l*-vocalisation is a case of 'the emergence of the unmarked'. They concentrate on dialects of southern Britain, analysing, in particular, a large number of tokens collected in the Fens, an area where *l*-vocalisation has only fairly recently become established. They find that, in line with their expectations, vocalisation is further advanced in those Fenland areas where *l*-allophony has been established for a longer period than in those where it is a relatively recent innovation. They also consider the linguistic contexts which tend to promote or to inhibit vocalisation and offer explanations for the variation found, based on phonetic studies.

Accent and dialect variation is also the topic of the paper by CHARLEY ROWE ('He divn't gan tiv a college ti di that, man! A study of *do* (and *to*) in Tyneside English'), who uses data collected as part of the Tyneside Linguistic Survey (TLS), conducted in the late 1960s in Gateshead, across from Newcastle on the River Tyne in the northeast of England. Rowe concentrates on Tyneside English, and sets out to etymologise a set of salient Tyneside linguistic forms (the Tyneside equivalents of Standard English *do* and *to*). In Tyneside English, these forms emerge with [ɪv] intervocalically, and with [i] (with rich allophony) otherwise. She claims that the vowel is a result of Northern Fronting, and that, where [v] appears in these words, it probably reflects a fortition of [w], the offglide of [u]. This article, thus works – as with all of the articles discussed in this section – with data from little described varieties of English, as is refreshingly common in sociolinguistic work.

2.8. Widening the database further: other phenomena in the phonology of English

The points addressed above only represent a relatively small selection of the issues and phonological phenomena that English throws up, of course. It would not be possible to consider all possible points, but in this section, we discuss the three remaining contributions to this volume, each of which illustrates some of the otherwise untouched diversity that exists among work on English phonology. Each, in their own way, brings new material into the study of English phonology from sources which are often not seen as part of mainstream phonological material: from the study of metrics, loanword adaptation and second language acquisition.

COLLEEN FITZGERALD provides a novel treatment of syntactic inversion in English poetry (in 'An Optimality Treatment of syntactic inversions in English verse'), arguing that OT provides the best way of modelling such phenomena. Noting that syntactically ill-formed inversions often serve to increase metrical well-formedness, she claims that two metrical constraints force these inversions: MATCH STRESS and *CLASH. She adopts three basic syntactic constraints: (a) HEADLEFT (every X-zero is at the left edge of an X-max: Grimshaw, 1997), (b) SPECLFT (every specifier is at the left edge of an X-max: Grimshaw, 1997) and (c) ADJ-N (adjectives precede the nouns that they modify). Simply insisting that metrical constraints outrank syntactic constraints would incorrectly predict that any type of syntactic inversion can occur to improve the metre. This prediction is incorrect in that the overwhelming tendency in the verse by Shakespeare that she examines is for inversions to involve adjective–noun sequences or verbs and their complements. Additionally, head-complement inversion is more likely than specifier-head inversion, which, in the verse in question, only occurs in the case of subjects and their verbs. She therefore claims that the syntactic inversions in question are best modelled by interleaving syntactic and metrical constraints, so that some syntactic constraints outrank metrical ones, while other syntactic constraints are themselves outranked by metrical constraints.

MICHAEL KENSTOWICZ (in 'Salience and similarity in loanword adaptation: a case study from Fijian') analyses the corpus of English loanwords into Fijian assembled by Albert Schütz from the perspective of Optimality Theoretic faithfulness, based on the notions of auditory salience and similarity (Steriade, 2001a,b). KENSTOWICZ discusses four topics: word stress placement, consonant cluster resolution, variation in the form of the epenthetic vowel, and the adaptation of voiced stops, connecting in part with issues described here in Sections 2.2 and 2.6. KENSTOWICZ argues that the adaptation of a loanword involves the resolution of often conflicting demands to preserve as much information from the source word as possible (in this case, the English form), while still satisfying the constraints that make the lexical item sound like a word of the recipient language. Prince and Smolensky's (1993/2004) constraint-based Optimality Theory, with its key notions of faithfulness and violable constraints is, KENSTOWICZ argues, particularly well suited to model this aspect of linguistic competence. In adapting a foreign word, the speaker is often faced with choices as to which information of the source to preserve and which to sacrifice. Recent study of this question suggests that auditory salience and similarity are critical factors in resolving the choice (see, for example, Steriade, 2001a,b; Kang, 2003, among others; but see LaCharité and Paradis, 2002 for a different perspective). KENSTOWICZ argues that the speaker will tend to preserve features whose absence would be most noticeable; and when a repair must be made, the speaker will make required alterations as unobtrusively as possible by substituting a sound that most closely resembles the original. He analyses the adaptation of English loanwords into Fijian from this perspective, with data and basic descriptive generalizations from a series of papers by Schütz (1978, 1983). KENSTOWICZ's paper is one among a growing number of investigations into loanword adaptation, a great deal of which concern adaptation of English loanwords into a variety of languages, doubtless due to the global spread of English (see, for example Kenstowicz and Uffmann, 2006).

FEMKE WESTER, DICKY GILBERS and WANDER LOWIE address a related phenomenon (in 'Substitution of Dental Fricatives in English by Dutch L2 Speakers'), that is, the pronunciation by non-native speakers (here, Dutch speakers) of certain English speech sounds, namely the dental fricatives [θ] and [ð], which do not occur in Dutch. Like the two other articles in this section, WESTER, GILBERS and LOWIE adopt OT as their theoretical framework, so that language acquisition involves the learning of new constraint ranking. From the results of their experiment, which collected new data from 25 speakers over a period of a year, they note that [f] and [v] are rarely substituted, especially in comparison with the dental and alveolar stops. The alveolar fricatives [s] and [z] are substituted for the dental fricatives, but only in syllable-final position did these realisations occur more often than other possibilities. The most frequently substituted sounds are the obstruents [t] and [d], especially in syllable-initial position. They suggest that either markedness or phonological correspondence dominates phonetic correspondence. They work to model the attested substitution patterns in terms of segmental markedness, which yields a preference for stops over fricatives as the substituted segment. They propose an analysis in which a SEGMENTAL MARKEDNESS constraint dominates CORRESPONDENCE, yielding optimal outputs such as [tɪŋk] for 'think'. For the realisation [sɪŋk], however, their analysis requires the incorporation of the fact that the output minimally deviates from the target segment. Consequently, they split up the CORRESPONDENCE constraint into a scalar family of constraints. The output segment corresponds to the target in certain respects (that is, feature values), although it has default (unmarked) feature values for other characteristics. The SEGMENTAL MARKEDNESS

constraint demands unmarked feature values, such as [-continuant]. They note that the realisation [sɪŋk] can be described in OT as CORRESPONDENCE CONTINUANT >> SEGMENTAL MARKEDNESS >> all other CORRESPONDENCE constraints, which means that the output segment has the value for [continuant] of the target segment: [+continuant] as the only deviation from the default values. The optimal output then only deviates from the target in its value for [strident]. They note further that the output [tɪŋk] is optimal if CORRESPONDENCE CONTINUANT is also dominated by SEGMENTAL MARKEDNESS and that the correct realisation of the target demands that all CORRESPONDENCE constraints dominate SEGMENTAL MARKEDNESS.

The realisation of *think* /θɪŋk/ as [sɪŋk] is accounted for by means of a ranking in which CORRESPONDENCE STRIDENCY is dominated by SEGMENTAL MARKEDNESS, which in its turn is dominated by CORRESPONDENCE CONTINUANCY. The output [tɪŋk] demands that SEGMENTAL MARKEDNESS is undominated, and for the correct realisation, [θɪŋk], the Dutch speaker of English has to promote CORRESPONDENCE of the phonologically motivated feature [strident], which does not play a functional role in his or her own L1 system. When Dutch L2 speakers realise /ð/ as [d] in words such as *that, this* and *the*, WESTER et al. assume that CORRESPONDENCE VOICE dominates SEGMENTAL MARKEDNESS. A complicating factor is the fact that the data reveal that most Dutch L2 speakers prefer stops initially and fricatives finally. The same preference is obtained in first language acquisition data: *poes* [pus] ('pussycat') is less difficult to pronounce for a two-year-old child than *soep* [sup] ('soup') (see Ferguson and Farwell, 1975; Ferguson, 1978; van der Linde, 2001). The optimal syllable starts with a voiceless plosive and has no coda. If, however, the syllable does have a coda, sonorants are preferred to obstruents and within the class of obstruents; fricatives are preferred to plosives (*cf*. Clements, 1990). In other words, there is a preference for more sonorous consonants syllable-finally: HCODA. Whilst HCODA prefers fricatives to plosives syllable-finally, HONS prefers plosives to fricatives syllable-initially. Almost all subjects, however, tend to devoice the syllable-final obstruents, exhibiting, they claim, the influence of the process of final devoicing in L1. WESTER et al.'s analysis thus shows how new data from second languages varieties of English can provide novel evidence for phonological argumentation and theorising, just as KENSTOWICZ does for the adaptation of English forms into the phonology of other languages and FITZGERALD does for the interpretation of English verse forms.

3. Conclusion

So, is it still worth investigating the phonology of English? We believe that the discussion above shows that it is, for a whole host of reasons. We have shown, in ways which have not to our knowledge been properly discussed before, that English has provided data that has been fundamental in the development of our understanding of phonological issues in a good number of ways (both by itself and in conjunction with similar data from other languages). This has been true from the early beginnings of the continuous tradition of 'western' phonological theory up till the latest contemporary developments in OT, GP, Guierrean theory, sociophonology, Laboratory Phonology and feature theory. The fact that data from English has been so important in phonological theory in the past is certainly no reason why it should not be still. Indeed, the conclusions which had been thought to have been reached need to be revisited if the theoretical basis on which they were made is shown to be faulty, and the relatively well understood phonological phenomena of

(some aspects of) English can provide the perfect testing ground for novel theoretical ideas.

It is thus clearly still worth reconsidering some of the classic data of English, as some of the articles gathered here do. It is also clear from other articles here, however, that English can provide important new material for phonologists, both through the investigation of previously underdescribed varieties and through the instrumental or computational investigation of phenomena which had been thought to be understood. The range of phonological phenomena discussed above is wide, but it evidently could be wider – it is especially obvious that this volume contains nothing on intonation or other high-level prosodic phenomena in English, although important work has been carried out in these areas. We are happy that a wide range of phonological and sociophonological frameworks are represented in this volume, though – from instrumental sociophonetics to Government Phonology – as we believe that discussion across frameworks (and not just within them) is crucial if we are to understand what is really going on in the phonology of languages.

We have claimed in this article that data from English have helped determined the direction of phonological theory at times. Others have noted the pervasiveness of English data, but have not made the same connection (Bermúdez-Otero and McMahon, 2006, for example argue only that key theoretical innovations "have frequently been illustrated by means of case studies from English"), but we contend here that if there had not been English, with its particular own and widely-shared phonological phenomena, phonology would not have developed in precisely the ways that it has. Several caveats are needed here. Firstly, we do not mean to imply that we assume a simple deterministic model of the history of linguistics, or a blindly deterministic role for the phenomena of English in this history – if there had not been English, phonology may still have taken some of the paths described above, at least in those phenomena where data from English was only influential in combination with data from other languages. Secondly, it is clearly the case that other languages have provided crucial data, too, that have driven developments in phonology in just the same way that English has – this is very obvious. Thirdly, the fact that data from English has been so important in several cases in the development of phonological theory cannot be separated from the fact that recent phonological theory has mostly developed in North America, where most people speak English (and so are naturally interested in the phonology of English and know something of it, whether they work on the language in detail or not). It is therefore hardly surprising that English should have played this role and it is clearly not due to it having an inherent interestingness or importance greater than any other language. And fourthly, phonological theory could only be driven by these data in the ways described above once it was ready for it – there was no sudden discovery of *r*-sandhi or the vowel shift alternations which caused the developments that we have discussed here – rather, it is surely the case that these phenomena were recognised as 'important data' once the general theoretical plane had developed to a stage that they could be adopted into theory in these ways. Once phonological theory had reached that stage, however, the data from English discussed above could play a determinative role: phonological theory could have developed in various directions from these stages of development, and it was the existence of the English data, ready for theorising over, that led theory in certain directions and not in others. The data from English thus helped to specify which course from a range of possibilities were followed.

In sum, we hope that this volume shows how important work on English has been in the development of phonology, and how fertile the ground still is for phonologists of English.

References

Abercrombie, D., 1964. English Phonetic Texts. Faber and Faber, London.

Abercrombie, D., 1967. Elements of General Phonetics. Edinburgh University Press, Edinburgh.

Aitken, A., 1981. The Scottish vowel length rule. In: Benskin, M., Samuels, M.L. (Eds.), So Meny Peoples, Longages and Tonges: Philosophical Essays in Scots and Mediaeval English Presented to Angus MacIntosh. Middle English Dialect Project, Edinburgh.

Anderson, S., 1985. Phonology in the Twentieth Century. University of Chicago Press, Chicago.

Anderson, J., Ewen, C., 1987. Principles of Dependency Phonology. Cambridge University Press, Cambridge.

Anderson, J., Jones, C., 1977. Phonological Structure and the History of English. North-Holland, Amsterdam.

Asher, R.E., Henderson, E., 1981. Towards a History of Phonetics. Edinburgh University Press, Edinburgh.

Avery, P., Idsardi, W., 2001. Laryngeal dimensions, completion and enhancement. In: Hall, T.A. (Ed.), Distinctive Feature Theory. de Gruyter, Berlin, pp. 41–70.

Bell, A.M., 1867. Visible Speech: the Science of Universal Alphabetics; or, Self-Interpreting Physiological Letters, for the Writing of all Languages in one Alphabet. Simpkin, Marshall & Co, London.

Bermúdez-Otero, R., 1999. Constraint interaction in language change/Opacity and globality in phonological change. Unpublished Ph.D. dissertation, University of Manchester/Universidad de Santiago de Compostela.

Bermúdez-Otero, R., in press. Stratal Optimality Theory. Oxford University Press, Oxford.

Bermúdez-Otero, R., Honeybone, P., 2006. Phonology and syntax: a shifting relationship. In: Honeybone, P., Bermúdez-Otero, R. (Eds.), Linguistic Knowledge: Perspectives from Phonology and from Syntax. Special issue of Lingua 116 (5).

Bermúdez-Otero, R., McMahon, A., 2006. English phonology and morphology. In: Aarts, B., McMahon, A. (Eds.), The Handbook of English Linguistics. Blackwell, Oxford.

Blevins, J., 1997. Rules in optimality theory: two case studies. In: Roca (1997), pp. 227–260.

Bolton, K., 2003. Chinese Englishes: a Sociolinguistic History. Cambridge University Press, Cambridge.

Brandão de Carvalho, J., Scheer, T., Ségéral, P. (Eds.), in press. Lenition and Fortition. Mouton de Gruyter, Berlin.

Britain, D., 2002. Space and spatial diffusion. In: Chambers, J., Trudgill, P., Schilling-Estes, N. (Eds.), The Handbook of Language Variation and Change. Blackwell, Oxford, pp. 603–637.

Broadbent, J., 1999. A new approach to the representation of coronal segments. In: Hannahs, S.J., Davenport, M. (Eds.), Issues in Phonological Structure. John Benjamins, Amsterdam, pp. 1–25.

Bromberger, S., Halle, M., 1989. Why phonology is different. Linguistic Inquiry 20, 51–70.

Bullokar, W., 1580. Bullokar's Booke at Large, for the Amendment of Orthographie for English Speech. Henri Denham, London.

Burton-Roberts, N., Carr, P., Docherty, G. (Eds.), 2000. Phonological Knowledge; Conceptual and Empirical Issues. Oxford University Press, Oxford.

Burzio, L., 1994. Principles of English Stress. Cambridge University Press, Cambridge.

Bybee, J., 2001. Phonology and Language Use. Cambridge University Press, Cambridge.

Carr, P. 2000. Scientific realism, sociophonetic variation, and innate endowments in phonology. In: Burton-Roberts et al. (2000), pp. 67–104.

Chambers, J., 1992. Dialect acquisition. Language 68 (4), 673–705.

Chomsky, N., 1965. Aspects of the Theory of Syntax. MIT Press, Cambridge, Massachusetts.

Chomsky, N., 2002. On Nature and Language. Cambridge University Press, Cambridge.

Chomsky, N., Halle, M., 1968. The Sound Pattern of English. Harper & Row, New York.

Chomsky, N., Halle, M., Lukoff, F., 1956. On accent and juncture in English. In: Halle, M., Lunt, H., McLean, H., van Schooneveld, C. (Eds.), For Roman Jakobson. Mouton, The Hague, pp. 65–80.

Clements, G.N., 1990. The role of the sonority cycle in core syllabification. In: Kingston, J., Beckman, M. (Eds.), Papers in Laboratory Phonology 1: Between the Grammar and Physics of Speech. Cambridge University Press, Cambridge, pp. 283–333.

Davis, S., 2005. 'Capitalistic' vs 'Militaristic': the paradigm uniformity effect reconsidered. In: Downing, L., Hall, T.A.Raffelsieffen, R. (Eds.), Paradigms in Phonological Theory. Oxford University Press, Oxford, pp. 107–121.

Docherty, G., Foulkes, P., Milroy, J., Milroy, L., Walshaw, D., 1997. Descriptive adequacy in phonology: a variationist perspective. Journal of Linguistics 33, 275–310.

Dresher, B.E., 1981. Abstractness and explanation in phonology. In: Hornstein, N., Lightfoot, D. (Eds.), Explanation in Linguistics. Longmans, London, pp. 76–115.

Durand, J., 2005. Tense/lax, the vowel system of English and phonological theory. In: Carr, P., Durand, J., Ewen, C. (Eds.), Headhood, Elements, Specification and Contrastivity: Phonological Papers in Honour of John Anderson. John Benjamins, Amsterdam, pp. 77–97.

Ferguson, C., 1978. Learning to pronounce: the earliest stages of phonological development in the child. In: Minifie, F., Lloyd, L. (Eds.), Communicative and Cognitive Abilities, Early Behavioral Assessment. University Park Press, Baltimore, Maryland, pp. 273–297.

Ferguson, C., Farwell, C., 1975. Words and sounds in early language acquisition. Language 51, 419–439.

Firth, J.R., 1946. The English school of phonetics. Transactions of the Philological Society, 92–132.

Fischer-Jørgensen, E., 1975. Trends in Phonological Theory: a Historical Introduction. Akademisk Forlag, Copenhagen.

Fudge, E., 1969. Syllables. Journal of Linguistics 5, 253–286.

Garde, P., 1968. L'accent. Presses Universitaires de France, Paris.

Giegerich, H., 1992. English Phonology: An Introduction. Cambridge University Press, Cambridge.

Giegerich, H., 1999. Lexical Strata in English: Morphological Causes, Phonological Effects. Cambridge University Press, Cambridge.

Goldsmith, J., 1976. Autosegmental Phonology. Ph.D. dissertation, MIT.

Goldsmith, J., 1992. A note on the genealogy of research traditions in modern phonology. Journal of Linguistics 28, 149–163.

Goldsmith, J., 1999. Phonological Theory: The Essential Readings. Blackwell, Malden, MA, and Oxford.

Goldsmith, J., Laks, B., 2000. Introduction. In: Goldsmith, J., Laks, B. (Eds.), Folia Linguistica 34, Special Issue: The History of Phonology in the Twentieth Century, 1–10.

Grimshaw, J., 1997. Projection heads and optimality. Linguistic Inquiry 28, 373–422.

de Groot, A.W., 1929. Zum Phonologischen System des Nord-Niederlaendischen. Donum Natalicium Schrijnen. Dekker & van de Vegt, Nijmegen-Utrecht, pp. 549–550.

Guierre, L., 1970. Drills in English Stress-Patterns: Ear and Speech Training Drills and Tests for Students of English as a Foreign Language. Longmans, Harlow.

Guierre, L., 1987. Règles et Exercices de Prononciation Anglaise. Armand Colin-Longman, Paris.

Gussmann, 1980. Studies in Abstract Phonology. MIT Press, Cambridge, Massachusetts.

Hale, M., Reiss, C., 2000. Phonology as cognition. In: Burton-Roberts et al. (2000), pp. 161–184.

Halle, Morris, Idsardi, William, 1997. r, hypercorrection, and the Elsewhere condition. In: Roca (1997), pp. 331–348.

Halle, M., Mohanen, K., 1985. Segmental phonology of modern English. Linguistic Inquiry 16, 57–116.

Hammond, M., 1999. The Phonology of English: a Prosodic Optimality – Theoretic Approach. Oxford University Press, Oxford.

Harris, J., 1989. Towards a lexical analysis of sound change in progress. Journal of Linguistics 25, 35–56.

Harris, J., 1994. English Sound Structure. Blackwell, Oxford.

Harris, J., Gussmann, E., 1998. Final Codas: why the West was wrong. In: Eugeniusz, C. (Ed.), Structure and Interpretation: Studies in Phonology. Folium, Lublin, pp. 139–162.

Harris, J., Kaye, J., 1990. A tale of two cities: London glottalling and New York city tapping. The Linguistic Review 7, 251–274.

Hart, J., 1551. The Opening of the Unreasonable Writing of Our Ingish Toung. Manuscript.

Hart, J., 1569. An Orthographie: Conteyning the Due Order and Reason, how to Write or Paint Thimage of Mannes Voice, Most Like to the Life or Nature. William Seres, London.

Hayes, B., 1982. Extrametricality and English stress. Linguistic Inquiry 13, 227–276.

Holder, W., 1669. Elements of Speech: An Essay of Inquiry into the Natural Production of Letters: With An Appendix Concerning Persons Deaf and Dumb. J. Martyn, London.

Honeybone, P., 2005. Diachronic evidence in segmental phonology: the case of obstruent laryngeal specifications. In: van Oostendorp, M., van de Weijer, J. (Eds.), The Internal Organization of Phonological Segments. Mouton de Gruyter, Berlin, pp. 319–354.

Hooper, J., 1976. An Introduction to Natural Generative Phonology. Academic Press, New York.

Hyman, L., 2003. African languages and phonological theory. Glot International 7 (6), 153–163.

IPA (International Phonetic Association), 1999. Handbook of International Phonetic Association. Cambridge University Press, Cambridge.

Iverson, G., Salmons, J., 1995. Aspiration and laryngeal representation in Germanic. Phonology 12, 369–396.

Iverson, G., Salmons, J., 1999. Glottal spreading bias in Germanic. Linguistische Berichte 178, 135–151.

Iverson, G., Salmons, J., 2003. Laryngeal enhancement in early Germanic. Phonology 20, 43–74.

Jakobson, R., Waugh, L., 1979. The Sound Shape of Language. Harvester Press, Brighton.

Jakobson, R., Fant, G., Halle, M., 1952. Preliminaries to Speech Analysis. MIT Press, Cambridge, Massachusetts.

Jensen, J., 2000. Against Ambisyllabicity. Phonology 17, 187–235.

Jessen, M., 1998. Phonetics and Phonology of Tense and Lax Obstruents in German. John Benjamins, Amsterdam.

Jones, D., 1917. English Pronouncing Dictionary. J.M. Dent & Sons, London, First published by Cambridge University Press in 1991. 16th Edition 2003.

Jones, D., 1950. The Phoneme: Its Nature and Use. Cambridge University Press, Cambridge.

Kahn, D., 1976. Syllable-based generalizations in English phonology. Ph.D. dissertation, MIT. Published 1980, Garland, New York.

Kaisse, E., Shaw, P., 1985. On the theory of lexical phonology. Phonology Yearbook 2, 10–30.

Kang, Y., 2003. Perceptual similarity in loanword adaptation: English postvocalic word-final stops in Korean. Phonology 20, 219–273.

Kaye, J., 1990. 'Coda' licensing. Phonology 7, 301–330.

Kaye, J., 1995. Derivations and Interfaces. In: Durand, J., Katamba, F. (Eds.), Frontiers of Phonology: Atoms, Structures, Derivations. Longman, London, pp. 289–332.

Kaye, J., Lowenstamm, J., Vergnaud, J.-R., 1985. The internal structure of phonological representations: a theory of Charm and government. Phonology Yearbook 2, 305–328.

Kaye, J., Lowenstamm, J., Vergnaud, J.-R., 1990. Constituent structure and government in phonology. Phonology 7, 193–231.

Keating, P., 1984. Phonetic and phonological representation of stop consonant voicing. Language 60, 286–319.

Kelly, J., 1981. The 1847 Alphabet: an Episode of Phonotypy. In: Asher & Henderson, pp. 248–264.

Kenstowicz, M., Uffmann, C. (Eds.), 2006. Loanword Phonology: Current Issues. Special issue of Lingua 116 (7).

Kiparsky, P., 1968. How Abstract is Phonology? Reprinted in Fujimura (Ed.), 1984. Three Dimensions of Linguistic Theory. TEC Co. Ltd., Tokyo.

Kiparsky, P., 1982. From cyclic phonology to lexical phonology. In: van der Hulst, Smith, 1982, pp.131–175.

Kiparsky, P., 1985. Some consequences of lexical phonology. Phonology Yearbook 2, 85–138.

Kiparsky, P., 2000. Opacity and cyclicity. In: Ritter, N. (Ed.), A Review of Optimality Theory. Special Issue of The Linguistic Review 17, 351–365.

Kruisiga, E., 1943. The Phonetic Structure of English Words. Francke, Bern.

Labov, W., 1963. The social motivation of a sound change. Word 19, 273–309.

Labov, W., 1972a. The social stratification of (r) in New York City Department Stores. Chapter 2 of Labov (1972b), also reproduced. In: Coupland, N., Jaworski, A. (Eds.), 1997. Sociolinguistics: A Reader. Macmillan, Basingstoke.

Labov, W., 1972b. Sociolinguistic Patterns. University of Pennsylvania Press, Philadelphia.

Labov, W., 1994. Principles of Linguistic Change. Vol. 1: Internal Factors. Blackwell, Oxford.

Labov, W., 2001. Principles of Linguistic Change. Vol. 2: Social Factors. Blackwell, Oxford.

LaCharité, D., Paradis, C., 2002. Addressing and disconfirming some predictions of phonetic approximation for loanword adaptation. Langues et Linguistique 28, 71–91.

Lahiri, A., Fikkert, P., 1999. Trisyllabic shortening in English: past and present. English Language and Linguistics 3, 229–267.

Lass, R., 1976. English Phonology and Phonological Theory: Synchronic and Diachronic Studies. Cambridge University Press, Cambridge.

Lass, R., 1984. Phonology: An Introduction to Basic Concepts. Cambridge University Press, Cambridge.

Lass, R., Anderson, J., 1975. Old English Phonology. Cambridge University Press, Cambridge.

Lee, J.-Y., 1996. Some aspects of English phonology: an optimality theoretic approach. Ph.D. dissertation, University of Illinois at Urbana-Champaign. Published by Hashin, Seoul.

Lee, J.-Y., 2003. Tense and length in English phonology. English Language and Literature 49, 1093–1144.

Liberman, M., Prince, A., 1977. On stress and linguistic rhythm. Linguistic Inquiry 8, 249–336.

Lisker, L., Abramson, A., 1964. A cross-language study of voicing in initial stops: acoustical measurements. Word 20, 384–422.

Lowenstamm, J., 1996. CV as the only syllable type. In: Durand, J., Laks, B. (Eds.), Current Trends in Phonology: Models and Methods. European Studies Research Institute, University of Salford Publications, pp. 419–442.

McCarthy, J., 1993. A case of surface constraint violation. Canadian Journal of Linguistics 38, 169–195.

McMahon, A., 1991. Lexical phonology and sound change: the case of the Scottish vowel length rule. Journal of Linguistics 27, 29–53.

McMahon, A., 2000. Change, Chance and Optimality. Oxford University Press, Oxford.

Mohanan, K.P., 1986. The Theory of Lexical Phonology. Reidel, Dordrecht. Revised version of Mohanan, K.P., 1982. Lexical Phonology, Ph.D dissertation, MIT.

Nespor, M., Vogel, I., 1982. Prosodic domains and external sandhi rules. In: van der Hulst and Smith (1982).

Odden, D., 2005. Introducing Phonology. Cambridge University Press, Cambridge.

Ohala, J., 2004. Phonetics and phonology then, and then, and now. In: Quene, H., van Heuven, V. (Eds.), On Speech and Language: Studies for Sieb G. Nooteboom. LOT Occasional Series 2, pp. 133–140.

Orgun, C.O., 2001. English r-insertion in optimality theory. Natural Language & Linguistic Theory 19, 737–749.

Pitman, I., 1847. The English phonotypic alphabet. The Phonotypic Journal 6 (61).

Prince, A., Smolensky, P., 1993/2004. Optimality Theory: Constraint Interaction in Generative Grammar. Technical Report, Rutgers University and University of Colorado at Boulder, 1993. Revised version published, 2004. Blackwell, Oxford.

Roca, I. (Ed.), 1997. Derivations and Constraints in Phonology. Clarendon Press, Oxford.

Schütz, A., 1978. English loanwords in Fijian. In: Schütz, A. (Ed.), Fijian Language Studies: Borrowing and Pidginization. Bulletin of Fiji Museum No. 4, pp. 1–50.

Schütz, A., 1983. The accenting of English loanwords in Fijian. In: Agard, F. (Ed.), Essays in Honor of Charles F. Hockett. E.J. Brill, Leiden, pp. 565–572.

Scobbie, J., Hewlett, N., Turk, A., 1999. Standard English in Edinburgh and Glasgow: the Scottish vowel length rule revealed. In: Foulkes, P., Docherty, G. (Eds.), Urban Voices: Variation and Change in British Accents. Arnold, London, pp. 230–245.

Selkirk, E., 1982. The Syntax of Words. MIT Press, Cambridge, Massachusetts.

Selkirk, E., 1984. On the major class features and syllable theory. In: Aronoff, M., Oehrle, Richard T. (Eds.), Language Sound Structure. MIT Press, Cambridge, MA, pp. 107–136.

Simo Bobda, A., 1994. Aspects of Cameroon English Phonology. Peter Lang, Bern.

Smith, T., 1568. De Recta et Emendata Linguae Anglicae Scriptione. Roberti Stephani, Paris. Critical ed. In: Danielsson, B. (Ed.), 1983. Almqvist & Wiksell, Stockholm.

Steriade, D., 2000. Paradigm uniformity and the phonetics-phonology boundary. In: Broe, M., Pierrehumbert, J. (Eds.), Papers in Laboratory Phonology V: Acquisition and The Lexicon. Cambridge University Press, Cambridge, pp. 313–334.

Steriade, D., 2001a. Directional asymmetries in place assimilation: a perceptual account. In: Hume, E., Johnson, K. (Eds.), The Role of Speech Perception in Phonology. Academic Press, San Diego, pp. 219–250.

Steriade, D. 2001b. The phonology of perceptibility effects: the P-map and its consequences for constraint organization. Unpublished MS, UCLA.

Sweet, H., 1877. A Handbook of Phonetics: Including a Popular Exposition of the Principles of Spelling Reform. Clarendon Press, Oxford.

Szigetvári, P., 1999. VC phonology: a theory of consonant lenition and phonotactics. Unpublished Ph.D. dissertation, Eötvös Loránd University/Hungarian Academy of Sciences.

Tavoni, M., 1998. Renaissance linguistics: Western Europe. In: Lepschy, G. (Ed.), History of Linguistics. Vol. III: Renaissance and Early Modern Linguistics. Longman, London (Chapter 1.2).

Trager, G., Smith, H., 1951. An Outline of English Structure. In: Studies in Linguistics Occasional Papers, vol. 3. Battenburg Press, Norman, Oklahoma.

Trudgill, P., 1974. The Social Differentiation of English in Norwich. Cambridge University Press, Cambridge.

Trudgill, P., 1986. Dialects in Contact. Blackwell, Oxford.

Trudgill, P., Hannah, J., 2002. International English: A Guide to the Varieties of Standard English. fourth ed. Hodder Arnold, London.

van der Hulst, H., Smith, N. (Eds.), 1982. The Structure of Phonological Representations. Part I. Foris, Dordrecht.

van der Hulst, H., van de Weijer, J., 1995. Vowel harmony. In: Goldsmith, J. (Ed.), The Handbook of Phonological Theory. Blackwell, Cambridge, Massachusetts & Oxford, pp. 495–534.

van der Linde, K., 2001. Sonority substitutions. Unpublished Ph.D. dissertation, University of Groningen.

Vennemann, T., 1972. Rule inversion. Lingua 29, 209–242.

Walker, J., 1791. A Critical Pronouncing Dictionary. G.G.J. & J. Robinson & T. Cadell, London.

Wells, J., 1982. Accents of English. Three volumes. Cambridge University Press, Cambridge.

Withgott, M., 1982. Segmental evidence for phonological constituents. Unpublished Ph.D. dissertation, University of Texas at Austin.

Yip, M., 2003. What phonology has learnt from Chinese. Glot International 7 (1/2), 26–35.