(6) a. mat nat let rat wet yet
   b. bat tat get cat yet fat

In producing the set of initial consonants in (6b), the vocal tract is narrowed or totally closed so that air is trapped inside of it and, as a result, the air pressure inside the cavity is greater than that outside. By contrast, when the sounds in (6a) are produced, there is no obstruction to the air flow and no pressure build-up inside the cavity. It is customary to refer to the sounds in (6a) as sonorants and to those in (6b) as nonsonorants or obstruents.

We conclude this section with a list of distinctive features (7). This set of features is sufficient to define and distinguish, one from another, the great majority of the speech sounds used in the languages of the world. Many of the features on this list have been discussed above, but are included here for reference.

(7) The Articulatory Correlates of the Distinctive Features

1. syllabic/nonsyllabic; [±syl]. Syllabic sounds are those that constitute syllable peaks, nonsyllabic sounds are those that do not. Syllabic sounds are typically more prominent than contiguous nonsyllabic sounds. (Vowels, syllabic consonants vs. glides, nonsyllabic consonants.)

2. consonantal/nonconsonantal; [±cons]. Consonantal sounds are produced with a sustained vocal tract constriction at least equal to that required in the production of fricatives; nonconsonantal sounds are produced without such a constriction. (Obstruents, nasals, liquids vs. vowels and glides.)

3. sonorant/obstruent; [±son]. Sonorant sounds are produced with a vocal tract configuration sufficiently open that the air pressure inside and outside the mouth is approximately equal. Obstruent sounds are produced with a vocal tract constriction sufficient to increase the air pressure inside the mouth significantly over that of the ambient air. (Vowels, glides, liquids, nasals vs. stops and fricatives.)

4. coronal/noncoronal; [±cor]. Coronal sounds are produced by raising the tongue blade toward the teeth or the hard palate; noncoronal sounds are produced without such a gesture. (Dentals, alveolars, palato-alveolars, palatal vs. labials, velars, uvulars, pharyngeals.)

5. anterior/posterior; [±ant]. Anterior sounds are produced with a primary constriction at or in front of the alveolar ridge, while posterior sounds are produced with a primary constriction behind the alveolar ridge. (Labials, dentals, alveolars vs. palato-alveolars, palatal, velars, uvulars, pharyngeals.)

6. labial/nonlabial; [±lab]. As the term implies, labial sounds are formed with a constriction at the lips, while nonlabial sounds are formed without such a constriction. (Labial consonants, rounded vowels vs. all other sounds.)

7. distributed/nondistributed; [±distr]. Distributed sounds are produced with a constriction that extends for a considerable distance along the midsagittal axis of the oral tract; nondistributed sounds are produced with a constriction that extends for only a short distance in this direction. (Sounds produced with the blade or front of the tongue vs. sounds produced with the tip of the tongue. This feature may also distinguish bilabial sounds from labiodental sounds.)

8. high/nonhigh: [± high]. High sounds are produced by raising the body of the tongue toward the palate; nonhigh sounds are produced without such a gesture. (Palatals, velars, palatalized and velarized consonants, high vowels and glides vs. all other sounds.)

9. back/nonback: [± back]. Back sounds are produced with the tongue body relatively retracted; nonback or front sounds are produced with the tongue body relatively advanced. (Velars, uvulars, pharyngeals, velarized and pharyngealized consonants, central vowels and glides, back vowels and glides vs. all others.)

10. low/nonlow: [± low]. Low sounds are produced by drawing the body of the tongue down away from the roof of the mouth; nonlow sounds are produced without such a gesture. (Pharyngeal and pharyngealized consonants, low vowels vs. all others.)

11. rounded/unrounded: [± round]. Rounded sounds are produced with protrusion of the lips; unrounded sounds are produced without such protrusion. (Rounded consonants and vowels vs. unrounded consonants and vowels.)

12. continuant/stop: [± cont]. Continuants are formed with a vocal tract configuration allowing the airstream to flow through the midsagittal region of the oral tract; stops are produced with a sustained occlusion in this region. (Vowels, glides, r-sounds, fricatives vs. nasal and oral stops, laterals.)

13. lateral/central: [± lat]. Lateral sounds, the most familiar of which is [l], are produced with the tongue placed in such a way as to prevent the airstream from flowing outward through the center of the mouth, while allowing it to pass over one or both sides of the tongue; central sounds do not involve such a constriction. (Lateral sonorants, fricatives and affricates vs. all other sounds.)

14. nasal/oral: [± nas]. Nasal sounds are produced by lowering the velum and allowing the air to pass outward through the nose; oral sounds are produced with the velum raised to prevent the passage of air through the nose. (Nasal stops, nasalized consonants, vowels and glides vs. all other sounds.)

15. advanced/unadvanced tongue root: [± ATR]. As its name implies, this feature is implemented by drawing the root of the tongue forward, enlarging the pharyngeal cavity and often raising the tongue body as well; [− ATR] sounds do not involve this gesture. ([+ ATR] vowels such as [i,u,e,o] vs. [− ATR] vowels such as [ɪ,ʊ,ɛ,ʌ,ə].)

16. tense/lax: [± tense]. Tense vowels are produced with a tongue body or tongue root configuration involving a greater degree of constriction than that found in their lax counterparts; this greater degree of constriction is frequently accompanied by greater length. (Tense vowels vs. lax vowels.) We note that this feature and the last (ATR) are not known to cooccur distinctively in any language and may be variant implementations of a single feature category.

17. strident/nonstrident: [± strid]. Strident sounds are produced with a complex constriction forcing the airstream to strike two surfaces, producing high-intensity fricative noise; nonstrident sounds are produced without such a constriction. (Sibilants, labiodentals, uvulars vs. all other sounds.) The feature [+ strid] is found only in fricatives and affricates.

18. spread/nonspread glottis: [± spread]. Spread or aspirated sounds are produced with the vocal cords drawn apart, producing a nonperiodic (noise) component in the acoustic signal; nonspread
or unaspirated sounds are produced without this gesture. (Aspirated consonants, breathy voiced or murmured consonants, voiceless vowels and glides vs. all others.)

19. constricted/nonconstricted glottis: [± constr]. Constricted or glottalized sounds are produced with the vocal cords drawn together, preventing normal vocal cord vibration; nonconstricted (nonglottalized) sounds are produced without such a gesture. (Ejectives, implosives, glottalized or laryngealized consonants, vowels and glides vs. all others.)

20. voiced/voiceless: [± voiced]. Voiced sounds are produced with a laryngeal configuration permitting periodic vibration of the vocal cords; voiceless sounds lack such periodic vibration. (Voiced vs. voiceless consonants.)

3. Natural Classes of Sounds

In (2) we gave examples of the admissible three-consonant onsets in English words, and we argued at length that English speakers have knowledge of the admissible onsets of their language. We have as yet not stated the principle governing these onsets by virtue of which speakers can distinguish "possible" from "impossible" pseudo-words in a list such as (1). As a first approximation we may say that English words are subject to the limitation that in a three-consonant onset cluster, C₁ must be [s], C₂ must be one of the set [p,t,k], and C₃ must be one of the set [r,l,w,y].

An important aspect of this limitation is that it involves not just random sets of phonemes but sets that share some features in common. Thus, for example, the set [p,t,k] shares the features [− voiced, − continuant], whereas the set [r,l,w,y] shares the features [+ sonorant, − nasal]. And we find shared features in all sorts of phonological regularities in all sorts of languages: they generally involve natural classes of phonemes.

To cite one other example where the set of sounds [p,t,k] plays a role in English phonology, we observe that these sounds are pronounced with a special puff of breath or aspiration when they occur word-initially before stress as, for example, in such words as *pill, till, kill*. When these phonemes occur in other environments, they are not aspirated, as, for example, in *spill, still, skill*. In order to see more clearly what is involved in these cases, it is useful to examine the natural classes of phonemes as defined in the feature list (7). Let us assume, as proposed by Roman Jakobson, that phonemes are nothing but bundles or complexes of features and that therefore the only way that we can refer to a phoneme is by listing the features that compose it. When we attempt to follow this procedure, we discover that we need not list for each phoneme all features given in (7), but rather a smaller set of "defining" features. Thus, for example, we may uniquely designate the phoneme [p] by the four features:

(8) [− sonorant, + labial, − voiced, − continuant]

It is not possible to omit any of these features, for if we did we would be identifying not a single sound but a set of sounds. For example, if we omitted the specification of the feature [continuant], we would be identifying the set [p,t]: if we omitted the specification of [voiced], we would identify the set [p,t,k], and if we omitted the specification of [labial], we would identify the set [p,t,k], i.e., the set that can occupy the middle position in English three-consonant onsets and also is subject to aspiration word initially before stress.

Unlike the sets just reviewed, a set like [p,t] can be identified only by specifying more features than are required for each of the two sounds individually. In order to identify the set [p,t], we would have to specify the disjunction (9):