CELTIC MUTATIONS: BEYOND THE P'S AND Q'S

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The Common Thread

As the academic field of Celtic studies inevitably grows ever more details, we tend to lose sight of the common threads. For the linguist, this problem is particularly troubling with respect to one of the most prominent aspects held in common by the Celtic languages — the systems of initial mutations.

Examining the Welsh and the Irish systems, we are first struck by the similarities: Both systems consist of two major types of mutation: (1) Lenition, the "weakening" of the consonant originally in intervocalic position (between vowels), and (2) eclipsis, a change in the consonant originally due to a preceding nasal consonant (and in Welsh of an aspirate). Moreover, both systems developed from the same phonetic pressures, and both emerged at around the same time in history.

Further accentuating the similarities in the systems are the facts that the two languages were in contact at the time of these developments and that the speakers were apparently aware of correspondences between them. For example, when British missionaries introduced the root *pask-* 'Easter' (from Latin *pascha*), the Irish changed it to *casc-* in order to conform to the correspondence between P-Celtic and Q-Celtic established by sound changes that had been completed centuries before (compare Thurneysen 1980: 570-72 on the phenomenon; also Schmidt 1993 on the relative dating).

If, however, we look more closely, we tend to forget such common threads, for in some crucial details, the Welsh and Irish mutation systems are very different indeed. In fact, at the phonetic level they differ so profoundly and fundamentally as to appear totally unrelated.

The Aspirate System of Welsh

The consonants of Welsh operate along a traditional fortis-lenis scale as in table 1. In lenition (or soft mutation), a consonant in one column (or in linguistic parlance "series") changes to the next available more lenis consonant in the row (or the "order"). This is the same relationship that lies behind the mutations of Greek and the changes in Indo-European traditionally known as Grimm's Law (see Griffen 1988).

Table1: The Welsh Aspirate Fortis-Lenis Scale				
	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	*f* [v]	*b* [b]	*p* [p^h]	*ff/ph* [f]
Dental	*dd* [ð]	*d* [d]	*t* [t^h]	*th* [θ]
Velar	Null	*g* [g]	*c* [k^h]	*ch* [χ]
	Liquids			
Lateral	*l* [l]			*ll* [ɬ]/[l̥h]
Trill	*r* [r]			*rh* [r̥h]
	Nasals			
labial	(*f* [v])	*m* [m]		*mh* [m̥h]
dental		*n* [n]		*nh* [n̥h]
velar		*ng* [ŋ]		*nhg* [ŋ̊h]

While the the workings of the scale have long been recognized, the actual phonetic underpinnings of the system have until recently eluded researchers, causing such general linguists as Vennemann and Ladefoged (1972) and Bauer (1988) and such Cymric specialists as Ball and Müller (1992) to

question its very existence as a phonetic relationship. Recent research into the scale in Welsh, however, shows that it is indeed based upon a single phonetic parameter — the ratio of high-to-low frequency emission (see Griffen 1975, 1985, 1997b).

To bring this rather esoteric-sounding concept to the level of the concrete, let us examine the spectrogram in figure 1. This is a graphic record of speech sounds in the three properties of frequency (or pitch), with the higher frequencies higher on the spectrogram; of amplitude (or loudness), with the louder sounds shown as darker areas; and time, flowing from left to right.

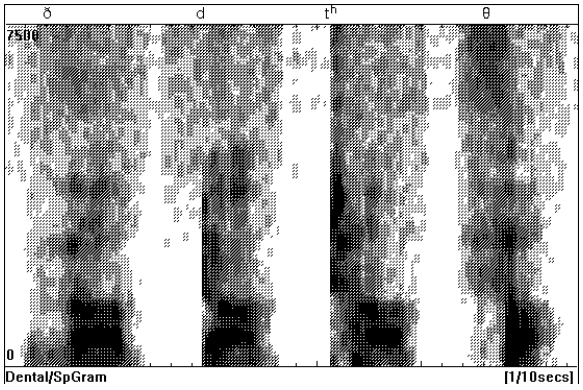

Figure 1: Spectrogram of the Nonsense Syllables [ðə də t^hə θə]

Looking at the representations from the lenis [ð] to [d] to [t^h] to the fortis [θ], we should notice that the bulk of darkness (the amplitude or loudness) shifts upward as we go "up" the scale. That is, the more fortis the consonant, the stronger the higher frequencies become relative to the lower. Since the high frequencies are the realm of aspiration (the [h] sound or the puff of breath after [p^h], [t^h], and [k^h]) this type of fortis-lenis scale can be called an aspirate fortis-lenis scale. Indeed, in aspirate eclipsis (traditionally known as spirantization) and in the hard mutation, the direct introduction of the aspirate [h] is seen as the catalyst for the change "up" the scale from lenis to fortis (compare Griffen 1975, 1985: chapters 5 and 7; also 1997a). To understand lenition (in Welsh, Irish, or any language), we must also consider the relationship between consonant and vowel. Although consonants and vowels follow one another in alphabetic writing (as opposed, for instance, to the vocalic pointings of Hebrew), in actual speech the vowel is the basis of the syllable and the consonant occurs with the vowel and obstructs or constrains it. For example, if we pronounce *feel* and *fool* slowly and carefully, we will hear and even feel the different vowels produced during the *f*. This fact is recognized in modern dynamic phonetics and phonology, and it can be represented in the syllabic frame in figure 2.

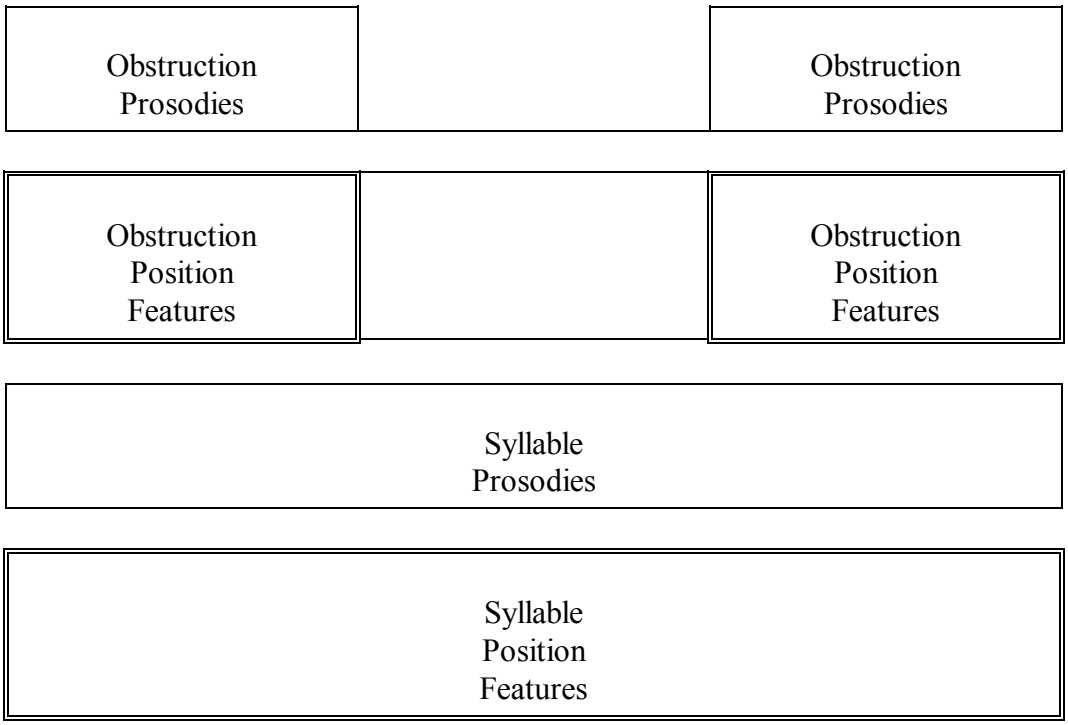

Figure 2: The Syllabic Frame

In the frame, we see that the consonant constrains the vowel in a process known technically as "dynamic coarticulatory constraint." Moreover, the various features relating to consonantal obstruction and vocalic emission can also be further classified by constraint, with the main positional features as the basis and the "prosodies" (such as consonantal aspiration and nasality and syllabic accent) as constraints.

Now we can finally return to the Welsh mutations. In lenition, the consonantal constraint historically occurred where two vowels came together "under" the constraint. This fundamentally weakened the constraint, resulting in Welsh in the loss of one degree of aspiration and a shift "down" the scale. Using the symbol {h} to represent the degree of aspiration, we can illustrate such a change as in figure 3, in which the feminine noun *de* [de:] 'right' undergoes lenition by virtue of being preceded by the definite article *y* [ə] 'the' yielding the phrase *y de* [əðe:] 'the right'.

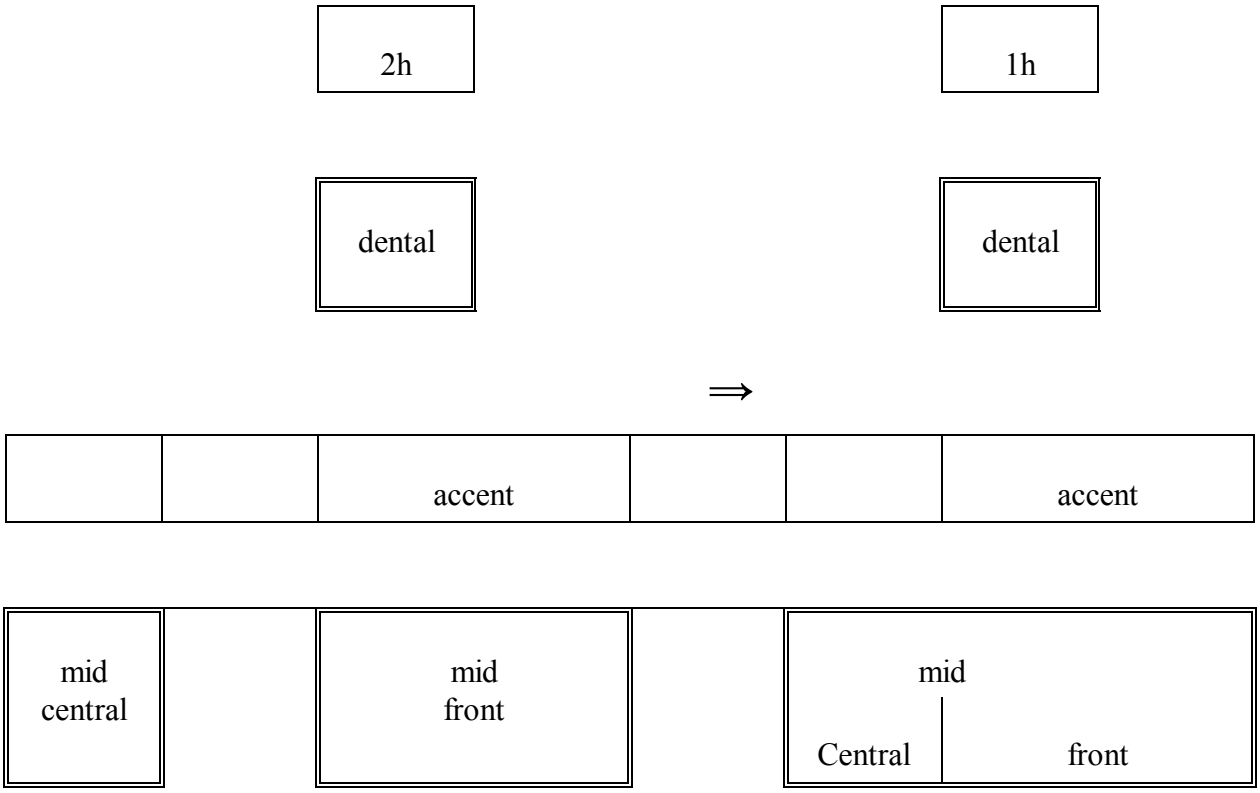

Figure 3: Lenition of *y* [ə] + *de* [de:] to *y dde* [əðe:]

We should note that this type of lenition is an integral part of the overall system, as indeed it must be. Since the system is based upon the degree of aspiration, lenition is thus realized as a weakening of the constraint or a loss of aspiration by one degree.

Nasal eclipsis or nasal mutation, on the other hand, has no effect on the relative degree of aspiration — and in phonology it is the relative degree, not the absolute degree that is important (compare Jakobson and Waugh 1979: 13-18). In figure 4 (leaving out the vowels for the sake of simplicity and clarity, as they neither affect nor are affected by the eclipsis), the combination of *n* [n] and *t* [t^{h}] results in *nh* [n̥h]; for example, *yn* [ən] 'in' and the place name *Tal-y-bont* [t^{h}aləbond] result in the phrase *yn Nhal-y-bont* [ə(n)nn̥haləbond]. The addition of a nasal prosody to the initial obstruction position results simply in the addition of nasality to whatever degree of aspiration (relatively!) that is there already. This creates such apparent anomalies as voiceless aspirated nasals,

which are in fact not at all anomalous within the system.

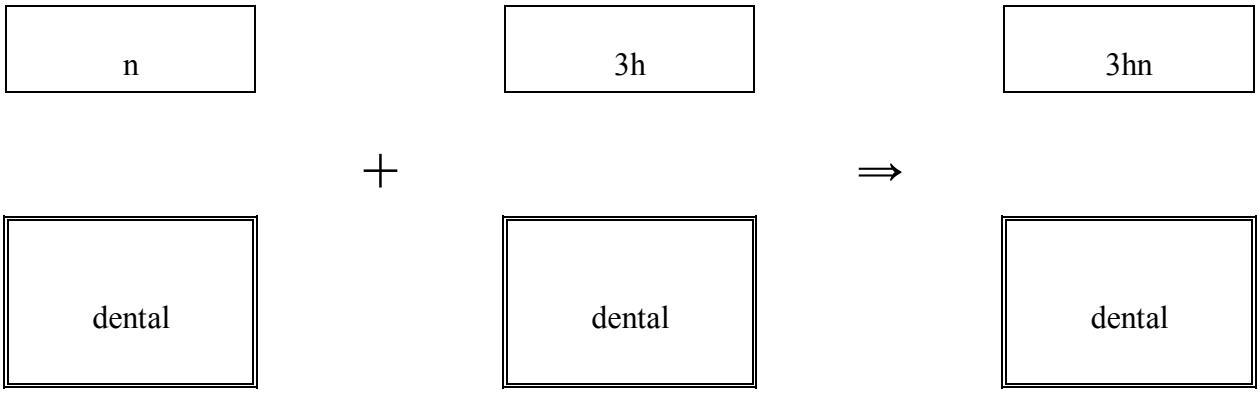

Figure 4: Nasal Eclipsis in Welsh

With the basis in aspiration, the fortis-lenis scale of Welsh (and also of Greek, Indo-European, etc. – see especially Griffen 1993) is regular, predictable, and elegant. Most importantly, it is "true to itself" – it displays the high degree of consistence that is needed for such a system to operate.

Irish Mutations

Turning our attention to Old Irish, we find a system that appears to be quite different. Rather than upon aspiration, Irish lenition came to be based upon the degree of constraint as shown in table 2.

Table 2: Old Irish Lenition

Stops		Spirants		Continuants	
Radical (2c)	Mutation (1c)	Radical (1c)	Mutation (0c)	Radical	Mutation
c [k^h]	*ch* [χ]	*ch* [χ]	null	*s* [s]	*h* [h]
t [t^h]	*th* [θ]			*w* (*f*) [w]	null
p [p^h] (loans)	*ph* [f]			*m* [m]	*m* [μ]
g [g]	*g* [g]	*g* [g]	null	*n* [n]	*n* [v]
d [d]	*d* [δ]	*d* [δ]	null	*l* [l]	*l* [λ]
b [b]	*b* [β]			*r* [r]	*r* [ρ]

This system is far easier for us to visualize than is the Welsh, since it is based upon physiological relationships that we can be very much aware of. While few of us can actually hear the aspirate gradations in the Welsh scale or can feel the various widths at the orifice of the larynx that correspond with them, we can all note the difference between the complete stoppage of air through the mouth in the second degree of constraint (2c) in the production in [t^h] or [d] as opposed to the partial stoppage in the first degree of constraint (1c) in the production of [θ] or [δ], respectively, as opposed to no restriction at all (0c).

If we were to attempt to extrapolate our experience with Welsh into Irish, however, we would be quite baffled. While the [d]/[δ] relationship appears to be quite properly lenitive, the [t^h]/[θ] relationship appears not only to be nonlenitive, but even to be fortitive. We could well wonder why Hibernicists choose to call both lenition (with even more wonder at the older term of aspiration).

The reason why these relationships appear so baffling to the Cymricist is that the Irish system is based upon a different phonetic parameter from that of the Welsh. When the consonantal constraint historically occurred at the intersection of two vowels, the weakening of the constraint was realized

through a weakening of the degree to which the airstream was blocked. Using the symbol {c} to represent constraint, we can illustrate Irish lenition in general as in figure 5.

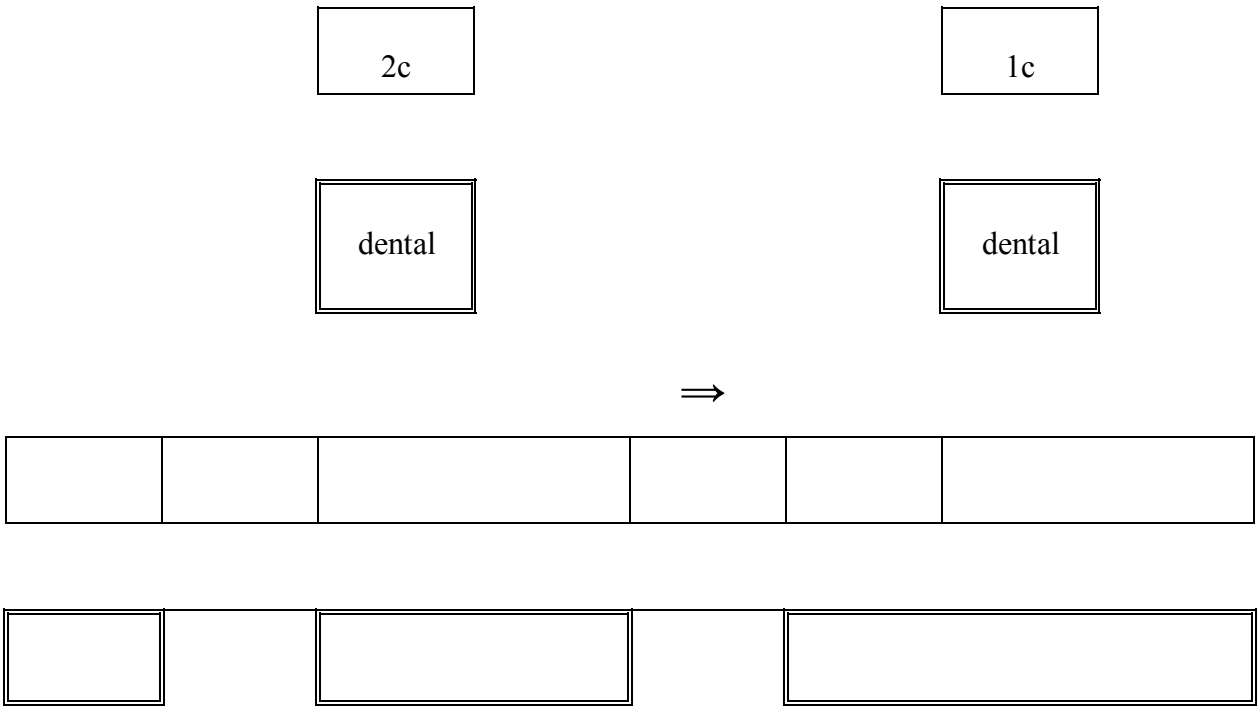

Figure 4: Lenition of [t] to [θ] or [d] to [δ]

As for eclipsis, the system as outlined in table 3 is somewhat more complicated.

Table 3: Old Irish Eclipsis

Position	Radical	Mutation
Nonaspirates		
labial	b	m
dental	d	n
velar	g	ng
Aspirates		
labial	p	b
dental	t	d
velar	k	g

In eclipsis with the nonaspirated stops, the addition of nasality appears to be identical to that for Welsh. Indeed, we can illustrate it in figure 6 simply by replacing the symbols from figure 4.

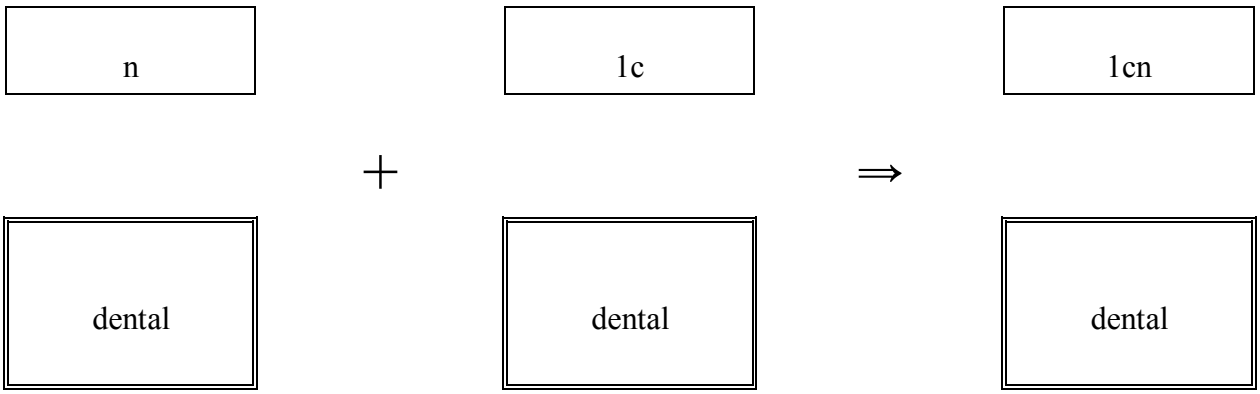

Figure 6: Nasal Eclipsis of Irish Nonaspirates

The reason why nasality can be realized in this form of eclipsis is that nasality in Irish already exists at that level of constraint. This is, once again, a physically-oriented system of which the speaker is well aware, as opposed to the auditory system in the Welsh.

This difference in orientation is evident in the eclipsis involving the aspirated stops. Here, the addition of nasality to aspiration would lead to a combination not only absent from the language, but physiologically counterintuitive and inconvenient. Consequently, both nasality and aspiration in effect cancel each other out in a process known traditionally from the Prague School of linguistics as "neutralization" (see Trubetzkoy 1969: 228-41), as illustrated in figure 7.

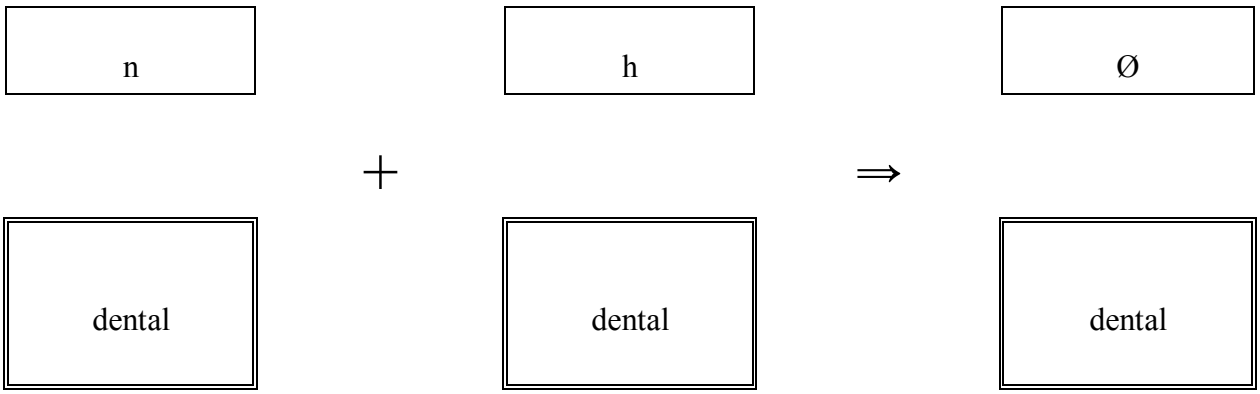

Figure 7: Nasal Eclipsis of Irish Aspirates

In effect, the relationship between the aspirated and the nonaspirated stops operates within the overall system of Irish at a subsidiary level. Since the overall system is based upon the degree of constraint, then that feature must indeed take precedence. So long as the subordinate relationship involving aspiration does not interfere with the overall system, then it is allowed.

The Irish system, then, is just as elegant and consistent with itself, in its own phonetic parameter, as is the Welsh. Taking the dentals as illustrative, we could show the basic relationships as in figure 8.

	2c	1c	0c
Aspirate	t^h	θ	null
Nonaspirate	d	ð	null

Figure 8: Phonetic Relationships

Contrasting Systems

A problem does arise, however, if one is thoroughly steeped in the one system and attempts to interpret the other based upon one's past experience. On the one hand, if we become thoroughly familiar with the Welsh system to the point of assuming that this system *is* the fortis-lenis scale, then the Irish system appears problematic, for there is nothing in the acoustic effects of Irish lenition that would indicate that there is in fact a lenition occurring. It must be something else.

On the other hand, if we become thoroughly familiar with the Irish system and assume that it *is* the fortis-lenis scale, then the Welsh system appears just as problematic, for there is nothing in the discernable physiological effects of Welsh lenition that would indicate that there is in fact a lenition occurring. It must be something else.

Such confusion between the systems might lead us to ask, for example: If the aspirated nasal could occur in Welsh, why could it not in Irish? Once again, the Welsh system is based upon aspiration, which must be fundamentally at the basis of the consonantal relationships. If a requirement should arise in which nasality and aspiration should coincide and they can coincide acoustically, then coincide they must. Perhaps the most interesting developments with regard to the necessity of such combinations is found in the more recent integration of the affricates [tʃ] and [dʒ] and the development for them of innovative nasal mutation forms and now of spirant mutations forms as well (see Griffen 1974, 1997b).

We must bear in mind that the Welsh system is an acoustically based, auditory system. There is no acoustic proscription against the auditory effects of nasality cooccurring with those of the appropriate degree of aspiration. This being the case, the physiology is required to produce the sound.

The Irish system, on the other hand, is based upon the discernable physiology. As the cooccurrence of nasality and aspiration do create physiological problems in requiring an aspirate release partially through the nasal cavity in an otherwise oral system, then there is no physical compunction to have them cooccur. Consequently, they are both simply neutralized — a simple, elegant, and by no means rare solution among the world's languages.

Conclusion: Toward a Broader Celtic Understanding

For Celtic studies in general, the important aspect of the Welsh and the Irish mutations together is that at about the same time in history, these two related languages in contact developed systems that in function are very much alike. These functionally similar systems developed in spite of the fact that the two languages are based upon fundamentals of phonetic parameters that are about as different as can be — an auditory acoustic orientation in Welsh as opposed to an oral physiological orientation in Irish: What is heard as opposed to what is produced.

In the wider area of general linguistics, the juxtaposition of these two choices, so close and yet so distant, even raises theoretical problems that go far beyond this presentation and call to question some tenets of phonology that many linguists hold dear. The analysis of the production by the Irish and the analysis of the intended perception by the Welsh challenge the simple generative interpetation of the motor theory of speech production restricted to a unidirectional analysis by synthesis (see Griffen 1999).

From a more practical point of view, this odd juxtaposition of the auditory Welsh and the oral Irish orientations could well cause Celticists to lose sight of the common thread – the fact that these systems are virtually identical on the larger, functional level. It is only on the structural level of detail that they differ, regardless of how drastic these structural phonetic details may be.

Why is it important to keep this common thread in focus? It is in the manner in which these peoples use their language – not in the phonetic details – that we gain insights into their approach to how things are done. If we can get beyond the particulars to see these common threads, then we shall gain far clearer insights into the Celtic world view beyond the P's and Q's.

REFERENCES

Ball, Martin, and Nicole Müller. 1992. *Mutation in Welsh*. London: Routledge.

Bauer, L. 1988. "What is Lenition?" *Journal of Linguistics* 24, 381-91.

Griffen, Toby D.1975. *A New Welsh Consonant Shift: Description and Implications*. Ph.D. diss. Gainesville: University of Florida. [Ann Arbor, Michigan: University Microfilms International 76-4237.]

------. 1985. *Aspects of Dynamic Phonology*. Amsterdam: Benjamins.

------. 1988. *Germano-European: Breaking the Sound Law*. Carbondale: Southern Illinois University Press.

------. 1993. "Germano-European and the Phonetic Plausibility Theory," *Word* 44, 473-84 .

------. 1997a. "The Law of the Sibilants in Brythonic," *Studia Celtica (Bulletin of the Board of Celtic Studies)*.

------. 1997b. "Welsh Alveopalatals: Functional Pattern Attraction," *Word*.

------. 1999. "Auditory *versus* Oral Lenition," *LACUS Forum* 25, 119-26.

Ó Siadhail, Micheál. 1989. *Modern Irish: Grammatical Structure and Dialectal Variation*.

Cambridge: Cambridge University Press.
Schmidt, Karl Horst. 1993. "Insular Celtic: P and Q Celtic," Martin J. Ball with James Fife (eds.), *The Celtic Languages*, 64-98. London: Routledge.
Thurneysen, Rudolf. 1980. *A Grammar of Old Irish*. Trans. by D.A. Bińchy and Osborn Bergin. Dublin: Dublin Institute for Advanced Studies.
Trubetzkoy, Nikolai S. 1969. *Principles of Phonology*. Trans. by C.A.M. Baltaxe. Berkeley: University of California Press.
Vennemann, Theo, and Peter Ladefoged. 1973. "Phonetic Features and Phonological Features." *Lingua* 32, 61-74.