

Must sound change be linguistically motivated?*

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A number of well-documented sound changes in Austronesian languages do not appear to be either phonetically or phonologically motivated. Although it is possible that some of these changes involved intermediate steps for which we have no direct documentation, the assumption that this was always the case appears arbitrary, and is in violation of Occam's Razor. These data thus raise the question whether sound change must be phonetically motivated, as assumed by the Neogrammarians, or even linguistically motivated, as assumed by virtually all working historical linguists.

Keywords: sound change, Austronesian languages, phonetic motivation, linguistic motivation, actuation problem, bizarre reflexes, dissimilation, hypercorrection

1. Introduction

It probably is safe to say that no topic in linguistics has been studied longer or more intensively than sound change. Beginning with the work of Rask and Grimm early in the nineteenth century there has been an unbroken research

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tradition which has sought not only to document sound change, but also to explain why it occurs, what determines its form, and why apparent exceptions to rule-governed change are sometimes found. In the nineteenth century the study of sound change reached its peak in the work of the Neogrammarians, who were concerned primarily with the issue of regularity. In the twentieth century the research burden for the study of sound change (as opposed to the study of its results) shifted to the newly emergent field of sociolinguistics, pioneered by the work of William Labov. Within the Labovian research paradigm the major goals have been to understand how sound change spreads (the *implementation* problem), and why irregularity is sometimes produced by change which tends overwhelmingly to be regular. The question of why sound change begins in the first place (the *actuation* problem) has largely been left to historical linguists.

Saussure (1959 [1915]: 147ff.) held that “The search for the causes of phonetic changes is one of the most difficult problems of linguistics.” He briefly reviewed the history of proposals (some of them quite fanciful) for why sound change takes place. These include (1) anatomical differences correlated with race, (2) adaptations to conditions of soil and climate, (3) the principle of least effort, (4) phonetic education during childhood, (5) the general state of the nation at a particular moment, (6) substratum, and (7) changes in fashion. Saussure found none of these proposed determinants fully convincing, and although the focus of his brief review was on why sound change occurs at all (the actuation problem) rather than why it takes the form it does (what might be called the ‘channeling’ problem), his general discussion suggests that he would not have been surprised by a change such as $*p > f$, but would have been prepared to seek a special explanation for a change such as $*y > p$.

Although Saussure did not directly address the issue of what determines the form of sound change, his reaction to changes of the two types just noted almost certainly would have differed, since historical linguists in general consider a change such as $*p > f$ ‘natural’, but $*y > p$ ‘bizarre’. The term ‘bizarre’ suggests rarity, and this may be true for any given change which is classed as ‘bizarre’, but bizarre sound changes *as a class* may be more common than many scholars realize. Figure 1 lists ten unusual sound changes in Austronesian languages which, if nothing else, should force us to re-examine the assumptions that underlie notions such as ‘natural’ and ‘bizarre’ in relation to phonological change (C = conditioned, U = unconditioned, PA = phonological alternation).

In considering these historical transformations I will argue: (1) that the phonological developments in Figure 1 are results of primary sound change,

1. *w/y > -p in languages of western Manus	C	no PA
2. *w/b > c-, -nc- in Sundanese	C	no PA
3. intervocalic devoicing in Kiput, Berawan	C	no PA
4. *dr > k ^h in Drehet	U?	no PA
5. *b/d/g > -m/n/ŋ in Karo Batak, Berawan	C	no PA
6. C > C: /__V# in Berawan	C	no PA
7. *b > -k- in Berawan	C	no PA
8. *g > p-, -j-, -p in Sa'ban	C	no PA
9. *an/aŋ > -ay and *em/en/eŋ > -aw in Iban	C	no PA
10. postnasal devoicing in Murik, Buginese	C	no PA

Figure 1. Some bizarre sound changes in Austronesian languages

not of secondary changes such as analogy; (2) that these changes are single-step reflexes, not the cumulative product of multiple innovations; (3) that there is no evidence for articulatory, auditory, or structural motivation of these changes; and (4) as a default explanation it would appear that social motivation underlies not only the implementation, but also the actuation of some sound changes.

Theories of sound change have focused on three types of possible motivation: (1) phonetic motivation, (2) structural motivation, and (3) social motivation. The latter two types require some qualification. The term 'structural motivation' covers any type of non-phonetic, non-social factor which might lie behind the inception of sound change, including phonological, morphological or syntactic conditions. In actual usage, as by Prague School theorists or Generative grammarians, structural factors have been seen less as motivations of change than as limiting determinants of changes already set in motion. Likewise, social forces are widely recognized as the engine driving the *implementation* of some sound changes, but until recently these have not been implicated at all in the actuation of sound change.

The common denominator in all existing theories of sound change is phonetic motivation. Indeed, some schools of thought, as the Neogrammarians or American Structuralists, have held that *all* sound changes are phonetically motivated. Paul (1978 [1880]), for example, representing the mature Neogrammarian position, maintained that sound change is the outcome of two opposing forces: the *Bewegungsgefühl* (essentially the speaker's proprioceptive awareness of articulatory movements, which he tries in vain to duplicate from one utterance to the next), and the *Lautbild* (the psychological feedback of the

speaker hearing his own speech and that of others). Although the *Lautbild* can limit the extent to which a phonetic drift is allowed to continue, it has no effect in initiating change. In effect, then, sound change is seen as the result of a gradual, unconscious drift of articulatory norms, kept in check only by the need to maintain effective communication. A view essentially identical to this was maintained much later within the American Structuralist tradition by writers such as Bloomfield (1933: 346ff.), Dyen (1963), and Hockett (1965). Within the very different tradition of Natural Phonology as initiated by Stampe (1969, 1973), phonetics and phonology are assumed to be identical, and the only possible motivation for sound change therefore is phonetic. As Donegan (1993: 125) puts it, “every phonological change – from a ‘low level’ nuance of pronunciation to a radical restructuring of perception – can be understood as the failure by speakers to overcome a phonetic constraint that past speakers did overcome.” A similar view is expressed by Aitchison (1981: 130), who holds that sound change is the result of “tendencies which are inevitably built into language because of the anatomical, physiological and psychological make-up of human beings.” In effect, sound change is ‘doing what comes naturally.’ Chen & Wang (1975: 278), representing what is in some ways a very distinct theoretical position, conclude with respect to the actuation problem that “it is mainly the concrete, phonetic properties of speech sounds that trigger or allow changes to take place in the sound system, and determine their subsequent development.” Ohala (1993: 263ff.), who has pioneered efforts to wed phonetic theory with historical linguistics, proposes a theory of sound change which “locates the mechanism centrally in the phonetic domain and primarily within the listener.” In the unified account that he advocates, both ‘natural’ (assimilative) and ‘unnatural’ (dissimilative) changes are seen as products of primary phonetic forces to which the listener contributes a mediating role. In other words, it is not production, but rather perception (hence auditory phonetics), which acts as the major transformative force in sound change. Finally, in advancing a new theoretical model which attempts to bridge the gap between current approaches to synchronic and historical phonology, Blevins (2004: 8) maintains that “recurrent synchronic sound patterns have their origins in recurrent phonetically motivated sound change.” Even where changes cannot readily be seen as phonetically motivated, she believes (190) that a phonetic explanation will ultimately be found: “Given the numerous recurrent synchronic sound patterns which can be explained in terms of phonetically based sound change, it is not unreasonable to hypothesize that *all* such recurrent sound patterns or phonological tendencies have similar origins” (*italics added*).

Other scholars, working in the Prague School and Generative traditions, have maintained that sound changes may be either phonetically or phonologically motivated. Martinet (1978 [1952]:126), who appealed to the structure-based concepts of ‘push chain’ and ‘drag chain’ to explain patterns of linked phonemic shift, appears to acknowledge as much: “We shall reckon with a sound shift as soon as the normal range of a phoneme . . . is being ever so little displaced in one direction or another, whereby the margin of security which separates it from its neighbors increases or decreases. *We do not choose to discuss at once the possible causes of such a shift, but rather try to determine how it may affect other phonemic units of the pattern*” (italics added). In Prague School terms, then, sound change is structurally motivated once it has been set in motion, but the *primum mobile* need not differ in any significant way from the Neogrammarians’ gradual unconscious drift of articulatory norms. Generative grammarians – Kiparsky (1965, 1988, 1995), Postal (1968), King (1969) – broke with earlier views in maintaining that sound change (1) is not a primary datum, but is rather the phonetic consequence of change in a more abstract underlying system of rules, (2) is abrupt rather than gradual, and (3) can be either phonetically or phonologically motivated. More recently, Iverson & Salmons (2003) have shown that some changes which arise in the purely phonetic context of coarticulation may be phonologically conditioned in their later stages.

Finally, within the sociolinguistic paradigm defined by the work of Labov (1972, 1981, 1994) it is generally agreed that while the *implementation* of sound change is socially motivated, the inception of change is triggered by purely phonetic factors. Nearly all theories of how sound change begins (the actuation problem) thus appeal to some type of linguistic motivation, whether this motivation is located in the phonetics of speech production or perception, or in structural factors such as pattern pressure or functional load (Prague School), or conditioning by a non-phonetic environment (Generative Grammar).

In an important, if somewhat programmatic statement, Milroy (2003) has suggested that the actuation of sound change need not always be driven by the internal system of the language, but may in some cases result from volitional acts of its speakers. He does not deny the role of system-internal (‘endogenous’) factors, but questions whether language change depends exclusively on them (2003: 148): “*endogenous explanations are in themselves proposed solutions to the actuation problem*. The position that we are arguing here is that they may not be sufficient. Linguistic change is multi-causal, and the etiology of a linguistic change may include social, communicative and cognitive, as well as linguistic

factors.” In light of the general neglect of the actuation problem within quantitative sociolinguistics, Milroy’s statement marks a fundamental break not only with traditional views in historical linguistics, but also with commonly held views regarding the role of social forces in sound change. Despite the clarity of his theoretical position, however, the only example of a socially motivated sound change that Milroy describes – the monophthongization of /ai/ before voiceless obstruents in the Afro-American Vernacular English (AAVE) of inner-city Detroit – appears to be an instance of socially motivated *implementation* rather than actuation. For the sake of simplicity, unless stated otherwise all references to ‘sound change’ henceforth should be understood as referring implicitly to the actuation of sound change.

Given enough time sound change will take place as an almost inevitable product of the physics of speech, and in so doing it will provide a wealth of variation for speakers to exploit for indexical purposes. However, despite the general availability of these linguistic resources it appears that speakers sometimes deliberately create new phonological shapes, presumably for the same (indexical) purpose. In the following pages I will argue that a minor but not easily dismissed set of sound changes in natural languages is most simply explained as an arbitrary product of conscious choice rather than a consequence of the interplay of linguistic forces, whether these be conceived as phonetic or phonological. The general issue that I raise in relation to the theory of sound change is thus parallel in essential respects to the issue of nature vs. culture that has surfaced periodically in the literature of social and cultural anthropology (e.g. Lévi-Strauss 1969 [1949]:3–12). Language, like culture, can be seen as a tapestry of historically disparate elements, some of which reflect universal predispositions, and others historically particular manipulations of a cultural product. If this view is correct, it would follow that sound change is not a unitary phenomenon, as assumed by the Neogrammarians and almost all subsequent scholars of various theoretical persuasions. Rather, as Milroy suggests, sound change is the complex resultant of phonetic, phonological and social processes, and the challenge to future research is to disentangle the causal elements which have operated to produce particular phonological changes.

The data considered here will be drawn from the Austronesian (AN) language family. This offers several advantages. First, scientific study of the sound correspondences holding between major Austronesian languages began with the pioneering work of the Dutch Indonesianist H. N. van der Tuuk in the 1860s and has continued at an accelerating pace and on an expanding scale ever since. The comparative phonology of the Austronesian languages is thus per-

haps as well-studied as that of any language family apart from Indo-European.¹ Second, with well over 1,000 languages scattered more than halfway around the globe, Austronesian is the second largest language family in number of languages (Grimes & Grimes 2001), and so provides an enormous natural laboratory for the study of sound change. Finally, despite their relevance to issues of general theoretical interest, the resources of this large and well-studied language family have often gone unappreciated both by historical linguists working with other language families, and by general phonologists.

Before any of the above arguments can be taken seriously, however, it will be necessary to reach a common understanding of what is meant by ‘sound change.’

2. Sound change

To the Neogrammarians, and to virtually all scholars since, ‘sound change’ is the phenomenon of spontaneous innovation in phonology, sometimes called ‘primary sound change.’ Analogy, contamination, sporadic metathesis, sporadic assimilation and the like can introduce irregularities into sound correspondences, but these are products of ‘secondary change.’ They are, in other words, reorderings of phonological relationships based at least in part on the psychological salience of structural patterns in a language rather than products of unconscious phonetic processes working away at the mechanics of speech, whether these processes are regarded in particular cases as gradual or abrupt.

1. For early recognition of some of the more challenging sound correspondences in AN cf. van der Tuuk (1861, 1865, 1872). The standard Austronesian comparative dictionary of Dempwolff (1938) contained just over 2,200 lexical bases for a language that he called ‘Uraustronesisch’. We now know that this was not Proto-Austronesian, and that Dempwolff’s reconstructions represent several different time-depths. Blust (in progress) is a much larger and more detailed comparative dictionary which is only about 25% complete, but which already contains over 5,100 reconstructed lexical bases along with many more affixed forms and compounds, together with supporting data from more than 150 languages. Against this background of scholarship it is startling to find Lehmann (1992: 88) say that “A very large number of languages in southeast Asia and the Pacific have been classed together in the Austric family, and further in Austro-Tai, although the evidence for reconstructing even the proto-languages of its assumed subgroups is small.” The ‘subgroups’ named by Lehmann include (1) Austroasiatic, (2) Tai-Kadai, and (3) Austronesian.

The literature on sound change is large and varied, and it is not my intent to give a full review here. The following remarks, however, should serve to clarify more precisely how I believe the term ‘sound change’ is commonly represented, either explicitly or implicitly in the linguistic literature. More thoroughgoing general treatments of sound change can be found in Kiparsky (1988) or Blevins (2004), and far more detailed treatments of particular types of sound change can be found in other sources. My purpose here is only to construct a sketch of the expectations that most historical linguists have about types of change that are likely to occur, as this should help to highlight some of the characteristics that make the sound changes considered in this paper ‘bizarre’.

First, at the risk of belaboring the obvious, the notions ‘reflex’ and ‘sound change’ must be kept apart. A reflex is a mapping of a proto-form onto its historical continuation. This may involve one or more sound changes. Accumulations of sound changes can produce ‘telescoping’, whereby a reflex appears to involve a phonetically unmotivated sound change, but is actually the product of successive natural changes. A well-known example from the Pacific region is seen in POC *t > Rotuman *f*, a development which initially appears bizarre, but which we know from both historical records and dialect data, to have passed through an intermediate stage in which *t became θ before changing to *f*.

The case of POC *t > Rotuman *f* clearly is an instance of telescoping, and many other examples could be cited. But where does telescoping end and speculation about possible but unjustified intermediate steps begin? A second surprising sound change which is well-known to Polynesianists is Proto-Nuclear Polynesian (PNP) *l > Rennellese ηg (written *g*): *lima > *gima* “five”, *fale > *hage* “house”, *tolu > *togu* “three”, etc. Was there a chain of innovations *l > *r* > *y* > *g* > ηg ? Perhaps, but this is speculation. Given the known history of Rotuman *t > θ > *f* we might be inclined to support the view that *l > ηg in Rennellese is not the result of a single sound change, but rather the cumulative product of several changes. However, there are no dialectal or other comparative grounds to support such an assumption, and other apparently bizarre sound changes in languages of the Pacific region can be shown to be one-step innovations. This is most clearly seen in the oddly recurrent change *t > *k*, which has happened at least twenty times in Austronesian languages reaching from Enggano, off the west coast of Sumatra, to Hawaiian. In both Hawaiian and Samoan, the evidence is strong that there were no intermediate steps. Some Hawaiian dialects still retain *t as a voiceless unaspirated dental stop,

and *t* and *k* are sociolinguistically conditioned variants in Samoan, with no phonetic intergradation.²

In a sense, the Hawaiian and Samoan change $*t > k$, which is widely regarded as phonetically unnatural, undermines our confidence in the belief that PNP $*l > \text{Rennellese } \eta g$ must have been due to a chain of innovations. If $*t > k$ is a one-step change, why not treat $*l > \eta g$ in the same way? It is true that $*t > k$ is a historically recurrent change in Austronesian, while $*l > \eta g$ appears to be unique to Rennellese. However, the fact that an apparently bizarre sound change is unique to one language or small subgroup does not guarantee that it was a multi-step change, as we will see below in considering several atypical cases of glide fortition and obstruent devoicing.³

Second, most sound changes which affect feature composition (as opposed to metathesis or haplology, which reorder or delete whole segments) and which recur cross-linguistically are *incremental*. By this I mean that a sound change alters one feature value or set of implicationally related feature values at a time, as in place assimilations, intervocalic voicing, final devoicing, palatalization, umlaut, lenition sequences such as $*p > f > h > \emptyset$, or fortitions such as $*w > g^w$ or k^w . Changes which appear to alter two or more independent feature values simultaneously, as PNP $*l > \text{Rennellese } \eta g$ are almost automatically suspect as being the cumulative product of multiple single-step changes.

Third, sound change is a product of primary innovation, not of the reinterpretation of existing patterns or structures. It is thus structure-independent in its inception (although not necessarily in its completion) and is therefore to be distinguished from changes due to analogy, contamination and the like, which are structure-dependent.

2. Despite their parallelism these changes arose in somewhat different ways. $*t > k$ in Samoan is part of a general backing of Proto-Polynesian alveolar stops and nasals: the historically conservative *t* and *n* occur in formal speech registers, and shift to *k* and *ŋ* in colloquial styles. By contrast, the Hawaiian change $*t > k$ is best described in terms of geographical rather than social dialects, since the Ni'ihau dialect often retains *t*. Moreover, PPN $*n$ and *ŋ* merged as Hawaiian *n*.

3. Almost all known cases of $*t > k$ occur in languages which have first lost $*k$. Although this is a classical 'drag chain' situation, Blevins (2004) argues convincingly against this type of explanation. Rather, in her view after the loss of $*k$ the phonological space available for stops was simply partitioned between labial and non-labial, the latter allowing variation between coronal and velar.

Fourth, sound change is *recurrent*. Although the issue of regularity is often stated in binary terms, experienced historical linguists know that phonological reflexes may be sporadic, recurrent, or regular. Regular change is, by definition, recurrent, but the boundary between non-regular recurrent change and regular change is sharp: if a change is exceptionless (whether it is conditioned or unconditioned), it is regular. A more serious boundary problem arises in trying to distinguish sporadic from recurrent change. Unique changes are, by definition, sporadic. In general, non-regular recurrent changes will affect many more morphemes than sporadic changes, but there is no fixed number of examples that can be used to determine the boundary between non-unique sporadic changes and non-regular recurrent changes. Strict Neogrammarians undoubtedly will object to this departure from a binary classification, but the facts of language history clearly require it.⁴

Fifth, sound changes which are linguistically motivated are not confined to a single language or close-knit subgroup, but have a wide and scattered distribution in the world's languages. Examples include palatalization, intervocalic voicing or spirantization of stops, final devoicing, etc. as opposed to, say, PNP *l > Rennellese *ŋg*, or most of the ten changes considered in greater detail in this paper.

Sixth, the actuation/implementation distinction is critical. Although sociolinguists have convincingly demonstrated the social motivations of many sound changes, these studies have been concerned exclusively with the recruitment of existing linguistic variants for indexical purposes within a subgroup of society. With the exception of Milroy (2003), the actuation problem has been essentially ignored by scholars concerned with the social motivation of sound change.

Seventh, sound change may be conditioned or unconditioned. Conditioning environments may be expressed either in terms of adjacent segments, or in terms of position within the word. The great majority of conditioned sound

4. Kiparsky (1988:365) makes essentially the same point: "Historical linguistics is viable because there are regularities, and does not depend at all on exceptionlessness or on the absence of nonphonetic conditioning." Many examples of irregular recurrent sound changes have been documented in recent decades (Wang 1977; Ross 1988; Durie & Ross 1996). To call such changes 'sporadic' would be misleading, as truly sporadic changes may be unique. Moreover, most of the non-regular recurrent sound changes described in these sources do not differ in type or in apparent motivation from fully regular changes in other languages. Rather they are 'regular' changes which have stopped in mid-course.

changes can be seen as fairly transparent assimilations – that is, as examples of feature spreading across segmental boundaries. This is true of place assimilations, intervocalic voicing, palatalization, umlaut, lenition sequences such as $*p > f > h > \emptyset$, or fortitions such as $*w > g^w$ or k^w . Cross-linguistically common conditioned sound changes which do not appear to be assimilatory include the merger of all stops as glottal stop, or of all nasals as the velar nasal in word-final position. Final devoicing may also belong in this category, but is regarded by at least some as assimilation to pause.

The definition of ‘lenition’ and ‘fortition’ appears to be theory-dependent. As used here, lenitions are changes from articulations of greater constriction to articulations of lesser constriction, and may eventually terminate in zero. Fortitions, then, are changes in the opposite direction. Although it may be argued that some conditioned sound changes are lenitive, as with the merger of all stops as glottal stop, or of all nasals as the velar nasal in word-final position, lenition and fortition are more commonly associated with unconditioned sound changes. Lenition sequences of greater or lesser length which are well-attested cross-linguistically include (1) $*p > f > h > \emptyset$, (2) $*k > x > h > \emptyset$, and (3) $*s > h > \emptyset$. As Ohala (1993: 249ff.) and others before him have pointed out, dissimilation is often a far less transparent process of segmental interinfluence than is true of assimilation. We will return to this point below.

To conclude, while most sound changes appear to be driven by forces which can be characterized broadly as either phonetic, phonological, or social, the appeal to social motivations has to date largely been confined to the implementation of sound change.

In the case studies which follow every effort will be made to uncover linguistic (phonetic or phonological) motivations for the observed developments. Where these fail to carry conviction we will be forced to appeal to what Milroy (2003) calls ‘exogenous’ motivation – forces that lie outside the physiology or psychology of speech or the structure of language. Although sociolinguistic studies are lacking for the changes which will be examined here, the elimination of linguistic motivations as plausible explanations makes it at least a priori defensible that some phonological developments which deviate sharply from expected types of change are legitimate examples of socially-motivated sound change. In the interest of simplicity the unqualified expression ‘sound change’ will henceforth mean ‘the actuation of sound change’, and the expression ‘linguistically motivated sound change’ will serve as a cover term for ‘phonetically or phonologically motivated sound change’ (Milroy’s ‘endogenous’ motivation).

3. Case studies

Ten bizarre sound changes will be presented and discussed below. All of these are from languages of the Austronesian family, but they represent a wide range of geographical areas, subgroup affiliations, and typological variation.

3.1 Glide fortition in western Manus

Manus is the largest of the Admiralty Islands in Papua New Guinea, at about 50 miles long and 15–18 miles wide. Some 20–30 languages are spoken on the main island and on a number of smaller satellites which ring it, the exact number depending on the treatment of dialect chains. Several languages in western Manus show fortition of earlier glides *w and *y. Sori, spoken on a small island off the northwest coast of Manus, for example, reflects syllable-initial *w as *g* and *y as *j*. Surprisingly, however, two closely related languages, Drehet and Levei, reflect both *w and *y as *p*. More surprising still, this change has occurred only in historically secondary final position (Table 1).

Before proceeding, some explanation is needed. In all of the languages of Manus and its immediate satellite islands POC *-V(C) was lost (evidence for a final vowel is preserved only as an assimilatory trace in a few languages). If a word had a penultimate high or mid vowel followed by an unlike vowel, the loss of *-V(C) produced new diphthongs *-iy*, *-ey*, *-uw* and *-ow* as in *kalia ([kaliya]) > *kaliy* “grouper”, or *ulua ([uluwa]) > *uluw* “high tide”. In Drehet and Levei the codas of these historically secondary diphthongs underwent glide fortition

5. Lindrou cognates of Drehet and Levei forms are not available in every case. The following substitutions, placed within parentheses, have been made from other languages of Manus: *lohow* (Likum), *ñañow* (Sori), *tow* (Likum), *cikiley* (Likum), *kaliy* (Ere), *buay* (Titan), *pwiley* (Likum), *tapwey* (Likum). In addition, these supplementary data are noteworthy: Loniu *moñow* “yellow”, Bipi *taxow*, Likum *tarow* “to draw, write”, Sori *dawey* “to grate coconuts”, *drawey* “shell for grating coconuts”, Likum *droway* “grate coconuts”, Bipi *drawey* “coconut grater”, Sori *mohay*, Bipi *moxay*, Likum *muçay* “calm, still”, Likum *norey* “to play”, Lindrow *sey* “carrying pole”, Lindrou *bwesse*, Bipi *sey*, Likum *say* “carry (pig, etc.) on a pole between two men”.

6. A number of the languages of the Admiralties show irregular reflexes of this form, but glide-final bases of the type Sori *papuw*, Lele, Kele, Kuruti, Lindrow *hahuw*, Papitalai *mo-hahuw* are common in central and western Manus.

Table 1. Reflexes of Proto-Oceanic and Proto-Manus glides *w and *y in three of the languages of western Manus (source: Blust 1975)

POC	PM	Lindrou ⁵	Drehet	Levei	English
1) *w > p/___#					
*boRok	*powo	bow	pup	pup	pig
*kanawe	*kanawe	kanaw	–	kanap	seagull
*koe	*koe	ow	op	op	2sg.
*pat/pati	*pa-pu	hahuw ⁶	hahup	hahup	four
	*koV	kow	kop	kop	fence
	*lasoV	lasow (lohow) (ñanow)	nosop – muyonop	nasop lohopp muñanop	bandicoot to work yellow
*pakiwak	*ñaliwV	ñalew	nelip	nelip	canarium nut
	*pañiwa	beñew	peñep	peñep	shark
*paliawV	*paliawV	baliyew	peliep	piliep	bonito
	*pitawu	besew	pwisip	–	<i>Calophyllum</i>
*pwayawV	*pwayawV	bayaw	–	pwayap	wave at sea
	*qaiwa	ew	ep	ep	banyan
*qayawan		torow (tow)	– –	torop top	to draw, write to give
	*ulua	wuluw	ulup	ulip	high tide
	2) *y > p/___#				
		(cikiley)	k ^h ikelip	cikilip	coconut tree
		drowey	–	drawep	grate coconuts
*ia	*ia	iy	ip	ip	3sg.
*kalia	*kalia	(kaliy)	kalip	kalip	grouper
	*kaneV	kaney	kanep	kenep	mangrove crab
*kayu	*kayu	key	kep	kep	tree, wood
*layaR	*palea	baley	pelep	pelep	sail
	*mwayV	mway	mwep	–	sandcrab
		mwedrey	–	mocap	calm, still
		ñorey	–	nurep	to play
*paRi	*payi	bey	–	pep	stingray
*puqaya	*puaya	(buay)	puip	puep	crocodile
*qalia	*qalia	ley	lip	lip	ginger
		(pwiley)		pwilip	rat
		sey	–	sep	carry on pole
		(tapwey)	–	tapwep	stray, get lost
*waiwai	*weweyi	ewey	oip	oip	mango

just like reflexes of POC *y and *w; in other languages of mainland western Manus glides were generally unaffected.

Glide fortition in Drehet and Levei followed loss of final vowels, as non-final glides remained unchanged: (1) PM *kawasV > D, L *kawah* “friend”, (2) D *wo’op* “bamboo”, Likum *wa’ow* “thin bamboo used to make fish spears”, (3) PM *wariV > D, L *weri* “to sing” (lack of final -p unexplained), (4) PM *wati > D *waci*, L *wasi* “monitor lizard” (presence of final vowel unexplained), (5) POC *apaRat, PM *yapaya > D, L *yaha* “northwest wind”, (6) Lindrou *droyan*, D *k^hoyan* “traditional grass skirt”, (7) POC *kayajo, PM *kayaco > D *kiyIh*, L *kieh* “connecting sticks for outrigger”, (8) PM *kayalV > L *kayan* “pandanus sp.”, (9) POC *paRapi, PM *payapi > D *piyIh*, L *piyih* “afternoon”. In this connection note the similar retention in POC *puqaya > D *puip*, L *puep* “crocodile”, where the phonemic glide *y underwent fortition because it came to be final, but the medial transitional glide which remained intervocalic ([puwip], [puwep]) did not change (contrast, e.g., *ulua ([uluwa]) > *uluw > D *ulup*, L *ulip* “high tide”, where the same automatic transitional glide became final, and was strengthened).

In glide fortition glides *w* and *y* normally are strengthened in one of two ways: (1) by increasing the labial constriction of the former and the coronal constriction of the latter, hence *w > v, *y > z, or (2) by increasing the velar constriction of the former and the palatal constriction of the latter, hence *w > gw, *y > j. What is peculiar about glide fortition in Drehet and Levei is that both glides have the *same* outcome, and this outcome is not relatable to the earlier hypothesized phonetic state in any very direct manner.

What are we to make of observations such as these? First, we might dismiss the data as untrustworthy because the languages are not well-documented. Although it is true that little has been published on the languages of Manus, good data on the comparative phonology is available, and there can be no doubt about the validity of the sound correspondences in question.⁷

Second, we could speculate that the change from *w or *y to *p* proceeded through a comparatively long series of intermediate steps. For the labial glide

7. Ross (1988:315ff.) provides a comprehensive treatment of the comparative phonology of the languages of the Admiralty Islands but overlooks the correspondences cited here, in part because he cites no material from Drehet, and his Levei data appear to represent the Tulu dialect, which evidently has preserved final glides. Fieldnotes on some 32 language communities, generally including vocabularies of at least 700 words, were collected by the writer during a historically-oriented linguistic survey of Manus from February-May, 1975.

these steps might be $*w > v > f > p$; $*w > v > b > p$, or some such chain, with a minimum of three changes. For the palatal glide the chain would necessarily be longer: $*y > w > v > f > p$, etc. However, there is no evidence of any kind to support such intermediate steps, and they would be posited only to save the hypothesis that these sound changes are phonetically motivated. Moreover, even if we were to accept such a proposal, some hypothesized changes within the chain of inference would remain phonetically unmotivated (e.g. $*y > w$). It should be stressed that glides in other languages of western Manus, as Lindrou or Likum, and for that matter non-final glides in Drehet or Levei themselves, show no known deviation from canonical phonetic properties. In addition, Drehet and Levei are rather closely related to other languages of western Manus which have preserved glides in final position. Since close relationship implies recent separation, there must have been relatively little time for diversifying sound change to take place after Drehet and Levei split off from their closest relatives. A hypothesis of multiple intermediate steps from final glides to p is thus not only speculative, it must also operate within a very restrictive time-frame. Finally, the available evidence strongly suggests that this was a *conditioned* sound change: $*w$ and $*y$ were strengthened to p only in word-final position. Bizarre as this change is in itself, we must find it even more unsettling to discover that it is conditioned by an environment which has no apparent relationship to the phonetic content of the segments affected.⁸

As a last alternative, we might speculate that this change was structurally motivated. The consonant inventories of the contemporary languages appear in Table 2.

Both languages have a phonetic glottal stop which appears automatically after a final vowel, and between like vowels. However, glottal stop also appears between some sequences of unlike vowels if the first vowel is lower than the second, and its phonemic status remains somewhat unclear. Both languages also have a phoneme b which appears to be extremely rare (it was recorded only in L, D *bo* “fresh water, river”).

8. As one referee has pointed out, despite the common practice of referring to “word-final” position as a conditioning environment, word-final (as opposed to utterance-final) position “is not a phonetic position”. Laboratory phonetic studies of continuous speech may well support this view, but the fact remains that many sound changes do take place only word-finally, and we must reckon with this as a conditioning environment, whether such conditioning is regarded as phonetically motivated or not.

Table 2. Consonant inventories of Levei and Drehet

Levei				Drehet			
p	t	c	k	p	t	c	k
pw							k ^h
	s		h	pw			
m	n		ŋ		s		h
mw				m	n		ŋ
	dr			mw			
	l				dr		
	r				l		
w		y			r		
				w		y	

In initial position, Levei and Drehet reflect POC *p, *t, *k, *r and *s as follows:

*p- > p: *pakiwak (> pakiwa > pakiw > paiw > pew) > L, D *pep* “shark”, *putun (> putu > put) > D, L *puk* “a tree: *Barringtonia asiatica*”

*t- > L c : D k^h (in most nouns): *na topu > L *cuh*, D *k^huh* “sugarcane”, *na talise > L *celih*, D *k^helih* “a shore tree: *Terminalia catappa*”, *na tokon > L *co*, D *k^ho* “punting pole”

*t- > t (in some nouns and in other word classes): *tama-ña > L *tomo-ŋ*, D *tama-ŋ* “his/her father”, *tolu > L *tolu-h*, D *tulo-h* “three”, *tokalaur > L *tolaw* “east wind”

*k- > k: *na kayu > L, D *kep* “wood, tree”, *na kuluR (> kulu > kul > kun) > L, D *kun* “breadfruit”, *na kuron (> kuro > kur > kul > kun) > L *kwiŋ*, D *kun* “clay cooking pot”

*r- > L c, D k^h (in most nouns): *na ruRi- (> nruRi > nrui > drui) > L *cui-*, D *k^hui-* “bone”, *na raRaQ (> nraRa > nra > dra) > L *ca-*, D *k^ha-* “blood”, *na rami (> nrami > nram > dram) > L *coŋ-ki ah*, D *k^haŋ* “lime spatula (part of betel kit)”

*r- > l (in some nouns and in other word classes): *rua (> Proto-Admiralty *rua-pu) > L, D *rue-h* “two”, *raŋi > L, D *laŋ* “day, daylight”

*s- > s: *na salan (> sala > sal > san) > L *soŋ*, D *saŋ* “path, road”, *na sokalayaR (> sokalaya > sokalay > soalay > solay) > L *solay* (Sori loan), D *solap* “sailfish, marlin”, *na saman (> sama > sam) > L, D *saŋ* “outrigger float”.

Ross (1988:335) noted that languages of the Admiralty Islands often reflect base-initial consonants differently in nouns as compared with other word classes. This split arose from the presence of a proclitic nominal marker (or article) *na, which reduced to a simple nasal and then fused with the base-initial consonant in nouns, to produce a ‘secondary nasal grade’ reflex.⁹ Few examples of contrast between nominal and non-nominal bases are known for base-initial *p, *k or *s in Levei or Drehet, but the contrast between oral grade and secondary nasal grade reflexes of *r and *t is quite clear: the nasal grade derives from *dr*, a prenasalized alveolar trill in Proto-Manus which is reflected as Levei *c* (a voiceless palatal affricate), Drehet *k^h* (a strongly aspirated voiceless velar stop). Not all nouns show the expected secondary nasal grade reflex and a few non-nominal stems do, suggesting that the proclitic nominal marker *na did not show a perfect syntactic alignment with nominal stems.

In intervocalic position the corresponding reflexes typically show greater lenition:

*-p- > -h-: *na papaq-ña (> papa-ña > pafa-ña > paha-ña > paha-ñ > paha-n) > L *poho-ŋ*, D *paha-ŋ* “his/her mouth”

*-p- > -h-: *na topu (> ntopu > ndopu > dropu > drohu > droh) > L *cuh*, D *k^huh* “sugarcane”, *qipil (> qipi > ipi > ifi > ihi) > L, D *ih* “a hardwood tree: *Intsia bijuga*”, *qapuR (> qapu > apu > ahu) > L, D *ah* “lime (chewed with betel nut)”

*-t- > -t-: *mata-ña > L *mwato-ŋ*, D *mata-ŋ* “his/her eye”, *katita (> katit > ketit) > L, D *ketik* “putty nut: *Parinari laurinum*”, *katapa (> katafa > kataha) > L, D *katah* “frigate bird”

*-t- > -k-: *qatop (> qato > ato > at) > L, D *ak* “thatch; roof”, *mwata > L *mwak*, D *muek* “snake”, *putun (> putu > put) > L, D *puk* “a shore tree: *Barringtonia asiatica*”

*-k- > -Ø-: *pakiwak (> pakiwa > pakiw > paiw > pew) > D, L *pep* “shark”, Proto-Admiralty *nika (> nia) > L, D *ni* “fish”

*-r- > -r-: *urio (> wirio) > Levei *wiri* “dolphin” (absence of -p unexplained)

9. Proto-Oceanic obstruents and *r occur either as simple voiceless stops and *r, or as prenasalized voiced consonants: *p [p] : *b [mb], *t [t] : *d [nd], *r [r] : *dr [ndr], *s [s] : *j [nj], *k [k] : *g [ŋg]. Ross (1988) refers to the second members of these pairs as ‘primary nasal grade’, hence the need for a terminological distinction.

*-r- > -ŋ: *kuron (> kuro > kur > kul > kun) > L *kwiŋ*, D *kun* “clay cooking pot”

*-s- > -s-: Proto-Admiralty *mosimo > L, D *mwiŋ* “a shore tree: *Casuarina equisetifolia*”

*-s- > -h: *pose (> pohe) > L, D *poh* “canoe paddle”, *na talise (> ntalise > ndalise > dralise > dralis) > L *celih*, D *k^helih* “a shore tree: *Terminalia catappa*”

A notable feature of the Levei and Drehet phoneme inventories is the highly restricted set of consonants which may occur word-finally. Prior to glide fortition five consonants were allowed word-finally: one stop *k, one nasal *ŋ, one fricative *h, and the glides *w, *y. After glide fortition four consonants remained in final position: two stops *p and *k, one nasal *ŋ, and the fricative *h. Since *p did not survive as a final stop it might be speculated that final glides were reinterpreted as p under structural pressure to fill out a distributional pattern. But there is no obvious reason why structural pressure based on neutralization would not equally favor the shift of glides to t, or s, which were also absent word-finally, why final glides rather than final h would have been recruited for fortition, or why the change *-w > p alone would not have sufficed to fill the gap in distribution of stops (in fact *-w > p and *-y > t arguably would have done a better job if structural pressure were the motive force for the change). Any attempt to treat the fortition of the two glides as products of independent historical changes also founders on lack of solid evidence. We could greatly reduce the bizarre appearance of *w > p by assuming *w > b followed by final devoicing, but this would not help to explain the form of fortition for the palatal glide. Occam’s razor serves us well here: unless some persuasive argument to the contrary is forthcoming, it is simplest to assume that *-w > p and *-y > p were products of a single sound change which targeted the same output, since the contrary assumption implies convergent changes, both of which are phonetically unusual (although admittedly to different degrees). The obvious consequence of this conclusion is that while most sound changes appear to be linguistically motivated, others do not.

3.2 Glide fortition in western Java?

Three languages are native to the island of Java: (1) Betawi, or Jakarta Malay, spoken around the Indonesian capital of Jakarta, (2) Sundanese, spoken in the mountains and in some coastal areas of western Java, and (3) Javanese, with about 80 million speakers spread densely over the rest of the island. Malay pre-

serves *y unchanged, but reflects *w as zero in initial position and intervocalically between unlike vowels. Javanese reflects *w and *y as glides, and reflects *b as w in many (but apparently not all) native forms. Sundanese, on the other hand, does something totally unexpected: some (but not all) instances of both *w and *b have become *c-*, *-nc-* (Table 3).¹⁰

Unlike the situation in Drehet and Levei, where both *w and *y were strengthened, glide fortition in Sundanese affected *w, but not *y: *aya ‘father’s sister, father’s sister’s husband’ > *aya-h* ‘father’, *ayak > *ayak* ‘sift, winnow’, *bayawak > *bayawak* ‘monitor lizard’, *duyuŋ > *duyuŋ* ‘dugong’, *qayam ‘domesticated animal’ > *hayam* ‘chicken’, *layaŋ > *layaŋ* ‘to fly, float in the air’, *layaR > *layar* ‘sail; to sail’, *layu > *layu* ‘wilt, wither’, *mayaŋ > *mayan* ‘blossom of the areca palm’, *payuŋ > *payuŋ* ‘umbrella, parasol’, *puyuq ‘quail’ > *puyuh* ‘female quail’. Similarly, neither glide underwent fortition syllable-finally, where glides were eliminated by prior monophthongization: *qatay ‘liver’ > *hate* ‘heart’, *baŋaw > *baŋo* ‘heron’, etc. In a superficial way the typologically bizarre instances of glide fortition in western Manus and western Java exhibit a kind of mirror-image symmetry:

Western Manus

Voiced palatal glide > voiceless bilabial stop

Western Java

Voiced bilabial glide > voiceless palatal stop

Figure 2. Mirror-image symmetry between glide fortition in western Manus and western Java

One might even add to this metaphor of mirror-image symmetry the observation that the change in western Manus happened only word-finally, while

10. This bizarre change was pointed out by Bernd Nothofer under circumstances which reveal the extent to which theoretical preconceptions can distort the perception of some practicing linguists. Nothofer wrote his dissertation at Yale University in the early 1970’s, and then published a somewhat revised version of it in the Netherlands. Since the dissertation involved the historical phonology of Javanese, Sundanese, Malay and Madurese, one would naturally expect to see the striking change *w > Sundanese *c-*, *-nc-* discussed at some length, but in fact it is not mentioned at all in the main body of the thesis. Instead, a 15-page discussion of this change appears in an appendix to the original manuscript. The explanation that I was given by the author is that he was “not allowed” to mention the change when he wrote the dissertation, presumably because his supervisor considered it too outrageous to be taken seriously.

Table 3. *w and *b to c- : -nc-, and *mb to -nc- in Sundanese (source: Coolsma 1930; Nothofer 1975:296ff.)

PMP	Sundanese	Malay	English
*w > c-			
wahiR	cai	air	water
*w > -nc-			
*kiwa	karancaŋ kenca (Low) kiwa (High)	kerawaŋ	openwork; à jour design left side
*lawaq	kancah lancah	kawah (laba-laba)	vat, cauldron spider
*sawa	ranca sanca	rawa sawa	swamp python
*b > c-			
*bahaq	ca'ah	(air) bah	floodwaters
*badas	cadas canir carinjin cauŋ	banir berinjin bauŋ	gravel, stony ground buttress root banyan, <i>Ficus</i> spp. catfish
*bayaR	caya	bayar	pay
*ba-b-in-ahi	ca-wene "virgin" ba-bene "fiancée"	bini	woman
*baŋkudu	caruluk caŋkudu	belulok beŋkudu	fruit of the sugar palm <i>Morinda</i> spp.
*bataŋ	cataŋ kai ⁺ cayur	bataŋ bayur	tree trunk <i>Pterospermum javanicum</i>
*b > -nc-			
*laban	lancaŋ	lawan	oppose, opponent
*-mb- > -nc-			
	katuncar leuncaŋ	ketumbar lembaŋ	coriander seed** swollen with water

* ci- in numerous place-names (Ciamis, Cianjur, Cirebon, etc.)

⁺ "tree trunk stripped of its branches and lying on the ground" (*kai* = "tree")

** Nothofer (1975:298) suggests that this is a borrowing of Sanskrit *kutumburi/ kustumbari* "coriander seed".

the change in Sundanese happened everywhere *except* in final position. This schematization, of course, omits important details which further distinguish the two sets of changes: (1) in Drehet and Levei *both* glides are affected, whereas in Sundanese only *w undergoes fortition, (2) in Sundanese the fortition of a bilabial glide is accompanied by prenasalization in medial position. There are, moreover, deeper differences of detail which become apparent with further examination of the data.

As seen in Table 3, both *b and *w are reflected as *c-*, *-nc-* in Sundanese. This raises the question whether some instances of *b first became *w* before undergoing glide fortition. Since *b normally remains a voiced bilabial stop in Sundanese, this assumption would require that we recognize an unconditioned phonemic split. Nothofer tried to address this problem by reconstructing more than one type of ancestral *b, but the evidence for the distinction he proposes is weak and contradictory. Another possibility is that some instances of *w > *c-*, *-nc-* are due to borrowing from Javanese, where it is known that *b split into *b* or *w* without storable conditions (Dempwolff 1934–1938: 1: 41ff.). If Javanese words with *w* from *b were borrowed prior to glide fortition in Sundanese, it might be possible to unite the two changes as a single (still baffling) change *w > *c-*, *-nc-*. The major obstacle to adopting this hypothesis is the two examples which Nothofer gives of Malay forms with *-mb-* corresponding to apparent Sundanese cognates with *-nc-*. Since the change *b > *w* following a nasal is unattested in Austronesian languages it appears necessary to assume that in at least these two forms the cluster *-mb- changed directly to *-nc-*. If so, the Sundanese change cannot be characterized as glide fortition at all, but must be stated instead as a change of voiced labials to voiceless palatals in initial position, and of simple or prenasalized voiced labials to prenasalized palatals in intervocalic position.

Since the changes *w, *b > *c-*, *-nc-* and *-mb- > *-nc-* do not appear to be fully regular, it could be conjectured that we are dealing here not with primary sound change, but rather with some form of secondary change such as analogy, perhaps in combination with borrowing.¹¹ However, as seen already, any

11. As Juliette Blevins (p.c.) puts it: “It seems to me that the entire array of facts could go back to just one high-frequency correspondence (e.g. *cai/wai* or *cai/bai*), with analogical extensions of this high-frequency correspondence into subsequent borrowings. This is a direct change of *w to *c* or *b* to *c/nc*, but it is not primary sound change.” Very rarely analogical processes such as hypercorrection may produce recurrent sound correspondences which faintly mimic sound change, as with the introduction of intrusive medial *r* in three items in Bo-

attempt to link linguistic motivation with exceptionless reflexes is itself highly problematic. While complete regularity may not be a myth, it is certainly less common than one is led to believe from standard textbook discussions. The term ‘primary sound change’ should be reserved for innovations which affect phonological categories rather than individual morphemes. Whether a phonological category is affected completely or only partially in a given phonetic environment is irrelevant to this distinction. What matters is whether change targets a phonological category or an individual morpheme. If the former, then we are ipso facto speaking of primary sound change, whether it is regular or not.

Unconditioned phonemic splits are the bane of historical phonology, and although they must never be allowed in mutually corroboratory independent witnesses, where they occur in a single language we sometimes have no choice but to tolerate them in order to avoid an unrealistic proliferation of proto-phonemes in reconstruction. Analogies typically are sporadic, and it would be unprecedented to find a case in which a well-defined analogical pattern operated semi-systematically to produce numerous parallel innovations which mimic the effects of primary sound change. But this apparently would be the case if the hypothesis which Blevins advocates were adopted for the surprising labial to palatal innovations in Sundanese.

These are uncomfortable conclusions for anyone whose theoretical position maintains that primary sound change must be linguistically motivated. As with glide fortition in western Manus, any proposed chain of natural innovations is bound to be long, have at least one unnatural link, and to be purely speculative. Moreover, as Nothofer (1975: 307ff.) points out, a similar change is found sporadically in both Malay and Javanese, languages with which Sundanese has been in contact for many centuries. The number of forms in Malay and Javanese which show this change is comparatively small, and it appears likely that the change has spread (or begun to spread) from Sundanese to these other languages.¹²

laang Mongondow (Blust 1983). In the case at hand, however, the proposed alternative fails to explain (1) how such a unique change might have begun, (2) how a pattern attested in a single form could be generalized, and (3) how *cai/wai* or *cai/bai* could serve as an analogical model for the prenasalized variant in intervocalic position, whether this reflects *-w-, *-b- or *-mb-.

12. Some Malay forms with *w > c- or -nc- may have been borrowed from Sundanese, as with *kancah* “narrow-mouthed cooking pot for boiling rice” (next to *kawah* “vat, cauldron; crater”). In other cases, however, a hypothesis of borrowing is more problematic. Nothofer

3.3 Intervocalic devoicing in Kiput (northern Sarawak)

The languages of northern Sarawak are remarkable for their strange phonological histories, but even among these Kiput is exceptional. Like many other North Sarawak languages, it has fronted low vowels after original or historically derived voiced obstruents (Blust 2000). On top of this widely shared innovation Kiput shows diachronic evidence for such atypical changes as intervocalic devoicing, lowering of diphthongal nuclei unless a voiced obstruent occurs earlier in the word, *f > s, and possibly postnasal devoicing, as well as synchronic evidence for the spontaneous nasalization of non-low vowels before final *p*, *t*, *k* (but not glottal stop), constraints on moraic structure conditioned by syllable onset, and the alternation of *b* with *s*. From this smorgasbord of bizarre sound changes I will select just intervocalic devoicing for closer examination.

Obstruent devoicing is common enough in sound change, but experience leads us to expect it in word-final position. In Kiput, it happens contrarily in intervocalic position. To make a strange and complex situation even stranger and more complex, intervocalic devoicing in Kiput affected only labiodental fricatives, palatal affricates and velar stops, but had no effect on labial or alveolar stops (Table 4).¹³

Devoicing also affected Malay loanwords, although somewhat less consistently, possibly contingent upon the chronology of borrowing: Malay *bujan*, Kiput *buciə* ‘bachelor’, M *kerja*, K *kəɫəcih* ‘work’, M *harga*, K *ləkih* ‘price, cost’, M *pijit*, K *picit* ‘squeeze’, M *getian*, K *təkian* (met.) ‘thread’. BUT: M *bel-ajar*, K *bəɫajən* ‘to study’, M *lajan*, K *ləjəŋ* ‘copper pot’, M *bagi*, K *bagi?* ‘divide, share’, M *dagih*, K *dagIŋ* ‘meat’.

Kiput historical phonology is dauntingly complex, and to understand the examples in Table 4 it is useful to know that Kiput had a rule of glide fortition.

(1975:307) argues that Malay *cair* ‘diluted; watery (of viscous things)’ (< *wahiR), for example, could not be a borrowing of Sundanese *cai*, since the latter form has a zero reflex of *R. However, his interpretation neglects the possibility that borrowing could have taken place prior to the Sundanese change *R > Ø. It is unlikely that Malay and Sundanese would have independently innovated the same type of highly distinctive change, and since these languages have been in contact for centuries diffusion appears to be the most likely explanation for this striking convergence between them.

13. The schwa is marked by the standard phonetic symbol in Kiput, but following orthographic tradition it is written *e* in Malay (and *e in proto-forms). For typographical convenience the Malay spelling convention is extended to other languages in the discussions that follow.

Table 4. Intervocalic devoicing in Kiput (source: Blust 2002; PNS = Proto-North Sarawak)

PNS	Kiput
1. *-w- (and [w]) > -v- > -f-	
*jawat	(> daway > davay > daviəy) > <i>dafiəy</i> “face”
*pawat	(> pavat) > <i>pafiət</i> “fruit bat”
*sawa	(> sava > savah) > <i>safəh</i> “spouse”
*dua	(> duwa > duva > duvi > duvih) > <i>dufih</i> “two”
*bituka	(> bitua > bituwa > bituva > bituvi > bituvih > bitufih) > <i>tufih</i> “large intestine”
*buat	(> buwat > buvat > buvit > bufit) > <i>fit</i> “long, of objects”
*Ruab	(> ruwab > ruvab > ruviəb > luviəb > luviəp) > <i>lufiəp</i> “high tide”
*beRuanj	(> bəruwanj > bəruvanj > bəruviənj > bəluviənj > bəluviə) > <i>bəlufiə</i> “sun bear”
*uay	(> uway > uvay > uviəy > ufiəy) > <i>fiəy</i> “rattan”
2. *-j-, *-y- (and [y]) > -j- > -c-	
*pujut	> <i>puçut</i> “pick up with the fingers”
*tajem	> <i>tacəm</i> “blowpipe poison”
*tjujuq	> <i>tucəu?</i> “seven”
*ujunj	> <i>ucuə</i> “extremity, tip, top”
*kayu	(> kaju > kajəw) > <i>kacəw</i> “wood; tree”
*kuyu	(> kuju > kujəw) > <i>kucəw</i> “freshwater crab”
*lia	(> ləja > ləji > ləjih) > <i>ləcih</i> “ginger”
*duRian	(> duriyan > durəjan > durəjin > duləjin) > <i>ləcin</i> “durian”
*diaq	(> diyaʔ > dəjaʔ > dəjiʔ > dəjəiʔ > dəcəiʔ) > <i>cəi?</i> “good”
*ikuR	(> iur > iyur > əjur > əjuʔ > əjəuʔ > əcəuʔ) > <i>cəu?</i> “tail”
*liku	(> liu > liyu > ləju > ləjəw > ləcəw) > <i>cəw</i> “sink in river; river”
*likud	(> liud > liyud > ləjud > ləjut > ləcut) > <i>cut</i> “back (anat.)”
3. *-g- > -k-	
*agem	> <i>akəm</i> “hand; foot, leg”
*pager	(> pagəl) > <i>pakəl</i> “fence”
*tugal	(> tugil > tugin) > <i>tukin</i> “digging stick”

Unlike glide fortition in Drehet, Levei or Sundanese, however, the Kiput rule was relatively normal – *w became *v* and *y became *j*. As in Ndrehet and Levei, glide fortition in Kiput affected not only phonemic glides, but also the automatic phonetic transitions between a high vowel and a following unlike vowel. These historically secondary obstruents then had the same effect as inherited voiced obstruents in generally fronting a low vowel that followed (e.g., *dua > duwa > duva > duvi > duvih > *dufih* “two”). After low vowel fronting, intervocalic *v*, *j* and *g* devoiced, but *b* and *d* did not. In most (but not all) cases, words

which underwent glide fortition and intervocalic devoicing lost the syllable that preceded the strengthened glide (e.g. **buat* > *buwat* > *buvat* > *buvit* > *bufit* > *fit* “long, of objects”). Since these developments have been described in other publications (Blust 2000, 2002), they will be mentioned here only in passing.

This change is different from the preceding ones in several respects. Most importantly, intervocalic devoicing affected a single feature value. There is thus no possibility of considering a concatenation of natural changes which cumulatively produced an unnatural result.

Since voiceless stops commonly voice in intervocalic position, and this type of change is assimilatory, we might regard intervocalic devoicing as dissimilatory. Various ideas have been floated about the motivation for dissimilation, but on the whole the process remains far less transparent than assimilation. Kemp (1936) suggested that both assimilation and dissimilation tend to be anticipatory due to a tendency for speakers to think ‘ahead’ of their normal articulatory pace. However, he provided no concrete basis for why dissimilation (as opposed to assimilation) should occur in the first place. Togeby (1964) was concerned with whether dissimilation should be regarded only as a sporadic change, or whether it may sometimes be rule-based, and although he dismissed a number of apparent dissimilations as illusory, nowhere did he clearly indicate why he believed dissimilation occurs when it does.

One suggestion is that assimilation facilitates the articulatory task of the speaker, while dissimilation facilitates the processing task of the listener. It is very difficult to see how intervocalic devoicing in Kiput could be explained in this way. First, laboratory evidence would need to be presented showing that voiceless obstruents are, indeed, easier to perceive in intervocalic position than voiced obstruents. Second, such evidence would have to show that a difference in perceptual salience holds for *f*, *c*, and *k* as opposed to *v*, *j* and *g*, but not for *p* and *t* as opposed to *b* and *d*, since the latter obstruents did not devoice. Third, some reason would have to be given as to why a phonological process which purportedly facilitates the processing task of the listener is not more commonly exploited in natural languages.

Another idea has been proposed by Ohala (1981, 1993), who holds that dissimilation is essentially a form of hypercorrection: the listener assumes wrongly that an assimilation has taken place and mentally ‘undoes’ it. In this view dissimilation is not a type of primary sound change at all, but a type of analogical ‘retuning’.

Ohala provides convincing arguments that in some cases dissimilation is a mental undoing of an imagined assimilation. His clearest examples are those in

which dissimilation occurs in a vowel that is assumed to be colored by the features of an adjacent consonant, or between consonants separated by a vowel. To illustrate, for the first type the speaker intends $-yt$ and produces $-yt$, but the hearer assumes that the frontness of the vowel is conditioned by the position of the consonant, and so ‘undoes’ the misinferred assimilation to produce $-ut$. The second type is illustrated by Grassmann’s Law, which holds that the first of two aspirates in successive syllables deaspirated in both Greek and Sanskrit. Ohala shows that the apparent ‘action at a distance’ which seems to be implied by such changes could be mediated by formant transitions in adjacent vowels through which certain phonetic properties are transmitted between non-adjacent consonants.

For all its undoubted merits it is difficult to see how Ohala’s theory of dissimilation as hypercorrection would work in the case of intervocalic devoicing. It would have to be assumed that speakers of Kiput had some reason to interpret intervocalic v , j and g as products of voicing assimilation. It is true that pre-Kiput had no intervocalic f or c , and apparently had very few examples of intervocalic k , and that this differs from the labial and dental obstruents, where voicing contrasts $*p : *b$ and $*t : *d$ were found in intervocalic position. But this provides no basis in itself for the inference that Kiput speakers would have interpreted intervocalic v , j and g as products of voicing assimilation. Moreover, Ohala (1981:193) makes an explicit prediction about the kinds of phonological features that are most likely to be involved in dissimilation: “I have proposed that only those consonantal features should participate in dissimilation which have important perceptual cues spreading onto adjacent segments, especially vowels.” Consonantal features which are most likely to dissimilate, according to Ohala, include (1) labialization, (2) uvularization, (3) pharyngealization, (4) palatalization, (5) retroflexion, (6) place of articulation, (7) glottalization, and (8) aspiration. Features or segment types not likely to dissimilate include (1) fricative, (2) affricate, (3) stop, and (4) *voice* (italics added). If voice is a phonological feature that is not likely to dissimilate, Ohala’s theory of dissimilation as hypercorrection does not appear to help in finding an explanation of intervocalic devoicing in Kiput.

Blevins (2004) offers another perspective on phonological change which might shed light on the Kiput facts. Kiput shows intervocalic devoicing for $*j$, $*v$, $*g$, but not for $*b, *d$. Kiput also reflects $*p$ and $*t$ unchanged, thus maintaining a voicing contrast for labial and alveolar stops. By contrast, there was no $*c$, and $*f$ apparently became s before intervocalic devoicing since otherwise $*v$ and $*f$ would have merged as s in intervocalic position (Blust 2002:420).

Given only this much information the stage appears to be set for an explanation similar to that which Blevins (2004) offers for the recurrent change $*t > k$ (i.e., $*k$ changed, leaving the phonological space partitioned between labial and non-labial stops, so that the latter were free to vary).

The problem with appealing to this type of explanation is that $*g$ apparently merged with k in at least some Kiput lexical items as a result of intervocalic devoicing. As noted in Blust (2002: 393ff.), Proto-North Sarawak $*-k-$ was lost in about 40 percent of known Kiput etymologies. Conditioning may have been a factor in some cases (e.g. $*k$ is generally lost after $*i$, but preserved between like vowels), but overall the phonemic split which resulted from preservation of intervocalic $*k$ in some forms and loss in others cannot be predicted. The upshot of this observation is that Kiput preserves the voicing contrast for velars in intervocalic position, just as it does for labials and alveolars. Since intervocalic devoicing took place for velars, it is difficult to see why the same change did not affect $*b$ and $*d$.

Finally (as suggested by one referee), it might be argued that intervocalic devoicing is either phonetically or phonologically motivated in that it strengthens syllable onsets, and so improves the rhythmical rise and fall of sonority. In terms of the typology of sound change presented by Vennemann (1988) this would presumably be an instantiation of the 'Head Law': A syllable head is the more preferred: (a) the closer the number of speech sounds in the head is to one, (b) the greater the Consonantal Strength value of its onset, and (c) the more sharply the Consonantal Strength drops from the onset toward the Consonantal Strength of the following syllable nucleus.¹⁴ Since $*j > c$ in Vennemann's theory can be seen as an 'improvement' in preferred syllable structure the Kiput change might be regarded as somehow 'explained.' If any such putative universal motivation actually underlies this change, however, it is difficult to see (1) why intervocalic devoicing would not be as common cross-linguistically as, say, final devoicing, (2) why, in the case of Kiput, the change affected $-v-$, $-j-$ and $-g-$, but excluded $-b-$ and $-d-$, and (3) why $*j$ did not be-

14. Vennemann (1988:9) proposes a scale of 'consonantal strength' which decreases from voiceless plosives through voiced plosives, voiceless fricatives, voiced fricatives, nasals, laterals, rhotics, high vowels, mid vowels and low vowels. Since consonants and vowels are included together under the rubric 'consonantal strength' he speaks (somewhat confusingly) of the 'consonantal strength' of a syllable nucleus.

come *c*- word-initially, but is reflected either as *j*- (two known cases) *d*- (four known cases) or *s*- (two known cases; Blust 2002: 418).¹⁵

The foregoing changes have been treated at some length. For reasons of space this cannot be done for all of the developments documented here, and the remaining changes will be treated in somewhat more cursory fashion.

3.4 Proto-Manus **dr* > Drehet *k^h*

Within Drehet and Levei there is an interesting sound correspondence for which the history is partly but incompletely known. Drehet has a strongly aspirated stop *k^h*, which contrasts with unaspirated *k*. Typologically this is unusual, as the language has no other aspirated consonants (Table 2). Drehet *k^h* corresponds regularly to Levei *c* (a voiceless palatal affricate), and both are known to derive from Proto-Manus **dr*, a voiced prenasalized alveolar trill which is preserved in many of the modern languages as a nasal-rhotic sequence with a short oral closure between the nasal and the liquid ([*n^dr*]).¹⁶ Examples appear in Table 5.

Both languages have a phoneme *dr* (as in the language name Drehet), but this appears to be a product of borrowing after the sound change which produced Drehet *k^h*, Levei *c*. There are four or five known cases in which Drehet *k^h* does not correspond to Levei *c*. In some of these, as D *k^hak^ha* : L *kaca* “wooden headrest” the irregularity may be due to sporadic assimilation in Drehet, or to a constraint which disallowed *kV^hk^h* in pre-Levei. In others the reasons for irregularity are obscure. As can be seen from the examples given, the sound correspondence D *k^h* : L *c* is found only in syllable-initial position. This contrasts with the correspondence D *k* : L *k* (< Proto-Manus **k*), which is well-attested both syllable-initially and syllable-finally, as in D, L *kamop* “left side”, D *ka[?]acu-k* : L *ka[?]asu-k* “my skin”, D, L *-k* “1sg. possessor”, D, L *lok* “boil, ab-

15. Even more speculatively, one might argue that the pattern of intervocalic devoicing in Kiput represents a compromise between strengthening syllable onsets, and the well-known aerodynamic fact that labial, coronal and velar stops represent decreasing orders of potential voicing duration. But even here one is left with no explanation as to why a palatal affricate devoiced while an alveolar stop did not.

16. A similar historical development happened independently in the history of Fijian. However, while **mb*, **nd* produced Fijian *b* ([*mb*]), *dr* ([*n^dr*]), the same proto-sequences produced prenasalized trills at both bilabial and alveolar positions in many of the languages of Manus (Maddieson 1989).

Table 5. Evidence for the evolution of Proto-Manus *dr (a prenasalized alveolar trill) to Drehet *kh*, Levei *c*

No.	Proto-Manus	Drehet	Levei	English
01.	*driʔi-ŋku	k ^h iʔi-k	ciʔi-k	my foot
02.		k ^h ini-k	cinu-k	my ear
03.	*dru-i-ŋku	k ^h ui-k	cui-k	my bone
04.	*dra	k ^h a	ca	blood
05.	*drine-ŋku	k ^h ini-k	cini-k	my intestines
06.	*dramata	k ^h amak	camok	person, human being
07.	*drahopolV	k ^h apɔŋ	cahapɔŋ	twin
08.	*druʔu yapi	k ^h uʔu jih	cuʔu jih	firewood
09.	*dru	k ^h u	cu	housepost
10.	*druhu	k ^h uh	cuh	sugarcane
11.		k ^h ikelip	cikilip	coconut tree
12.	*dralise	k ^h elih	celih	<i>Terminalia catappa</i>
13.		k ^h iliŋ	ciliŋ	mushroom
14.		muk ^h e kep	mucok kep	root of a tree
15.	*druyu	k ^h u	cu	dugong
16.	*drapui	k ^h ah	coh	conch shell, triton
17.		k ^h æŋ	cæŋ	salt water
18.	*droIV	k ^h oŋ	coŋ	outrigger canoe
19.	*droko	k ^h o	co	punting pole
20.		k ^h oŋ	coŋ	basket
21.	*droV	k ^h ep	cep	sleeping mat
22.	*dranV	k ^h an	coŋ	slitgong, garamut
23.		k ^h aiŋ	cayunŋ	red
24.	*draʔinV	k ^h aʔiŋ	caʔiŋ	bad
25.		nik ^h up	nicup	true, correct

scess”, D, L *kemæŋ* “man, male”, D, L *kawah* “friend”, D, L *kaʔuh* “rafter”, D, L *konŋ* “village”, D, L *kop* “fence”, D, L *kep* “tree, wood”, or D, L *puk* “a shore tree: *Barringtonia asiatica*”. In final position, where PM *dr produced Drehet, Levei -ŋ, and a *k* : *k^h* contrast does not occur, Drehet *k* is normally pronounced [k^h], even though here it derives from Proto-Manus *t rather than *dr. What seems to be operative in this phonetic change is that speakers of Drehet perceive *k^h* as a distinctive marker of their language, and have extended its allophonic range beyond the set of environments in which it was produced by primary sound change. In effect, then, in its extension as a phonetic embellishment the aspirated velar stop appears to have taken on an emblematic function to set Drehet speech off from that of other closely related communities in western Manus.

What kind of phonetic or phonological bridge can be built between a prenasalized alveolar trill and either a voiceless palatal affricate or a voiceless aspirated velar stop? As with the change Proto-Nuclear Polynesian *l > Rennellese *ŋg*, we are thrown back upon speculation. In the present case there are two reflexes rather than one, and the separation time between Drehet and Levei cannot have been very long. If there were phonetically intermediate steps in the transition from PM *dr to *c* and *kh*, they are difficult to infer. A development *dr > *c* > *kh* is perhaps favored by the fact that several other Admiralty languages, including Likum, in southwest Manus, and Nauna in the eastern Admiralties, also reflect PM *dr as *c*. However, Seimat, spoken in the Ninigo Lagoon some 270 km. west of Manus, reflects *dr as *k* or *x*: *na rui-ŋku > *drui-ŋku > *kui-k* “my bone”, *na raya > *dra > *ka-ka* “blood”, *na ruyu > *dru* > *xu* “dugong”. This parallelism, between historically independent changes of *dr to a voiceless palatal affricate in some languages and a voiceless velar stop or fricative in others, suggests that the change paths leading from *dr to its reflexes were constrained by some type of linguistic motivation, although what this motivation might be remains completely obscure.

3.5 PMP *-b/d/g > Northern Batak, Berawan -m/n/ŋ

Adelaar (1981) has shown that the Batak languages of northern Sumatra reflect original voiced obstruents in final position in three ways which correspond to major dialect divisions: (1) Simalungun (independent, or a divergent branch of southern Batak) reflects Proto-Batak *-b, *-d and *-g unchanged, (2) Southern Batak dialects (Toba, Angkola and Mandailing) reflect these segments as the corresponding voiceless stops, and (3) Northern Batak dialects (Karo and Dairi-Pakpak) reflect final voiced obstruents as the homorganic nasals. Given the typology of known sound changes and arguments for linguistic motivation the most challenging development is the last of these, exemplified by Proto-Batak *abab > Karo Batak *abam* “fine burning ashes”, PB *saŋkeb > KB *saŋkem* “lid of a clay or copper cooking pot”, *alud > KB *alun* “to massage”, PB *sahun > KB *sahun* “take place, occur”, PB *sered > KB *seren* “stinger of an insect”, PB *deleg > KB *deleŋ* “mountain”, or PB *talag > KB *talaŋ* “be open, as a door”. As seen in two of these examples and in others cited by Adelaar (1981), non-final voiced obstruents did not change in the northern Batak languages. While examples of this conditioned change are not numerous (reflecting the low type frequency of final voiced obstruents in Proto-Batak or earlier Austronesian proto-languages), there is no question regarding its validity.

Although the change of stops to nasals is unusual in itself, the a priori expectation is that voiced stops would be more likely than voiceless stops to become nasals, since both are voiced. But why should voiced stops become nasals only in word-final position, where the more common development is for stops to devoice? Is this simply an alternative method of unmarking voiced obstruents in final position which, though recognized as a logical possibility (Kager 1999: 54), has not to my knowledge previously been reported? If so, why has it been chosen in preference to final devoicing, when this more common strategy was available? The examples given above make it clear that final voiced stops became nasals without regard to preceding phonemic material (presence of a nasal earlier in the word, etc.). Apart from its possible role in unmarking, no obvious linguistic motivation for the nasalization of final voiced obstruents in northern Batak is apparent. The intrinsic theoretical interest of this development is magnified, however, when we recognize that an equivalent change also is found in Berawan, which, like Kiput, is a member of the phonologically highly innovative North Sarawak group of languages.

Four dialects of Berawan are known and are represented by field materials in the possession of the writer: Long Terawan, Batu Belah, Long Jegan and Long Teru. Long Terawan stands somewhat apart from the others, and might be considered a distinct, but closely-related language. Although very little data was collected for the dialect of Long Teru, the last three dialects appear to form a phylogenetic unit which we can call ‘western Berawan’, since Long Terawan is the easternmost member of the group.

Berawan historical phonology is complex, and some details are obscure. Nonetheless, adequate field materials are available for all dialects except Long Teru, and it is clear that in Proto-Berawan (PB), final voiced stops were replaced with the homorganic nasals (final *n then became palatal or velar in western Berawan, conditioned by the preceding vowel). Examples are available only for Proto-North Sarawak (PNS) *b and *d: *ulu eleb > LT *ulo lem*, BB *lulem*, LJ *lem* ‘knee’ (the first two examples lit. ‘head of the knee’), *uab > BB *η-uam*, LJ *m-uam* ‘to yawn’, *laled > LT *dilen*, BB *dilan* ‘housefly’, *liŋkab > LT *likam* ‘to open’, *alud > LT *alon*, BB *aloŋ* ‘boat’, *kuyad > LT, BB *kuyan* ‘grey macaque’, *likud > LT *likon*, BB *likoŋ*, LJ *lækauñ* ‘back (anat.)’, *lulud > LT *lulon* ‘shin’, *tukud > LT, BB *tukon* ‘support stick, prop’, *temulud > LT *temalon*, BB *temuloŋ* ‘to fly’, *pused > LT *pusen*, BB *pusan*, LJ *pocen* ‘navel’, *uled > LT *ulen*, BB *ulan*, LJ *olen* ‘maggot, caterpillar’, *sulud > LT *sulon*, BB *suloŋ* ‘comb’, *tumid ‘heel’ > LT *tumin* ‘cockspur’, BB *tuméŋ*, LJ *tomeiñ* ‘heel’. In non-final position *b, and *d are never reflected as nasals. To provide the fullest pos-

sible picture of this change and others which will be noted in passing below, the reflexes of all Proto-North Sarawak consonants in initial, medial, and final positions are given in Table 6 for the Berawan dialects of Long Terawan (LT), Batu Belah (BB), and Long Jegan (LJ). The same information is also provided for Kiput, as this will permit a more exact comparison of the unusual process of intervocalic devoicing in the two languages. Where more than one reflex is found in a given environment this is indicated only when each reflex is well-attested, either in complementary environments, or as an apparent unconditioned phonemic split. Blanks indicate that a proto-segment (or cluster) is not reconstructed in the position in question; question marks indicate that the proto-segment is reconstructed in the relevant position, but that no reflex is known. The symbol ‘0’ represents zero, and geminate/singleton distinctions in Berawan, which developed historically under fully storable conditions in at least Long Terawan, are not always marked.

Little information is available for reflexes of *-g, but *b and *d are reflected as nasals only in word-final position. The reflexes of word-final voiced obstruents in Berawan thus present a picture very similar to that in Northern Batak. In neither case is any linguistic motivation for the change evident: final nasals are reflected as nasals, and the development of final voiced obstruents thus led to conditioned merger in both groups of languages. Although suffixed forms of bases that reflect PNS final *b were not recorded, one can predict that if they are found in the language they will show a synchronic alternation of *-m* with *-k*. Phonetically bizarre as this prediction may sound, it is no more bizarre than the attested synchronic alternation of *b-* with *-s-* in Kiput forms such as *bile?* “either of the halves of something that is split” : *ɲe-sile?* “to split something in half”, *bule?* “blind” : *ɲe-sule?* “to blind someone”, *bulië* “metal cockspur” : *ɲe-sulië* “to fight cocks”, or *buruë?* “rotten” : *ɲe-suruë?* “to let something get rotten” (Blust 2002).

Finally, it might be surmised that the change of voiced stops to nasals word-finally passed through an intermediate stage in which these stops were prenasalized (hence PNS *ulu leb > *ulu lemb > Long Terawan Berawan *ulo lem*). Prenasalization of both voiced and voiceless obstruents is a common phenomenon in Austronesian languages, but is almost always confined to medial position. Since prenasalized final obstruents are unknown in any of the hundreds of languages of the Philippines or western Indonesia it would be unjustified to assume a historically intermediate stage in which they were present.

Table 6. Reflexes of the Proto-North Sarawak consonants in Kiput and three dialects of Berawan

PNS	Kiput			LT			BB			LJ		
	I	M	F	I	M	F	I	M	F	I	M	F
*p	p	p	p	p	p	ʔ	p	p	p	p	p	p
*t	t	t	t	t	t	ʔ	t	t	t/k	t	t	t/c/ʔ
*k	k	k/0	k/ʔ	k	k	ʔ	k	k	k	k	k	k/c/ʔ
*ʔ		0	ʔ		0	0		ʔ	0		ʔ	0
*b	b	b	p	b/k	k	m	b/p	k	m	b/p	k	m
*d	d	d	t	d	r	n	d	r	n/ŋ	d/l	r	n/ñ
*j	d	c		s	s		j/s	s		j	j/c	
*g	g	k	k?	g	k/g	?	g	k/g	?	g	k/g	?
*b ^h	s	s		p	p		p	p		p	p	
*d ^h	s	s		c	c		c	c		c	c	
*j ^h	s	s		c	c		c	c		c	c	
*g ^h	?	k		k?	k?		k?	k?		k?	k?	
*mp		pp			pp?			pp?			pp?	
*nt		tt			tt			tt?			tt	
*ŋk		kk			kk?			kk?			kk	
*mb		m ^b			m ^b			m ^b ?			m ^b	
*nd		n ^d			n ^d			n ^d			n ^d ?	
*nj		n ^j			n ^j ?			n ^j ?			n ^j ?	
*ŋg		kk?			?			?			?	
*m	m	m	m	m	m	m	m	m	m	m	m	m
*n	n	n/l	n	n	n	n	n	n	n	n/l	n	n/ñ/ŋ
*ñ	ñ	ñ		ñ	ñ		ñ	ñ		ñ	ñ	
*ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ/ñ
*s	s	s/0	0	s	c/s	h	s	s/c	ʔ	s/c	c	ʔ
*l	l	l	n	l/d	l	n	l	l	n	l/d	l	n
*r	?	r	n	?	r	n	?	r	n	?	r	n
*R	l	r/l	n	g/k	k	0	g	k	0	g	k	0/n
*w	?	f	w	?	b	w	?	v	w	?	v	w
*y		c	y		j	y		j	y		j	y
0			h			h			h			0

As seen in Table 6, Berawan historical phonology shows other peculiarities which require at least brief comment. We will touch on most of these only in passing, as they are discussed at greater length elsewhere (Blust 1993, 1995).

3.6 Gemination of the onset of open final syllables in Berawan

Long Terawan examples such as *batu > *bittoh* “stone”, *kutu > *kuttoh* “head louse”, *qatay > *atay* “liver”, *putiq > *puté* “white”, *laki > *lakkéh* “man, male”, *siku > *sikkoh* “elbow”, *likud > *likon* “back (anat.)”, *tukud > *tukon* “prop, support”, *bana > *binneh* “husband”, *tina > *tinneh* “mother”, or *tanaq > *tana* “earth” show an unusual condition for the genesis of geminate consonants: the onset of an open final syllable was geminated. Although the data are more abbreviated, an identical change appears to be reflected in all Berawan dialects. Note that neither the syllable type nor its position are sufficient in themselves to predict gemination, as the consonant onsets of open penultimate syllables, or of closed final syllables remain unaffected. In citation forms stress is generally final in all dialects of Berawan, but this is true whether the final syllable is open or closed. What linguistic factor, if any, might drive consonant onsets to geminate only if they initiate an open final syllable thus remains very puzzling.

3.7 PMP *b > -k- in Berawan

Probably the most striking reflex in Table 6 is the change of *b to -k- (or -kk-), as in *babuy > BB, LJ *bikuy* “pig”, *balabaw > BB, LJ *belikiw* “rat”, *qabu > LT, BB *akkuh* “ash”, *Ribu > LT, BB *gikkuh*, LJ *gikkew* “thousand”, *tuba > LT *tukkih*, LJ *tukkey* “fish poison: *Derris elliptica*”, or *qubi > LT *ukkih*, LJ *ukkey* “yam”. As seen in examples such as *beRas > LT *bekkeh* “husked rice”, *qabaRa > LT, BB *bikkIh* “shoulder”, *duRi > LT, BB *dukkih* “thorn”, or *paRa > LT *pakkih*, LJ *pakkyey* “storage rack above the hearth”, a similar change affected intervocalic *R (probably an alveolar trill, which became uvular in many daughter languages). The phonemes *b and *R thus merged as -k- (or -kk-), but are distinguished in other environments (as *b-* vs. *g-*, and *-m* vs. \emptyset).

Reflexes of PNS *g and *j in intervocalic position are contradictory: some morphemes show devoicing while others do not. It is possible that apparent exceptions to this change are loanwords which entered the language after it was completed, as with *legih* < Malay *harga* “price” (ultimately from Sanskrit). It is noteworthy that the glides *w and *y, which underwent fortition to *b* and *j* (Long Terawan) or to *v* (a voiced bilabial fricative) and *j* (western Berawan) never devoice in intervocalic position. Since at least some instances of PNS *j devoiced in this environment, it appears that glide fortition in Berawan followed intervocalic devoicing. In this respect Berawan and Kiput are fundamentally different, since glides that underwent fortition also devoiced in Kiput. Fi-

nally, since PNS *-d- had already lenited to *r in Proto-Berawan, it provides no further information about the scope of intervocalic devoicing in Berawan.

How large a class of segments did intervocalic devoicing affect in Berawan? The clearest evidence is for *R and *b, but since these proto-phonemes merged as -k- we can only be sure at first that intervocalic devoicing affected pre-Berawan *-g- and, less consistently, *-j-. Rather than propose a one-step change *R > -k- we posit PNS *R > Proto Berawan (PB) *g, with subsequent devoicing of the velar stop intervocalically, an interpretation which is consistent with the reflex *R > g in initial position. Similarly, it is likely that *b > -k- is a product of two successive changes: (1) *b > -g-, and (2) intervocalic devoicing. The evidence considered so far thus suggests that intervocalic devoicing followed the change *b > g, since if intervocalic devoicing had preceded the change of labials to velars we would expect to find at least some examples of *p > -k-, but none are known.

One other comparative observation is worth making here, as this fundamentally alters the impression that intervocalic devoicing in Berawan was restricted to *g and perhaps *j. In a small number of cases the change of *b, *g or *R to k is also attested word-initially. In every case where this change is found the base form is a stative verb: PB *besuR > LT *keco* “satiated, full after eating” (cp. *bana > *binneh* “husband”), *gatel > LT *kiten* “itchy” (cp. *garut > *garut* “grater”), *Raqen > LT *ki?en* “light in weight” (cp. *Ratus > *gitoth* “hundred”), *Raya > LT *kijilh* “big, large” (cp. *Ramut > *gimau?* “root”). Why would the initial stop of stative verbs behave as though it were intervocalic? Note that not only do *g and *R devoice in initial position, but *b shifts to a velar stop and devoices, when we would expect it to remain unchanged if it were initial. Although no stative verb prefix is known to be functional in contemporary Berawan, stative verbs were marked by *ma- in Proto-Malayo-Polynesian, and *me- in Proto-North Sarawak. The Long Terawan form *keco* “satiated” thus reflects a development *ma-besuR (> *me-besuR > *me-gesuR > *me-kesuR > *me-kecuR > *me-kecoR > *me-keco) > *keco*. This interpretation is further supported by etymologies such as *duRi-an (> dugian > dugiyan > dukiyan > dukejan > dukejin) > *kejin* “durian fruit”, or *baRuaj (> beRuaj > beguaj > beguwanj > bekuwanj > bekebanj > bekebinj) > *kebinj* “the Malayan sun bear: *Ursus malayanus*”, where k- reflects intervocalic *R prior to the loss of the initial syllable.

There is one last complication. In stative verbs Long Terawan k- sometimes corresponds to p- in western Berawan cognates: (1) PNS *me-besuR > LT *keco*, BB, LJ *peco* “satiated, full after eating”, (2) PNS *me-buruk > LT *kuro?*,

BB *purok*, LJ *puriu*? “rotten”, (3) PB **me-baŋa* > LT *kiŋgeh*, BB *piŋgah* “rotten” (Kenyah *baŋa* “stale, rotten”). In one other recorded case a Long Terawan cognate is not known, but a western Berawan form with *p*- corresponds to a *b*-initial cognate in an external witness: (4) LJ *pelileiñ* (Kenyah, Kayan *beliliŋ*) “round, circular”. Finally, in one case Long Terawan reflects **b*- unchanged even though it is found in a stative verb, and here the western Berawan dialects also have *p*-: (5) PB **me-beRat* > LT *bekkei*?, BB, LJ *pekit* “heavy”. The change **R* > *g* thus apparently preceded **b* > *g*, and the latter change evidently preceded intervocalic devoicing *within a morpheme* in all Berawan dialects. However, given the divergent reflexes of **b*- in Long Terawan and western Berawan stative verbs the conclusion appears to be inescapable that **b* > *g* happened twice in the Berawan languages. Figure 3 shows schematic derivations for PNS **abu* “ashes” and **me-besuR* “satiated” in Long Terawan (LTB) and western Berawan (WB):

PNS * <i>abu</i>	* <i>me-besuR</i>	Change
LTB <i>agu</i>	<i>me-gesuR</i>	LVS
<i>aku</i>	<i>me-kesuR</i>	IVD
<i>akkuh</i>	<i>keco</i>	Other changes
WB <i>agu</i>	<i>me-besuR</i>	LVS
<i>aku</i>	<i>me-pesuR</i>	IVD
<i>akkuh</i>	<i>peco</i>	Other changes

Figure 3. Derivations for the labial-to-velar shift (LVS) and intervocalic devoicing (IVD) in Long Terawan and western Berawan

Although the order of labial-to-velar shift and intervocalic devoicing is the same for both LTB and WB, the first of these changes affects intervocalic **b* unconditionally in LTB, but affects **b* in WB only within a morpheme, and not across a morpheme boundary. If we assumed instead that the change **b* > -*g*- within a morpheme happened once in the ancestor of all Berawan dialects we would be forced to conclude that LTB innovated a second labial-to-velar shift which affected initial **b* across a morpheme boundary. In other words, **abu* > **agu* could have happened in Proto-Berawan, but **me-besuR* > **me-gesuR* is impossible, since WB dialects do not show the latter change. It follows that **me-besuR* > **me-gesuR* happened in pre-LTB, and hence postdated the similar shift of intervocalic **b* within a morpheme. Alternatively, we could assume that the change **b* > *g* happened once in LTB, affecting all intervocalic labial

stops. Since this did not happen in WB, however, we would be forced to conclude that the change $*b > -g-$ within a morpheme happened independently in LTB and WB. Either way, we are forced to conclude that $*b > -g-$ was a recurrent change, which preceded intervocalic devoicing in both dialect areas.

This divergent development in the LTB and WB reflexes of PNS $*b-$ shows that intervocalic devoicing in Berawan affected not only earlier $*g$ and $*j$, but also $*b$; it did not, however, affect the strengthened reflexes of glides, presumably because these did not become obstruents until a later time. Unlike the situation in Kiput, where intervocalic devoicing operated on $*v$, $*j$ and $*g$, but had no consequences for $*b$ or $*d$, intervocalic devoicing in Berawan thus appears to have been essentially unrestricted, affecting labial, palatal and velar obstruents.

In short, both Kiput and the Berawan languages have innovated rules of intervocalic devoicing, but the details of these innovations differ significantly. The fact that such a change is absent in Narum, which subgroups immediately with Kiput, can be taken as evidence that intervocalic devoicing in Kiput and Berawan was a product of separate historical events. At the same time it hardly seems likely to be accidental that a change which is typologically so exceptional should occur in two groups of closely related languages which are geographically contiguous. The geographical distribution of these changes thus suggests diffusion, although the differences in detail between the two cases makes any hypothesis of borrowing extremely difficult to work out in detail.

Finally, since it is well-known that labials and velars are perceptually more similar to one another than either of these are to coronals (Jakobson & Waugh 1979:92ff.), the labial-to-velar shift might not be as bizarre as it initially appears. However, even granting a possible perceptual basis for connecting velar to labial stops, well-attested examples of regular changes interchanging labials and velars are rare. Moreover, this change is conditioned, since $*b$ and $*g/R$ maintained their distinctive place features word-initially and word-finally in all Berawan dialects. If there is a perceptual basis for the change $*b > -g-$, why would this perception operate only intervocalically (and in Western Berawan only when not in contact with a morpheme boundary)?

3.8 PMP $*g > p/j-$, $-j-$, $-p$ in Sa'ban

To follow up the foregoing discussion of labial-velar interchange, Sa'ban, an aberrant dialect of the Kelabit-Lun Dayeh language of northern Sarawak, shows a number of surprising sound changes (Blust 2001). Just one of these should

suffice to give an idea of the challenges that this language presents to general theories of linguistically motivated sound change. Proto-Kelabit-Lun Dayeh had a number of examples of *g. In Sa'ban *g- sometimes disappears, sometimes is reflected as *j-*, and sometimes as *p-*: *gain > *ayerŋ* "spinning top", *garen > *reŋ reŋ* "to roar", *getimel (> *timel* > *tmel*) > *hmel* "bedbug", *gulin > *lieŋ lieŋ* "shake head sideways", *guta > *toe* "cross a river"; *gatel > *jatel* "itchy", *genu-luh > *jenlew* "empty rice panicle", *geramih > *jelamey* "rice straw", *gituqen > *jInto'on* "star"; *gerawat > *pelawet* "complicated", *gileg > *pélep* "skittish". In medial position *g is always reflected as *-j-*: *agag > *ajiep* "rice sieve", *m-agap > *m-ajéep* "to startle", iguq > *jeu?* "shame", *pegamuŋ > *pejamueŋ* "tangled", *peregaiq > *jarei?* (met.) "all together", *saget > *ajIt* "quick(ly)", *tegeker > *teja?el* "to shiver", *tegeraŋ > *tejaréŋ* "ribs". In final position *g is reflected as *-k* in one known case, but otherwise as *-p*: *m-alug > *malok* "to trick", but *agag > *ajiep* "rice sieve", *areg > *arep* "crumbs, rubbish", *beluqug > *bel?up* "wasp, hornet", *eleg > *lep* "to stop, cease, as working", *gileg > *pélep* "skittish", *ileg > *élep* "separate, divorce", *pepag > *ppap* "a slap", *rurug > *hrop* "to fall, pour out".

Undoubtedly the most surprising reflex of Proto-Kelabit-Lun Dayeh *g is Sa'ban *-p*. Since Sa'ban has undergone word-final devoicing of stops it is possible that this change followed the path *g > b > *-p*. This hypothesis would still require an apparent single-step change from *g to *-b*. We are thus reminded of the change of *b to *-k-* in Long Terawan Berawan (LTB), since in both cases there has been a phonological innovation which connects labials and velars. However, the differences are intriguing. In LTB labials became velars, while in Sa'ban velars became labials. This is reminiscent, in a general way, of the apparent mirror-image symmetry seen in comparing glide fortition in western Manus and western Java.

Long Terawan Berawan

Voiced bilabial stop > voiceless velar stop

Sa'ban

Voiced velar stop > voiceless bilabial stop

Figure 4. Mirror-image (or pseudo mirror-image) symmetry between labial-velar interchange in Long Terawan Berawan and Sa'ban

One might add that, as with glide fortition in western Manus and in western Java, the environments for labial-velar interchange in Long Terawan Berawan

and Sa'ban were essentially complementary: in LTB the change $*b > k$ happened intervocalically, while in Sa'ban the change $*g > p$ happened only in initial position, where it is rare, and word-finally, where it is common. In addition, although the change $*b > k$ in Long Terawan Berawan apparently took place in two steps (the first a change in place of articulation, and the second a devoicing of intervocalic obstruents), the change $*g > p$ in Sa'ban appears to have been a one-step change, since it occurred not only word-finally, where there was general devoicing of obstruents, but also word-initially, where no general devoicing took place. In at least this regard the Sa'ban innovation $*g > p$ appears inherently more complex than $*b > -k-$ in LTB, since it involved a simultaneous change of place and voicing features, whereas the latter can be decomposed into two successive changes: (1) $*b > -g-$, and (2) intervocalic devoicing.

3.9 $*an/an > ay$ and $*em/en/en > w$ in Iban

Final nasals have peculiar reflexes in some of the languages of Borneo. In many of the Land Dayak languages of southwest Borneo and in some other parts of western Indonesia and mainland Southeast Asia nasals are 'preploded' word-finally unless the last syllable begins with a nasal consonant. This phenomenon has been described at some length in other publications and phonetic explanations have been proposed for it (Blust 1997). There is thus no need to consider it further here. However, in Iban, a close relative of Malay spoken in southwest Sarawak, final nasals show a different and equally surprising development: Proto-Malayic $*-an, *-an > -ay, *-em, *-en, *-en > -aw$ (Nothofer 1988: 50).¹⁷ Common examples include $*jalan > jalay$ "road", $*makan > makay$ "eat", $*panjan > panjay$ "long", $*pulan > pulay$ "go home", $*terban > terebay$ "to fly", $*telanjan > telanjay$ "naked", $*diem > diaw$ "quiet, silent", $*injem > injaw$ "borrow" and $*pesen > pesaw$ "to order". As with the change $*w/b$ to $c-$, $-nc-$ in Sundanese, the lenition of final nasals to glides in Iban apparently has not affected all potentially available forms. Nonetheless the change clearly is recurrent, and the probability that it is a product of analogy or some other mechanism of secondary change is virtually nil. Similarly, since Iban is closely related to Malay and even more closely related to a number of Malay-like languages indigenous to southwest Borneo which retain final nasals intact, the likelihood

17. Proto-Malayic last-syllable $*a$ and $*e$ (schwa) have merged as a in contemporary Iban. Comparative evidence from other Malayic languages shows that these vowels must still have been distinct when final nasals lenited to glides.

that this change involved intermediate steps is small. There is, moreover, a second type of evidence which supports this interpretation. For some forms there are variants, one with the final nasal, the other with a final glide, as with Proto-Malayic **jaran* > Iban *jaran/jaray* “far apart”, or **sayen* > *sayan/sayaw* “pity”. Whether this indicates that the change is still in progress, or that it created variants which have survived in different linguistic or pragmatic contexts is unclear, but in either case it strongly suggests that the lenition of final nasals to glides following non-high vowels was a single-step change.¹⁸

It is difficult to imagine what possible linguistic motivation there could be for such a change. Consider the specific details of conditioning: (1) nasals are affected only in final position, (2) these become glides only after non-high vowels, (3) the frontness of the resulting glide (palatal vs. labial) results not from the articulatory properties of the nasal, but rather from the height of the preceding vowel.¹⁹ Given the data that we have for a language which is better described than most (in grammars and a dictionary of some 8,000 entries), the possibility that this change could have been a purely conventional artifact of culture must be taken seriously. Rather than exclude it from consideration as a primary sound change because it is irregular, it might be more profitable to consider whether some innovations could be irregular precisely because they are conventional. In other words, the conscious manipulation of language data which depends upon human attention and consistency may be inherently more prone to irregularity than changes which operate outside the conscious control of the speaker.

3.10 Postnasal devoicing in Murik and Buginese

Finally, in at least two historically independent cases, obstruents have devoiced after nasals but not in initial or intervocalic position. Murik, a language spoken in northern Sarawak which subgroups closely with Kayan, shows the following sets of reflexes of the Proto-Kayan-Murik (PKM) plain and prenasalized obstruents in initial and medial positions (Blust 1974).

18. Nothofer (1988:54) suggests that ‘diphthongization’ may also have taken place “when the final sequence was *-ep or *-et.” However, he gives only three examples, and this claim thus remains highly tentative.

19. There is one gap in the data: no examples of final nasal lenition are known for reflexes of *-am. It is possible that both Proto-Malayic *-am and *-em became Iban *-aw*, but this is indeterminate.

Table 7. Murik reflexes of Proto-Kayan-Murik plain and prenasalized obstruents

PMP	PKM		Murik	
	I	M	I	M
*b	*b	*b	b	b
*mb		*mb		mp
*d	*l	*r	l	r
*nd		*nd		nt
*z	*j	*s	j	s
*nz		*nj		nc
*g	*g/k	*g/k	g/k	g/k
*ŋg		*ŋg		ŋk

The clearest evidence for postnasal devoicing of obstruents in Murik is seen in the labial and alveolar stops, where *mb and *nd are reflected as the simple voiced stops in the Uma Juman (UJK) and Long Atip (LAK) dialects of Kayan, but as *-mp-* and *-nt-* in Murik: PKM **-mb-* > Murik *-mp-*, PKM **-nd-* > Murik *-nt-*: PKM **kelembit* > Uma Juman Kayan, Long Atip Kayan *kelebit*, Murik *kelempit* “shield”, PKM **bumbun* > UJK *m-ubun*, Murik *umpun* “ridge of the roof” (with irregular loss of *b- in both languages), PKM **lindem* > UJK, LAK *lidem*, Murik *lintem* “dark”, PKM **-inda* > UJK *h-ida*, Murik *t-inta* “beneath, below”, PKM **mandan* > UJK, LAK *madan*, Murik *mantan* “to fly”, PKM **tundek* > UJK, LAK *tudek*, Murik *tuntuk* (with *u* for expected *e* in the final syllable) “beak of a bird”, PKM **lindin* > UJK, LAK *lidin*, Murik *lintin* “wall of a house”, PKM **undik* > UJK, LAK *udik*, Murik *untik* “upper course of a river”, PKM **tandab* > UJK *tadav*, LAK *tadam*, Murik *tantap* “catch, dive to catch something”,²⁰ PKM **andən* > UJK *aden*, Murik *anten* “deaf”, PKM **pindan* > UJK, LAK *pidan*, Murik *pintan* “blossom, flower of a fructifying plant”, PKM **pendan* > UJK *pedan*, Murik *pentan* “small fructivorous bat”.

Although reflexes of **-nj-* and **-ŋg-* also show postnasal devoicing, the evidence for a similar change in these consonant orders is compromised by the general devoicing of PMP **-z-/PKM *-j-* (> *s*) and **g* (> *k*), even when not prenasalized: PKM **nji* > UJK, LAK *ji*, Murik *nci* “one”, PKM **menjat* > UJK

20. As this comparison and others show, PKM **-b* is reflected as *-v* in some Kayan dialects, but as *-m* in others. Little information is available for PKM **-g*, and the change of PKM **-d* > *-n*, which is found in all known Kayan dialects, appears to result from **d* > *r*, followed by the merger of final liquids with **n*. Although the evidence in Kayan dialects such as Long Atip is more tenuous than that in Berawan, then, final voiced obstruents appear to have merged with the homorganic nasals independently in both groups.

Table 8. Buginese reflexes of Proto-South Sulawesi plain and prenasalized obstruents

PMP	PSS			Buginese		
	I	M	F	I	M	F
*b	b	w-	p?	b/w	w	ʔ
*mb		mb		mp		
*d	d/r/l	r	t?	d/r/l	r	ʔ
*nd		nd		nr		
*z	j	r		j	r	
*nz	nj			nc		
*g	g	g	k?	g	g	ʔ
*ŋg		ŋg		ŋk		

mejat, Murik *mencat* “pull”, PKM **unjuŋ* > UJK, LAK *ujuŋ*, Murik *uncuŋ/ujuŋ* “tip, extremity, topmost part of a tree”, PKM **anjat* > LAK *ajat*, Murik *ancat* “rattan tote bag”, PKM **tunjuŋ* > LAK *tujuŋ*?, Murik *tuncuŋ*? “to point, indicate”, PKM **tunŋan* > UJK, LAK *tugan*, Murik *tunŋan* “dibble stick”, but PMP **quzan* > PKM **usan* “rain”, PMP **gatel* > PKM **katen* “itchy”.²¹

Mills (1975) provides a substantial body of reconstructed forms for Proto-South Sulawesi, together with their reflexes in several daughter languages. Of these, Buginese shows clear evidence of postnasal devoicing (Table 8).

Examples include PSS **bumbun* > B *wumpuŋ* “heap up”, PSS **rumbia* > B *rumpia* “sago palm: *Metroxylon* spp.”, PSS **lambuk* > B *lampuŋ*? “to pound rice”, PSS **andi* > B *anri* “younger sibling”, PSS **dindiŋ* > B *renriŋ* “housewall”,²² PSS **pandan* > B *panreŋ* “pandanus”, PSS **anjap* > B *anceŋ*? “offering to the spirits”, PSS **janji* > B *janci* “to promise”, PSS **punjuC* > B *ma-poncoŋ*? “short”, PSS **angep* > B *aŋkeŋ*? “price, value”, PSS **genŋem* > B *genŋeŋ* “hold in the hand”, and PSS **tunŋal* > B *tunŋeŋ*? “each, single”.

These instances of postnasal devoicing are reminiscent of intervocalic devoicing in Kiput: in both cases we find devoicing in an environment where

21. Murik has simple obstruents *p, t, k, ʔ, b, d, j, g, s* and prenasalized obstruents *-mp-, -nt-, -nc-* and *-ŋk-*. Since [c] and [j] are in complementary distribution, [nc] can be regarded as phonemically *-nj-* (Blust 1974). If this analysis is adopted the devoicing of postnasal *j* must be considered part of the synchronic phonology, unlike the devoicing of other stops following nasals, which led to phonemic restructuring. This cluster is represented as *-nc-* here only for expository convenience.

22. I have modified Mills’ orthography of Buginese in several ways, most notably by substituting *e* for his ‘barred i’ (= mid-central vowel). Ambiguity between mid-central and mid-front vowels can be avoided by the use of diacritics: *e* vs. *é*.

we would normally expect to find assimilatory voicing. This takes us back to Ohala's theory of dissimilation as hypercorrection. For both Murik and Buginese the idea that dissimilation is a type of hypercorrection shows an interesting correlation with distributional facts. Proto-Kayan-Murik can be reconstructed with intervocalic *p and *b, but prenasalized voiceless obstruents reduced to the simple stop (possibly through intermediate geminates), leaving only the clusters *-mb-, *-nd-, *-nj-, and *-ŋg-, which then underwent postnasal devoicing. A similar situation would have existed in Buginese, where prenasalized voiceless obstruents first became voiceless geminates (PSS *aŋkat > B *akka*? "lift up", PSS *bintuin > B *wittoin* "star", PSS *tumpay > B *tuppay* "frog", etc.). Once voicing neutralization existed for obstruents following nasals, speakers of Murik and Buginese may have assumed that prenasalized obstruents had acquired voicing by assimilation, and then 'undid' the assumed secondary feature. However, as noted earlier, Ohala himself (1993:253ff.) regards voicing dissimilation as an unlikely phonological process. Of course, it is possible that he is wrong, and that *a priori* cases of voicing dissimilation such as Thurneysen's Law in Gothic, which have since been explained in other ways, really do involve dissimilatory devoicing.

However, even if we were to allow the feature [voice] to participate in dissimilation there is no obvious reason why speakers would assume that a phonological feature results from assimilation unless there were identical segments or identical features in successive syllables. In the examples discussed by Ohala, some feature in the environment of the dissimilation can always be interpreted as a source of imagined assimilatory change, as with Latin *kwɪŋkwē* > *kiŋkwē* "five", where speakers arguably assumed that the initial labiovelar was a product of assimilation to the second labiovelar, and then 'undid' the labialization. With postnasal devoicing, however, it is difficult to see what would prompt speakers to assume that voicing assimilation had taken place in earlier clusters *-mb-, etc. In many Oceanic languages voiced stops are automatically prenasalized, and prenasalized voiceless stops cannot occur. Yet no examples have ever been reported of postnasal devoicing in these languages.

Alternatively, to adopt an interpretation parallel to one that Blevins (2004) suggests for the change *t > k, postnasal devoicing may very well have taken place in Murik and Buginese because the voicing contrast for obstruents was first lost after nasals (but not elsewhere). In this environment, then, voice was free to vary. If the voiceless variant of postnasal obstruents prevailed over time then postnasal devoicing took place. If the voiced variant prevailed then the posthoc interpretation would be that a natural change had occurred: voiceless

obstruents were voiced after nasals. Note that this interpretation differs from Ohala's theory of dissimilation, which requires that speakers assume an assimilation to the unmarked value (*-mb-*, etc.) and then 'undo' the imagined assimilation to produce marked values (*-mp-*, etc.). Within Evolutionary Phonology as developed by Blevins, postnasal devoicing would not be dissimilatory, but like the change $*t > k$, would represent one possible outcome of free variation in a neutralizing environment.²³

4. How common are linguistically unmotivated sound changes?

It would be disingenuous to pretend that the typologically bizarre sound changes considered in this paper were chosen at random. These cases clearly were selected from among many hundreds of 'normal' changes in order to challenge the common assumption that sound change must be linguistically motivated. But should the selection bias which operated in assembling this set of examples cause us to dismiss the data as marginal and unimportant in reaching a general understanding of the nature of sound change? In other words, a basic question that we need to confront is: "How common are such apparent linguistically unmotivated sound changes?"

In practice this question may be difficult to answer if only because a determination of linguistic motivation may in many cases remain intractably ambiguous. It has already been noted that the line between speculation regarding possible multi-step sound changes which produce bizarre results and the acceptance of phonetically or phonologically unmotivated single-step changes is often difficult to draw. With $*t > k$ we seem to be on firm ground in claiming, at least for some languages, that this was a single-step change; for cases like Proto-Nuclear Polynesian $*l >$ Rennellese ηg , on the other hand, the matter is far less clear-cut. Should a given reflex which implies a bizarre sound

23. It is worth noting that neutralization could result either from shift or from merger. In the cases at hand reduction of prenasalized voiceless obstruents to simple or geminate voiceless obstruents would have left the voicing of remaining prenasalized obstruents redundant, and hence subject to fluctuation. However, neutralization could also have arisen through postnasal devoicing, in which voiced and voiceless stops merged after nasals. The difference is that the latter scenario assumes a phonetically unmotivated sound change as the *cause* of neutralization, whereas the former scenario assumes a phonetically unmotivated sound change as the *consequence* of neutralization.

change be treated like $*t > k$, where there evidently was no intermediate step, or like $*l > \eta g$, where intermediate steps *may* have been present? Setting this problem aside, it seems clear that bizarre *reflexes* are far less numerous than historical developments which result from phonetically transparent processes of assimilation, lenition, fortition, and the like. Nonetheless, changes of the type highlighted in this paper form a distinct subset of apparent phonological innovations which is difficult to dismiss, and closer attention to this problem will undoubtedly turn up many other examples.

5. Conclusions

The sheer number of unusual sound changes in a single language family which has been brought to light in this paper suggests that ‘unnatural’ sound changes may be more frequent than is commonly believed. What, then, gives rise to the impression that nearly all sound changes are ‘natural’? Changes that appear to be ‘natural’ may simply be those that recur across languages and language families (final devoicing, postnasal voicing, etc.), while those that are ‘unnatural’ are confined to individual languages or genetic groupings ($*y > -p$, intervocalic devoicing, etc.). This distribution does not imply that ‘unnatural’ changes are especially rare, merely that they are not recurrent. The distinction that must be made here corresponds closely to the usual distinction between type frequency and token frequency: natural changes have higher token frequency, since they happen in many languages (and so impress themselves upon the mind of the investigator). Unnatural changes, on the other hand, happen only in single languages or in small genetic groupings and so may easily be overlooked or forgotten. But in a detailed catalogue of sound changes for the world’s languages unnatural sound changes may turn out to occupy a far larger proportion of the changes than is commonly believed. Stated differently, although an innovation such as final devoicing may occur in scores or even hundreds of the world’s languages, from the standpoint of general typology it is a single change, and hence occupies one place in an inventory of types, just like any ‘bizarre’ sound change. In terms of token frequency, then, bizarre sound changes may represent only a tiny percentage of the changes which have occurred, but in terms of type frequency they may represent a considerably larger slice of the pie.

This paper has focused on ten bizarre sound changes in Austronesian languages. These changes are selective, but they hardly exhaust the inventory of theoretically unexpected sound changes available in the literature, or in un-

published fieldnotes. According to the most recent edition of the *Ethnologue* (Grimes & Grimes 2001), there are some 1,262 Austronesian languages. Since many languages are multi-dialectal and many dialects differ in interesting particulars of their phonologies, it is no exaggeration to say that the Austronesian language family provides an enormous natural laboratory for the study of language change. Many sound changes in Austronesian languages belong to the common types familiar from textbook discussions. Others, like those discussed here, do not.

I have tried to consider explanations that would allow us to salvage the theory that all sound changes are linguistically motivated, but some changes appear to remain fundamentally intractable. No amount of speculation about possible intermediate steps is likely to provide a plausible phonetic motivation for more than a few of the changes considered here, and alternative structural explanations are also problematic. By default the only remaining explanation appears to be that speakers may sometimes engage in a conscious, arbitrary manipulation of linguistic symbols which produces systematic or semi-systematic results that resemble phonetically motivated sound change. Until now sociolinguists have concentrated almost exclusively on the implementation of sound change, leaving the actuation problem to historical linguistics, where it has traditionally been considered outside the research paradigm of the field. But if sociolinguists are to fully understand sound change as a living process this neglect cannot be permanent. Once the actuation question is investigated on a large scale with many diverse languages, it may well be discovered that, although many sound changes begin as a result of automatic phonetic processes working on the mechanics of speech, others not only are spread through linguistic communities, but *arise* through a conscious effort to distinguish the speech of one social subgroup from that of another.

Some linguists may doubt that the actuation of a sound change can be consciously calculated. However, George W. Grace has reminded me that in the Uisai dialect of Buin, a Papuan language of Bougainville Island in the Solomons chain, “we find all the gender agreements reversed – that is, all the masculines are feminine and all the feminines are masculine. There is no accepted mechanism for linguistic change which can cause a flip-flop of this kind and magnitude. I believe that at some stage in the past, some influential speaker of the Uisai dialect announced that from now on his people were not to speak like the rest of the Buins. Once the change was adopted, it would become the natural speech of the community within one or two generations” (Laycock 1982: 36). It is arguable whether the facts in Buin involve the conscious manipulation

of syntax or of semantics, but one form of speech disguise or avoidance language clearly exploits antonymy. According to Hale (1971) in certain ritual contexts initiated men among the Warlpiri (Walbiri) of central Australia replace every noun, verb and pronoun of ordinary Warlpiri with an antonym. We might question whether such a conscious manipulation of language could lead to permanent change. Many features of child language, for example, are idiosyncratic and do not appear to be motivated by phonetic factors, but they fail to survive into adult speech, and so could not possibly be implicated in diachronic processes. Unlike the purely synchronic case reported by Hale, however, in Iban of southwest Borneo, a number of lexical items have undergone what appears to be a systematic semantic innovation (Blust 1980). Examples include Malay *hanit* “foul-smelling” (Proto-Austronesian *qanjeliC “smell of burnt rice, burning hair, etc.”), but Iban *anjit* “fragrance, sweet scent (of flowers, etc.)”, Malay *ampul* “expand, be blown out”, but Iban *ampul* “soft, unmuscular (of body), soft (of fruit)”, Malay *boŋkar* “heaving up, raising up something heavy”, but Iban *buŋkar* “pull down”, Malay *hibur* “solace, comfort”, but Iban *ibur* “shocked, distressed, disturbed”, Malay *kampon* “cluster of buildings making up a large homestead or a small hamlet”, and related words of similar meaning in many other languages of western Indonesia, but Iban *kampon* “forest”, Malay *kilau* “luminosity; brilliancy; sheet-lightning” and semantically similar reflexes of *kilaw “reflected light” in many other languages, but Iban *kilau* “dusk”, Malay *liut* “lithe; leathery; tough”, but Iban *liut* “soft, silky”, Tagalog *namnám* “sense of taste” and reflexes of *ñamñam “tasty, delicious” with similar semantics in many other languages, but Iban *ñam-ñam* “tasteless, insipid”. In general, semantic changes are notoriously random and unpredictable, and it is surprising to encounter a case like this, where it can be argued that the meanings of a number of lexical items (seventeen in all) have been ‘reversed’ in some culturally meaningful sense of semantic reversal.

Iban antonymy clearly involves semantic change, and the Buin facts are arguably grammatical, but there is no obvious reason why conscious manipulation of language could not also operate in the area of phonology. This is true in synchronic descriptions of ‘speech disguise’, where the phonological forms of ordinary speech are systematically transformed (e.g. Conklin 1956). If phonological form can be consciously manipulated in systems of speech disguise it is difficult to exclude the operation of similarly conscious or calculated mechanisms in ordinary phonological innovation. It is in this process that we might yet have some chance of coming to terms with the kinds of changes I

have discussed here – changes which, though uncommon, evidently occur far more often than most linguists appear to realize, or have been willing to admit.

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Résumé

Un certain nombre de changements phonétiques bien documentés ne semblent être motivés ni phonétiquement, ni phonologiquement. Bien qu'il soit possible que certains de ces changements impliquent des étapes intermédiaires sur lesquelles nous ne disposons pas de documentation directe, le fait de supposer que tel a toujours été le cas paraît arbitraire et constituerait une violation du principe d'économie. Ces données soulèvent la question de savoir si les changements phonétiques doivent être motivés phonétiquement, comme les Neogrammairiens l'ont supposé, ou alors s'ils doivent être motivés linguistiquement, comme en réalité tous les professeurs de linguistique historique d'aujourd'hui le présument.

Zusammenfassung

Eine Reihe gut dokumentierter Lautentwicklungen in austronesischen Sprachen scheinen weder phonetisch noch phonologisch motiviert zu sein. Obwohl es möglich ist, dass solche Veränderungen Zwischenstufen beinhalten, über die keine direkte Dokumentation vorliegt, scheint die Annahme, dass dies schon immer der Fall war, willkürlich zu sein und stellt außerdem einen Verstoß gegen "Occams Rasiermesser" dar. Angesichts dieser Daten stellt sich die Frage, ob der Lautwandel, wie von den Junggrammatikern angenommen, phonetisch motiviert sein muss, oder ob er sogar linguistisch motiviert ist, wovon nahezu alle historischen Sprachwissenschaftler ausgehen, die sich aktiv mit der Erforschung dieses Gegenstandes beschäftigen.

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