2. The North American English vowel system

The general framework used by ANAE for the description of North American vowel systems is presented in this chapter. These vowel systems all show some relatively stable vowel classes and other classes that are undergoing change in progress. A systematic description of the sound changes will require a point of departure or *initial position* that satisfies two criteria:

(1) each of the current regional vowel systems can be derived from this representation by a combination of mergers, splits, shifts of sub-system or movements within a sub-system, and
(2) the differential directions of changes in progress in regional dialects can be understood as the result of a different series of changes from the initial position.

Within the evolutionary and historical perspective of this Atlas, we are free to take up any point in the history of the language as an initial position to trace the evolution of a given set of dialects. The degree of abstraction of these initial forms depends upon the nature and extent of the sound changes that differentiated the dialects. If mergers are involved, the initial position will show the maximum number of distinct forms; if splits are involved, it will be the minimum. For conditioned sound changes, such as the vocalization of postvocalic /r/, the initial position will show the undifferentiated forms, for example, /r/ in all positions. Since chain shifts by definition preserve the original number of distinctions, the initial representations will be identical in this respect; but if the chain shift has crossed sub-systems, it may have introduced a different set of phonetic features in that system and is not in that sense structure-preserving.

An initial position is an abstraction that may not correspond to any actual uniform state of the set of dialects in question, since other intersecting sound changes, including retrograde movements, may have been operating at an earlier period. Its major function is to serve as the basis for an understanding of the internal logic of the patterns of change now taking place in North American dialects and to show the relations among the various mergers and chain shifts that drive regional dialects in different directions.[1]

2.1. Long and short vowels

The classification of any English vowel system must begin by recognizing the distinction between the **short** vowels of *bit*, *bet*, *bat*, *pot*, etc. and the **long** vowels of *beat*, *bait*, *boat*, etc. This is not because the members of the first set are shorter than the members of the second, though they frequently are. In some English dialects, like Scots, the phonetic length of a vowel is determined entirely by the consonantal environment, not the vowel class membership. But Scots, like other dialects, is governed by the structural distinction between long and short vowel classes, which is a product of the vocabulary common to all dialects.

English short vowels cannot occur word-finally in stressed position, so there are no words of the phonetic form [bɪ, bɛ, ba, bo or bʊ]. Long vowels can occur in such positions, in a variety of phonetic shapes. The word *be* can be realized as [bi, bi^{ɪ}, bɪi, bi^{j}, bɨ^{j}], etc. Thus in English, long vowels are *free* while short stressed vowels are *checked*. It follows that a short vowel must be followed by a consonant.[2] The checked–free opposition is co-extensive with the short–long distinction that is common to historical and pedagogical treatments of English, and it is central to the ANAE analysis of North American English as well.

2.2. Unary vs. binary notation

In the tradition of American dialectology initiated by Kurath, a simplified version of the IPA was adapted for phonemic notation, choosing the phonetic symbol that best matches the most common pronunciation of each vowel in a particular variety. In this *unary* notation, both checked and free vowels are shown as single symbols, except for the "true" diphthongs /ai, au, oi/.

Table 2.1. Phonemes of American English in broad IPA notation (Kurath 1977: 18–19)

Checked vowels				Free vowels					
Front		Back		Front		Central		Back	
bit	/ɪ/	/ʊ/	*foot*	*beat*	/i/			/u/	*boot*
bet	/ɛ/	/ʌ/	*hut*	*bait*	/e/	/ɜ/	*hurt*	/o/	*boat*
bat	/æ/	/ɑ/	*hot*					/ɔ/	*bought*
				bite	/ai/			/au/	*bout*
				quoit	/oi/				

A similar notation, resembling broad IPA, is found in many other treatments of modern English, particularly those with a strong orientation towards phonetics (Ladefoged 1993) or dialectology (Thomas 2001; Wells 1982).

Such a unary approach to phonemic notation was rejected for the Atlas on the basis of several disadvantages. First, it is a contemporary, synchronic view of vowel classes that differ from one region to another.[3] This limits its capacity for representing pan-dialectal vowel classes that are needed for an overview of the development of North American English. The historical connection between modern /ɑ/ and Middle English short-*o* is not at all evident from the transcription of Table 2.1.

Second, it makes more use of special phonetic characters than is necessary at a broad phonemic level, contrary to the IPA principle that favors minimum deviation from Roman typography.

1 The concept of initial position is not unrelated to the synchronic concept of *underlying form*, the representation used as a base for the derivation of whatever differences in surface forms can be predicted by rule. An initial position is a heuristic device designed to show the maximum relatedness among dialects as a series of historical events.

2 There are very few counter-examples to this principle. In New York City, words like *her* and *fur* are frequently realized with final short vowels: [fʌ, hʌ]. In unstressed syllables, conservative RP used final short /i/ in words like *happy* and *city*, but that is now being replaced by /iy/ among younger speakers (Fabricius 2002).

3 Kurath differentiates three American systems, one of which is identical with British English. He follows this presentation with a perspective on the historical development of these systems.

Third, and most important, the unique notation assigned to each vowel fails to reflect the structural organization essential to the analysis of the chain shifts that are a principal concern of this Atlas. Though the vowels are listed as "checked" and "free" in Table 2.1, the notation represents all vowel contrasts as depending on quality alone.

For these reasons, the transcription system used by ANAE was based instead on the binary notation that has been used by most American phonologists, beginning with Bloomfield (1933), Trager and Bloch (1941), Bloch and Trager (1942), and Trager and Smith (1951). Hockett's (1958) textbook and Gleason's (1961) textbook both utilized a binary notation for English vowels. The feature analysis of Chomsky and Halle (1968) incorporated such a binary analysis, and a binary analysis of English long vowels and diphthongs is a regular characteristic of other generative treatments (e.g. Kenstowicz 1994: 99–100; Goldsmith 1990: 212).[4]

A binary notation makes two kinds of identification. Front upglides of varying end-positions [j, i, ɪ, e, ɛ] are all identified as /y/ in phonemic notation. Similarly, the back upglides [w, u, ʊ, o, ɤ] are identified uniformly as /w/. Secondly, the nuclei of /i/ and /iy/, /u/ and /uw/ are identified as 'the same.' Such an identification of the nuclei of short and long vowels is a natural consequence of an approach that takes economy and the extraction of redundancy as a goal. The same argument can be extended to the nuclei of /e/ and /ey/, /ay/ and /aw/.[5] In the binary system, short vowels have only one symbol, which denotes their nuclear quality, while long vowels have two symbols. The first denotes their nuclear quality, the second the quality of their glide. There are three basic types of glide at the phonemic level: front upglides, represented as /y/, back upglides (/w/), and inglides or long monophthongs (/h/).[6]

Another important generalization made by the binary system is that, at a broad phonemic level, the traditional representation of the lax–tense difference between short and long vowels such as /ɪ/ vs. /i/, /ʊ/ vs. /u/, etc., is redundant. Both /ɪ/ and /i/, for instance, share a high-front nucleus. The exact quality and orientation of these nuclei differ from one dialect to another. What consistently distinguishes them phonologically is the presence or absence of a front upglide. The vowel of *bit* can therefore be represented simply as /bit/, and that of *beat* as /biyt/. At the phonetic level, these are often realized as [bɪt] and [bit], depending on the dialect, but at the phonemic level, the use of a special character for *bit* can be dispensed with.

2.3. Initial position

Table 2.2 presents the initial position of North American dialects, showing in binary notation the maximal number of distinctions for vowels (not before /r/). Table 2.2 identifies three degrees of height and two of advancement.[7] The six short vowels are accompanied by eight long upgliding vowels and two long ingliding vowels.[8] Rounding is contrastive only in the ingliding class.[9] The word-class membership of these phonemes is illustrated in Table 2.3, with words in the *b__t* frame wherever possible.

Table 2.2. The North American vowel system

	SHORT		LONG					
			Upgliding				Ingliding	
			Front upgliding		Back upgliding			
	V		Vy		Vw		Vh	
nucleus	front	back	front	back	front	back	unrounded	rounded
high	i	u	iy		iw	uw		
mid	e	ʌ	ey	oy		ow		oh
low	æ	o		ay		aw	ah	

Table 2.3. Keywords for the phonemes of Table 2.2.

	SHORT		LONG					
			Upgliding				Ingliding	
			Front upgliding		Back upgliding			
	V		Vy		Vw		Vh	
nucleus	front	back	front	back	front	back	unrounded	rounded
high	*bit*	*put*	*beat*		*suit*	*boot*		
mid	*bet*	*but*	*bait*	*boy*		*boat*		*bought*
low	*bat*	*cot*		*bite*		*bout*	*balm*	

Following the logic of binary notation, this representation greatly reduces the number of special symbols necessary for the phonemic transcription of the vowel contrasts in English dialects. Furthermore, it captures important generalizations about the sub-systemic organization of the vowel space that are missed by a more phonetically based transcription. It is not linked to typical phonetic values of one arbitrarily selected reference dialect, since its relation to the phonetic values of IPA symbols is abstract and historical rather than concrete and descriptive.

In addition to transcribing each vowel phoneme, the occurrence of marked allophonic variation often makes it necessary to add a symbol to indicate the presence, absence, or quality of following consonants. The allophone of /ay/ before voiceless consonants is designated /ay0/ as opposed to the residual category /ayV/. The checked allophone of /ey/ is sometimes shown as /eyC/ as opposed to the free allophone /eyF/.

The use of /h/ to indicate a class of long and ingliding vowels, which show no formant movement or move in a centering direction, was a prominent feature of the binary analysis introduced by Bloch and Trager. It is not as generally used as /y/ and /w/.[10] Instead, one often finds along with /iy, ey, uw, ow/ the symbol /ɔ:/ for the class of *caught*, *law*, etc. or /a:/ for the class of *father*, *pa*, etc. This special

4 Recent treatments of English vowels in Optimality Theory tend to show binary representations at a lower level of abstraction. Thus /ey/ frequently appears in Rutgers Optimality Archive papers as [eɪ] and /ow/ as [oʊ].

5 In the most commonly accepted notation, the mid-back nuclei of /ʌ/ and /ow/ are not transcribed with the same nuclei, and the redundant phonetic difference in rounding is preserved. Nevertheless, Chapter 14 will develop the argument that at least in the eastern United States, these nuclei are structurally identified and move together in the course of Northern and Midland sound changes.

6 The /h/ glide is an abstract notation indicating either a lengthened vowel or an inglide towards schwa. These are generally in complementary distribution: low back vowels are generally long monophthongs, while high and mid vowels are ingliding.

7 The /a/ in /ay, aw, ah/ is frequently represented by a low central vowel in many dialects, but at the abstract level of the initial position, it is a back vowel, opposed to /æ/. In the majority of North American dialects, the nucleus of /aw/ is front of center. Chapter 18 will show that a chain shift in Southern English, initiated by the diphthongization of long open-*o* words, forces a structural reinterpretation of initial /aw/ as /æw/.

8 These positions can be represented as a set of binary features in which the nuclei are combinations of [+voc, –cons, ±high, ±low, ±back, ±round] and the glides are combinations of [–voc, –cons, ±back, ±high].

9 Table 2.2 omits several marginal classes that are limited to a few words, like /eh/ in *yeah*, /ih/ in *idea* and *theatre*, /uh/ in *skua*.

10 Gleason (1961) substituted a capital /H/ for /h/, to avoid the implication that this centering glide was 'the same' as initial /h/. Although initial and final /h/ are in complementary distribution, it can be argued that the phonetic differences are not motivated by the environmental difference.

notation captures the phonetic character of the word classes involved. But it does not reflect the generalization that English words with final stress must end with a glide or a consonant. By writing /oh/, /ah/, for the long and ingliding sub-system, we incorporate this generalization, which plays a central role in the description of mergers and chain shifts in the chapters to follow.[11]

As noted above, a binary notation is more favored by North American than British linguists. This is largely due to the different status of diphthongization in British and American dialects. Diphthongization of all long vowels, especially in final position, is the general rule in North America. Monophthongal /e:/ and /o:/ do occur, but only in limited areas. Wells (1982) uses monophthongal symbols for the long high vowels /i:/ and /u:/, a representation that seems useful for RP. Many regional British dialects have consistently monophthongal long vowels, as well as the Caribbean dialects strongly represented in Britain today. To apply the notation /iy, ey, ow, uw/ to this range of British dialects would seem artificial at best. On the other hand, Wells's use of /i:/, /u:/, and /o/ for the phonemes of "General American"[12] is an odd extension of the British system. Nevertheless, the organization of vowels presented by Wells in his 1982 overview of English dialects is strikingly similar to the ANAE initial position. Wells divides English vowels into long and short (checked and free). Furthermore, he separates the long vowels into front upgliding, back upgliding and ingliding (without using those labels). Table 2.4 shows the relations of the two representations by inserting the labels for lexical sets introduced by Wells, now widely adopted in British dialectology, into the framework of Table 2.2.3.[13]

Table 2.4. Wells' view of "General American" vowel classes

	SHORT	LONG					
		Upgliding				Ingliding	
		Front upgliding		Back upgliding			
	V	Vy		Vw		Vh	
nucleus	front back	front	back	front	back	unrounded	rounded
high	KIT FOOT	FLEECE			GOOSE		
mid	DRESS STRUT	FACE	CHOICE		GOAT	NURSE	THOUGHT
low	TRAP		PRICE	MOUTH		PALM, LOT	

2.4. Description of the word classes

The vowel classes labeled in Table 2.2 are defined in the following section. Historical vowel classes are indicated in boldface, modern lexical reflexes in italic. Conventional labels for phonemes are given in quotes. In each case, the historical word class is composed of a core set or sets of reflexes of Old English and Middle English words, along with a variety of loan words, principally from French and Latin, but from other sources as well.

/i/ "short-*i*", derived primarily from M.E. short **i**, in *bit*, *sit*, *will*, *tin*, *bitter*, *dinner.*

/e/ "short-*e*", derived primarily from M.E. short **e**, in *bet*, *set*, *red*, *ten*, *better*, etc. along with a number of shortened M.E. **ea** words in *head*, *dead*, *lead*, *breakfast,* etc.

/æ/ "short-*a*", derived primarily from M.E. short **a**, in *bat*, *sat*, *had*, *man*, *batter*, etc. along with foreign **a** loan words that may or may not alternate with /ah/: *fact*, *lamp*, *cab*, *jazz*, *pasta*, *Mazda*.

/o/ "short-*o*", derived primarily from M.E. open **o** or **ɔ** in *cot*, *rot*, *odd*, *Tom*, *hotter*, etc. In most British dialects, this is the short back rounded vowel realized on a non-peripheral track (see below). In most North American dialects, it was unrounded and lowered to [ɑ] by the nineteenth century (Barton 1832). It was then merged with the small sub-class of words with /a/ after initial /w/ (*watch*, *wander*, *warrant*) and generally with the /ah/ class (*balm* = *bomb*, see below). In Eastern New England, Pittsburgh and some Canadian communities, /o/ remained as a rounded vowel, and merged with /oh/. /o/ does not remain in its original back rounded position as a separate phoneme in any North American dialect.

In those dialects that retained the opposition between /o/ and /oh/, a large number of /o/ words shifted to the /oh/ class, before back nasals, as in *strong*, *song*, *long*, *wrong*, etc.; before voiceless fricatives (in *loss*, *cloth*, *off*, etc.), and irregularly before /g/, as in *log*, *hog*, *dog*, *fog*, etc. This process occurred by lexical diffusion, leaving many less common words in the /o/ class, such as *King Kong*, *Goth*, *doff*, etc.

/ʌ/ "wedge", derived primarily from M.E. short **u** in *but*, *bud*, *come*, *some*. The North American mid-back unrounded vowel is the result of the unrounding of the majority of M.E. short **u** words. In addition, two M.E. long **u:** words were unrounded to /ʌ/: *flood*, *blood*.

/u/ "short-*u*". A certain number of M.E. short **u** words did not undergo this unrounding, largely after labials and before /l/: *put*, *push*, *bush*, *full*, *wool*, *bull,* as opposed to *putt*, *hush*, *mush*, *dull*, *gull*, etc. Some M.E. long **o** words were shortened to join this class, largely before /k/ and /d/: *hook*, *cook*, *look*, *good*, *hood*, *stood* and also *foot*, *soot*.

/iy/, "long-*e*", derived primarily from M.E. **e:** after merger with M.E **ea:**, in *see*, *seed*, *sea*, *bead*, etc. This vowel was raised by the Great Vowel Shift to high front position and diphthongized to /iy/. In hiatus position, M.E. **i:** remained in high front position and joined this class (*idiot*, *maniac*). A large number of recent loan words with [i] in other languages are now a part of this class: *machine*, *visa*, *diva*.

/ey/, "long-*a*", derived primarily from M.E. **a:** after merger with M.E. **ai:**, in *made*, *name*, *maid*, *say*, etc. This was raised from a low front to a mid front position by the Great Vowel Shift and diphthongized to /ey/.[14]

/ay/, "long-*i*", derived primarily from M.E. **i:**, undergoing diphthongization and nucleus-glide differentiation in the Great Vowel Shift: *sigh*, *high*, *buy*, *ride*, *die*, *bite*, *time*, etc.

/oy/, a small class from early French loans, in *soil*, *boil*, *choice*, *noise*, etc., along with a number of common words of uncertain origin: *boy*, *toy*, etc.

/uw/, "long-*u*", derived primarily from M.E. **o:** in *mood*, *food*, *fool*, *room*, *too*, *do*, etc., excluding words that were shortened before /d/ and /k/ (see /u/ above). This vowel was raised to high position by the Great Vowel Shift and diphthon-

11 It can be pointed out that the use of /h/ to represent a free vowel is well entrenched in English orthography. Spellings such as *yeah*, *huh*, *ah* and *oh* are found in place of *ye*, *hu, a*, and *o*; monophthongal /ay/ is normally spelled *ah* for *I* and *mah* for *my*. In Pittsburgh, monophthongal /aw/ is regularly spelled *ah* as in *dahntahn*. Users of this every-day practice are not troubled by the fact that in *huh*, final /h/ is phonetically distinct from initial /h/.

12 This term has not been used by American dialectologists to any extent since the appearance of Kurath (1949), but it continues to be used in Europe. The exact referent is difficult to determine, but it almost always indicates a rhotic, non-Southern dialect.

13 This table does not correspond precisely to the initial position of Table 2.3, but rather reflects the typical American dialect in which /o/ has merged with /ah/ (Chapter 14) and /iw/ has merged with /uw/ (Chapter 8). Wells represents the mid-central nucleus in the NURSE class as a vowel /ɜ/, as in British English, whereas ANAE places this constricted nucleus with other vowels before tautosyllabic /r/ (see Table 2.6). Wells uses /o/ as the vowel of the GOAT set in America, where ANAE uses /ow/, while his notation for the British GOAT set is the diphthong /əʊ/

14 Some scholars believe that M.E. **ai**, **ay** did not merge with monophthongal **a:** but retained its separate status until M.E. **a:** reflexes were diphthongized in the seventeenth century.

gized in most dialects. Words with M.E. **u:** that did not undergo the Great Vowel shift are joined with this class (*soup*, *you*, etc.).

/ow/, "long-*o*", from M.E. open **o:**, in *boat*, *road*, *soap*, as well as M.E. diphthongal **ow**, in *stow*, *flow*, *know*, *bowl*, etc.

/aw/, from M.E. **u:**, respelled in the French style as **ou**, diphthongized with further nucleus-glide differentiation in the Great Vowel Shift, in *house*, *mouth*, *proud*, *now*, *cow.* This process did not affect vowels before labials or velars or after /y/, which remain in the current /uw/ class: *you*, *your*, *youth*, *soup*, *group*, etc.

/iw/, from a wide variety of M.E. and French sources, spelled *u*, *eau*, *ew*, *ui*, which were generally realized with a palatal onglide as /juw/. The loss of the glide after coronals in North America created the opposition of /iw/ and /uw/ in *dew* vs. *do*, *suit* vs. *shoot*, *lute* vs. *loot*, *rude* vs. *rood*, etc.

/oh/, "long open-*o*". This class has a highly skewed distribution that reflects the complex and irregular history of its composition. It is the result of monophthongization of **au** in *law*, *fault*, *talk*, *hawk*, *caught*, in turn derived from O.E. **aw** (*thaw*, *straw*, *claw*); O.E. **ag** (*maw*, *saw*, *draw*); O.E. **ah**, broken to **eah** (*fought*, *taught*); O.F. **a** + **u** in the next syllable (*brawn*, *pawn*), M.E. **av** (*hawk*, *laundry*); O.F. **au** (*applaud*, *fraud*, *because*); O.F. **am**, **an** (*lawn*, *spawn*). In addition, some long open-*o* words are descended from O.E. **oht** (*thought*, *daughter*, *brought*). Its current distribution is largely limited to final position and words terminating in /t, d, k, n, l, z/. The lengthening of /o/ before nasals and voiceless fricatives enlarged the /oh/ class considerably, but did not materially affect the number of environments where contrast with /o/ is to be found.

/ah/ "broad-*a*". Original O.E. **a:** was raised to a mid-back vowel **oa.** When a new M.E. **a:** was created by lengthening in open syllables, it was raised to a mid front vowel which became modern /ey/. A residual **a:** class is centered about the unique word *father* with **/ah/** in an open syllable, joined by a few words with word-final /ah/: *pa*, *ma*, *bra*, *spa*, and a number of marginal onomatopoetic and affective forms, *rah rah*, *haha*, *tra la*, *blah blah*, etc. Words with vocalized /l/ formed a part of this class: *calm*, *palm*, *balm*, *almond*, though a large number of North Americans have retained or restored the /l/. To this small nucleus is joined a very large number of "foreign a" words: *pasta*, *macho*, *lager*, *salami*, *nirvana*, and *karate*, though some of these are assigned instead to /æ/ in some dialects (Boberg 2000). As noted above, /o/ has merged with this class for most North American dialects. In traditional Eastern New England speech, some members of the British broad-*a* class have been added, so that some words before voiceless fricatives and nasal clusters appear with /ah/: *half*, *pass*, *aunt*, *can't*, etc.

2.5. Vowels before /r/

The keywords of Table 2.3 are almost all before /t/; the vowel phonemes are in direct contrast in the same environment. Other such sets, before /d/, /g/, or /s/ will show similar contrasts. The discussions of chain shifts in the chapters to follow will confront the question as to whether vowel contrasts operate primarily between allophones or phonemes. If the former, then one might expect to find allophonic chain shifting, where vowels rotate before /n/ but not before /t/. In fact, there is very little evidence of such shifts. Chapters 12 to 20 will show that following consonants are responsible for many strong co-articulatory effects and many categorical constraints. There are fewer distinctions before nasal consonants than before oral consonants. The diphthongs /aw/ and /oy/ do not occur before labials and velars. But in general, there is little difficulty in identifying vocalic allophones before various consonants with the general schema of Table 2.2. Native speakers find it easy to identify the vowels in *beat*, *bean*, *bead* and *beak* as 'the same.'[15] This is not true, however, for vowels before /r/. In some dialects, it is not immediately evident whether the vowel of *bore* is to be identified with the vowel of *boat* or the vowel of *bought*, or whether *bare* belongs with *bait* or *bet*.[16] As a result, sets of vowels before /r/ show a puzzling array of mergers and chain shifts quite distinct from those operating in the rest of the vowel system.

In fact, there are only minor problems in assigning vowels before intervocalic /r/. They are centralized in comparison to the corresponding allophones before obstruents, but can be identified with the categories of Table 2.2, as shown in Table 2.5.[17] This shows the maximal set of oppositions, which are greatly reduced in many dialects. Before intervocalic /r/, /iy/ and /i/, /uw/ and /u/ are merged in most current dialects. Chapter 9 will show that for the majority of North American speakers, there is complete merger of /ey/, /æ/, and /e/ in *Mary*, *marry*, *merry*. Philadelphia preserves these distinctions, but suspends phonemic contrast of *merry* and *Murray* in a near-merger (Labov 1994: 397–418). Great lexical variation is shown in the assignment of words to the /or/ or /owr/ classes, as in *moral*, *coral*, *tomorrow*, *borrow*, etc.

Table 2.5. Initial position for vowels before intervocalic /r/

	SHORT		LONG			
			Upgliding			
			Front upgliding		Back upgliding	
	V		Vy		Vw	
nucleus	front	back	front	back	front	back
high	/i/ *mirror*	/u/ *jury*	/iy/ *nearer*			
mid	/e/ *merry*	/ʌ/ *Murray*	/ey/ *Mary*	/oy/ *Moira*		/ow/ *story*
low	/æ/ *marry*	/o/ *morrow*		/ay/ *spiral*		/aw/ *dowry*

While the vowels before intervocalic /r/ show an opposition of short to long vowels, no such opposition can be found for vowels before a tautosyllabic /r/ that cannot be assigned to syllable-initial position. The high and mid short vowels in *fir*, *her*, *fur*, and words with *-or-* after /*w*/ have all merged to syllabic /r/ which falls structurally into the mid-back unrounded position.[18] While upglides can occur before intervocalic, syllable-initial /r/ as in *Mary*, they never occur before tautosyllabic /r/, where the transition to full /r/ constriction is through an inglide. Vowels before tautosyllabic /r/ fall naturally into the sub-class of long and ingliding vowels. When syllable-final /r/ is vocalized, the small group of two ingliding vowels /ah/ and /oh/ in Table 2.2 is augmented with /ih, eh, uh/.

Table 2.6 presents vowels before tautosyllabic /r/. As on the right side of Table 2.2, there is a rounded–unrounded distinction among the back vowels and a three-way distinction of height among the back vowels. This is the result of the

15 Techniques for investigating mergers developed by Di Paolo (1988) make use of this capacity of subjects to identify vowels in one context with vowels in another.

16 Such identifications are problematic to a lesser degree for vowels before /l/, where many mergers are now in progress (Chapter 8). But in most dialects, the vowel of *fall* will be easily identified with the vowel of *fought* rather than the vowel of *foal*. Di Paolo (1988) asks subjects to identify vowels across allophones to trace the merger of vowels before /l/.

17 In Table 2.5, the long and ingliding class is eliminated. However, it would not be unreasonable to assign the vowel of *nearer* to /ih/, *Mary* to /eh/, *story* to /oh/. These vowels usually do not show upglides, and they are phonetically closer to the long and ingliding set. From a structural viewpoint, the assignments of Table 2.5 are simpler.

18 Here too the contrast with the situation in Great Britain can be striking. Scots preserves the distinction between *fir* and *fur*, *kernel* and *colonel*.

continuation of the opposition of M.E. close-*o* and open-*o* in the set of *mourning* vs. *morning*, *four* vs. *for*, *ore* vs. *or*, *port* vs. *storm*. Chapter 7 will show that this distinction has almost disappeared in North American English. Nevertheless, there are enough remnants to require it to be represented in the initial position of Table 2.6.

Table 2.6. Initial position for vowels before tautosyllabic /r/

	Ingliding Vh		
	front	back	
		unrounded	rounded
high	/ihr/ *fear*		/uhr/ *moor*
mid	/ehr/ *fair*	/ʌhr/ *fur*	/ohr/ *four*
low		/ahr/ *far*	/ɔhr/ *for*

2.6. The linguistic status of the initial position

The presentation of the English vowel system began with the schemata developed by Bloomfield, Bloch, and Trager. Although their approach to phonological analysis is remote from current practice in many respects, it is immediately relevant to the task of the Atlas, for several reasons. They explored the logic of the binary notation explicitly, and they were concerned with accounting for the range of dialect diversity that is the subject matter of the Atlas. Their references to the dialects of the Eastern United States, which were then well charted, are accurate and relevant, though their references to Southern or "mid-western" dialects must be revised in the light of current knowledge. They were not concerned with the structural relations among the phonemes that form the basic inventory for any one dialect, which (following Martinet 1955) must be the central focus of the present work. The configuration of the six short vowels of Table 2.2 represents a set of oppositions that are fully operative in most American dialects, although the low vowels frequently migrate from the V sub-system of checked vowels to the Vh sub-system of free vowels. The members of the Vy and Vw sub-systems are intimately related internally in ways that are fully exemplified in chain shifting and parallel shifting.

Table 2.2 has many empty cells, indicating unrealized combinations of vowels and glides. Sound changes that move a single phoneme without affecting the inventory could therefore be represented by a change of notation. For example, when the nucleus of /aw/ moves from back of center to front of center, it might well be written as /æw/. This implies a phonemic change for what might be considered a low-level phonetic shift in the realization of a phoneme. The Atlas will not make such changes of notation, but will retain the original notation to preserve the identity of the historical word classes of Table 2.2. Changes in notation will occur only when structural shifts in neighboring phonemes require it. For example, Southern /aw/ in *house* will be written with the /a/ nucleus as long as the word class /oh/ is realized with a rounded nucleus and a back upglide. But when the nucleus of /oh/ is unrounded, it assumes the structural identity of /aw/, and this is only possible if the original /aw/ has assumed the identity of /æw/.

The initial position therefore represents a balanced set of contrastive oppositions which functioned effectively for North American English dialects at the outset and continues to function in this way for a limited number of dialects. The weak points of the initial position that became the loci of change are:

(1) The skewed distribution of /oh/ and its limited contrast with /o/
(2) The skewed distribution of /ah/ and its limited contrast with /o/
(3) The skewed distribution of /iw/ and its limited contrast with /uw/
(4) The skewed distribution of /ohr/ and its limited contrast with /ɔhr/

Chapters 9 and 11 will deal with the consequences of the instability noted in (1); Chapters 11 and 14 will explore the consequences of (2); and Chapter 12 will discuss the massive continental changes that followed from the instability of (3). Chapter 8 will show that the instability of (4) has led to the almost complete elimination of this contrast.