THE FURTHER DEVELOPMENT OF WELSH AFFRICATES

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The mutation system of initial consonant gradation in dialects of North Welsh has been expanding to incorporate the affricates [tš] and [dž] borrowed from English. This has resulted in the apparent development of new segments, including those including nasal affrication and alveolopalatal frication. While from a traditional segmental viewpoint the developments appear to be chaotic, in the framework of non-segmental, dynamic phonology the incorporations have been regular and to some extent predictable.

AS A GRADUATE STUDENT some three dozen years ago, I treated the borrowing of the English affricates into the Welsh phonological system (Griffen 1974) and found that the English [tš] and [dž] are incorporated into a Welsh dialect not when the sounds are imitated and used in borrowings, but when they are integrated into the mutation system. This system of initial consonant gradation can be illustrated as in **Table 1**, which is limited here to the alternations from stops – [m], [r̥h] (and [r]) and [ɬ] (and [l]) also enter into the system but not into the problem at hand. Under certain grammatical conditions, the "radical" (the dictionary form), is realized as one of the three mutations. For example, the word *tad* [tad] 'father' is realized in soft mutation (lenition) in the phrase *ei dad* [i dad] 'his father', in nasal mutation in the phrase *fy nhad* [(v)ə(n) n̥had] 'my father', and in spirant mutation in the phrase *ei thad* [i θad] 'her father'.

Radical	Soft	Nasal	Spirant
p	b	m̥h	f
t	d	n̥h	θ
č	ǰ	ň̥h	
k	g	ŋ̊h	χ
b	v	m	
d	ð	n	
ǰ		ň	
g	-	ŋ	

***Table 1**: Mutation system relationships*

In **Table 1** we see the incorporation of the affricates [tš] and [dž] into the mutation system of a North Welsh dialect in Dyffryn Nantlle as reported by R.O. Jones (1969). Following the mutation pattern, a loanword such as [tšain] ‘chain’ is realized in soft mutation as in the phrase [i džain] ‘his chain’ and in nasal mutation as in the phrase [(v)ə(n) n̥šhain] ‘my chain’. Likewise, a loanword such as [džam] ‘jam’ is realized in nasal mutation as in the phrase [(v)ə(n) ňžam] ‘my jam’. The voiceless aspirated alveopalatal affricate [tš] and the voiced unaspirated alveopalatal affricate [dž] thus function within the system as single units and can be represented as the phonemes /č/ and /ǰ/, respectively. Likewise, the voiceless aspirated alveopalatal nasal affricate [n̥šh] and the voiced unaspirated alveopalatal nasal affricate [ňž] function within the system as single units and can be represented phonemically as /n̥h/ and /ň/, respectively.

In his argument for treating the borrowed affricates as units and not as combinations of a stop phoneme and a fricative phoneme, Watkins (1961:19) notes that if the phonemes were separate units, then the spirant mutation of the sequence /t/ + /š/ would result in the combination */θš/ – an impossible sequence. This would appear to eliminate from consideration any soft mutation of /ǰ/ and any spirant mutation of /č/.

The development thus far of the borrowed affricates in Welsh supports Martinet’s theory of pattern attraction: “the phonemes of a pattern tend to be as fully integrated as conflicting factors make it possible” (Martinet 1952:20). Within the same vein, but from a morphophonological perspective, I concluded that “the tendency to fill out a pattern is not the cause of language change of this type; rather, it is the effect. The cause is ‘phonemic,’ in the sense of the phonologically relevant feature of Prague, and it is this particular type of motivation which Martinet no doubt had in mind by arranging the series in terms of distinctive feature” (Griffen 1974:162).

The missing elements – the soft mutation of /ǰ/ and the spirant mutation of /č/ – remain problematic though, for there are some possibilities for the expansion of the system to include these elements. Conjecturing on plausible candidates to fill these positions, I suggested that the palatalized [š″] already present in the Bangor dialect (Fynes-Clinton 1913:xxii-xxiii) might fit in as the spirant mutation of /č/ and that this might lead to pressure for a palatalized [ž″] as the soft mutation form of /ǰ/ (Griffen 1974:163).

1. A NEW DEVELOPMENT IN THE WELSH AFFRICATES. As reported by Thomas & Thomas (1989:47-48), certain North Welsh dialects have indeed developed a spirant mutation variant of /č/ in the form of the alveopalatal [θ″] (my notation). Representing [č] in the orthography as *tsh* and [θ″] as *thi*, they note such correspondences as *tshocled* [čoklɛd] ‘chocolate’ and *i thiocled* [i θ″oklɛd] ‘her chocolate’, *tships* [čips] ‘chips’ and *i thiips* [i θ″ips] ‘her chips’.

While this development differs from the prediction above, the difference is one of minor detail. The suggestion that the palatalized [š″] could become the spirant mutation form of /č/ was based upon the factor that has indeed proved decisive: “If one forms the hypothesis that palato-alveolar stops in Welsh are predictably affricate, and the same with nasals, then one can conceivably predict

that the order can have a fricative series not necessarily affricate..." (Griffen 1974:163).

The point that is important here is that these borrowings are identified in the phonology not so much as affricates, but as alveopalatals. Within the functional order-and-series framework of **Table 1**, we can enter this new development as in **Table 2**.

Radical	Soft	Nasal	Spirant
p	b	m̥h	f
t	d	n̥h	θ
č	ǰ	ň̥h	θ″
k	g	ŋ̊h	χ
b	v	m	
d	ð	n	
ǰ		ň	
g	-	ŋ	

***Table 2**: New mutation system relationships*

This development is exemplary of change within a morphophonological system in keeping with Martinet's theory of pattern attraction. Yet it is disquieting, for the new development has resulted in a disturbing mixture of plosives, affricates, and fricatives.

This problem, however, has always plagued traditional segmental analyses of the Welsh mutation system. In one environment, a voiceless aspirated plosive changes to a voiceless unaspirated plosive while a voiced unaspirated plosive changes to a voiced fricative. In a totally unrelated environment, the voiceless aspirated plosive changes to a voiceless fricative. All the alveopalatal affricates do is to muddle an already confusing system – at least from the traditional segmental phonemic perspective. And once we add the other elements – [m], [r̥h] (and [r]), and [ɬ] (and [l]) – the system appears to be downright chaotic. From the dynamic perspective, on the other hand, the system is simple and regular.

2. THE ASPIRATE FORTIS-LENIS SCALE. Dynamic phonology has been presented in detail in previous work (most significantly for this problem in Griffen 1985 and 2004) and in numerous published articles and conference papers, and it would be far beyond the scope of this paper to go into the detail here. The important point for us at the moment is that through dynamic analysis we can devise a phonetic and phonological justification for the fortis-lenis scale – a feat unattainable in segmental models (as is quite evident from research from Vennemann & Ladefoged 1973 to Bauer 1988; and in Welsh phonology in particular, see Ball 1989/90).

Briefly, the fortis-lenis scale developed from dynamic phonology is most clearly understood from its acoustic aspect. As shown in the spectrographic

analyses in Griffen 1975, the fortis-most obstruction is dynamically realized with the greatest ratio of high-to-low frequency energy emission. That is, there is more noise in the higher frequencies than in the lower frequencies. This stands to reason, since the fortis-most consonant is considered the most "consonant-like" – the least like the vowels, characterized by lower-level emissions. Going down the scale, the ratio is reduced in a rather steady way, yielding the scale with [θ], for example, as the most fortis (with the greatest amount of high frequency energy in ratio to the low), [t^h] as the next most fortis, [d] as the next most lenis, and [δ] as the most lenis in the Welsh system.

The high frequency energy is characterized as "aspiration," and this fortis aspiration plays a vital role in the fortis-lenis system of Welsh and in the mutation system itself (see Griffen 1985:chapters 5 and 7), as summarized for the entire system in **Table 3**. The lowest aspirate level is characterized as {1h} (where braces enclose features in dynamic coarticulation not to be confused with segments), and in coarticulation with the dental obstruction {d} it is perceived segmentally as [δ]; the next aspirate level {2h} coarticulated with the dental position {d} is perceived as [d]; the third aspirate level {3h} coarticulated with the dental position {d} is perceived as [t^h]; and the fourth aspirate level {4h} in coarticulation with the dental position {d} is perceived as [θ].

	Degree of Aspiration (series)			
Position of Obstruction (orders)	Susurratae 1 aspirate {1h}	Mediae 2 aspirate {2h}	Aspiratae 3 aspirate {3h}	Spirants 4 aspirate {4h}
	Obstruents			
labial {b}	*f* /v/	*b* /b/	*p* /p^h/	*ff* or *ph* /f/
dental {d}	*dd* /ð/	*d* /d/	*t* /t^h/	*th* /θ/
velar {g}	-	*g* /g/	*c* /k^h/	*ch* /χ/
	Nasals			
labial {bn}		*m* /m/		*mh* /m̥h/
dental {dn}		*n* /n/		*nh* /n̥h/
velar {gn}		*ng* /ŋ/		*nhg* /ŋ̊h/
	Liquids			
lateral {l}	*l* /l/			*ll* /ɬ/ or /l̥h/
trill {r}	*r* /r/			*rh* /r̥h/

***Table 3**: The Welsh aspirate system before alveopalatals*

Within the dynamic framework, the aspirate "prosodies" (the pertinent manner features) are independent of the position of obstruction; and within the mutation system, it is the prosody that varies regardless of the position of obstruction. As illustrated in **Table 4**, soft mutation involves the loss of one degree of aspiration from {3h} (perceived segmentally as [p^h], [t^h], [k^h] – leaving aside the affricate for now) to {2h} (perceived as [b], [d], [g]) and from {2h} to {1h} (perceived as [v] – originally [β] –, [δ], and a null that was originally [γ]). Spirant mutation involves the gain of one degree of aspiration from {3h} to {4h} (perceived as [f] – originally [φ] –, [θ], [χ]). Nasal mutation entails merely the imposition of nasality {n} without any effect on the relative degree of aspiration (as pointed out by R.O. Jones, aspirated plosives become aspirated nasals, unaspirated plosives become unaspirated nasals ― Griffen 1974:149).

Relationships			
Radical	Soft	Nasal	Spirant
{3h}	{2h}	{3hn}	{4h}
{2h}	{1h}	{2hn}	
Processes			
Radical	Soft	Nasal	Spirant
{3h}	-h	+n	+h
{2h}	-h	+n	

***Table 4**: Dynamic perspective*

Thus, the dynamic analysis of the mutation system and its underlying fortis-lenis scale turns a complex array of phonemes into a simple and straightforward system in which the aspirate or nasal level in a particular initial position is increased or decreased by a single increment. All that needs to be noted in addition to this is the phonetic detail that the labial position shifts to the labio-dental in the lenis- and fortis-most coarticulations (frication) and that the {g1h} coarticulation is weakened to null. Both adjustments result from phonetic historical changes and neither is of phonological pertinence – neither changes the relationships or the processes.

The crucial concept for us to grasp in this is that the degrees along the fortis-lenis scale have nothing to do with plosivity or frication – only with aspiration. The statement that [p^h]/[t^h]/[k^h] are related to [b]/[d]/[g] as [b]/[d]/[g] are related to [v]([β])/[δ]/-([γ]) in soft mutation simply means that the prosodic {3h} is related to {2h} as {2h} is related to {1h}.

In a dynamic analysis of the Welsh affricates within the mutation system, we must not be distracted by such considerations as plosivity and frication – nor indeed by their combination in affrication. While these may be valid considerations in other languages (and, of course, each language maintains its

own system), in the aspirate fortis-lenis system of Welsh, the degree of fortis aspiration and nasality is the only phonologically pertinent factor

3. THE AFFRICATES AS ALVEOPALATALS. With the "primary obstructions" now in an elegant system, we must somehow adapt this system to accommodate the new affricates. As noted above, however, the inclusion of /θ″/ as a spirant mutation form of /č/ confirms the prediction that the important factor in the affricates is not the affrication, but the alveopalatal position. The question we must ask at this point is: How different is /č/ from /t/ other than in the position of obstruction in the affected dialects of North Welsh?

From the dynamic perspective, the aspirate [t^h] entails the constraint of the dental position by an audibly high ({3h}) degree of aspiration. In the working of the system, it is evident that the [tš] shares this degree of aspiration. Moreover, acoustically the [t^h] is characterized by an almost total absence of low-level frequency emission and a burst of high-level noise. [tš] is likewise characterized by an almost total absence of low-level frequency emission and a burst of high-level noise. Indeed, the noise levels of [h], [s], and [š] significantly overlap (compare the classic study of Strevens 1960).

Among some North Welsh dialects, the initial {d3h} coarticulation is in fact produced as [t^s] even when the bilingual speaker pronounces the corresponding English sound as [t^h] (see Griffen 1975:15). The crucial point in the pronunciation of the {d3h} coarticulation, then, is not the nature of the aspiration ([h] or [s]), but merely its degree within the high range. At this level of aspiration, [t^s] is simply an acceptable realization of the {3h} degree of aspiration at the dental (alveolar) position of obstruction, although in other languages it may be considered an affricate.

The only difference between [ts] and [t^s] is the notation used by the linguist. Likewise, the only difference between [tš] and [$t^š$] is the notational convention. It is not the case that the one must be termed an affricate and the other a plosive with fricative release. Thus, in answer to our question above, the only pertinent difference between [t^s]/[t^h] and [$t^š$] is in the position of obstruction — the former being dental and the latter alveopalatal.

Once the /č/ becomes functional in the native mutation system, it occupies the alveopalatal position {d″}, as represented in **Table 5**. In its radical form, it is realized with a phonologically nonpertinent shibilant release in the {d″3h} coarticulation. In effect, the affricate ceases to be phonologically an affricate and evolves into the alveopalatal "primary obstruction" constrained by the third degree of aspiration.

As for the /ǰ/, this {d″2h} coarticulation is now necessarily interpreted as the realization of the alveopalatal position of obstruction {d″} constrained by the second degree of aspiration {2h}. In fact, this very same development is attested in palatalizations of the dental constraining a front (palatal) vowel. For example, *findio* 'to find' is often realized as [findžo] (see G.E. Jones 1984:44) – nothing more than an alveopalatal version of the corresponding dental.

	Degree of Aspiration (series)			
Position of Obstruction (orders)	Susurratae 1 aspirate {1h}	Mediae 2 aspirate {2h}	Aspiratae 3 aspirate {3h}	Spirants 4 aspirate {4h}
	Obstruents			
labial {b}	*f* /v/	*b* /b/	*p* /p^h/	*ff* or *ph* /f/
dental {d}	*dd* /ð/	*d* /d/	*t* /t^h/	*th* /θ/
alveopalatal {d″}		*j* /ǰ/	*ts* /č/	*thi* /θ″/
velar {g}	-	*g* /g/	*c* /k^h/	*ch* /χ/
	Nasals			
labial {bn}		*m* /m/		*mh* /m̥h/
dental {dn}		*n* /n/		*nh* /n̥h/
alveopalatal {d″n}		/ň/ or /n″/		/ň̥h/ or /n̥h″/
velar {gn}		*ng* /ŋ/		*nhg* /ŋ̊h/
	Liquids			
lateral {l}	*l* /l/			*ll* /ɬ/ or /l̥h/
trill {r}	*r* /r/			*rh* /r̥h/

***Table 5**: The Welsh aspirate system with alveopalatals*

Furthermore, the nasal mutation forms are likewise interpretable simply as variants of the alveopalatal radical. Since the shibilant off-glide is a nonphonologically pertinent phonetic characteristic of the alveopalatal obstruction position, it occurs as the manifestation of aspiration at this position. Whether the phonologist uses the notation /ň̥h/ and /ň/ or /n̥h″/ and /n″/ makes no difference, for nasal mutation remains simply the imposition of the prosodic feature of nasality in coarticulation with the other obstructional (and vocalic) features.

Finally, the spirant mutation /θ″/ should be rather obvious. It is simply the realization of the highest degree of aspiration {4h} coarticulated with the alveopalatal position of obstruction {d″}. Within the dynamic framework, there is no more reason to distinguish between the frication perceived in the {d″4h} coarticulation and the affrication perceived in the radical {d″3h} than there is to distinguish between the frication perceived in the {d4h} coarticulation and the plosion (particularly the sibilant – affricate! – release) perceived in the {d3h} coarticulation. Within the aspirate fortis-lenis scale of Welsh (and others of its

type – see particularly Griffen 1988), the only phonologically pertinent distinction is along the scale itself.

4. CONCLUSION. In effect, there has never been a Welsh affricate – only English affricates borrowed into Welsh. Once the borrowing is incorporated within the system of a dialect, it is adapted to the system and reinterpreted not as an affricate, but simply as an alveopalatal position of obstruction.

Of course, the process is still incomplete. Now that it is clear what has been happening in the borrowing of the English affricates and their incorporation as alveopalatals into the Welsh system though, linguists know more precisely what to search for in those dialects that have included the alveopalatals thus far: The soft mutation form of {2h} is {1h}; so the soft mutation of {d″2h} (perceived as [dž]/[d^{ž}]) should ultimately be realized as {d″1h} (perceived as [δ″]). But the system may yet offer another surprise.

We should also note that the dynamic approach greatly enhances Martinet's theory of pattern attraction: "the phonemes of a pattern tend to be as fully integrated as conflicting factors make it possible. This means that filling of holes may involve phonemes which already had some degree of integration, but which, through the process, will emerge as more fully integrated" (Martinet 1952:20). Tied to the segmental phoneme, the theory of pattern attraction gathered together a tenuous array of plosives, fricatives, and finally affricates – as well as nasals and liquids. In the framework resulting from dynamic analysis, however, the theory is far more elegant. And it is also more reliable, for the regularity of the relationships that obtain among the coarticulated features of speech is far more visible once the segment is cleared from the line of sight.

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