THE HIGH GERMAN SOUND SHIFT: PHONETIC JUSTIFICATION

T.D. Griffen

Southern Illinois University at Edwardsville

The High German Sound Shift took place first among the Upper German dialects of Alemannic shortly before the historical period and then spread northward along the Rhine. Through this sound shift, the main consonant correspondences were established differentiating the High German dialects (undergoing the shift) from the Low German dialects and English (not affected by it). While the causes of this spread toward the north were, as aptly pointed out by Barnes (1978), probably political and military, the phonetic causes of the shift have been rather problematical.

As expected in something called a sound shift, the changes affecting High German and particularly the Upper German dialects spread across several related sounds. Treating the more lenis changes first, we find that all of the High German dialects underwent a change from the geminate [dd] to [tt], and the Upper German dialects underwent a change from the geminate [bb] to [pp] and also a change from the geminate [gg] to [kk]. These changes can be illustrated through such correspondences as Old English biddan 'to request' to Old High German bittan, Old High German sibba 'peace' to Old Alemannic sippa, and Old Saxon liggian 'to lie' to Upper German likken. (Examples throughout are taken from Braune 1967, Waterman 1966, and Wright 1907.)

In the second group of changes in this shift, we find that between vowels, where Braune (1967:91-2) points out that there was a tendency toward gemination, the voiceless stops became voiceless fricative geminates. Thus, for example, we see such correspondences as Old English open 'open' to Old High German offan, Old English etan 'to eat' to Old High German ëzzan, and Old English sprecan 'to speak' to Old High German sprëhhan.

These changes involving geminates made use of consonants that were already in the language at that stage. In other changes, however, a new series of affricates was established. In initial position and in medial position after the consonants [l], [m], [n], and [r], the voiceless stops affricated in the various dialects to different degrees. Throughout the High German dialects, [t] changed to [ts] in these environments; in Upper German and East

Franconian (and sporadically in other dialects), [p] changed to [pf]; and in High Alemannic (the uppermost of the High German dialects), [k] changed to [kx]. For example, we find such correspondences as Old English pund 'pound' to East Franconian pfunt, Old English tunge 'tongue' to Old High German zunga (where z represents [ts]), and Old High German trinkan 'to drink' to High Alemannic trinchan (where ch or cch represents [kx]).

There was one final case of affrication involved in this shift. The traditional geminates were realized not as fricatives, but as affricates. For example, Middle Dutch dapper 'strong' corresponds to Old High German tapfer 'brave', Old English settan 'to set' corresponds to Old High German setzan, and Old Saxon wekkian 'to wake' corresponds to Upper German wecchan. Once again, the velar change affected only the High Alemannic dialects.

The Problem

For those linguists adhering to the traditional "inner approach" as stated by Jakobson and Halle (1971), the High German Sound Shift outlined above presents a definite problem. According to this inner approach, changes and relationships of the phonology must be justified (or motivated) by phonetic considerations, not by abstract psychological notions. This problem has been stated quite succinctly by Foley (especially 1973), perhaps the most notable of the proponents for the "outer approach" (that is, the nonphonetic approach). Foley sees the problem in two parts: First of all, the change is not representable in the current binary feature system; and second, the change is one of strengthening, from lenis to fortis.

Addressing the first problem, I should point out that while the fortis-lenis scale has given some phonologists working from phonetic bases a great deal of difficulty, I have demonstrated before the Mid-America Linguistics Conference (see Griffen 1977a, also Griffen 1975a:chapter 10) that for a nonsegmental phonologist the fortis-lenis scale made up of several members in gradual opposition is fully justifiable from systematic phonetic alternations and from physiological and acoustic phonetic experiments. Physiologically, the fortis-lenis scale may be represented through the parameter of aspiration, where this aspiration is the air (or air-pressure) passing through the orifice of the larynx and opening the orifice in ever-increasing amounts from the lenis-most to the fortis-most articulations (see Perkell 1969:36-7). Acousti-

cally, it may be represented also through the parameter of aspiration, where this feature is a ratio of high to low frequency energy, in which the aspirate high frequency energy constrains the nonaspirate low frequency energy in an observed increasing progression from lenis to fortis. Foley's attack on the phonetic justification of the fortis-lenis scale, then, can now be considered not as much an attack upon the inner approach as an attack upon the exclusive use of the binary feature system by some phonologists. In this capacity, it is by no means unique (compare, for example, Williamson 1977).

The more serious problem, however, is one which is directed rather obliquely at the inner approach. In pointing out that the shift was one of strengthening, or a change from lenis to fortis, Foley actually hits upon the more damaging fact, for according to phonetically based markedness criteria, in a general shift the change should proceed from the marked to the unmarked, in this case from fortis to lenis (see Griffen 1977b). Thus, by providing a general shifting from lenis to fortis, the High German Sound Shift thrusts upon us a significant contradiction to the principle that phonological change is justified by phonetic relationships, upon which the markedness criteria are based.

Provective Change

In order to approach this problem, we should first examine just how these changes in the High German Sound Shift fit into the general patterning of the fortis-lenis scale. Certainly, it is strengthening, in spite of what we would expect from the principles of phonetics and markedness. Fortunately, though, we do have attested examples of strengthening from other languages, most notably from Welsh.

In Welsh, the process of strengthening is often known as provection, for it was originally discovered with respect to consonants provecting (or lengthening). Within the fortis-lenis scale, provection proper can be handled phonetically as long as we work in a nonsegmental framework. According to such a framework, provection creates two homorganic obstructions, and these are then coalesced into one syllabic position, to be uttered as a simple obstruction on the vowel either at the beginning or at the end of a syllable. However, each obstruction is constrained by a certain degree of the aspiration described above. When the degrees of aspiration are combined, the total aspirate constraint is

increased--physiologically as more air passing through the orifice of the larynx and acoustically as a heightened high-to-low frequency energy ratio. (This process is treated in greater detail in Griffen 1980a.)

For example, when we add a unit of aspiration directly to one obstruction, we realize the next-more-fortis member. Thus, the Welsh prefix ad [a:d] 'again' and the word heb [he:b] 'say (archaic)' have combined into ateb [ateb] 'to answer'. When the aspirate prosody constraining one obstruction combines with another due to the coalescence of two homorganic obstructions in provection, the result is the same. Thus, the Welsh prefix cyd [kɨ:d] 'together' and dir [di:r] 'land (soft mutation form)' combine into cytir [kətir] 'common land', and likewise the Latin loan-word litteras has undergone the same change to form the modern Welsh llythyr [ɬə:θɨr] 'letter'.

For this study, it is crucial that we take provection, including this strengthening, precisely for what it is. On the one hand, the process by which the coalescence of homorganic obstructions allows their aspirate prosodies to combine and heighten is by no means psychological, but is very much phonetic. It is based entirely upon physiological and acoustic evidence collected within a nonsegmental approach to phonology and founded upon current dynamic phonetic research. On the other hand, any change that takes place through such provection is highly contextually sensitive and a change from two units to one. It is not a general shifting, whatever it may be.

The High German Sound Shift as Provective Change

The solution to the problem of strengthening in the High German Sound Shift lies in the application of firmly phonetic principles of provection to the changes exhibited by the shift. The High German consonant system at the time of the shift was, of course, based upon the fortis-lenis scale which may be represented by the labials as [v] (probably still [β]), [b], [p], and [f] (possibly still [ɸ]), from lenis to fortis. Certainly, the changes in the shifting were realized along this scale.

In the first two types of change noted above, from the voiced geminate stops to their voiceless counterparts and from the voiceless geminating stops to their fricative counterparts, a strong case can be made for provection. In both cases, the provected

geminate was coalesced into one syllabic position and the prosodic degrees of aspiration were thus allowed to combine. Hence, for example, some proto-form as *sibba (as it was realized in Old Saxon) changed through the High German series to Old Alemannic sippa, and a proto-form such as *opan underwent the provection accompanying the tendency for gemination in this environment and changed through the High German series to Old High German offan, itself testifying to the provection of this environment.

By attributing the changes affecting the Old German geminates to provection, we are describing a series of changes on the basis of phonetic relationships. The process from geminate provection, or lengthening, to coalescence with the combination of prosodic elements is firmly within the realm of phonetic plausibility. Moreover, this development can be seen in attested changes in such languages as Welsh, possessing a consonantal (or obstructional) system based on the gradual opposition of tension--the fortis-lenis scale.

Directing our attention now to the first group of affricate changes, we find that all of these changes took place in word-initial or syllable-initial position. As we see in Danish (Fischer-Jørgensen 1954), Welsh (Griffen 1975b), and other fortis-lenis systems, this position is one of fortis strength, though not necessarily of full provection. Even in the Old West Germanic dialects themselves, we find that the lenis-most elements [β], [δ], and [γ] could not occur in these positions without changing to the more fortis [b], [d], and [g], respectively. Furthermore, in the more extreme of the Upper German dialects, this position has at various times caused [b], [d], and [g] unstably to be realized as [p], [t], and [k], respectively. For example, Old High German bintan 'to bind' corresponds to Upper German pintan, Old English dohtor 'daughter' corresponds to East Franconian tohter, and Franconian gast 'guest' corresponds to Upper German kast.

Affrication in this environment is certainly not unexpected. In more fortis dialects of Welsh, for example, we find that bilingual Welsh-English speakers may pronounce the English word tea with a clear glottal fricative aspiration as [tʰi:], but they will pronounce the Welsh word te 'tea' with affrication as [tse:]. This affrication, then, is nothing more than a homorganic release in a more fortis environment, which in fact initial position is.

The fortis release realized as affrication is phonetically quite justifiable. If we make a high-speed recording of the non-

sense syllables [pa], [ta], and [ka], and then we splice off the closure portion of the tape, we will hear [ϕa], [sa], and [xa]. The lengthening of this release in fortis speech, then, is actually a form of provection (though, in this case, it is not followed by the coalescence of obstructions, as this occurs in word-initial position, where we would not expect gemination). What we find here is simply some form of half-provection--provection, to be sure, and provection with its phonetic justification within the fortis-lenis scale, but not provection realized to its fullest in gemination. Hence, for example a proto-form such as *tunga was pronounced with enough fortis aspiration that a homorganic release was produced and heard distinctly enough for the word to be recorded as zunga. (Indeed, if fortis Welsh dialects were being written down now for the first time, they, too, would include such spellings as tse for te, and Cymrists could well speak of some sort of shift.)

Due to this status of half-provection for the affricates, it may appear at first glance rather strange that the traditional geminates only underwent this affrication, and not the full geminate provection. I would suggest, though, that by the time of the shift, these geminates simply functioned to mark the preceding vowel for short duration, as written geminates are used today in standard New High German. Because the preceding vowel was marked as short (and the following vowel was most likely also short), the overall fortis nature of the environment was quite low. Thus, these particular instances of provection did not become affected by the geminate process noted above to the degree of full provection with coalescence, but simply became realized as fortis articulations accompanied by the fortis release associated with affrication.

When we survey the whole range of the High German Sound Shift, we find that each change can be fully justified phonetically by the process of provection--be it of full provection realized through gemination or of half-provection realized in affrication. From this standpoint, the inner-approach analysis of this shift is certainly well-founded, and there is no need at all for us to seek nebulous psychological motivations for it.

Of far greater importance, however, is the implication of this evidence of provection for the status of the phenomenon as a full-fledged shift. To be sure, the changes occurred in a gradual scale and in quite a few environments, and this does give the illusion of a general shifting. On the other hand, these changes

did not involve the traditional neutralization of contrasts with the realization of the lesser marked members of the opposition. Instead, each change took place in a specific environment of provection and can be accounted for through the combination of units (not their change as such) in specific highly contextually motivated processes--there was no general shifting throughout the system. I would therefore contend that the series of changes traditionally known as the High German Sound Shift did not constitute a general shift at all, but simply a series of provective combinatory changes, each with its own contextual motivation and all with precise phonetic justification.

Conclusion

In conclusion, I should briefly like to point out one further implication of this determination that the High German Sound Shift was not a shift, and this implication leads us far beyond this particular phenomenon. One reason why linguists today insist upon calling this phenomenon a general shift is that it appears to mirror the First Germanic Sound Shift, which, as Foley (1973) also points out, was likewise a matter of strengthening. In other research, however, I have found that the First Germanic Sound Shift could not have operated in the manner in which it has been proposed, with Germanic developing through it from Indo-European. As I point out elsewhere (see Griffen 1980b, in press), according to phonetic principles, markedness conventions, and observations of attested changes in other fortis-lenis languages, the shift must have progressed in a manner very close to the reverse of Grimm's Law (and therefore also the reverse of Verner's Law).

One point militating against this reinterpretation of what amounts to an Indo-European Sound Shift (as opposed to a Germanic one) has been the perceived status of the High German Sound Shift. If German is to be so anomalous as to contradict general principles of phonetics, markedness criteria common to all other languages, and observations of the manner in which fortis-lenis languages are known to undergo change that it would shift in this totally unexpected way in High German, then one could conceivably argue that the earliest Germanic language was also this anomalous. As I have pointed out in this paper, however, High German phonology is not a unique anomaly that must be handled by psychology rather than by phonetic reality; rather, it is quite normal, and there is no reason to assume that Germanic in any form was ever so irregular as to contradict phonetic fact.

REFERENCES

Barnes, M.R. 1978. Sociolinguistic aspects of the OHG Consonant Shift. Papers from the 1977 Mid-America Linguistics Conference, ed. by D.M. Lance and D.E. Gulstad, 291-302. Columbia: University of Missouri.

Braune, W., and K. Helm. 1967. Althochdeutsche Grammatik. 12th ed. Tübingen: Max Niemeyer Verlag.

Fischer-Jørgensen, E. 1954. Acoustic analysis of stop consonants. Miscellanea Phonetica 2.42-59.

Foley, J. 1973. Assimilation of phonological strength in Germanic. A Festschrift for Morris Halle, ed. by S.R. Anderson and P. Kiparsky, 51-8. New York: Holt, Rinehart and Winston.

Griffen, T.D. 1975a. A new Welsh consonant shift, description and implications. Ph.D. diss. Gainesville: University of Florida. Ann Arbor: University Microfilms International (#76-4237).

Griffen, T.D. 1975b. Lenis initials in Welsh borrowings. Language Sciences 36.6-12.

Griffen, T.D. 1977a. An inner-approach analysis of the fortis-lenis scale. Proceedings of the 1976 Mid-America Linguistics Conference, ed. by R.L. Brown, K. Houlihan, L. Hutchinson, and A. MacLeish, 109-14. Minneapolis: University of Minnesota.

Griffen, T.D. 1977b. The archiphoneme in historical linguistics. Forum Linguisticum 2.107-18.

Griffen, T.D. 1980a. Provection from prosodic constraint. The sixth LACUS forum, ed. by W.C. McCormick and H.J. Izzo, 102-110. Columbia, South Carolina: Hornbeam.

Griffen, T.D. 1980b. The reverse shift hypothesis. The SECOL Bulletin 4.72-6.

Griffen, T.D. in press. Lenition, provection, and the Indo-European Sound Shift. To appear in Forum Linguisticum.

Jakobson, R., and M. Halle. 1971. Fundamentals of language. 2nd ed. The Hague: Mouton.

Perkell, J.S. 1969. Physiology of speech production. Cambridge, Massachusetts: MIT Press.

Waterman, J.T. 1966. A history of the German language. Seattle: University of Washington Press.

Williamson, K. 1977. Multivalued features for consonants. Language 53.843-71.

Wright, J. 1907. Historical German grammar. Oxford: University of Oxford Press.