REVIEWS

J. C. CATFORD, *A Practical Introduction to Phonetics* (2nd edn.). Oxford: Oxford University Press, 2001. Pp xiii + 229. ISBN 0-19-924635-1.
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The author stresses in his preface that the place taken by the word 'practical' in the title is carefully chosen, and he is definitely correct to do so. The work is very much oriented towards practical experimentation, with the reader's own body as the scientific instrument. While centred on what is normally termed articulatory phonetics, it does not neglect the acoustic aspect of the science.

The book is organized into eleven chapters: an introduction, a chapter on initiation and articulation, one on phonation, two on more detailed aspects of articulation, one on co-articulation and sequences, two on vowels, of which the second particularly treats the cardinal vowel system, one on the prosodic features of stress, pitch and length, with discussion of the concepts of syllable and foot, one on sound systems of languages, and a final, review chapter. There is a short bibliography, mostly of works that may be seen as classics on the topic area.

Scattered throughout the chapters from the second to the tenth are over one hundred and twenty practical experiments intended to provide awareness of the specific facets of phonetics being discussed. These are a particular strength of the work, as they offer very clear instructions and, on occasion, alternative ways to reach the desired result (see, for instance, experiment 72). If intelligent novices cannot achieve what is intended in working through these experiments, it is highly likely that they would have just as much, if not more, difficulty with any other approach. The care and ingenuity put into these experimental activities mean that they do not just cover what might be expected, such as the more obvious articulatory postures, but are even able to offer insights into matters more usually handled with special equipment, such as formant frequencies for vowels (see experiments 113 and 114).

The just under five dozen diagrams and figures cover very varied aspects of the work's contents. All are helpful; some are especially interesting, such as the comparison of the vocal tract with a pneumatic mechanism involving a bellows, pistons, valves and chambers (figure 1) or the illustrations of the cardinal vowels in terms of positional value and formant frequencies, the latter being given both in Herz and in doh-ray-me terms (figures 45 and 46). Even more classic diagrammatic matters, such as states of the glottis (figure 17) or stricture types (figure 20), are treated in a clear, helpful and succinct way, which is probably unbetterable in a context limited to black-and-white line drawings, as opposed to some form of film presentation.

Throughout the work, one gets a strong feeling of the application of a great deal of common sense and experience in training budding phoneticians. Examples would range from the frequent references to sounds in given languages to the way in which formant frequencies are carefully noted not to be absolute, but to vary with the size of the speaker's vocal tract. This latter explanation is not always to be found even in books ostensibly concentrating on the topic. Another instance would be the stress on the anatomical variations between individuals exemplified by figure 26 on the shapes of alveolar ridges.

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The section on sound-systems has a good deal of interesting cross-language comparison, and manages in under twenty-five pages to give at least a nod in the direction of languages as diverse as Georgian, Thai, Arabic, Sindhi and French, as well as offering a useful chart of permissible consonantal clusters in English.

No book is completely without fault (Professor Catford is not quite accurate in his treatment of the Spanish tap and trill phonemes on p. 181, for instance) but this work is freer of blemishes than almost any other. It can be enthusiastically recommended as suited to be a textbook for any student being trained in phonetics, and even for those people who wish to familiarize themselves with the subject but are not able to have access to classes and teachers.

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There is a saying that 'Silence is golden!' If readers take nothing more away from this volume than the value of silent, introspective observation and practice in the field of phonetics, then the book remains a success. J. C. Catford's *A Practical Introduction to Phonetics* (hereafter APIP) is a book that is probably already well-known to almost all practising phoneticians. It must be said, however, that although its avowed purpose is to enable students to discover the theory of phonetics for themselves, the idea of 'componential-parametric phonetics' (p. 9) as a selling-point in today's classroom has an unlikely ring. In a culture where students increasingly expect to be given everything they need and where the shortness of time allowed for learning demands virtually instant results, there is very little opportunity for the kind of slow, deliberate, quiet introspection and sustained practice that lies at the heart of this book. Additionally, in the second edition, APIP remains a deeply erudite volume, with extensive utilisation of (often complex) latinate terms and a detailed reference to music theory of the kind that is considerably beyond the experience of most students. My feeling has always been that APIP is a phonetician's book for phoneticians. It is a resource book which marks a career-long interest in the practicalities of phonetic theory (an interest first declared in a lesser known publication in the *UCLA Working Papers in Phonetics* series, Catford & Ladefoged (1968), which was demonstrably indebted to the influence of Smalley (1963) and where the very first exercise, 'Say a long [ffff] . . .' (Catford & Ladefoged 1968: 3), is the precursor of the first experiment in APIP itself (p. 11)). APIP essentially blends the practical exercises of Catford & Ladefoged (1968) with the theoretical framework of Catford (1968) to offer materials and inspiration for the teacher of both phonetic theory and practical phonetics alike – a classic volume which has now entered a second edition.

Regarding the changes we can expect to find here, Catford tells us that 'The new edition contains additions and corrections, and most importantly, presents an expanded and updated list of items for further reading' (p. vi), and it is with this claim always in the background that the present review is written.

Beginning with the additions, it has to be said that routine updating apart (and I will consider the effects of this separately), very little has been added here that was not already contained in the first edition. Although this may sound negative, it is not actually intended

as a criticism. There was really no need for a lot of new content. In terms of content, the first edition was already hugely satisfactory. The book contains 11 chapters, enabling the discovery, largely through 124 empirical procedures or 'experiments' (with occasional theoretical explanatory prompting), of the whole of basic articulatory phonetic theory. The contents include an introduction to phonetics and the vocal tract itself (in chapter 1), initiation (chapter 2), phonation (chapter 3), articulation (the latter broken down into types of stricture in chapter 4, including primary, secondary and double articulations in chapter 6, and locations of stricture in chapter 5), vowel description and the Cardinal Vowels (chapters 7 and 8), prosodic features (chapter 9) and, before a final review of key points (chapter 11), a brief introduction to phonology (chapter 10).

In all, there are some dozen or so points at which the second edition departs from the first. By far the most major of these is the rewritten final section entitled 'For further reading' (pp. 217–219). Here Catford offers more focused advice on the suitability of the various publications mentioned as well as introducing six or seven new titles, which post-date the 1988 publication of the first edition of APIP. Obviously, such advice has to be selective and will inevitably reflect personal preference but I think it is a mistake to overlook accessible and user-friendly publications like Halle & Clements (1983) on features (and even the more recent Spencer (1996), whose features so closely reflect Catford's own articulatory divisions of the vocal tract) while continuing to include the now more outmoded and specialised publications from the 1960s. The opportunity has also been missed to update the recommended edition of 'Gimson'. Although now in its sixth edition (Cruttenden 2001), the 1994 fifth edition, revised by Alan Cruttenden (Gimson 1994), was current when Catford's second edition of APIP went to press. As a final point, I think the reader should be offered closer guidance on the value of Jones (1970) with regard to contemporary British English pronunciation habits. The situation regarding the incidence of glottal stops in British English speech today, for example, has moved on from the 1960s and even from the 1980s, thus rendering Catford's own snapshot (p. 97) out of date – pure glottalling (see Wells 1982, for example) is not even mentioned.

The other additions that I have been able to discern are distributed through the body of the text. They include the introduction of the concept of 'prephonation' (in response to the research of Harris 1999) on p. 56, a few new real-language examples (mention of Burmese aspirated fricatives, for example, on p. 57 and some Arabic minimal pairs illustrating presence and absence of velarization on p. 105), one or two additional and helpful cross-references (pp. 29 and 30, for example) and the latest IPA chart with revised reading notes (pp. 114–117). Other new content that I have noted are a small paragraph on voiceless vowels (p. 40), the addition of German **ʏ** to the discussion of additional vowel symbols (p. 151) and a few words of clarification regarding stress and introducing the concept of 'prominence' (p. 168) as well as an alteration to the presentation of the initiation line in figures 3–7. While all the additions are beneficial, this last change represents a big improvement. The new downward-sloping line equates better psychologically with breathing out/emptying the lungs than did the wavy (rather sinusoidal-looking) line in the first edition. These diagrams are now spoilt only by the inconsistent representation of the articulation of **h** (broken lines in figure 4 but solid in figure 6), which could confuse the learner.

Of course, one of the biggest changes in the second edition (not mentioned by the author in his preface) is the publisher's makeover, giving APIP a truly twenty-first century image. This has involved a change of size (unfortunately APIP now no longer slips so easily into your pocket or bag), new page layout (with new-style running headers) and new subheadings (emboldened and left aligned) all bound in a new, more attractive cover. Unfortunately, however, recasting the image has not been without cost. Quite a number of new errors have been created during this process including failure to update the cross-reference on p. 23, a missing comma and word space ('*labio-apico-*, etc.' [*sic*]) on p. 79,***ɬl** replaces the originally correct **ɬ** on p. 88, the first edition 'ploded' becomes 'plodded' on p. 108 of the second edition, ***lʊ** replaces the first edition **oʊ** on p. 211, etc.

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An effort has also been made to update the use of symbols throughout, bringing these in line with usage in the 1996 IPA chart and the latest, 1999, edition of the *Handbook of the International Phonetic Association* (IPA 1999; hereafter *Handbook*) and I suspect that it is symbol updates that account for at least half of the corrections Catford alludes to in his Preface. These updates include the voiced palatal fricative symbol on p. 63, the voiced bilabial trill symbol (together with removal of the claim that this does not exist) on p. 69 and the use of the regular IPA symbol for the voiced epiglottal plosive on p. 96.

With regard to this last point, however, the updating of symbols has also generated a substantial number of inconsistencies, creating in turn what are now effectively a large series of new errors. The replacement of ʮ and ɷ by ɪ and ʊ turns out to be particularly inconsistent (traces of the old symbols can be found throughout, for example, on pp. 75, 109, 150, 170, 181, 186, and so on). Examination of the revised click symbols (introduced on p. 27) also reveals a slight problem. Comparison of Catford's symbols with the IPA illustrations shows that while, in the latter, all the pipe symbols (single ǀ, double ǁ and double-barred ǂ) all sit on the line in accordance with the American usage illustrated in Pullum & Ladusaw (1986: 192–199), in the IPA, they not only project above but also descend below the print line (see *Handbook*, pp. 20–21). (Fortunately, this is a detail which will not confuse student readers in the way in which the vowel inconsistencies are likely to cause confusion.) Further inconsistencies arise, however, from the updating of diacritics. By way of illustration, in the 1949 edition of *Principles of the International Phonetic Association* (IPA 1949; hereafter *Principles*), current at the time of the first edition of APIP, the left half ring was used in subscript form to indicate more open/lowered varieties of a sound (*Principles*, p. 16) and in right adjacent position to indicate 'lips more spread' (*Principles*, p. 17). The diacritic ˕ was then offered only as an alternative representation of articulatory lowering (*Principles*, p. 16). Nowadays, however, the only lowering sign is ˕ (*Handbook*, p. 16). The continued use of subscript left half ring by Catford (see pp. 60 and 80, for example) to indicate lowering is very confusing for the student reader, who is supplied here with the 1996 IPA chart for reference (on pp. 114 and 115) and who can only find a mismatch of information. What is particularly unfortunate is that considerable trouble has been taken to improve the printing of this wrong diacritic (p. 80) where its application has obviously been corrected in comparison with the first edition. Instances of articulatory raising are also misrepresented here through lack of updating (see, for example, p. 151).

On p. 85 of APIP, there is a further error involving diacritics. Here, Catford writes: 'You will have observed that the IPA supplies no special symbols or diacritics for the laminal [t]s.' The astute reader will, of course, have observed exactly the opposite, finding on p. 115 the laminal diacritic, subscript square, ̻ (for discussion see *Handbook*, p. 17). (The laminal diacritic did not, of course, exist in the *Principles*, which was current at the time of the first edition of APIP.) A final point regarding diacritics takes us back to the symbolisation of a more rare sound type, the labiodental plosive. Again, on p. 81 this time, Catford claims that, probably due to the articulatory difficulty, such stops are not used in languages and no symbol is provided for these sounds in the IPA. This is not strictly true. Such plosives are recorded as occurring in Tonga and Shubi with rather artistic symbols for representing such sounds having been coined by Doke as early as the 1920s (see Ladefoged & Maddieson 1996: 17). More recently, however, the IPA has responded to the need to represent such articulations in clinical phonetics and a specialised application of the dental diacritic is listed, provided for under the extended symbols chart 'ExtIPA Symbols for Disordered Speech (Revised to 1997)' (*Handbook*, p. 193), giving p̪ and b̪ (a practice which I also follow in my own non-clinical phonetics classes). Such instances apart, however, corpus evidence (Ruhlen 1975, Maddieson 1984, for example) tends to confirm Catford's opinion here that labiodental plosives are rare in non-disordered speech.

With regard to the body of the text as a whole, however, little has changed. This allows me to make four final points of substance. First, there are three general points

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which have always concerned me. One relates to initiation, one to phonation and one to coarticulation.

Regarding the account of the ingressive glottalic airstream mechanism, Katrina Hayward writes: 'Prototypical, "text-book" implosives are produced with voicing.' (Hayward 2000: 269) This accords well with descriptions of the mechanism encountered in many other contemporary text-book accounts. Ladefoged & Maddieson (1996: 82), for example, write:

> Earlier accounts of this class of sounds [implosives] generally indicated that they were typically produced with a constricted setting of the vocal folds. It is now recognised that the laryngeal setting can vary and implosives can be produced with modal voice, with a more tense setting, and with a complete glottal closure. Voiced implosives are stops that are produced by lowering the larynx while the vocal folds are vibrating.

Catford begins his treatment of this particular form of initiation with voiceless implosives (sufficiently rare sounds for the IPA to have withdrawn the symbols altogether – compare, for example, the current 1996 revision of the IPA chart as APIP (p. 114) with the earlier 1989 version in the centre-fold of *JIPA* 19.2 (1989). Although not alone in taking this approach (see Laver 1994), it seems misleading to begin with the least typical form of this initiation type, the voiceless version, produced with complete glottal closure (APIP, p. 26). It also seems misleading then to imply that voicing in the more cardinal and usual voiced implosives, such as those found in Sindhi, for example, which Hayward (2000: 269) advises us are particularly good examples, occurs merely as a function of seepage: 'because the vocal folds are not tightly closed, but set for voice, a small amount of air seeps upward through the glottis into the vacuum above it' (APIP, p. 48). This can hardly be claimed to constitute (modal) voice in the generally accepted sense and is likely to cause considerable confusion for learners as they follow up the recommended additional reading in the end section of APIP, where, *inter alia*, both Ladefoged & Maddieson (1996) and Laver (1994) (who, on p. 173, explicitly states that voiced implosives 'are made on a complex airstream mechanism, combining a glottalic ingressive mechanism with egressive pulmonic voicing') are strongly recommended sources of information. The lungs might well be considered 'inactive' (APIP, p. 48) in the glottal closure/breath-holding interval of a voiceless implosive, but they remain active, in spite of pressure fluctuations, in voiced ones. In fact, for a detailed account of some of the many possibilities for implosive articulation, Catford's readers might be interested in Ashby (1990).

Phonation (my second general point) is something of a minefield and, as with initiation, Catford is an established authority with published research stretching back over many, many years. Nevertheless, phoneticians (unlike our students) are well aware that even with the present advancement of phonetic science, there is scope for differences of description, analysis and conclusion in some matters. Phonation (including the description of voice quality) is, I believe, one such area. In spite of the huge amount of research and literature in the field today, it can still be said that one person's [hɔ(ɹ)s] is, indeed, another person's [hʌski]. However, it is student readers that I am trying to focus on again here and the basic information that they need in order to get going on a subject. Chapter 3 of APIP is concerned with phonation and begins by identifying four different types: voicelessness (which Catford also calls 'breath' phonation (see p. 51), whisper, (modal) voice and creak. Both types and terminology are matched exactly by Laver (Laver 1994: 189–194) but there is already some difference of both description and categorisation when compared with Ladefoged & Maddieson (1996: 47–77). The concept of whisper, for example, plays no part in Ladefoged and Maddieson's account at all, while the concept of breath is applied to the auditory effect resulting from vocal fold vibration (as for voice) combined with increased glottal aperture and higher rate of pulmonic airflow than usual, which they call 'breathy voice' (Ladefoged & Maddieson 1996: 56) as used in sounds such as **b$^{\text{fi}}$**. For Catford, such sounds have 'whispery voice' in which 'the vocal folds are vibrating to produce voice but at the same time there is a continuous escape of air

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generating the sound of whisper' (p. 53). Both works, however, offer alternative nomenclature here, describing the auditory effect also as 'murmur'. However, a further complication then arises in APIP, where a voice quality only used 'when out of breath and panting' is described using words with indisputable similarity to aspects of Ladefoged & Maddieson's description of murmur ('the glottis is rather widely open, but the rate of airflow is so high that the vocal folds are set "flapping in the breeze" as the air rushes by' (p. 52)). This voice quality, which only occurs in the abnormal situation of being out of breath, Catford designates, confusingly for the student reader, 'breathy voice'.

The third point that I would like to raise here is again a potential source of confusion for the learner and this is Catford's use of the term coarticulation. Basically, Catford's application of this expression denotes any articulation in which the speaker could be said to be doing more than one thing at the same time – multi-articulating, if you like. The two main types he distinguishes are double articulations and primary + secondary articulatory combinations (see p. 99). For Catford, then, multi-articulating (or co-articulating, in his terms) is crucial to the production of sound types such as **k͡p** or **k^{w}**. While he recognises that this occurs intentionally and deliberately, and devotes chapter 6 to its further exploration, the co-articulation that I tend to devote so much time to in the classroom ('the retention of a phonetic feature that was present in a preceding sound, or the anticipation of a feature that will be needed for a following sound' (Wells 2000: 151)) receives only a fleeting mention, virtually dismissing it: such a form of multi-articulating 'also occurs "accidentally" as it were in the close transition from one consonant to another' (p. 99). It is also worth pointing out that in spite of including nasalization in this chapter (mistakenly, I believe, as a form of secondary articulation, although opinions do differ here; see, for example, Trask (1996: 354)) and illustrating this through reference to nasalized vowels (p. 101, for example), this passing reference to co-articulation as a characteristic of connected speech only mentions consonants.

My fourth and final point is a matter of style and concerns, in particular, the description of vowel articulations (chapters 7 and 8). In a teaching capacity, I find myself frequently trying to encourage precision in the articulatory description of speech. Regarding the description of consonants, this is a matter in which the descriptive style of APIP excels. However, when we come to the study and description of vowels, there is much less precision and the reader is left with the impression that, somehow, the tongue is a free mass, capable of locating and relocating (as a mass) within the oral cavity. In keeping with Catford's practice in the description of consonant articulations, I would expect to find reference here to precise parts of the tongue, the anterodorsum, posterodorsum (or the front and back, as many of us would term them) or some intermediate point(s) between the two extremes. Instances of this style are numerous: 'the feeling of moving the tongue to the front and back of the mouth' (p. 124), 'force your tongue even further back' (p. 126), '[the location of] the highest point of the tongue retreats backwards' (p. 130), 'CVs [are] vowels produced with the tongue thrust as far forwards as possible or pulled back as far as possible' (p. 134) and 'that feeling of straining the whole mass of the tongue backwards into the pharynx' (p. 146), to cite just a few. It seems to me that one of the difficulties here is that by insisting on such very precise terminology elsewhere (antero-, postero-, pre-, post-, apico-, lamino-, dorso-, etc.), the very useful (if rather more vague) front, back and even centre of the tongue seem to have got lost. The technically correct Latin-based constructions are off-putting to many of today's students, but these students do (in my experience, at least) respond to front, centre and back and even to expressions of the sort 'part of the tongue between front and centre' or 'part of the tongue nearer to the centre than the front', and so forth. While I would in no way wish to support any dumbing down of the theoretical information made available to students and while I accept that there may not necessarily be a consistent one-to-one relationship between exact tongue posture and auditory effect, I still believe that there is a trade-off between what we as experienced phoneticians might be happy to grapple with and what the average *ab initio* student of the discipline today is likely to find meaningful and acceptable regarding language and usage. Of course, I may be a voice in the wilderness. Some

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of the same style that I am complaining of in the second edition of APIP (text all carried forward directly from the first edition, it might be added) can also be found in other seminal publications. There is, for example, an uncanny resemblance in the description of ə̹ between the two APIP editions and the *Handbook* (compare, for example, APIP, p. 202 and *Handbook*, p. 16).

Most other matters that one might wish to raise are one-offs: there are, for example, more than four click languages and the names Bushman and Hottentot given here (p. 30) are not actually specific language names at all but two sub-groups of Khoisan; the choice of vowel-symbol in the second syllable of *Llangollen* (p. 39) disagrees with the transcription in Wells (2000: 43); the *ad hoc* right or left alignment of the devoicing diacritic to indicate partial devoicing (p. 46) is unnecessary given the IPA's right-bracketed and left-bracketed under-ring diacritic for this purpose (*Handbook*, p. 189); the IPA no longer describes ʃ and ʒ as 'palatoalveolar' (p. 92; some further updating/correction is needed); advice regarding the old 'labiovelar' terminology is retained although IPA practice has moved on here (p. 100); I think 'front rounding' (p. 144) is a mistake and the term 'outer rounding' may actually be intended; there is confusion between the voiced velar fricative symbol ɣ and secondary CV7 ˠ (p. 148); the tone group boundary (‖) and the foot boundary (|) are in the wrong order in one example on p. 187 (these were correct in the first edition); the slant brackets in the phrase 'phonetically transcribed as /u/' (p. 201) is an error imported directly from the first edition; etc.

In conclusion, it remains only to reiterate that, criticisms apart, in its second edition, *A Practical Introduction of Phonetics* by J. C. Catford is as unique and valuable as it always was. However, until the many new symbol errors and confusions are corrected (such that the text throughout at least corresponds to the IPA chart it includes) and, ideally, some of the other more typographic errors are also corrected, while I continue to use this text myself, it is not one that I can easily recommend to my students. The responsibility for these mistakes, however, cannot be laid at the author's door alone.

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Of the nine contributions to this volume, six deal with segmental issues, one with suprasegmentals, and two straddle the theoretical divide. J. Coleman ('Improved prediction of stress in out-of-the-vocabulary words') takes up a problem which, apart from its intrinsic linguistic interest, is significant for Human Language Technology, especially text-to-speech (TTS) synthesis. For the purposes of TTS synthesis, a language may be described in terms of (a) relative predictability of the grapheme-to-phoneme conversion, and (b) the predictability of word stress. For instance, Finnish is perfectly predictable in both respects. Russian is perfectly predictable at the segmental level, but only after the almost totally unpredictable stress has been located. English is renowned for its generally low 'segmental' predictability with fairly predictive, though rather complex, stress rules. It is often the case in English that 'out-of-the [TTS synthesis] vocabulary' (OOV) items have reasonably regular grapheme-to-phoneme relations, after stress has been located. Coleman has compiled a large and practical database to produce stress rules that could predict the phonemics of a significant majority of OOV words. He reviews 'the linguistic principles of English stress assignment' without mentioning the seminal contributions of Kingdon (1958) and Fudge (1984). He also shows that text parsing is an indispensable pre-condition to finding the correct stress in machine-reading English text for synthesis.

Although the concept and the term 'Received English' may still persist for some time in teaching English as a foreign language, it is now obsolescing in studies on accents in a geographic-linguistic or socio-linguistic context. The kind of speech which nowadays tends to affect the pronunciation of highly educated people in England (and, much more weakly, in Scotland and Wales) is often referred to as 'Estuary English' (EE), the river Thames being implied. It has, over the last 20 years or so, become *en vogue* both in the media and in the specialist literature because a new Standard English 'accent' is evolving under its influence. EE may be thought of impressionistically as an accent about halfway between the traditional

prestige kind of English and a 'civilized' Cockney. A satisfactory amount of information on EE may be found i.a. on the Web, including an excellent, not-too-technical monograph by Horgues (1998–99). The most strongly penetrating EE influence on the Standard, is 'glottaling', i.e. the substitution of the glottal stop for pre-consonantal /t/. J. Przedlacka ('Estuary English glottaling in the home counties') relates her observations of glottaling by teenagers, her principal finding being that this feature is more common in female than male speech, girls' speech apparently being known to be on the cutting edge of change in pronunciation.

Broad phonetic and phonological differences between Castilian and Latin American Spanish have been described before, and B. S. Rosner, L. López-Bascuas, J. GarcPa-Albea & R. Fahey ('Voice-onset times in Castilian Spanish') add detail to the description of features distinguishing European and American varieties of Spanish, viz. VOT in initial stops.

In Tamil, as in many other languages, there is a phonologically relevant distinction between single and geminate obstruents. E. Reynolds ('Word-initial gemination in Tamil') tests this distinction measuring three features of Tamil obstruents, viz. duration, RMS amplitude minima and the temporal extension of voicing. All three features have proved to be significant for the distinction. It would be an important contribution if comparative laboratory phonology could find out to what extent these distinctions are language-universal.

C. M. Sangster investigates the 'Lenition of alveolar stops in Liverpool English' in the speech of female teenagers from the viewpoint of possible neutralization of the lenited forms of these phonemes with 'traditional' or 'underlying' /s, z/ and /ts, dz/ as manifested in the duration of the respective sounds. She finds that the neutralization (if any) is only partial. The paper is significant as classically illustrating the application of experimental methods at the borderline between synchronic and diachronic phonology.

Developmental phonetics has long passed the 'anecdotal' stage, when all (pseudo-) knowledge of how the phones and prosodies are acquired by children learning L1 was based on impressionistic, mostly parental, observations. E. Grabe, B. Post & I. Watson ('Acoustic correlates of rhythm in English and French four-year-olds') apply measurement of segmental duration to find how, in L1 acquisition of rhythm, based on the young child's interaction with his/her mother differs between English and French, and how this difference is related to the intrinsic difference between the adult performance of stress-timed and syllable-timed rhythm. The authors find that only the duration of vowels should be considered in this respect, which may be essential in resolving the controversial issue of the physical reality of the putative distinction between the two kinds of phonetic rhythm. French children are more successful in acquiring their mother's speech rhythm than are English children in analogous conditions.

I. Watson & J. Hajek ('A perceptual basis for the foot parameter in the development of distinctive vowel nasalization') find that rhythmical rather than purely durational features correlate with the perception of vocalic nasalization.

Most co-articulation studies have investigated relations between neighbouring phones. P. West ('Long-distance coaticulattory effect of British-English /l/ and /r/: an EMA, EPG and acoustic study') first thoroughly examines coarticulation effects between /l/, /r/ and the neighbouring vowels, and then extends the investigation to cover the case when the affecting segment is separated by two intervening segments from the affected one. Both anticipatory and perserverative effects are found in articulation as well as the acoustic signal. Although the material is somewhat restrictive (few contexts and three speakers), the quantitative analysis is exemplary in its thoroughness. It would be extremely interesting to see the experiment extended to slow and then fast connected speech.

Most earlier studies of the reaction time in phoneme tracking centred on differences between phone types. P. West, A. Slate, J. Coleman & M. C. Borja demonstrate that 'Reaction time in phoneme monitoring varies [directly] with segment duration'. Both vocalic and consonantal segments were investigated.

Though most contributions to this volume are of the kind traditionally called experimental phonetics and now mostly referred to as 'laboratory phonology', no reference anywhere can be spotted to either classical generative phonology or any of its successors. Another characteristic

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of this collection of papers is that wherever measurement of any kind is involved, statistical methods, sometimes quite sophisticated, are used to test the hypotheses.

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AIDAN COVENEY, *The Sounds of Contemporary French: Articulation and Diversity*. Exeter: Elm Bank Publications, 2001. Pp. x + 214. ISBN 10902454-02-2 (pb).
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This book deals with French phonetics and phonology, and includes comparisons with English sounds. There are also sections on general phonetics in which information on other languages is added. A number of accents of French are dealt with, where information is available. The book is based on articulation, drawing heavily from Botherel, Simon, Wioland & Zerling (1986). This may explain why it does not consider matters such as liaison, stress, and intonation.

The author explicitly comments upon his own (and that of many other authors) reluctance to use the term 'standard' with reference to pronunciation. French authors prefer talking about *français standardisé*, 'standardised French'. Coveney prefers the term 'supralocal French', abbreviated to SF, but perhaps SLF would have been less likely to call 'standard French' to mind.

English-speaking learners will certainly find a wealth of information about French segments and many useful comparisons with sounds in varieties of their own language such as standard British English, Cockney and 'Estuary English'.

In the general sections, Coveney makes reference to several more or less recent publications from which he takes data and information about other languages. At times, he appears to be too willing to accept indirect information without checking the facts himself. I find that material from Maddieson (1986) (which is naively accepted by Coveney) can be unreliable simply due to the enormous scope of the book. For example, Coveney's assertion (p. 54) that Ladefoged & Maddieson (1996) say that pharyngeal and epiglottal fricatives can be contrastive is misguided. Agul, the language in which they are both said to appear, actually has epiglottal fricatives and epiglottal fricative trills, so the real distinctive feature is indubitably manner of articulation. In another case, Coveney describes the approximant [w] as simply 'velar' rather than 'labial-velar', which is surely inaccurate. Besides, it is very hard to believe (p. 38), following Maddieson (1986) and his source (Paulian 1975), that the labiodental nasal [ɱ] may really be a phoneme. As a matter of fact, from the very source one can infer that, instead of a phoneme '/ɱ/', that language, among its prenasalized consonants, has a prenasalized /bv/, for which a diacritical sign (like /ⁿbv/, instead of /ɱ/) would have been more realistic and less misleading.

Apart from things such as these, which could well be considered marginal, Coveney's treatment of French sounds is generally reliable. His second chapter deals with consonants, the third with vowels. I believe that his dependence on the data from Botherel et al. leads to an incorrect set of symbols for the nasalised vowels, [ɛ̃, œ̃, ɔ̃, ɔ̃]. [æ̃, œ̃, ɔ̃, õ] would be more appropriate for modern French, though there is no longer an [œ̃] in Parisian French. Symbols are very important descriptive and teaching devices, so they should be kept up to date in describing languages.

Coveney's fourth chapter, 'Intersegmental coordination', gives more space than previous books to coarticulation, allophonic variation and assimilation. Voicing and devoicing, nasalisation and denasalisation, and labialisation and delabialisation for vowels and consonants are dealt with, together with assimilation of place and manner of articulation, palatalisation and velarisation, vowel harmony, and plosive coordination.

Always drawing on the Strasbourg data, the author presents examples of phenomena some of which are generally missed even by trained phoneticians. I question the use of such detail in teaching the pronunciation of a foreign language and suggest that the inclusion of more information about prosody would be more useful.

In short, the book will certainly be useful for English-speaking learners as well as foreign readers in that it contains a very thorough treatment of French segmental phonetics and phonology. But no language may be considered fully described if its basic intonation structure is not included, and I hope that Coveney will consider this in his next book.

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PETER LADEFOGED, *Vowels and Consonants: An Introduction to the Sounds of Languages*. Oxford: Blackwell Publishers, 2000. Pp. xxii + 191. ISBN: 0-631-21411-9 (hb); 0-631-21412-7 (pb).
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Vowels and Consonants: An Introduction to the Sounds of Languages presents a large sampling of the sounds of the diverse languages of the world. This is not a systematic book on phonetics, nor is it an exhaustive look at all the vowels and consonants contained in the world's languages. The book effectively looks at the vowels and consonants that the renowned phonetician, Peter Ladefoged, has found to be the most interesting during his long career – fittingly called a book of 'personal favorites'.

One of the obvious strengths of the book is its creative and interactive nature, which greatly reinforces the learning of phonetics by the reader. Many of the most well known vowels and consonants from languages of the world that Ladefoged has chosen to include in the book are also produced on the accompanying CD, which also includes color figures and videos. The CD can be used with either Netscape or Microsoft Explorer on either a PC or Macintosh, and each recording can be played when it is opened and an acoustic analysis be

made of the sound files. Ladefoged recommends that readers listen to the sound files on the CD as they read through the text so as to reinforce the concepts and ideas presented in the book. Other illustrations are included on the CD, and these are discussed below.

Part 1 includes the first seven chapters, which discuss vowels and consonants in terms of their acoustic properties. Major constraints on the evolution of the sounds of the world's languages are first discussed, which include 'ease of articulation, auditory distinctiveness, and gestural economy' (p. 3). According to Ladefoged (pp. 2–3), a language requires a certain number of vowels and consonants in order to construct words that are short and distinctive. Languages such as Spanish and Japanese are able to get by with only five vowels, and some languages (e.g., most aboriginal languages of Australia) use as few as three vowels. The vowels /i a u/ are evenly distributed near the perimeter of the vowel space. These 'point' vowels are the most acoustically different and are thus a very good means by which to differentiate words. Many languages make use of these vowels, normally with at least one more. Many languages use five or six more vowels, thus creating an evenly proportioned vowel space. A majority of vowels of the world's languages can be distinguished by only the first two formants. The only vowel in which the F3 plays a significant role is the rare American English (AE) vowel that occurs in the word *bird*.

The second part of the book (Chapter Eight, 'Talking computers', and Chapter Nine, 'Listening computers') focuses on speech synthesis and speech recognition, respectively. Most people are acquainted with the fact that long sentences read by a computer sound somewhat mechanical. Making a good Text-To-Speech (TTS) system is a complex process. One example of creating a TTS system is provided. First, a written text is turned into a set of phonetic characters from which the computer creates a list of diphones and any syllables or whole words that are then stored. Stored items can thus vary in length, but most systems use stored whole words, some syllables and some smaller units. Consonants are more straightforward than vowels for TTS systems, as each consonant letter typically corresponds to one phonetic symbol, although understanding the distinction that can occur between positional allophones (e.g., aspirated and unaspirated /p/) must be handled. Next, the intonation pattern of the sentence is calculated based on its punctuation, and the necessary pitch of each item is stored. Dealing with the variety of intonations is complicated, as are combinations of words that are not pronounced as separate speech units but as continuous speech – some reduced and some emphasized – e.g., the differences between the sentences 'I have to fish', and 'I have two fish'.

Current recognition systems unfortunately rely more upon computer science techniques than phonetic and linguistic knowledge. The system learns and makes models from recordings of an extensive list of sentences, breaking each one up into strings of numbers representing one-hundredth of a second slice. The recognition system must know the probability that a particular set of numbers corresponds to a specific speech sound. The system does this by generating all the possible ways a speaker will produce each of the speech sounds. The best speech recognition systems control the number of possible responses, so they can choose from among a very small number of possibilities. In the recognition of running speech in any sequence of words, the system can determine the probability of each word. Some sounds and words are more frequent than others. A computer is good at taking all possible matches and putting them in memory and, at the same time, looking for the thousands of words that could come next.

The last part of the book focuses on describing the vowels and consonants of English and other languages from an articulatory approach. Chapter Ten, 'Making English consonants', includes an insightful description of the American English (AE) /r/. According to Ladefoged, the articulation of this sound is tricky to explain, in part, because it is pronounced differently within different dialects. The section labeled 'Muscles controlling the tongue and lips' in Chapter Eleven ('Making English vowels') includes a picture of the principle muscles that control the movements of the tongue, which are described and shown in diagrams. Analyses of X-rays have shown that tongue shapes associated with English vowels can be described as different combinations of two movements, one of which determines the degree of tongue

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raising and another the backward movement of the tongue, the only exception again being the AE vowel in *bird*.

Chapter Twelve, 'Actions of the larynx', has the sections 'Voiced and voiceless sounds', 'Voicing and aspiration', 'Glottal stops', 'Creaky voice', 'Ejectives', and 'Implosives', including examples from various languages of each of these categories. There are perhaps 600 different consonants and 200 vowels in the world's languages, according to Ladefoged, some of which are produced in places in the mouth unfamiliar to native English speakers; for example, nasals made with the tongue touching the upper front teeth, the palatal stops of Hungarian, the uvular stops of Aleut, and the clicks of some African languages. Ladefoged feels it is more difficult to know precisely the number of vowels there are among the world's languages due to the fact that vowel space is continuous. In his last chapter, 'Putting vowels and consonants together', Ladefoged provocatively suggests (p. 170) that individual vowels and consonants do not accumulate in the brain separately but are stored as words or at least whole syllables. For support, he alludes to the fact that speakers of a language do not make mistakes such as the word *cat* for *tack*, which would be possible if sounds were stored as separate units. To Ladefoged, vowels and consonants are just convenient fictions for use in describing speech but are invaluable aids for talking about the sounds of languages.

The book includes numerous helpful and easy-to-understand illustrations, figures, and tables on the accompanying CD. For example, in Chapter Two, 'Pitch and loudness', there is a demonstration of the various uses of pitch, including detailed pictures of the vocal cords vibrating at different pitches. In Chapter Four we can observe the overtones produced when saying the vowels /ɑ/ as in the word *father* and /i/ as in the word *see* and can notice how the waveform repeats itself. Vowel charts of the formants of men and women from California, American northern cities, and southern England are presented in Chapter Five. Chapter Eleven includes drawings of the vocal tract showing the mean position of the tongue and the highest point of the tongue in AE vowels. Another diagram plots these points on a scale with the corresponding acoustic data alongside. Also included are graphs of the five point vowels produced by the Belgian phonetician Didier Demolin, which are included in the CD. The book overall includes many useful depictions of the vocal organs, including an MRI scan of the head.

Vowels and Consonants: An Introduction to the Sounds of Languages takes a pioneering approach to phonetics, and it should fundamentally change the way the subject is taught. Ladefoged has the special ability to make the topic of phonetics very intriguing to both the novice and the specialist. The book is written in such a lucid manner that even an amateur without prior training in linguistics or speech acoustics should be able to understand the ideas and concepts that are presented.

DOUGLAS C. WALKER, *French Sound Structure*. Calgary: University of Calgary Press, 2001. Pp. xii + 229. ISBN 1-55238-033-5.
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In his preface, the author expresses the hope that in *French Sound Structure* he has produced 'a detailed, well-illustrated, and useful description of the pronunciation of Modern Standard French' (p. xi). He has succeeded admirably in this aim. A welcome addition to studies of French pronunciation, the book is aimed primarily at university students of French, and

secondarily at students of linguistics. Basic linguistic concepts, essential to an understanding of the central issues in French phonology, are explained in a concise and accessible way. Unlike other works aimed at a similar readership, such as Tranel (1987) or Price (1991), *French Sound Structure* makes no claim to be a pronunciation manual or to incorporate an introduction to articulatory phonetics. But phonetic notation is of central importance: the IPA is used extensively throughout, minimal articulatory feature labels are given to the symbols and, importantly, the reader can learn to relate sound to symbol by listening to the copious illustrations on the accompanying CD-ROM.

There are seven chapters of varying length reflecting their relative importance. Three brief introductory chapters set the scene. Chapter 1, 'The object of description', introduces the variety of French – so-called Standard French (SF) – which is the primary focus of description in subsequent chapters. Chapters 2 and 3 present some basic descriptive and theoretical concepts: orthography and word structure are dealt with in chapter 2, while chapter 3 concentrates on the phonological units and domains deemed relevant: segment, syllable, phonological word and phonological phrase. Well over half the book is taken up by the two following chapters: 4, 'Vowels and semi-vowels', and 5, 'Consonants'. It is in these two meaty chapters that the classic issues in French phonology are reviewed, discussed, exemplified and updated. Key issues in chapter 4 include vowel length; the distribution of the mid vowels; on-going mergers between pairs of vowel phonemes; distribution of the nasalized vowels; schwa ('mute e'); and the status of semi-vowels. In chapter 5 we move on to an account of consonant clusters; nasal consonants; assimilations; aspirate-h (more of a phantom consonant); and word-final consonants, including full discussion of linking phenomena: *enchaînement* and liaison. Chapter 6 is a brief and rather disappointing account of 'Prosody', but the final short chapter, 'Around the phonological periphery: playing with language', is a lot of fun: the pronunciation of abbreviations, acronyms and the forms produced using the language game *verlan* (French spoken *à l'envers*, work it out!) are used to illustrate current tendencies in pronunciation, which include many examples of forms with pronounced final consonants creating closed syllables. Finally, an appendix contains the word lists and text used on the CD by speakers of Northern, Southern and Canadian French.

In its coverage, Walker's work is traditional – the central issues in French phonology have not suddenly changed. Earlier accounts of French sound structure, *inter alia* Dell (1973), Walter (1976), Tranel (1987), Encrevé (1988), Wioland (1991), are a source of useful examples, but many new ones are added. He demonstrates, for example, that where traditional descriptions tell us that the close mid vowel /e/ does not occur in word-final closed syllables, in practice, northern French speakers regularly pronounce borrowed *cake* as /kek/ and *ale* as /el/. The *loi de position*, which governs the complementary distribution of mid-vowel pairs in Midi French, is still being productively violated in the north, despite the tendency to neutralize certain contrasts. The limited linguistic apparatus Walker introduces is used effectively to underpin discussion of certain key theoretical issues. For instance, questions of syllable structure, (re-)syllabification and domains are central to discussions of *enchaînement*, liaison, semi-vowels and schwa-deletion. Here Walker takes a fairly concrete approach; his syllabification of a derived form such as /ʒən·se·pɑ/ (*je ne sais pas*) will link the /n/ to the coda of the first syllable, exactly as the surface form would suggest, rather than to an abstract underlying onset constituent followed by a nucleus left empty by an unpronounced schwa. Theoretical debate on topics like this is tantalizingly absent, no doubt beyond the scope of a book primarily aimed at students of French language. Readers with a more phonological bent will find plenty of evidence in the illustrative data on which to construct their own arguments.

The need to focus on a particular reference accent is probably real, particularly if the accent in question is the one in which the target readership aims to become proficient. At the same time, since this is a phonetically informed description of sound structure rather than a pronunciation manual, I would have welcomed more comparisons with Midi French and

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Canadian French like the section on nasalized vowels on pp. 75–76. Using more than one reference accent can be illuminating, and need not be confusing. For example, Giegerich's (1992) account of English phonology, comparing RP, American and Scottish accents, yields some refreshing insights. Walker's own expertise in Canadian French (1984) is downplayed in favour of the old 'Standard French' model. So what is the 'Modern Standard French' that Walker describes? His definition follows a widely accepted formula: 'that variety of the language identified most often with the speech of the Parisian middle class . . . when its members are engaged in polite conversation' (p. 2). This conventional definition perpetuates a confusion between the prestige French of '*le bon usage*', most appropriately described in terms of its standardized lexico-grammatical content, and the particular accent with which it is pronounced. We are careful nowadays not to equate Standard English with the prestige accent often associated with it in Britain, RP. The same distinction is not so easily made for French, when the label Standard French is applied to the pronunciation as well as the grammar of educated speakers in Paris and the Île-de-France (and perhaps in northern France more widely). Though he sticks to the old Standard French label, the sensitive discussion of regional, social and register differences in chapter 1 shows that Walker is aware of these issues, and of variability within the Standard model.

One is tempted to think that the chapter on prosody was included out of a sense of duty. It is very sketchy, particularly on matters of pitch and intonation. The description of French intonation relies heavily on Di Cristo (1998), and many examples are borrowed from his paper, but the stylized pitch curves in chapter 6 are gross over-simplifications of Di Cristo's original fundamental frequency contours. The alignment of contour to text is left vague on the page, and the graphics often do not match the pitch patterns used on the audio recordings. Inexplicably, the final section of the chapter, examples of 'Colloquial constructions', involves no discussion of prosodic matters at all.

The presentation of the issues in the two main chapters is mostly remarkable for its clarity, its thoroughness and its wealth of examples. Even so, there are details with which one takes issue, and some unexpected omissions. For example, in describing the distribution of the mid vowel pairs, no allowance is explicitly made for intermediate phonetic qualities (e.g. '*e moyen*'). It is claimed (pp. 52–53) that /ɔ/ is preferred over /o/ in non-final open syllables, but much evidence (including examples on the CD) would seem to point the other way. In final closed syllables, *fausse* and *fosse* are a surprising choice to exemplify the contrast between /o/ and /ɔ/ since the two are usually regarded as homophones: [fos] (though the speaker on the CD obligingly pronounces *fosse* as [fɔs]). There is no explicit mention of the role of morpheme boundaries in facilitating schwa-deletion (common in *forte#ment*, despite the two consonants preceding the schwa position, less so in *appartement*). The account of liaison at the end of chapter 5 is rather repetitive, and becomes more of a catalogue than a discussion. There is no explanation of the phonetic consequences of a block on *enchaînement* – the audio examples suggest inconsistent use of a glottal stop. There are a number of typos, particularly among the transcriptions, but commendably few altogether.

Though much of *French Sound Structure* is a synthesis of earlier work, there are valuable new insights and examples, as mentioned. What ought to confirm this as the textbook of choice is the inclusion of the CD-ROM. Nearly all the sets of examples in the text have at least a subset illustrated on the CD. However, some words of caution are necessary. Firstly, technical problems: I was initially unable to get a clean audio output, despite my system apparently fulfilling the minimum requirements listed. An upgrade including some add-on RAM has solved the problem. Secondly, listener-readers should be aware that there will not always be a close match between the transcribed and the audio examples; the note on p. 208, appealing to the 'considerable variation in the pronunciation of Standard French' to explain the discrepancies, is something of an editorial cop-out. It is particularly frustrating to find that the speakers chosen to exemplify the contrast between e.g. /a/ and /ɑ/ (chapter 4, p. 61, CD track 26) simply do not make it. If the (rather old-fashioned) contrast is worth illustrating, then some effort should have been made to find a speaker who could do so. It is misleading in such

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circumstances to allow speakers to do their own thing, however authentic the variation, and mis-matches are likely to undermine listeners' confidence in their own perceptual abilities. For the most part, the speakers do a good job – though the pronunciation of *acuité* (chapter 5, p. 122, CD track 3) as /asɥite/ rather than /akɥite/ was quite a surprise! The five recordings of the accent-revealing text + word lists are a particularly valuable resource.

My own teaching in this area involves a course in French phonology for Linguistics students. They already have a basic grounding in phonetics, and Walker's textbook will serve as an excellent starting point for discussion of the theoretical issues. I shall recommend it warmly. Students of French without a phonetics/linguistics background are given a very supportive introduction to technical matters, and will find it well worth the challenge.

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