

REVIEWS

NINA GRØNNUM & JØRGEN RISCHÉL (eds.), *To Honour Eli Fischer-Jørgensen* (Travaux du Cercle Linguistique de Copenhague, vol. XXXI). Copenhague: C. A. Reitzel, 2001. Pp. 297. ISBN 87-7876-213-8.

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This volume in honor of one of the leading phoneticians of recent times contains important papers by twelve prominent phoneticians from Europe and America, as well as introductory material usual to *Festschriften*. Part of this consists of an impressive list of the honoree's publications from 1932 to a forthcoming article, including, of course, her important 1975 survey *Trends in Phonological Theory*. Frans Gregersen and Una Canger contribute an essay in tribute to Eli Fischer-Jørgensen, giving much interesting biographical information. I was entertained by a novel 'conversation' between Eva Gårding and Gösta Bruce (both based in Lund), entitled 'A bridge over the Sound' (a play on words, of course, referring to the Øresund between Denmark and Sweden). In this informal discussion, we learn many interesting background facts including, for example, that Eli drew the eight line drawings of phonologists that adorn the cover of *Trends in Phonological Theory* (this is not acknowledged anywhere in my copy of the book!).

The first of the research articles is a discussion by Hans Basbøll of the minimum number of binary distinctive features needed to define the sonority classes used in a phonotactic analysis of syllable shapes. After considering the strengths and weaknesses of a variety of proposals, he concludes that an adequate sonority hierarchy can be captured using the three features [sonorant], [voiced] and [stop]. The fourth of the research papers also examines phonological features. In this article Osamu Fujimura investigates /s/ + plosive clusters, arguing that many of their special characteristics can be accounted for by utilizing a feature [spirantized].

The second paper is one of only two that is not concerned primarily with either phonetics or phonology, although the author, Niels Davidsen-Nielsen, has published in these areas. His topic is fronting in Irish English: for example, in sentences such as *Sweet he is*. He examines explanations for these constructions from the perspectives of contact languages, influence of Irish and of Old English; and then explores the syntactic, phonological, semantic and pragmatic properties of fronting. He concludes that, while fronting in Irish English and in Danish are not syntactically identical, nevertheless schemas proposed for Danish fronting can also be applied to the instances in Irish English. The other such paper is by Jacob Mey; it takes a pragmatic look at how easy it is for us to access the referent or proforms in a given text (in this case, a written text). Mey argues for what he terms a 'pragmemic' approach, whereby readers co-create the text, and activate items through their own competence.

The paper by Gunnar Fant and Anita Kruckenburg examines fundamental frequency in prose reading in Swedish. The authors not only analyze the F0 of several subjects, but also build in a modeling and prediction mechanism that deals also with accent patterns and prominence through a prominence parameter. While this research still has some aspects that need attention to produce greater accuracy of prediction, Fant and Kruckenburg feel it has provided some interesting insights into the nature of the word accent contrast in Swedish. Hajime Hirose looks at larynx function (especially vocal fold adduction and abduction) in an article that describes a variety of experi-

mental procedures. These include EMG and fiberoptics, and the measurement of sub- and supraglottal pressure.

Klaus Kohler's contribution looks at the possibility of a German equivalent to the Danish *stød* in both read and spontaneous speech. The author investigates a range of glottalization behaviors that have a variety of functions in different languages. The phonetic features include glottal stop and low frequency irregular glottal pulsing, breathiness, and breathy voice. The functions include signaling morpheme and word boundaries with vowel glottalization, reinforcing fortis plosives with consonant glottalization, signaling syllable types, and paralinguistic features related to discourse structure. Kohler then investigates whether these different aspects of glottalization can be seen in the acoustic record of a database of spontaneous and read speech in German. Perception experiments were also undertaken through the manipulation of some of the recorded samples. The author concludes that in certain contexts, glottalization similar to that of the Danish *stød* is found in German connected speech, and argues for the importance of spontaneous speech as opposed to citation forms in phonetic experimentation.

Peter Ladefoged and Taehong Cho are interested in cross-linguistic aspects of VOT in velar plosives and describe comparisons across eighteen different languages. Of particular interest were the eleven languages in the sample that lacked an aspirated versus unaspirated contrast with velar plosives. While the plosives of these languages were all deemed voiceless (as we would expect from studies of phonological universals), the VOTs used differed from just under 30 ms to over 90 ms. While the seven languages that do have an aspiration contrast show a fairly clear point of contrast in terms of VOT for their fortis and lenis stops, the eleven languages that lack this distinction plot on a continuum of VOT and it is not easy to assign them into the aspirated and unaspirated categories. The authors propose that rather than using acoustic measures of VOT as a distinguishing feature, we should rather assume an 'articulatory VOT' parameter, with VOT variability being accounted for by the effects of varying aerodynamic and physiological conditions.

Leigh Lisker's article examines the three Polish fricatives [s, ʃ, j]. The acoustic characteristics of the sounds are illustrated, and then a study is described that used naïve American English listeners to identify the fricatives under varying acoustic conditions. The results demonstrated that while the listeners had no trouble identifying [s], they did have problems separating [ʃ] from [j], although identifying the noise component alone, or the post-noise interval was easier. The author feels that a possible explanation for the results may involve perception of pitch and loudness distinctions, and discusses the implications this has for ideas of phonetic versus auditory processing. Manjari Ohala and John Ohala also investigate perceptual confusions: this time with Hindi stops. Of particular interest was the place distinction labial, dental, retroflex, palatal and velar in VC position. Acoustic analysis showed a certain amount of overlap in transitions between certain vowels and certain of the stops. A perceptual experiment then investigated subjects' abilities to distinguish the stops both with and without the final release burst. Accurate identifications at 86% with the release burst dipped to 63% without that cue. Differences in the identification scores could, for the most part, be explained by the acoustic characteristics of the vowels and consonants concerned, but the authors also admit that some of the results were difficult to explain.

As befits a Festschrift for a Danish phonetician, there is a contribution on Danish dialectology. Peter Molbæk Hansen discusses data on Jutlandic accents (collected over 20 years before). Of particular interest were any phonetic distinctions that might have remained between monosyllables derived from disyllabic words through reduction of word final vowels and those derived from original monosyllables. The results show that the apocoped words were of consistently longer duration than the original mono-

syllables, irrespective of the presence or absence of syllable final obstruents. Of longer duration still were genuine disyllabic words.

The final article is by Kenneth Stevens and looks at the contribution that the physiology of the vocal tract makes to acoustic (and thereby phonetic) aspects of speech. Stevens describes the physical characteristics of the vocal tract walls, and then looks in turn at how they influence vowels and sonorant consonants, and obstruents. The author concludes by noting that it is not only the geometry of the vocal tract (in terms of the size of the various resonating chambers) that contributes to the ability to produce distinctive vowels and consonants, but also the properties of the vocal tract walls.

This collection of papers by leading researchers is a worthy recognition of the contribution of one of the world's greatest phoneticians to our field of study. All the topics are of interest and some important new work is reported. While this volume is not quite the 'reader in phonetics' that the publishers' press release purports, it is still an important addition to any phonetician's library.

PETER LADEFOGED, *A Course in Phonetics* (4th edn.). Orlando, FL: Harcourt, Inc., 2001. Pp. xiv + 289. ISBN 0-15-507319-2.

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Anyone – and that would probably comprise everyone involved in phonetics and pronunciation research and teaching – who has read earlier editions of *A Course in Phonetics* will find the layout of this edition comfortably familiar and the coverage consistently comprehensive. There have of course been changes and additions, which the next section of this review will largely focus on.

As outlined in the preface, *A Course* can be divided into three parts so that readers may pay attention to the particular parts appropriate for their objectives. The first (chapters 1 and 2) acquaints the reader with introductory concepts. The second (chapters 3–5) focuses on English phonetics, and the third (chapters 6–11) deals with general phonetics and examines the phonetic structures of other languages.

In this, as in previous editions, I would have preferred *A Course* not to focus on English phonetics in the early chapters, only to have to revisit consonants, vowels and suprasegmentals in later chapters, exploring their occurrence now in all languages. Addressing these topics from the beginning, with an overview of various languages, highlighting their relevance in English, would perhaps make for a more systematic presentation. Airstream mechanisms, phonation types and place and manner of articulation are addressed only in chapters 6 and 7, which strikes one as rather late in the book. Moreover, a different organisation in topic presentation could help with the elucidation of certain accounts: e.g. an account of the cardinal vowel system early on (rather than in the antepenultimate chapter) could then lead into an explanation of how vowels in languages can be placed in a quadrilateral. Such an approach has been taken in other books, including those solely on English (e.g. Roach 2000). Nonetheless, these three chapters do provide a comprehensive foundation for the sound pattern of English, and, as pointed out in the introductory comments (p. vii), together comprise a unit which can be read if one's interest lies in English phonetics and phonology or which can be skipped if one is not primarily concerned with it.

As in earlier editions, a variety of exercises, testing factual knowledge or providing

data for analysis, as well as numerous performance exercises, found at the end of each chapter, are extremely useful for students' self-revision or for testing or practice in class. The inclusion of answers would no doubt be considered an improvement by readers working through *A Course* on their own. The other useful resources in the book are suggestions for further reading, a glossary, a list of sources and the index.

Chapter 1 provides a basic introduction to articulatory phonetics. Mid-sagittal diagrams of the vocal tract are provided throughout, some updated from the previous edition: e.g. greater detail of places of articulation at the coronal region (Figure 1.4). However, mid-sagittal diagrams only show two dimensions, as Ladefoged himself points out (p. 5). Complementing these with diagrams of electropalatograms (cf. e.g. Cruttenden 1994) – note the removal of the short section on palatography found in the previous edition (Ladefoged 1993: 60) – would perhaps enrich the illustration, these being able to show more articulatory detail, e.g. in fricatives and laterals.

Chapter 2 introduces phonemic principles and phonetic transcription. Tables 2.1 and 2.2, which list the symbols for English consonants and vowels, have been updated, providing the conventional names for the symbols, a welcome inclusion as many newcomers to phonetics are often at a loss for how to refer to them. There appear, however, to be a few errors in the names for vowels (Table 2.2): [eɪ] is described as 'lowercase *e*' without the addition of 'plus *r*' (present in the name for [aɪ]); notwithstanding the omission of 'plus *u*', the description 'lowercase *o*' applies to [oʊ] in column 1, not to [əʊ] in column 2 (the table caption identifies them as names for the symbols in the second column); schwa is not documented or described in the table – apart from appearing in the BrE diphthongs in column 2 – though it is discussed in the text (pp. 31–32). In transcription, though opting for the IPA symbol [j] and not [y] for the voiced palatal approximant, since this is a book 'concerned with general phonetics' (p. 27), Ladefoged chooses to symbolise the voiced alveolar approximant with [r] rather than [ɹ], used previously, because this is the choice of 'the two major dictionaries of . . . English pronunciation' (ibid.) – this works fine here, but once the later chapters extend beyond English, [r] and [ɹ] are needed for the trill and approximant respectively.

Chapters 3 and 4 describe the inventory and phonological variation of English consonants and vowels, respectively. In addition to appealing to auditory perceptions, acoustic evidence for some allophonic variants is presented, e.g. waveforms illustrating voice onset time in English plosives and vowel duration (pp. 44–46). Though slightly daunting for readers with no background in acoustic phonetics, which is introduced later, Ladefoged does explain the diagrams simply enough for the naive reader to follow the argument, and they certainly serve their purpose in providing acoustic and visual evidence for the descriptions. The description of allophonic variation of English consonants is divided into sections for different manners of articulation, providing useful landmarks, but one can still be overwhelmed by the comprehensive account in the running text. Fortunately, a section follows which summarises and slightly extends this in terms of rules; a similar section is found in the next chapter outlining the rules for English vowel allophones. This is a more reasonable division, compared to the previous edition's single section of rules for both consonants and vowels, located in the second half of the chapter on vowels. Additionally, the natural classes of sounds to which the rules apply are expressed in terms of IPA categories, instead of distinctive features as in the previous edition.

In chapter 5 on English words and sentences, the section on intonation, which used to occur before the section introducing stress, now follows, more logically, the section on sentence stress. An entirely new section has been added to the end of this chapter (pp. 103ff.), in which the ToBI (Tone and Break Indices) system is described. This is a desirable inclusion, given the current prominence of ToBI in intonation analysis and transcription, and, though potentially complex with its numerous variations, Ladefoged presents it to the reader in a very accessible form. Unfortunately, Table 5.5 is

printed erroneously with five columns instead of four: the content of the third column should simply be deleted; the tones in the fourth column belong in the third column under 'Phrase Accent'; and the tones in the fifth column belong in the fourth column, whose heading should be 'Boundary Tone'.

Chapter 6 deals with airstream mechanisms and phonation types. In the section on voice onset time (p. 125ff.), in place of the stylisation of vocal fold vibration found in previous editions, acoustic information from waveforms are used as illustration (pp. 126, 131). I feel, however, that the old stylised diagram was also useful, showing not only the onset of vocal fold vibration, but also having, aligned with that, the opening and closing of the articulators and of the vocal folds (Ladefoged 1993: 143). This aids understanding of some of the descriptions in the text, e.g. that the degree of aspiration will depend on the degree of glottal aperture during the closure (p. 127). The current presentation of VOT measurement (in milliseconds, from a speech waveform) does lead neatly into an illustration of differences in VOT in different languages along a continuum represented on a numerical scale (Figure 6.6), as opposed to a scale simply representing different kinds of stops, as previously (Ladefoged 1993: 144).

In chapter 7, I particularly appreciate the treatment of laterals (p. 153ff.) not as a manner of articulation comparable to the other terms such as fricative, stop or approximant (cf. e.g. the IPA chart). Instead, it is made clear, both in the text as well as in Table 7.7, that the central–lateral distinction can apply to different places and manners of articulation.

In chapter 8, on acoustic phonetics, the previously large, rather unwieldy Spectrographic Analysis section is now split into three, separately addressing the acoustic analysis of vowels and consonants, with a final section on individual differences. Indeed, this chapter has been greatly revised, with spectrograms and pitch analyses made using contemporary computer techniques and numerous new diagrams, e.g. to illustrate intensity (p. 166), and acoustic cues in different kinds of fricatives (pp. 182, 183) and approximants (p. 184). Many definitions and accounts of acoustic details have also been expanded upon, e.g. the relation between pitch, frequency and the bark scale (pp. 166–167). Ladefoged also takes the reader through the process of interpreting spectrograms of connected speech in detail (pp. 185ff.). All the fundamental information needed to understand and be able to work with acoustic analysis at a basic level is included, remarkably, in this single chapter, providing an adequate footing for those who lack a scientific background and find a more acoustically detailed reading too daunting. The exercises at the end of this chapter (pp. 197–198) are all new, and provide good practice in segmenting and reading information in spectrograms.

Chapter 9 provides an account of cardinal vowels which notably differs from that provided in the IPA *Handbook* (IPA 1999): only cardinal vowels 1 and 5 are defined articulatorily (p. 201) (as in Daniel Jones' original conception), whereas the *Handbook* allows for cardinal vowels 1, 4, 5 and 8 to be defined in articulatory terms (IPA 1999: 10–11). Ladefoged then addresses the difficulties in the cardinal vowel system (pp. 202–204), e.g. whether the vowels are described in terms of tongue height or acoustic properties, showing from x-rays how the highest points of the tongue do not match the cardinal vowel chart outline (Figure 9.3). In an interesting move, the primary cardinal vowels are presented in a three-dimensional representation of vowel space (Figure 9.4), addressing the variable of lip rounding not represented in the traditional quadrilateral. New figures have also been included, e.g. of tongue positions for rhotacised vowels and third formant frequency lowering in rhotacised sounds (pp. 213, 214).

In chapter 10, addressing syllables and suprasegmental features, I particularly like the extensive coverage of tone, as well as the new and final section, which perhaps just a little too briefly discusses stress, tone and pitch accent languages.

The largely reorganised chapter 11 provides a wider perspective of the issues

involved in phonetics, beginning with a discussion of the control of articulatory movements, followed by the principles of ease of articulation and sufficient perceptual separation, pointing out the linguistic relevance of such phenomena. Approaches for linguistic phonetic description and classification are addressed: first, that of the International Phonetic Association, and then phonetic feature notation. The placing of this latter section is superior to its location in Chapter 2 in previous editions, which seems too early for such a discussion. The account of a feature hierarchy (pp. 257–263) is presented logically and comprehensively, and greatly extended and updated from the list of binary features in previous editions (Ladefoged 1993: 42–44).

Unfortunately there were some errors in the first printing of this edition (also indicated at <http://hctv.humnet.ucla.edu/departments/linguistics/VowelsandConsonants/course/errata.html>).

In addition to those mentioned earlier, there are a few errors in the symbols found in the IPA chart (inside front cover): the voiceless retroflex plosive is misrepresented with the symbol for the alveolar; the unrounded back close-mid and rounded central open-mid vowels are badly shaped; the front and back close-close-mid vowels are missing; and the unrounded central close-mid vowel is misrepresented using the symbol for the unrounded front close-mid vowel.

The index also has some inaccuracies in the page numbers provided, particularly for topics and performance exercises found in the last chapter, e.g. *Articulation, ease of* is listed wrongly as being on pp. 267–268 and should be pp. 250–251; *Features, hierarchy of*, 252–257 in fact starts on p. 257; *French, semi-vowels in*, 268 and *German, vowels in*, 268 should both be 267; *Sentence stress*, 118–119 should be 98–99; *Target tones*, 103–106 should be 103–107; *Vietnamese, vowels in*, 265 should be 268.

Some figures are slightly inconveniently placed, appearing on the page overleaf from the text which refers to it, e.g. Figure 3.5, referred to on p. 51, is found overleaf; Figure 9.10 illustrates ATR vowel description in the text on p. 211 but is found overleaf; Figure 9.12 shows third formant lowering of rhotacised vowels on p. 214 but the discussion of this is on the page before.

Changes in the style of phonetic transcription have been made to bring it in line with the two major dictionaries which have been published since the third edition, viz. Daniel Jones' *English Pronouncing Dictionary*, 15th edition (Jones 1997) and the *Longman Pronouncing Dictionary*, 2nd edition (Wells 2000), which both provide an accurate and updated record of current British and American pronunciation.

As in previous editions, numerous examples are provided throughout to illustrate the sounds described, from languages around the world and varieties of English. In addition to BBC English and other BrE accents, one encounters not just 'General American English' but accents from e.g. California, Pittsburgh and Detroit. A very pleasing addition is the easy availability on the Web (at <http://hctv.humnet.ucla.edu/departments/linguistics/VowelsandConsonants/course/contents.html>) of many of the features and sounds discussed, especially the rarer ones (which used to be on Hypercard). I use these in lectures as illustrations from the mouths of native speakers, which pleases and amuses students more than hearing me produce them! Not every feature being described is illustrated with examples, however: e.g. in Secondary Articulation (pp. 217ff.), examples of palatalisation in Russian are provided (Table 9.3) with a selection of these on the website, but no examples are provided for the other secondary articulations. Of course resourceful and motivated readers can access other relevant examples at the Appendix and Indexes websites as well as that for Ladefoged's other recent publication (Ladefoged 2001) (all linked at <http://hctv.humnet.ucla.edu/departments/linguistics/VowelsandConsonants/A%20Course%20in%20phonetics/index1.html>), but having them all within the book and its website would be more useful and convenient.

As with all Ladefoged's prose, *A Course*, written in a conversational style, is always

engaging. With clear and concise explanations, peppered with numerous amusing personal anecdotes, many of them extremely reassuring for the student of phonetics learning, for example, to make an implosive (p. 117), he never fails to convey the purpose and value, and downright fun, inherent in phonetics.

Having been introduced to phonetics as an undergraduate with the second edition, then using the third edition with different goals and greater motivation, first as a postgraduate student, then as a new and nervous lecturer, it is with great pleasure and satisfaction that I view this fourth edition, even as I constantly revamp the phonetics modules I teach. Whenever I have had to recommend a single basic introductory text on general phonetics, it has always been *A Course in Phonetics*, and from the looks of this fourth edition, it will continue to be.

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NICHOLAS REID, with contributions from HELEN FRASER, *2000 Phonetics: An Interactive Introduction*. University of New England, Australia, 1999. ISBN: 1-86389-609-0.

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2000 Phonetics: An Interactive Introduction is a stand-alone CD which runs under either Windows (Win 95/98/NT4, Pentium processor or equivalent) or Macintosh (System 7.5.1 or later, 68040 or faster processor) without the need for installation. Hardware requirements are a 2 x speed CD ROM, 12 MB of free RAM, 800 × 600 8 bit colour, and a mouse. Information and ordering from <http://www.une.edu.au/tlc/phon.htm>.

The opening screen consists of a main menu with six choices: vocal tract, speech sounds, airstream mechanisms, phonation modes, acoustic analysis, and exercises. These are accessed by clicking the mouse on images; two menus at the top of the screen duplicate the same choices, one providing access to the main sections via the keyboard, although within the sections a mouse is needed to access the various exercises. The main image menu is arranged in a circle, so no sequential ordering is suggested, but the ordering in the menus suggests working through the CD in the sequence in which the six sections are reviewed here.

The vocal tract section consists of one screen showing a mid-sagittal section of the places of articulation with labels. Moving the mouse over the labels highlights the

relevant area of the diagram and an explanatory paragraph appears. There are no sounds or animation. This is a clear and handy resource, either for on-screen demonstrations or for self-access learning, and will doubtless replace many a teacher's stack of OHTs. Animations and sound would have made it an even better section.

The section on speech sounds consists of four screens of clickable symbol charts: 'all consonants', 'English consonants', 'cardinal vowels' and 'Australian English vowels'. The 'all consonants' screen follows the same format as a number of other such clickable charts, such as IPA Help (<http://www.sil.org/computing/speechtools/ipahelp.htm>) or Ladefoged's *Vowels and Consonants* (<http://hctv.humnet.ucla.edu/departments/linguistics/VowelsandConsonants/vowels/contents.html>), both available free on the internet. Unlike these charts, the sounds here are exemplified only in intervocalic position. The screen shows an IPA chart on which the user can click to hear the sound of each symbol. As with the rest of the CD, the recordings are clear, with no intrusive background noise. Some of the recordings are by a male speaker, some by a female.

A number of symbols from the IPA chart are missing, including: bilabial trill, labiodental nasal, labiodental approximant, voiced and voiceless lateral alveolar fricatives, voiced and voiceless retroflex fricatives, retroflex approximant, voiced palatal fricative, voiced and voiceless pharyngeal fricatives, voiced glottal fricative, velar approximant, and lateral velar approximant. This means that the complete chart could not be taught without recourse to other examples. However, a more serious inadequacy is that the sounds of the stops are inaccurate. The voiceless stops, which should be voiceless and unaspirated, are pronounced with aspiration and are later directly equated with English 'voiceless' (i.e. voiceless, aspirated) stop phonemes. Thus, the IPA symbol [p] is said to be as in English *pie*, [k] as in *curl*, when these English sounds are [p^h, k^h], respectively. The voiced stops, similarly, are wrongly equated with English 'voiced' phonemes; voiced [b] is equated with English /b-/, as in *buy*, which is in fact closer to [p], an unaspirated, voiceless stop.

The 'English consonants' screen shows the same IPA chart as the 'all consonants' screen, but with only the symbols used for English phonemes active. Again, clicking on an active symbol plays the sound. Unacceptably, the recordings are the same intervocalic sequences as those in the 'all consonants' section, thus continuing the confusion between the English phoneme set and the phonetic symbols of the IPA chart; the so-called 'voiced' phonemes of English should be voiceless and unaspirated but are pronounced with voicing. The use of the same recordings of V_V sequences instead of phonemes in English sound sequences also means that there is no indication of allophonic variation, such as pre-fortis clipping, and clear/dark l, which would have been useful in an introductory package of this sort.

The 'cardinal vowels' screen shows two IPA vowel quadrilaterals, showing the 'primary' and 'secondary' cardinal vowels separately. Below the quadrilaterals, the symbols are repeated and can be clicked on to hear the sound. One of the transcriptions is inaccurate: the vowel listed as 'primary cardinal 5' has the sound correct but the symbol is that of secondary cardinal 5. The secondary cardinal vowels quadrilateral contains only S1, S2, S3 and S8.

On the next screen, 'Australian English vowels' the phonemes are shown in two quadrilaterals, one for monophthongs, the other for diphthongs. Animated arrows represent the diphthongal movement. Three non-English vowels are shown which might be encountered in foreign languages: the first vowel in Japanese *Fuji*, and the vowels in French *peuple* and *tu*. Also exemplified are differences between 'cultivated' and 'broad' pronunciations of four diphthongs.

Had the unfortunate inaccuracies not occurred, these would both have been clear and useful classroom or self-access resources, but as it stands the section on speech

sounds would be best omitted and students redirected to one of the other similar charts mentioned.

The section on airstream mechanisms starts with an introductory screen and menu leading to sections on egressive pulmonic, ingressive pulmonic, velaric, glottalic, and esophageal airstream mechanisms. These are explained in text and exemplified with animations showing the processes of the mechanism in slow motion. A slight inconvenience is that the animations and videos start automatically when a screen is entered, which could be disturbing if the CD was being used in front of a class. It would be better if this could be controlled by a mouse click. As well as animations, there are videos of a speaker of a click language, and of a user of a tracheoesophageal valve and of an artificial larynx, both useful for classroom demonstrations, although the latter two primarily for their audio channel as the videos are rather dark.

An introductory screen of the phonation models section leads into a series of screens explaining the difficulties involved in and methods of photographing the larynx in action. Diagrams of rigid and flexible endoscopy are given with explanations. Video footage is supplemented with animations representing in simplified form the various phonation modes, plus breathing and lifting, an animation of the vibration cycle, and an explanation and examples of stroboscopic video.

In the acoustic analysis section, an introductory screen explains the difference between a waveform and a spectrogram, followed by examples of how various types of speech sounds appear in each, and an example of a word played backwards; a revealing exercise for the beginning phonetics student. There are a few useful pop-up windows, for instance, explaining what is meant by 'listening phonetically' and 'formants' (which also highlights formant traces on a spectrogram).

The exercises contain tests on most of the topics covered previously (airstream mechanisms are omitted). Disappointingly, these consist of the same material as that found in the previous sections, simply reworked as a test. The computer does not keep scores or give any detailed feedback, so this part could not be used for assessment of any sort.

In conclusion, the package is entertainingly written, with clear animations and good quality sound and videos, and neatly supplements or replaces more cumbersome audiovisual materials. It is, however, marred by the confusion of phonetic symbols of the IPA chart with symbols for the phonemes of English. With this exception, which means I would not use that section for teaching, and with the exception of an exercises section which is rather disappointing for being largely a direct repetition of the earlier sections reformulated as a series of tests, the CD groups together in an easily accessible format a useful range of multimedia resources, including sound files, video clips, and animations, and is a clear and motivating package for classroom or self-access use. It is highly recommended for teachers and learners alike.