Chapter 3

Aspiration in Welsh Mutation

Back in section 1.5, we saw that aspirate coalescence was sufficient to change a media to an aspirata in Welsh: When the media at the end of a word coalesced with the aspiration at the beginning of the next word, the result was an aspirata at the beginning of the second word. Inasmuch as such aspirate coalescence is known to bring about a fortition (a shift "up") in the scale, we should examine just how aspiration works within the Welsh phonological system and how it may be manifested.

3.1 Aspiration in Welsh

Of course, it is not enough simply to note that aspirate coalescence changes a media to an aspirata, for in effect this says that one letter changes to another in our orthography. Rather, we need to examine two areas: First, we must determine how this

aspiration exercises such an effect from within the framework of the syllabic frame. The reason why this framework is necessary is that it allows only those categories and relationships into the frame that are fully justified from the phonetic evidence – the features and syllables.

Once this first requisite is satisfied, we can then examine the phonetic detail of aspiration as it functions in the system. In this chapter, then, we must collect the data – the evidence of the workings of aspiration in the Welsh system.

3.1.a Aspirate Coalescence. Let us therefore first consider the aspirate coalescence described in section 1.5, in which xxxxxxx. This coalescence of final [d] with initial [h] can be represented as in figure 3.1.[1]

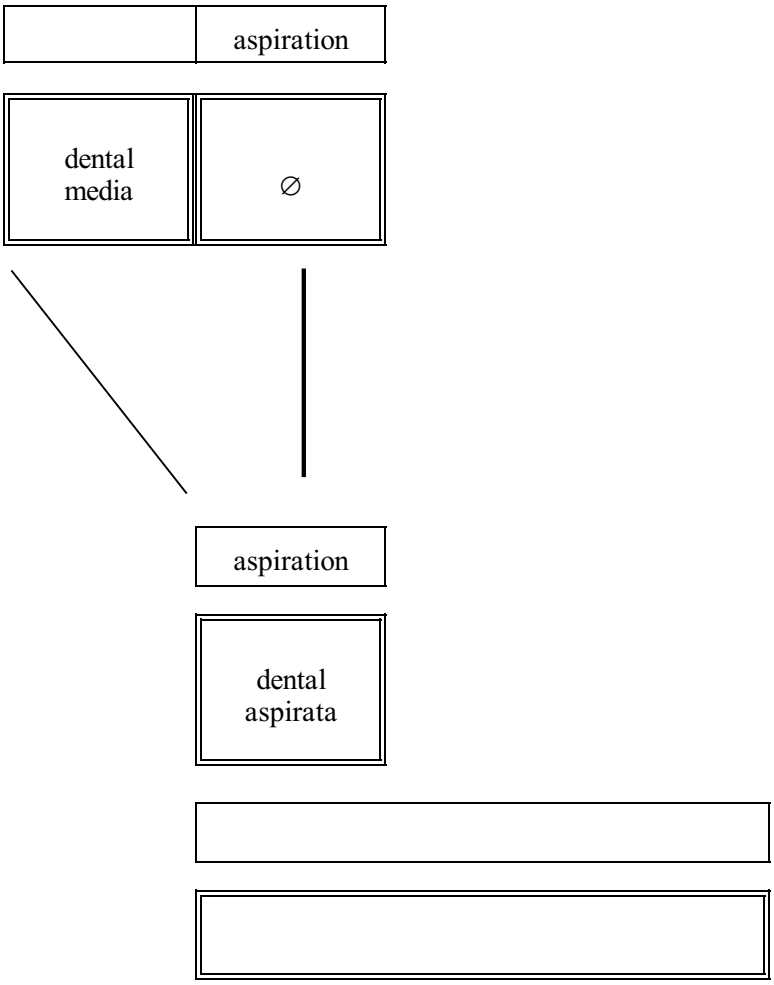

Figure 3.1: The Dynamics of Aspirate Coalescence

We should note that the aspiration is treated as an obstruction prosody rather than as a position of obstruction. To be precise, it is an obstruction prosody constraining the "null" obstruction. This is the most economical use of the framework, and as we shall increasingly see, it is also the most insightful.

In this aspirate coalescence, the final media is resyllabified to the initial position of the following word. This is enabled by the fact that there is no other position of obstruction vying for the preferred syllable-initial position – the aspiration is, once again, a prosody. Once the aspirate prosody constrains the media, the sound in the initial position of the second syllable is interpreted as an aspirata.

As pointed out in section 1.4.b, the final position is a position of aspirate neutralization to begin with, so the [d] is the neutral realization of either the media [d] *per se* or the unaspirated [t$^{=}$] (the tenuis). Adding the [^{h}] to the [t$^{=}$] obviously results in [t^{h}], and adding this same aspirate prosody to [d] (the equivalent of [t$^{=}$]) therefore results in the very same [t^{h}]. Thus, the fundamental relationship between the media degree along the fortis-lenis scale and the aspirata degree is solely a function of the aspirate prosody.

Let us, at least to begin with, use the terms very precisely, for the media and the aspirata are segments or symbols in phonetic transcription. What we are concerned with here are not the segments, but the degrees along the fortis-lenis scale.

3.1.b Aspirate Mutation. If aspiration is responsible for the relationship between two degrees along the fortis-lenis scale, and if indeed there is some common phonetic parameter underlying this scale, then we should look for aspiration to connect other degrees as well. The most salient form of aspiration working within the system occurs in the aspirate mutation.

We should recall from section 1.4.a, that in aspirate mutation an [h] is added to the following word. Thus, for example, *ei hafal* [i: ha:val] 'her apple' derives from *afal* [a:val] 'apple', which undergoes the aspirate mutation following the third person singular feminine possessive adjective. We can thus view this possessive as maintaining the form *ei* + *h*–. In the syllabic frame, this can be represented as in figure 3.2.

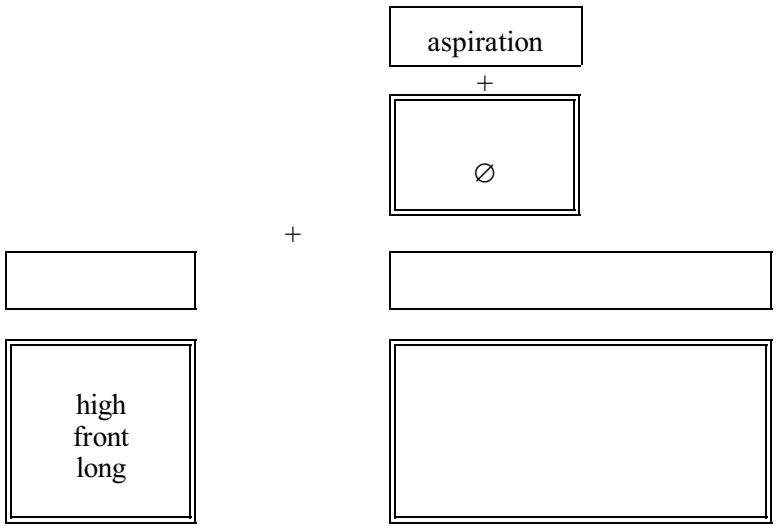

Figure 3.2: Aspirate Mutation

Historically, the aspirate mutation was motivated by the *-s* ending in the Brythonic pronoun. The sibilant changed to aspiration in a process that will have further ramifications below and that affected the following consonant as an aspirate prosody, as we see in figure 3.2

As it were, the same aspirate prosody in this environment (and in some others as well) brought about a change from the aspirate degree to the spirant degree in what came to be known as spirant mutation. For example, *ei thad* [i: θa:d] 'her father' derives from the same aspirate prosody coalescing with the following aspirata in the radical form *tad* [t^ha:d] 'father'. This can be represented as in figure 3.3.

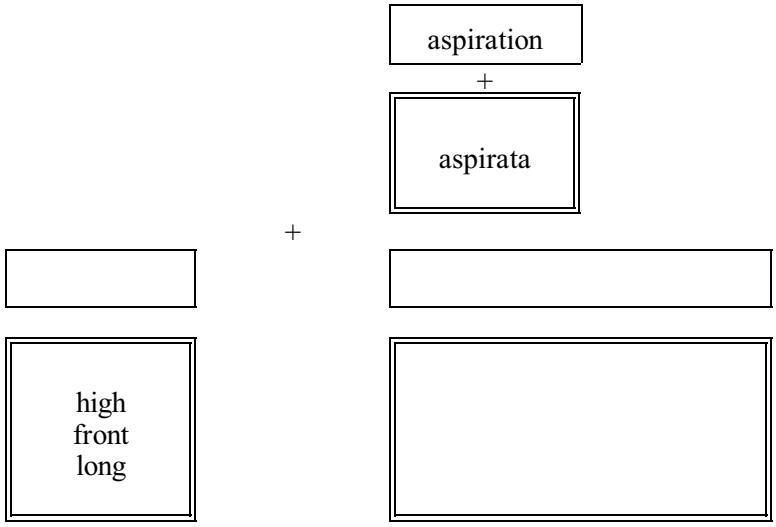

Figure 3.3: Spirant Mutation

Indeed, we can see both degrees along the scale affected through spirant aspiration and aspirate coalescence in the full form of the possessive. This full form inserts the personal pronoun *hi* [hi:] 'she/her' after the possessed noun. Thus, the words *ei* [i:] 'her', *tad* [t^ha:d] 'father', and *hi* [hi:] 'she/her' combine as *ei thad hi* [i: θa: t^hi:] – a combination of figures 3.3 and 3.2, respectively.

In certain phrases within certain dialects, the aspirate/spirant mutation has extended to the nasal as well. In the Bangor dialect at the turn of the twentieth century, the pronunciation of *ei mab hi* 'her son' was recorded as [i: m̥ha: p^hi:].[2] Thus, even the nasal is raised to the next available degree along the fortis-lenis scale by the addition of aspiration as an obstruction prosody.

The addition of aspirate prosody to the media degree, then, results in the aspirata degree, and the addition of aspirate prosody to the aspirata degree results in the spirant degree. This being the case, then this aspirate prosody is something more than simply the puff of breath that we feel after an aspirata (but not a tenuis – that is, after the [t^h] in *tie* but not after the [t̻] in *sty*). After all, the process of adding to or increasing that puff of breath results in a spirant (even a spirantized aspirated nasal).

3.1.c Geminate Coalescence. Geminate coalescence (traditional provection) provides us with a clearer picture of what the relationship is between the various degrees of aspirate prosody and

the degrees along the fortis-lenis scale. This geminate coalescence (similar to its aspirate coalescent counterpart) also occurs on two levels of the fortis-lenis scale and results in a shift "up" the scale.

The more obvious of these provections is the historical spirantization, for it affected the aspirata, with its obviously discernable puff of breath. As noted in section 1.2, when two homorganic aspiratae came together in Brythonic or in Latin loanwords, they coalesced in Welsh into the syllable-initial position of the second aspirata as a spirant – the same phenomenon we see in aspirate coalescence. For example, Brythonic *Brittones* [brittones] 'Britons' is realized in Welsh as *Brython*.[brəθon].

The coalescence is actually the same as that for aspirate coalescence in which the media could simply shift over to the next syllable because there was no other consonant vying for the position. In the case of homorganics, the first consonant can merge with the second because they are both pronounced at the same position of articulation. This is illustrated as in figure 3.4.

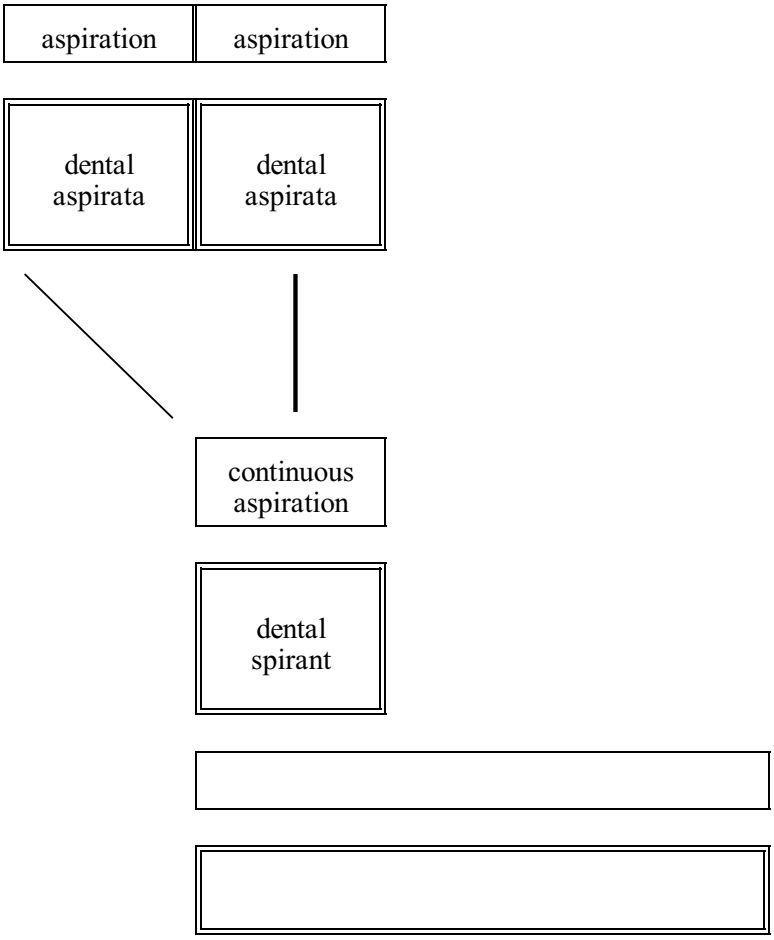

Figure 3.4: Geminate Coalescence

As the positions merge, the aspirate prosody in syllable-initial position is merged with the aspirate prosody moving over from the preceding syllable-final position. The merger of the two degrees of aspiration yields a heightened degree of aspiration commensurate with the degree that we saw in aspirate/spirant mutation.

The geminate coalescence of mediae is precisely the same. The only difference is that we cannot hear and feel the puff of breath that we have become accustomed to calling "aspiration" before the coalescence (although, to be sure, we can certainly perceive it after coalescence). Once again, as in section 1.3.e, when a word ending in a media is followed by a word beginning with the homorganic media, the result is an aspirata. For example, the combination of *gwybod* [g^{w}ɨbod] 'to know' and *dim* [dim] 'not' results in [g^{w}ɨbo t^{h}im] 'not to know'.

What is happening here is precisely the same as in the geminate coalescence of aspiratae, more commonly known as provection or spirantization. The combination of two homorganic consonants with the same degree along the fortis-lenis scale results in one syllable-initial consonant with the next higher degree along the fortis-lenis scale. In the "shift up" from aspiratae to spirant, the motivating factor is clearly the combination of degrees of aspiration. With the appearance of the puff of breath in the created aspirata, the "shift up" from mediae to the aspirata must involve the merger of two degrees of aspiration sufficient in their combination to produce the

puff of breath.

When we attempt to represent this development in the syllabic frame, however, we find ourselves stymied. How do we represent the aspiration constraining the media degree such as to change the media degree to the aspirata degree?

3.2 Aspiration and the Fortis Lenis Scale

Before we can approach the question of geminate coalescence of the media degree and definitely before we can begin to address the issue of soft mutation, we shall have to make a major change in the notational system we have been using thus far. The problem is not in the frame itself, for that is quite well verified by the phonetic evidence. The problem lies rather in how we have been inserting the features into the frame.

3.2.a Back to Basics: The Position Feature. When we examine the figures thus far in this chapter with the principles developed in the previous chapter, we see that we have apparently been making a major mistake. Actually, this mistake has been a necessary heuristic device, given our information to this point and our need to proceed from somewhat familiar ground.

In figures 3.1 through 3.4, we have been placing the designation

of media, aspirata, and spirant into the main obstruction feature box. This we have done because, after all, these designations refer to major consonantal types – the media [d] *versus* the aspirata [t^h] *versus* the spirant [θ]. In traditional English phonology, these represent distinct and separate segment types.

However, we are working neither from the assumption of segment types nor from the universality of English feature organization. Out of necessity (because to go directly to the next step would frankly have been too traumatic), we have at least partially been thinking segmentally.

Returning to the principles of dynamic phonetics and phonology as outlined in the previous chapter, we see that the only features that should go into the main obstruction feature box are those that define the position (place and configuration) of the oral apparati. Accordingly, [d] and [t^h] and [θ] should all have the designation {dental} in that box. While we are refining our notation, we should also use the braces rather than the brackets to make sure that we are indeed talking about features applying to the syllabic frame rather than those pertaining to transcription (traditionally placed in square brackets, such as [dental]).[3]

Now the question is: How do we represent the difference in the fortis-lenis scale between media and aspirata and between aspirata and spirant?

3.2.b Prosodic Aspiration and the Fortis-Lenis Scale. As far as we got in our analysis of the geminate coalescences in section 3.1.c, we determined that the spirant degree consisted of the aspirata degree with added, heightened aspirate prosody – prosody realized as continuous aspiration. Moreover, the aspirata degree consisted of the media degree with the same added, heightened aspirate prosody – though realized not as continuous aspiration, but as the mere puff of breath *per se*.

If we designate the basic obstruction feature as simply as {dental} then the difference among media, aspirata, and spirant lies not in the obstruction feature itself, but rather in the aspirate prosody. To make room for the susurrata, which will be treated in the next section under soft mutation, let us designate the degree of aspiration coarticulated with the {dental} at the media degree as {2h}, the degree of aspiration coarticulated with the {dental} at the aspirata degree as {3h}, and the degree of aspiration coarticulated with the {dental} at the spirant degree as {4h}. This provides us with the dynamic *versus* traditional equivalences in table 3.1.

Table 3.1: Dynamic *versus* Traditional Equivalences

Position of obstruction	Degree of aspiration		
	{2h}	{3h}	{4h}
{labial}	b	p^h	f
{dental}	d	t^h	θ
{velar}	g	k^h	χ

What table 3.1 tells us is that *for Welsh* (with no claims regarding other languages with their own systems) the difference among media, aspirata, and spirant has nothing to do with the dental obstruction; [d], [t^h], and [θ] are all the same basic obstruction – {dental}. The only difference lies in the degree of aspiration *coarticulated with the consonantal obstruction but not inherent to it*. This is a very basic implication of dynamic phonetic research: The feature is pertinent not to some other feature with which it happens to be coarticulated, but to its position within the syllable. To analyze the data otherwise would lead us right back into the old segmental fallacy (and it would lead us further away from the fundamental nature of mutation).

To soften the shock of this totally new way of looking at features, let us step back and review the matter from the point of view of the speech event – the physiological and acoustic dynamic coarticulatory constraint. The air is forced through the glottis in the laryngeal division to create the phonation with its fundamental frequency. The phonated airstream is supplied with harmonic formant frequencies by the vocalic/syllabic apparati. Now, the vocalic emission is obstructed at the dental position of obstruction. The manner of this obstruction is determined by the obstruction prosodies.

There would be no problem if the prosody were {nasal}. We could easily conceive of {dental} constrained by {nasal} as being

the equivalent of [n] in traditional transcription, especially if we were describing the nasal mutation in Welsh. So why is there such a problem in conceiving of {dental} constrained by {4h} as being the equivalent of [θ] in traditional transcription?

The crucial point in conceptualizing {dental} coarticulated with {4h} as [θ] lies in the mutation system. If the only occurrences of [θ] in any language were as fortitive or provective forms of [t^h] (as is, in fact, the case for Welsh), then we could concede that the perception of voiceless frication is simply a by-product of the heightened aspiration of the [t^h]. But because the [θ] is a familiar alphabetic phoneme in traditional English phonology, we balk at the concept.

Once again, we are dealing here neither with English "universals" (aspects of the English language that "obviously" apply to all languages) nor with segments. What we need to do is to go with the data organized within the language under study within the framework of the only two elements verified scientifically in experimental phonetics – the syllables and features – and, forgetting how we operate in English and how we write and transcribe things from left to right, to rely *solely upon those data*.

The fact is that the mutation system of Welsh and related phenomena such as coalescence and provection describe a phonological system in which the degrees along the fortis-lenis scale are defined by the degree of prosodic aspiration. It is not that spirant

mutation creates a segment [θ] out of a segment [t^h]. The evidence quite clearly indicates that spirant mutation is simply the heightening of the {3h} level of aspiration to the {4h} level by the addition of any significant amount of aspiration.[4]

3.2.c The Welsh Alveopalatals. The efficacy of the dynamic relationships is borne out in the development of "alveopalatals" in the Welsh phonological system. Indeed, this provides perhaps the most direct argument for the prosodic nature of the different obstruent degrees.

In many dialects the affricates [ʧ] and [ʤ], borrowed from English in such loanwords as *chain* and *jam*, have been incorporated into the mutation system[5] These sounds tend to be highly unstable in the dialects attempting to borrow them, until they begin to function in the mutation system. Eventually, the initial consonant in a word such as [ʧain] (or [ʧəin]) 'chain' is seen to correspond to [t^h] in the soft mutation relationship of [t^h]~[d]. Accordingly, the word in an analogous mutation form finds its way into such phrases as [i ʤain] 'his chain'.

In the dialect of Dyffryn Nantlle, however, there has been a further development. A word such as [ʧain] 'chain' can now be realized in nasal mutation as in the phrase [(v)ə(n) n̥ʃain] 'his chain', and a word such as [ʤam] 'jam' can now be realized in nasal mutation as in the phrase [(v)ə(n) nʒam] 'my jam'. In

traditional terminology, the voiceless aspirated alveopalatal (stop) affricate is realized in nasal mutation as the voiceless aspirated alveopalatal nasal affricate, as the voiced unaspirated alveopalatal (stop) affricate is realized as the voiced unaspirated alveopalatal nasal affricate.

There are two possible features that characterize these sounds as they are admitted into Welsh dialects. The most obvious is their status as affricates – sounds starting out as stops and then releasing through fricatives. Within the Welsh phonological system as typified by the mutation relationships in table 1.2, however, it is far more likely that they would be incorporated not primarily as affricates, but as alveopalatals – sounds made by raising the front of the tongue to the area right behind the alveolum. When such an articulation involves oral stoppage (when the tongue actually stops the air from passing by the position of obstruction), the affricate release is automatic – a predictable result of the alveopalatal articulation.

If the alveopalatal position is simply added to those obstruents already in place in the Welsh mutation system, then the developments noted thus far are not at all unusual, but rather highly expected. The coarticulation of {d′} (the alveopalatal position) with {3h} would result in the pronunciation of [tʃain] ‘chain’, and the reduction of the aspirate prosody to the level of {2h} would naturally result in the pronunciation of [dʒain]. We might wish to revise our notation to reflect the position feature by giving the soft

mutation of [tʹain] as [dʹain].

With the addition of prosodic nasality, the realization coarticulated with {2h} aspiration would naturally result in the pronunciation of something that we would transcribe as [n̥ʃain]; and the coarticulation with {1h} with a word such as [ʤam] 'jam' would produce the pronunciation transcribed as [nʒam]. Accordingly, we may revise our notation to show the nasal mutation of [tʹain] as [n̥ʹain], and that of [ʤam] as [nʹam].

Such a development within the functioning of the mutation system would just as naturally lead to a realization of the {4h} degree in spirant mutation from the {3h} degree. Indeed, this is precisely what has occurred in some North Welsh dialects.[6] The dialects in question have developed a spirant mutation variant of [ʧ] in the form of an alveopalatal fricative that may be rendered consistently with our notation as [θ']. Thus, for example, the spirant mutation of [ʧoklɛd] or more precisely of [tʹoklɛd] 'chocolate' is realized in the phrase [i θ'oklɛd] 'her chocolate', and that of [ʧips] or [tʹips] 'chips' in [i θ'ips] 'her chips'.

The insight gained from examining the development of the Welsh alveopalatals is that we can see that it is the heightened aspiration coarticulated with [tʹ] that yields [θʹ] – a sound with which we are totally unfamiliar and that does not exist in the segmental phonemic inventories to which we are accustomed. Indeed, these are not "sounds" at all, but rather patterns of "sound"

derived from the phonetic data rather than from the alphabet.

3.3 Soft Mutation and Lenition

We can now wrap up the fortis-lenis scale with the addition of the susurrata level of prosodic aspirate constraint. The addition of this level necessitates, as does the soft mutation itself, a two-step process – from aspirata to media and from media to susurrata.

3.3.a The Lenition of Aspirata to Media. As noted in section 1.1, soft mutation involves a lenition from the aspirata to the media. For example, the third person singular masculine possessive pronoun governs the soft mutation, such that the combination of *ei* [i:] 'his' and *tad* [t^{h}a:d] father results in the phrase *ei dad* [i: da:d] 'his father'.

This step of soft mutation we could have justified back in section 3.1.a, without the complications introduced in section 3.2. On the surface, it is quite obvious that as the combination of [d] (or [t$^{=}$]) and [^{h}] in coalescence results in [t^{h}] as a form of fortition, then it stands to reason that the removal of [^{h}] from [t^{h}] should result in [d] (or [t$^{=}$]) by lenition.

Indeed, this lenition by removal of aspiration is precisely what we would expect from the neutralization patterns described in

section 1.4.b. When a word such as English *sad* (Middle English *sad, sadde*) is borrowed,[7] it is realized in Welsh as *sad* [sa:d] 'solid'. When an ending is added, an original aspirata reasserts itself in hard mutation to yield *satach* [sat^{h}aχ] 'most solid'.

Thus, it is quite evident from the data that the fortition of [d] yields [t^{h}] and that the lenition of [t^{h}] yields [d]. In dynamic terms, when the {dental} obstruction feature is constrained by the {2h} level of aspiration in the radical, the aspirate level is increased to the {3h} in fortition; while when the {dental} obstruction feature constrained by the {3h} level of aspiration in the radical, the aspirate level is reduced to {2h} in lenitive soft mutation.

3.3.b The Lenition of Media to Susurrata. We can now proceed to the determination of the level of aspiration associated with the susurrata. The soft mutation (or lenition) that produces a media from an aspirata is the very same soft mutation (lenition) that produces a susurrata from a media.

In the combination of such words as *ei* [i:] 'his' (once again, governing soft mutation) and *tad* [t^{h}a:d] 'father' in the phrase *ei dad* [i: da:d] 'his father', the lenitive soft mutation is quite evidently effected by the reduction in the degree of aspiration. By straightforward analogy, the combination of *ei* [i:] 'his' and *dant* [dand]/[dant$^{=}$] 'tooth' the same reduction in the degree of aspiration is responsible for the susurrata in the phrase *ei ddant* [i: δand]/[i:

ðant$^{=}$] ‘his tooth’.

We can therefore describe this susurrata degree of aspirate prosody as {dental} constrained by {1h}. At this point, we shall take this value on the strength of the analogy. In the following chapter, however, we shall see clearly from the acoustic evidence that this is indeed the case.

3.4 The Welsh Mutation System and the Fortis-Lenis Scale

We can now revise table 1.2 from chapter 1 to take into account the aspirate nature of the degrees along the fortis-lenis scale. As we see in the new table 3.2, however, the change is by no means dramatic.

Table 3.2: The Aspirate Fortis-Lenis Scale				
	Degree of Aspiration			
Position of Obstruction	Susurratae 1 aspirate {1h}	Mediae 2 aspirate {2h}	Aspiratae 3 aspirate {3h}	Spirants 4 aspirate {4h}
	Obstruents			
labial	*f* [v]	*b* [b]	*p* [p^h]	*ff/ph* [f]
dental	*dd* [ð]	*d* [d]	*t* [t^h]	*th* [θ]
velar	-	*g* [g]	*c* [k^h]	*ch* [χ]
	Liquids			
lateral	*l* [l]			*ll* [ɬ]/[l̥h]
trill	*r* [r]			*rh* [r̥h]
	Nasals			
labial		*m* [m]		*mh* [m̥h]
dental		*n* [n]		*nh* [n̥h]
velar		*ng* [ŋ]		*nhg* [ŋ̊h]

In this table, the traditional segmental values are given in the matrix in order to describe the effect in our transcription of the intersection (that is, the coarticulation) of the various degrees of aspiration and the positions of obstruction. Once again, the increase in aspiration in any column to the next available degree is what defines fortition, while the decrease in aspiration in any column to the next available degree is what defines lenition.

The reason why the new table is not dramatically different from the old one is that we are, on the one hand, describing the same functioning of the same system. On the other hand, we are repeating the transcription (letter, phoneme, segment) forms within the matrix to supply familiar points of reference. If we wished to increase the level of unfamiliarity along with that of precision, we could simply shade the cells that are realized in the system and otherwise leave them blank – predictable manifestations of the position and aspirate prosody coarticulations that need not be further specified. Tied as we are to the alphabetic writing and transcription systems, however, it is best to specify them, *so long as we do not use these letters for the purposes of phonetic or phonological analysis!*

It should be noted in closing this chapter, however, that if we were to go to the extreme of simply shading the cells in the matrix that are realized in the system, then the incorporation of the Welsh alveopalatals (section 3.2.c above) would not have been seen as such a dramatic event in the history of the language. Indeed, it would

have been rather predictable. By its very predictability within the dynamic framework in which aspiration functions as the pertinent phonetic feature underpinning the Welsh mutation system, we should see that this approach provides far better insight into the Welsh sound system than does the old alphabetic method.

Notes to Chapter 4

1. Since we are reexamining the phonological phenomena described in chapter 1, readers are urged to look back at the notes for the original descriptions for references regarding the phenomena themselves. For the dynamic analyses that have most contributed to the development of their current form, see especially Toby D. Griffen, "Provection from Prosodic Constraint," *LACUS Forum* 6 (1980), 102-110; "Prosodic Alliteration in Cynghanedd Poetry," *Bulletin of the Board of Celtic Studies* 29 (1981), 497-503; "Early Welsh Eclipsis: Dynamic Analysis," *Bulletin of the Board of Celtic Studies* 31 (1984), 48-61; *Aspects of Dynamic Phonology*, chapter 9; *Germano-European*, chapter 3; "The Cause of Sibilant Aspiration in British," *LACUS Forum* 17 (1991), 146-50; "The Law of the Sibilants in Brythonic," *Studia Celtica (Bulletin of the Board of Celtic Studies)* 31 (1997), 125-33.

2. See Fynes-Clinton, *The Welsh Vocabulary of the Bangor District*, p. xviii.

3. Once again, we cannot overemphasize the difference between analysis and transcription. For analysis, the segment has absolutely no place because there is no evidence for it in the phonetic data. Transcription, on the other hand, is simply a convenient means of representing the sound in a manner familiar from common orthographic practices (at least among those cultures using an alphabet). Neither should we analyze writing and call it phonological analysis, nor should we organize features into syllabic frames and call it writing.

4. As for English (and languages like it), we would simply have to come up with some other set of obstructions – such as, {alveolar} and {(inter)dental}. The fact that structural phonemicists have long collapsed the two through complementary distribution – alveolars are stops, (inter)dentals are fricatives – reflects their need to account for things in phonemes (compare, for example, Chomsky and Halle, *The Sound Pattern of English*, xxxxx, p. 177). While one could argue that adding another position of articulation (or two, when we consider the labials) is uneconomical, the removal of the need to repeat each occurrence of the prosodies of {stop} and {fricative} more than makes up for the addition in the main obstruction features. And, of course, the dynamic approach is based upon phonetic fact, not upon orthography.

5. For a discussion of the early incorporation of the affricates and the nasal affricates, see Toby D. Griffen, "The Development of Welsh Affricates: A Change through Borrowing," *Lingua* 34 (1974) 149-65.

6. The further effects on the mutation system are reported in B. Thomas and P.W. Thomas. *Cymraeg, Cymrâg, Cymrêg...: Cyflwyno'r tafodieithoedd*. Caerdydd: Gwasg Taf, 1989. The linguistic implications are discussed in detail in Toby D. Griffen, "Welsh Alveopalatals: Functional Pattern Attraction," *Word* 48 (1997), 353-66.

7. See, for example, T.H. Parry-Williams, *The English Element in Welsh*, Cymmrodorion Record Series, no. X (London: Honourable Society of Cymmrodorion, 1923), p. 78.