Introduction. A striking phenomenon in applied linguistics is the length of time it takes for changes in general linguistic theory to show any applicability, if they ever do, to language teaching or other real-world endeavors for which an understanding of the nature of language is a prerequisite. Periodically, someone points this out in print: see, e.g. Johnson 1968 [failure] and Blurf 1977 [Servant]. The exception to this overgeneralization is syntax, in which the theory of Principles and Parameters (Chomsky 1981) has had a very noticeable effect on our notions of second language acquisition (if not second language teaching—cf. Cook 1996). But particularly in the area of the acquisition of second language phonology, it is difficult to discern any trace of the changes in phonological theory that have taken place since the 1940’s. I refer to such notions as the following:

- Distinctive feature theory (Jakobson, Fant, & Halle 1951)
- Intrinsic Rule ordering (Koutsoudas, Sanders, & Knoll 1974)
- Markedness (Chomsky & Halle 1968)
- Natural phonology (Stampe 1969)
- Autosegmental phonology (Goldsmith 1976)
- Natural generative phonology (Hooper 1976)
- Lexical Phonology (Kiparsky 1982)
- Underspecification (Archangeli 1984)
- Feature geometry (Clements 1985)
- Metrical phonology (Goldsmith 1990)
- Optimality theory (Prince & Smolensky 1993)

It is the goal of this paper to describe some of these changes (some have called them ‘advances’) in phonological theory, and to evaluate their possible applications, primarily to second/foreign language teaching, but in some cases to other possible real-world situations involving language.

Distinctive features. As originally conceived by Jakobson et al., part of information theory involved the identification of those acoustic features of each phoneme which separated it from all other phonemes of the language. From a maximum of twelve universal features, each language would select those that were distinctive for its phonemes. Each feature had a binary value of plus or minus, giving a maximum of $2^{12}$, or 4096 different sounds. Naturally, no language used all features; [flat], for instance, used originally for retroflexion and pharyngealization, played no distinctive role in the phonology of English, nor did [compact], used for palatalization.

Many modifications have been made over the years to the set of distinctive features used to describe the world’s languages. Now there are thought to be about forty, most of them articulatory rather than acoustic. No linguist has proposed abandoning distinctive features since the mid-60’s (see Householder 1965). Yet, though it seems to be the consensus that sounds are best described as bundles of features instead of as monolithic wholes, and though phonological processes are universally couched in terms of features, we have seen virtually no influence of...
this on the study of interlanguage phonology or the teaching of pronunciation. Superficially, it would appear that second language learners acquire, rather than whole phonemes, the distinctive features which are the building blocks of those phonemes: an English speaker learning French, for instance, has to learn the feature [nasal] as a distinctive one in vowels, not a redundant one as it is in English, in which the nasality of vowels is entirely predictable based on that of the following consonant. The same learner must make [round] a distinctive feature rather than a predictable one. A French speaker learning English has to learn to make [strident] a distinctive feature: in French, fricatives are redundantly [+strident], but in English this feature serves (in some analyses) to distinguish /θ/ from /s/ and /ð/ from /z/. Anyone doing a contrastive analysis of two languages can see that features which are distinctive in one of them are redundant, or absent, in the other.

Yet the metaphor breaks down when it becomes apparent that features can be distinctive in different ways. In Arabic, [voice] is distinctive in coronal obstruents: [t s f] contrast with [d ð z (d)j], respectively, as do the ‘emphatic’ (pharyngealized) sounds [tˤ sˤ] with [dˤ ðˤ zˤ]. It would there seem that an Arabic speaker learning English should, since [voice] is a distinctive feature in Arabic, have no transfer problems with the voicing of English obstruents. But this is not the case: /p/ and /b/, distinctive in English, are allophones of the same phoneme in Arabic ([p] appearing only word-finally in some styles); /v/, distinct from /f/ in English, is absent from Arabic, and is often pronounced [w] or [f] by Arabic speakers.\(^2\) English speakers learning Arabic have to learn to produce and perceive the uvular fricatives [χ] and [ʁ] (and for Standard Arabic the stop [q], pronounced [g] in the colloquial variety). The feature [continuant] is distinctive in English labial and coronal obstruents, but palatal, velar, and uvular fricatives are not part of English. Distinctive feature theory is silent, too, on why the voiced post-palatal fricatives are apparently so much more difficult for English speakers than the voiceless ones.\(^3\)

It appears that features are themselves not independent, but interact in different ways in different languages. It is this interaction which must be acquired, and it seems that for second language learners, features are acquired not independently but as components of sounds and/or phonemes. Features may play more of a role in processes than they do in individual sounds. Consider the Spanish rule by which the voiced stops [b d ɡ] are replaced with their fricative counterparts [β ð γ] in certain environments. The rule can be couched in distinctive feature terms much more economically than in terms of individual sounds, making a generalization:

\[
\begin{align*}
\left(1\right) & \rightarrow [+\text{continuant}] /\left[\begin{array}{l}
-\text{sonorant} \\
+\text{consonantal} \\
+\text{voice}
\end{array}\right] +\text{sonorant} \\
-\text{nasal}
\end{align*}
\]

Rule (1) is definitely a rule in Spanish. For Spanish speakers learning English, it is the suppression of this rule that must be acquired if, e.g., ladder is to be correctly differentiated.

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1 There are some exceptions: Hancin-Bhatt 199? and Weinberger 199? as noted earlier, and Dickerson 197?. But it is striking how few of the articles in a collection like Ioup & Weinberger 1987 and even James & Leather 1997, for instance, use features in any way beyond descriptive shorthand.

2 The situation in Arabic velars is somewhat more complex, but it does not affect the argument.

3 Voiced fricatives are less frequent and therefore more marked than voiceless fricatives in the world’s languages; but even the Markedness Differential Hypothesis (Eckman 1987) would not predict that speakers of a language which contrasts /θ s j/ with /v ð z ʒ/ would have more difficulty with /γ n/ than with /s χ/.
from *lather, saber* from *saver*, etc.\(^4\) English speakers must, on the other hand, acquire (1) when they learn Spanish.

In German, no syllable can end with a voiced obstruent. This is conveniently expressed by the following rule:

\[
(2) \text{[-sonorant]} \rightarrow \text{[-voice]} /___\
\]

Like the Spanish rule (1), this rule must be acquired by speakers of English, in which both syllables and words can end with voiced obstruents, when they learn German. Russian has a similar rule, but it applies to words, not syllables: a Russian speaker might pronounce the German word *Halbband* ‘half-volume’ [ʰalpˌʃant] as *[ʰalbˌʃant], assimilating the voicing of the second bilabial stop to that of the first. An English speaker might say *[ʰalbˌʃand], with no devoicing at all, since neither devoicing rule is part of English.

**Markedness.** Similar but not identical to the Prague School’s prewar notions of markedness (Trubetzkoy 1939), the theory of markedness outlined in Chomsky & Halle 1968 proposed that each feature had a marked and an unmarked value in various contexts. Interaction of these markings produces segment types which are less marked and therefore easier to acquire than others. Among the vowels, /a/ is considered the least marked, since a low back vowel occurs in virtually all languages, and because children acquiring their languages are said to learn these vowels early, along with the maximally distant /i/ and /u/. Voiceless obstruents are less marked than voiced ones, since many languages have only voiceless ones, but none have been found with only voiced ones; the presence of voiced obstruents in a language implies the presence of voiceless obstruents.\(^5\)

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**References**
Blurf, xx. 1977. Linguistics: A good servant, but… *ELT Journal*…

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\(^4\) They must also, of course, learn to produce the fricatives in environments other than those shown in the structural description of (1), to differentiate *day* from *they*, *bowels* from *vowels*, etc.

\(^5\) Not necessarily at matching places of articulation; cf. Arabic /b/. 