

Peter Ladefoged (2001) *Vowels and Consonants: An introduction to the sounds of languages*. Oxford: Blackwell Publishers. Pp. xxii+191.

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Reports drift up from South America suggesting that an obscure language uses an “impossible” phonetic element. So, the intrepid explorer/linguist tramps through the Amazon in search of a reputed sound never before studied by a phonetician, and perhaps thought to be impossible in human language.

This kind of phonetic research has been derided as “butterfly collecting”. The somewhat colonialist tone of this story leaves a bad taste for some. Others have been offended because the most famous practitioner of cross-linguistic phonetic exploration has famously suggested that language preservation is not the linguist’s job (Ladefoged, 1992; see also pp. 139-140 of *Vowels and Consonants*). More importantly, though, the criticism of “butterfly collecting” points to a supposed lack of attention given to phonetic/linguistic theory when the focus is on describing “vowels and consonants”.

For two weeks in 1993 I joined Ladefoged and a rather large entourage on a phonetic field trip to the Oaxaca state of Mexico listening for “ballistic” syllables in Jalapa Mazatec (Pike & Pike, 1947). We didn’t find them. But we did apply a range of phonetic and phonological data collection methods to an understudied language. The resulting work, published in a series of papers by various members of the research team (Silverman et al., 1996; Kirk, et al., 1993; Steriade, 1994), provide a set of primary phonetic data for one particular language. It turns out that one of the most linguistically interesting aspects of the language was one that we didn’t anticipate - that Mazatec realizes a contrast between breathy and creaky voice qualities in a somewhat unusual way. What is breathy voice? A butterfly collecting trip to Mexico added a bit of information that can help us evaluate theories of phonetic realization and perhaps also phonological representation.

Ladefoged & Maddieson’s (1996) *The Sounds of the World’s Languages* is the ultimate phonetic collection - a comprehensive survey of the range of phonetic segments in the languages of the world. As in all of Ladefoged’s (and Maddieson’s) work, the really major contribution is

that the sounds are phonetically described using instrumental analyses of their acoustic and articulatory properties. Traditional impressionistic phonetic descriptions take a back seat to instrumental descriptions. And at first glance, Ladefoged's latest book, *Vowels and Consonants*, appears to be a continuation of this tradition of instrumental phonetic exploration. For in the preface he states,

“I've just tried to give you a flavor of what happens when people talk, explaining most of the well-known sounds, and giving you a glimpse of some of the more obscure sounds that I've found interesting. As a result, this is a book of personal favorites.”

But appearances can be deceptive with *Vowels and Consonants*. This is a popularizing book for high-school seniors that presents a cutting edge of phonetic theory in deceptively simple language. As a popularizing book it achieves the goals that Anthony Burgess set but failed to accomplish in his *A Mouthful of Air*, though Burgess does get points in phonetic heaven for saying, “I plead now for the introduction of some kind of phonetic study into the English curriculum at all levels. Children must learn to know what their vocal organs are doing when they speak their own, or any other, language.”

For the experienced phonetics teacher *Vowels and Consonants* is filled with surprises. For example, the International Phonetic Alphabet is prominently displayed at the beginning of the text but not discussed until page 176. Acoustic/phonetic descriptions of speech sounds dominate the first half of the book, while the terms “manner of articulation” and “place of articulation” are not discussed until page 99. In a book titled *Vowels and Consonants*, the first phonetic elements discussed are Mandarin tones, and toward the end of the book vowels and consonants are declared to be “convenient fictions”.

One of the most appealing aspects of *Vowels and Consonants* is the very well-done CD-ROM (by Jenny Ladefoged) that accompanies it. All of the sounds mentioned in the book are linked in the html documents on the CD. Additionally, several passages of the book only make sense if the reader listens to the examples on the CD. The CD is organized so that there is a web page for each chapter of the book, with audio recordings and photographs, and two videos (vocal fold vibration, and vowel articulation x-ray). One very nice surprise is that the CD also contains

the *Course in Phonetics* web pages, which have recordings for all of the examples cited in that book and Ladefoged's demonstrations of how to do the production exercises. The CD also contains a very helpful exemplified IPA chart, with recorded examples of each of the sounds symbolized in the IPA, as pronounced by Peter Ladefoged. Everything on the CD is available in exactly the same format with updates and corrections on the web (Ladefoged, 2001).

But where *Vowels and Consonants* really surprises is that rather than being about phonetic exploration, this is a book about the theory of phonetics, summarizing in clear approachable prose Ladefoged's "lifetime chasing ideas in phonetics" the high-points of which include his *Preliminaries to Linguistic Phonetics* (1971), "What are linguistic sounds made of?" (1980), and "Out of chaos comes order" (1984). To be sure, the bulk of the book is an extended discussion of what linguistic sounds are made of, but the discussion is framed by theoretical chapters. Chapter 1 outlines Ladefoged's three part view of phonetics, and chapter 15 relates the phonetic form of the mental lexicon to the IPA and a distinctive feature theory.

The remarkable success of Ladefoged's work can be seen partly in the ubiquity of his perspective. People don't think that they are operating within a theory of phonetics, but rather that Ladefoged's view is simply the way it is. This reflects his leadership in directing the field to problems and solutions of his choosing, and is also partly due to his sensitive reading of the field. Thus, the key theoretical point of chapter 15 (discussed below) is especially worthy of notice.

The three part view of phonetics that forms the backdrop for *Vowels and Consonants* is that (1) sound change is constrained by the auditory system, articulatory system, and the cognitive organization of lexical structure, (2) speech conveys multiple layers of information, including social group membership, the physical and emotional state of the talker, and the identity of the talker, and (3) the sounds used in language can be described in terms of acoustics, articulation, and the symbols of the IPA. This is a fairly accurate description of the consensus view among phoneticians, though, the second point, Ladefoged's emphasis on information conveyed by speech, is somewhat unique, and has been for many years (see Ladefoged and Broadbent, 1957). Phoneticians sometimes forget how pervasive the "layers of information" view is in modern phonetics until we are again confronted with students trying to interpret spectrograms.

The book has five logical sections. The first section is composed of the first chapter and sets the theoretical framework for the remainder. The second section is composed of chapters 2

through 9 and deals with the acoustic description of speech sounds. The third section introduces articulatory phonetic descriptions of English vowels and consonants in two chapters. The fourth section extends articulatory phonetic description to other languages offering detailed instrumental articulatory analyses of the actions of the larynx (chapter 12), consonants (chapter 13) and vowels (chapter 14) from a number of different languages. The last section, chapter 15, provides a concluding theoretical discussion of vowels and consonants.

Presenting acoustic phonetics first, before giving traditional articulatory descriptions of the sounds, is unusual. Ladefoged justifies this emphasis, saying “We know far more about the acoustics of speech than about the movements of the tongue and lips. A spectrogram gives us more information about a sound than any present-day account in terms of the vocal organs” (p 96). In this section of the book, chapters 8 “Talking computers” and 9 “Listening computers” are unique and particularly valuable. They provide a simplified view of speech technology from a historical perspective that justifies the level of presentation and makes the chapters a joy to read. Ladefoged’s directness and clarity also helps. For example, at the end of chapter 9 he states, “My personal bet is that we will have almost perfect speech recognition systems before we have completely natural sounding speech synthesis” (p. 95). It is a delight to read an author who is willing to make such a clear prediction.

The speech production sections of *Vowels and Consonants* follow a format that is familiar to anyone who has read Ladefoged’s *A Course in Phonetics*. Though both of these books are introductions to phonetics, *A Course in Phonetics* is a systematic introduction suitable for classroom use, while *Vowels and Consonants* is more of a personal statement, and thus the content in these sections on speech production is less comprehensive. Two chapters introduce articulatory phonetics with descriptions of English consonants and vowels. These are then followed by three chapters covering a range of non-English phonetic variations, including breathy, creaky, ejective, and implosive consonants in chapter 12, clicks and non-English places of articulation in chapter 13, and nasalized vowels and other non-English vowels in chapter 14. As in previous works, Ladefoged tends to emphasize the aerodynamic description of consonant manner of articulation - in this respect choosing an emphasis more like Catford (1977) than Stevens (1998). The fundamentally auditory nature of phonetic vowel transcription, again a familiar point, is stated very memorably in chapter 11, where Ladefoged concludes a historical review of vowel transcription by saying “They thought they were describing the highest point of

the tongue, but they were not. They were actually describing formant frequencies.” (p. 115).

The final chapter “Putting vowels and consonants together” presents Ladefoged’s featural interpretation of the IPA. Unlike most other phoneticians, he has been willing over the years to explore the interface of traditional phonetics with modern theoretical phonology, and the approach here to distinctive features is familiar from his work dating back to at least 1971 (*Preliminaries*). He posits, for English, a hierarchically organized distinctive feature system with multivalued features. Then rather than attempt to lay out a comprehensive “universal” system, he focusses the discussion on decision procedures with questions like, “when do you decide to add a new feature?” or “how much cross-linguistic phonetic variation can be subsumed under a single feature value?” He offers no hard-and-fast rules.

Perhaps this is because the goodness of a descriptive scheme such as the IPA or distinctive feature theory (based solely on patterns of contrast and descriptive phonetic data) is a matter of opinion unresolvable by evidence in a way that an accurate account of the units that listeners and talkers use in linguistic communication is not. Thus, the key point in this final chapter is that “consonants and vowels are largely figments of our good scientific imaginations” (p. 170).

In support of this conclusion, Ladefoged turns two of the most commonly cited arguments for the segmental view of consonants and vowels against themselves and realigns one of the earliest arguments in support of the motor theory of speech perception. The rapid rate of consonants and vowels in the normal flow of speech (10-15 segments per second) was taken by Al Liberman (1996) to suggest that speech is a “special code” that cannot be processed as a cipher the way for example Morse code is. Speech comes too fast (in segments per second) to be produced or perceived in normal ways. Ladefoged takes this argument seriously and notes that everything is fine, speech production and perception rates are completely normal, if we count rate in terms of syllables per second.

What about alphabetic writing systems? Writing systems support the view that speech is processed in syllable-sized chunks. “It is noteworthy that alphabetic writing has almost certainly been invented only once, whereas there are many independent inventions of systems for writing down syllables” (p. 172). Alphabetic writing is “clever” but as a one-time occurrence in human history does not reveal the “real properties of words”. What about speech errors? Ladefoged concludes that the role of syllable structure in speech errors, that onsets substitute for onsets,

etc., shows that words are probably stored in our brains in syllable sized chunks.

Is he right? Are vowels and consonants merely analytical elements that are useful for linguistic descriptions like grammars or writing systems, but not actually used as the units of speaking and listening? He is certainly right to say that this view “is not that of many speech scientists” (p. 183), but he is also reflecting a lively undercurrent in linguistic/phonetic research (Savin & Bever, 1970; Klatt, 1979; Mehler, 1981; Segui, 1984; Read, et al., 1986; Sevald et al., 1995; and Johnson, 1997). The most likely answer seems to be that literacy in an alphabetic writing system makes an alphabetic analysis available in some listening and speaking tasks, but that consonants and vowels are not necessary for speech communication.

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