1. All varieties of English distinguish the syllabic nuclei in the following words:

\begin{verbatim}
beat  boot
bit   book
bate  boat
bet   but
bat   Baht
bite  bout  boil  Bert  beaut
\end{verbatim}

In addition, many speakers of American English (though not Canadian) distinguish the nucleus of \textit{Baht} (which rhymes with \textit{cot}) from that of \textit{bought} (which rhymes with \textit{caught}). British\(^2\) and Antipodean\(^3\) English additionally have a third low back vowel phoneme, so they distinguish \textit{Baht} and \textit{bought} not only from each other but also from \textit{bot}.\(^4\)

2. I deliberately stated the above without using phonetic symbols, postponing their appearance until this section, the discussion of what these vowels sound like. No two speakers pronounce them exactly the same, but some broad overgeneralizations can be made. I'll cite each vowel by giving the word from (1) containing it, and then suggest a symbol for the phoneme, and give my own pronunciation of it.

\begin{verbatim}
Word  Symbol  MMTH says
beat  /i/    [bijt]
bit   /i/    [bit]
bate  /e/    [bejt]
bet   /e/    [bet]
bat   /æ/    [bæt]
but   /a/    [bæt]
bite  /aj/   [bajt]
boil  /oj/   [bojyl]
boot  /u/    [buwt]
book  /ø/    [buk]
boat  /o/    [bowt]
bought /ɔ/   [bɔ:t]
Baht  /a/    [ba:t]
bot   /ø/    [bøt]
bout  /aw/   [bawt]
beaut /ju/   [bjuwt]
Bert  /ør/   [bøt]
\end{verbatim}

In syllables with secondary stress, all of these vowels are shortened, and some diphthongs become monophthongs: \textit{be} is [bij], but \textit{begone} is [bi'gən]; \textit{bate} is [bejt] but \textit{chaotic} is [kʰe'btik], etc. I believe that my /aj/, /aw/, /oj/, and /ju/ retain their diphthongal quality even when unstressed.

3. In English, unstressed vowels are severely reduced—more so than in any other language, I believe, although French comes close. Many become /ə/: \textit{invoke} [in'vewk], \textit{vocation} [vo'kejsn], \textit{invocation} [in'vekejsn]; \textit{Democrat} [də'mækrat], \textit{democracy} [də'mɑk,rəsi].

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\(^1\) Thai currency.
\(^2\) English, but not Scottish or Irish.
\(^3\) Australian and New Zealand.
\(^4\) An equine disease.
4. Not all speakers have diphthongs for /i e u o/, even under primary stress. Many speakers from the Northern U.S. and Canada pronounce these as “pure” vowels.

5. Not all vowels can occur in all environments. While the environment /b ___ t/ seems hospitable to all English vowels except /u/, there are several other restrictions. The vowels /i e æ u/ do not occur word-finally; syllables in which they occur are always closed with or followed by a consonant. Not all vowels appear before /r/ or /l/ or /l/, as shown in Table 4.3 on p. 87 of Ladefoged’s *A Course in Phonetics*.

6. This brings us to the notion of **neutralization**. This term refers to the loss, in a particular environment, of a distinction between sounds that is, in other environments, phonemic. For instance, /i/ and /u/ contrast in *feet* and *fit*, but which of them occurs in *fear*? They don’t contrast before /r/. The same thing is true of /æ/ and /e/. Which one occurs in *bear*? What about /æ/ and /e/ before /r/? Do you pronounce *merry* and *marry* differently? If you look at Table 4.3, Ladefoged appears to have decided that *beer* is /bɛr/, and *bear* is /bɛr/. He and I also think that the vowel in *sing* is /ʌ/, the same as the one in *sin*, but many people from the Midwest really pronounce it the same as the one in *seen*. Here are some environments which promote neutralization in my English:

<table>
<thead>
<tr>
<th>Distinction</th>
<th>Neutralizing Environments</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>/i/ - /u/</td>
<td>___ /r/, ___ /ŋ/</td>
<td>beer, sing</td>
</tr>
<tr>
<td>/e/ - /æ/</td>
<td>___ /r/, ___ /ŋ/</td>
<td>bear, length</td>
</tr>
<tr>
<td>/o/ - /ɔ/</td>
<td>___ /r/, ___ /j/</td>
<td>boar, boil</td>
</tr>
<tr>
<td>/u/ - /o/</td>
<td>___ /r/, ___ /ʃ/</td>
<td>tour, push</td>
</tr>
<tr>
<td>/ʌ/ - /ə/</td>
<td>___ /ŋ/</td>
<td>long</td>
</tr>
</tbody>
</table>

Some American English speakers have further neutralizations in their vowel systems. There are people for whom ___ /l/ is similar to ___ /r/, producing no distinction between *sale* and *sell*, and even *feel* and *fill* for some speakers ([aj ’dʒnt fr ɡud sow aj skipt ðə sel]) and *file* and *foul* for others. Few Americans brought up west of the Alleghenies distinguish *berry* from *Barry*, and many speakers in Appalachia and some other places do not distinguish *special* and *spatial* (both ['speʃəl]) or *fish* from *fiche* (both [fiʃ]).

Finally, it is not clear why there are no English words in which /aj/, /aw/, /oʃ/, or /ju/ occur before /ʃ/ or /ŋ/. /aw/, /ɔ/, /ɔ/, and /oʃ/ do not occur before labial consonants in any non-Scottish varieties of English.

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5 Whose absence looks like an accidental gap rather than a systematic constraint, since that vowel can occur after /b/ as in *book* and before /t/ as in *soot*.

6 This phonological or distributional fact is the only thing they have in common, though they are called the “lax vowels” of English. Their production does not involve any less muscular tension than that of the other vowels.

7 I honestly don’t know which phoneme I use before /ʃ/ in words like *boil* and *horse*. I used to be sure it was /ɔ/, but no longer. It could very well be /ə/. Ladefoged thinks *coil* is /kɔːl/.