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THEORETICAL IMPLICATIONS OF THE GREAT MENOMINEE
VOWEL SHIFT

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Abstract: I attempt here to detail some of the historical phonology of Menominee, a Central Algonquian language, in a tentative effort to fill in the bare outlines hinted at in Bloomfield 1924 and 1939. The central topic is the development of the Menominee vowel system. The facts appear to suggest that in Menominee and perhaps in Central Algonquian in general, word-initial position is a weak, rather than a strong, phonological position, contrary to a general hypothesis of Foley 1977.

0. Introduction. Among the historical developments from Proto-Algonquian to Menominee (one of the Central languages, still spoken near Green Bay, Wisconsin) was a series of vowel lowerings. From certain exceptions to part of the lowering process, seen as "strengthening" in the sense of Foley 1977, it is possible to infer its preferred phonological environments.¹ The inferred sequence of lowerings lends support to the independently motivated notion that in Menominee, and perhaps in Central Algonquian in general, initial position in the word is a weak, rather than a strong, phonological position. This appears to lend further support to the concept of "family universal" in the sense of Lass 1975, and, by implication, to the idea that research on general linguistic universals is actually leading to the discovery of "family universals".

In passing I will consider the relative chronology of the Menominee lowerings and their relationship to other changes.

1.0 Preliminaries. Before discussing the fate of the Proto-Algonquian (hereafter PA) vowels in Menominee, I must take note of certain changes in the segmental composition of words, and also of changes which can perhaps be subsumed under the general heading of length changes (changes in vowel length), so that these may be referred to later without exemplification.

1.1 Changes in the segmental composition of words.²

1.1.1 *Cwa· > Cua (first vowel prominent):

*apwa·ni > apuan 'roast' (noun)
*kwa·pahamwa > kuapaham 'he dips it out'
*mwa·kwa > muak 'loon'

1.1.2 *Cya· > Cia (first vowel prominent):

*kesya·peəkeswe·wa > keslapəhkesi·w 'he heats him (stone, metal)'
*nekyā· > nekiah 'my mother'
*kya·ta·wa > kiata·w 'he hides it'

1.1.3 *hwe· > he·:³

- *kawahwe·wa > kawa·he·w 'he fells him by tool or shot'
 *kepahwe·wa > kepa·he·w 'he covers him up'
 *ki·ška·lowe·hwe·wa > ke·skanowehe·w 'he cuts off his tail'

1.1.4 *Cwīw > Cow:

- *akwiwā > akow (>ako·w) 'he dons a garment'
 *wa·pantwiwaki > wa·pahtowak 'they look at each other'

1.1.5 *maw > mow:

- *wi·ntamawe·wa > we·htamowe·w 'he tells it to him'
 *keθkino·hamaweke·wa; cf. Men. kehkē·no·hamowekow 'he teaches'

1.2 Loss of material from word-final.1.2.1 Final short vowels drop:⁴

- *a·cime·wa > a·cemew 'he tells of him'
 *a·kema > a·kem 'snowshoe'
 *kyi·spene > ki·spen 'if'

1.2.2 After final short vowels drop, final clusters reduce:

- *a·totamwa > a·totam 'he tells of it'
 *a?lapyā > a?nap 'net' (n)
 *a?seninki > a?seneh 'on the stone' (loc)
 *atehkwa > ate·h 'caribou'
 *e·hkopye·kaθki > e·hkopikah 'as far as the water extends'

1.3 Length changes.⁵

1.3.1 A long vowel after a cluster is shortened if not before a cluster:

- *pi·nte·wi > pe·htew 'it is enclosed'
 *ne?θā·wa > ne?naw 'he was killed'
 *kwi·nkwi·h̄sa > ki·hkih 'mud-hen'

1.3.2 In an even-numbered syllable (counting from the beginning of the word and from each long vowel), a vowel is lengthened before a cluster:

- *ki·šehkiθkyi > ke·sehki·hkiw 'cedar grove, swamp, land'
 *ko·hpačih̄ta·wa ko·hpače·htaw 'he ruins it'
 *wa·pamehko; cf. Men. wa·pame·hkon 'look ye at him, them'

1.3.3 Also in an even-numbered syllable (defined as in 1.3.2), a vowel is shortened if not before a cluster:

*ki·ma·pane·wa > ke·ma·pamew 'he peeps at him'
 *ki·mene·wa > ke·menew 'he feels her secretly'
 *pema·tesipanye·ki, cf. pema·tesyanik 'they once lived'

1.3.4 The second syllable of a word is lengthened if the first syllable is short, unless the latter terminates in glottal stop:

*akime·wa > ake·me·w 'he counts him, then'
 *kekeskamwa > kek·skam 'he wears it, has it, as he goes'
 *natohtamwa > nato·htam 'he listens for it'
 But: *a?lapya > a?nap 'net' (n)
 *ke?cikami > ke?cekam 'sea'

Note that in some of these cases it is not determinable whether 1.3.2 or 1.3.4 is responsible for lengthening of a second syllable. Cf. also

*kapehkamwa > kape·hkam 'he passes it, goes past it'
 *netehkoma > nete·hkom 'my louse'

2.0 Lowering of PA front vowels. The PA vowel system, as reconstructed from the Central languages Fox, Cree, Menominee and Ojibwe (Bloomfield 1946), is as follows:

*i	*i·	*o	*o·
*e	*e·	*a	*a·

This system is reflected by Fox, Cree and Ojibwe (as well, incidentally, as Potawatomi; cf. Hockett 1939, 1948), except that in Cree and Ojibwe *i and *e fall together as i, and in Potawatomi most short vowels have reduced to ə. Menominee however has developed new vowels; its vowel phonemes are set up in Bloomfield 1962 as:

i	i·	u	u·
e	e·	o	o·
ε	ε·	a	a·

The Menominee system results from a series of lowerings in the front vowels, followed by an analogical (and incomplete) split in the back vowels.⁶ I will discuss here only the front vowels.

2.1 The long front vowels.

2.1.1 PA *e· > Men. ε·:

*ke·ko·hi > ke·ko·h 'something; anything'
 *pye·to·me·wa > pi·to·me·w 'he carries him hither
 on his back'

*nepe·wa > nepɛ·w 'he sleeps'

2.1.2 PA *i· > e· (producing new e·), except where, in Menominee, a high vowel or post-consonantal glide follows anywhere in the word:

*ki·kitowa > ke·ketow 'he talks'

*mi·ka·twiwaki > me·ka·towak 'they fight each other'

*wi·yawī > we·yaw 'his body'

But: *kesi·nkwe·wa 'he washes his face'; cf. Men. kesi·hkwan 'towel'

*neni·čya·nehsa > neni·čiansh 'my child'

*pi·ntwike·wa > pi·htikew 'he enters a dwelling'

There is a complication in the lowering *i· > e·, namely, that when *i· is followed later in the Menominee word by a high vowel or post-consonantal glide, *i· lowers in spite of this, if between the *i· and the following high vowel or post-consonantal glide there intervenes, in the Menominee word, ɛ or ɛ· (<*e, *e·):

*ki·kitowilenyiwa > ke·ketoweneniw 'councilman'

*ki·menecya·kana > ke·meneciakan 'bastard'

*ki·skiθencye·wa > ke·skens·hčiw 'he has had a hand cut off'

Note that it is the Menominee reflexes ɛ, ɛ· that are involved, since those *e which failed to lower due to environment (cf. 4.0) or for other reasons do not have the property:

*ki·škešwe·wa > ki·skesiw 'he slices him through'

*mi·tenkwa·mwa > mi·tehkwa·mow 'he defecates in his sleep'
(In the element *enkwa·mi- 'sleep' *e exceptionally does not lower)⁷

2.1.3 PA *Cwi·, *Cyi·, *Cwe·, *Cye· > new Ci·:

*kwi·θome·wa > ki·nomew 'he longs for him'

*kešyi·pisowa > kesi·pesow 'he speeds'

*pye·twe·we·kesiwa > pi·ti·wɛ·kesew 'he comes with noise'

*mye·xkana·wi; cf. Men. mi·hekan 'trail'

2.2 The short front vowels.

2.2.1 PA *e > Men. ɛ in most environments (exceptions to be discussed in 4.0):

*aʔsenya > aʔsɛn 'stone'

*kaška·peθkahamwa > kaska·pehkaham 'he locks it with a key'

*meʔšye·wi > mɛʔsiw 'it is big'

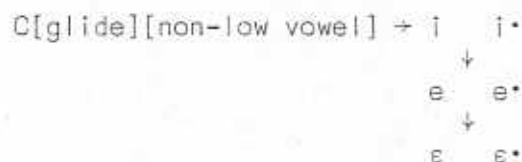
2.2.2 PA *i > Men. e (producing new ə):

- *a·čimowa > a·čəmow 'he narrates'
 *pema·tesiwā > pama·tesəw 'he is alive'
 *kepahike·wā > kepa·hekəw 'he covers the opening
 of something'

2.2.3 PA *Cwi, *Cyi > new Ci:

- *elenyiwa > enə·niw 'man'
 *pi·ntwike·wā > pi·htikəw 'he enters'

2.3 The overall picture is therefore, for the front vowels, as follows:

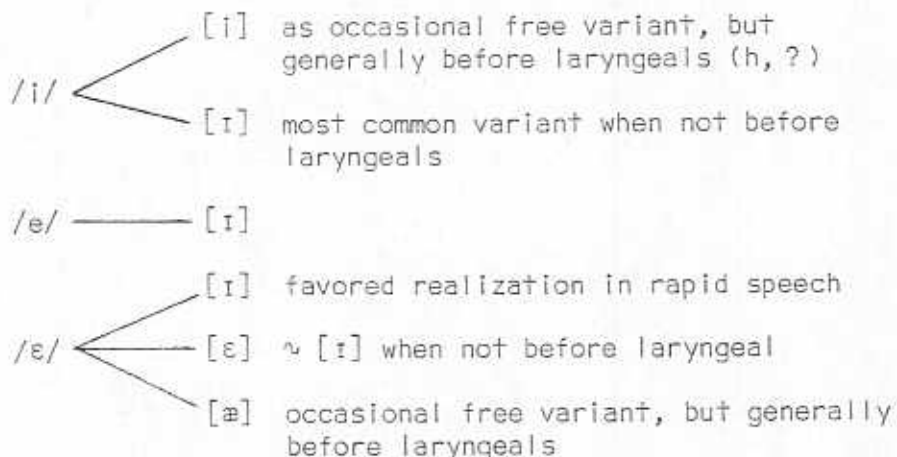


Presumably, we have here a typical pull- or drag-chain, the low vowels first further lowering, then the high-to-mid shift, yielding new mid vowels, and finally the consonant-glide-vowel contractions to give new high vowels. There is at least one bit of evidence that at least part of the process might be seen instead as a push-chain; see 7.0.

3.0 Phonetics. I must digress for a moment to discuss general objections to my term 'lowering' as applied to the development of the Menominee vowel system (the issue having been raised by Hockett in commenting on an earlier draft). It is of course true that the reflexes of *e· in the Central languages are lower-than-mid front vowels, except for Cree. Fox-Kickapoo, Menominee, and present-day Kansas Potawatomi (at least the speakers I have worked with) have a very low front vowel; Wisconsin Ojibwe and Wisconsin Potawatomi have a somewhat higher one; but only Cree and some types of Ojibwe have a mid vowel, at least in the Central area. The Shawnee reflex, if I interpret Hickerson 1958 correctly, has a considerable range of variation from mid to low.

Of course much depends upon the extent to which we take Bloomfield's reconstructed PA as satisfactory for languages outside the Central area as well as for the Central languages which were the basis of his reconstruction; Hockett's position on this is well known: he does not identify the ancestor language of the entire family with Bloomfield's PA (see, for example, Hockett 1973:302). For Common Eastern Algonquian, Goddard (1971) sets up *e· as continuing PA *e· and notes that in certain Eastern languages it "was lowered and backed to [ā]" (1971:140). Cheyenne also seems to have non-low e, ee (Davis 1962:§2).

Comments on the phonetics of the Menominee front vowels are in order: /i/ is [i̇]; /e/ is [ė] except when diphthongized in certain circumstances; /ɛ/ is [æ̇]. The short vowels have allophones which distribute as follows:



It can be seen that, when we refer to lowering, for example of *e to ɛ, we mean systematic or phonemic lowering. Phonemic contrasts among the short front vowels tend to neutralize in all positions except before laryngeals. Whether a given [ɪ] is a realization of /i/, /e/ or /ɛ/ can be determined if it ever occurs before a laryngeal; otherwise, [ɪ] is /i/ if it blocks lowering of PA *i̇ (2.1.2); i.e., if it conditions raising synchronically; cf. Bloomfield 1962: §§4.59-66; if not, it is /e/ or /ɛ/. Further it is /ɛ/ rather than /e/ if it conditions lowering of PA *i̇ in environments where otherwise lowering would be blocked (2.1.2), or the synchronic equivalent (Bloomfield, *ibid.*).

Although I am content to regard the Menominee lowerings as systematic - development of new low positions in contrast to mid position - it does seem, nonetheless, that the phenomena discussed in 2.1.2 and 5.1.2 suggest a qualitative difference between PA *i̇, *e, *ė and their Menominee reflexes *e, ɛ, ɛ̇ as well, since the reflexes have phonological effects different from those of vowels which went unchanged.

4.0 Exceptions to the lowering of *ė. The short front low PA vowel *ė failed to lower in the following environments.

a. when initial in the word:

*ehkwa > ehkuah 'louse'
 *eleni > enɛ̇n (prenoun) 'plain, ordinary'
 *es̄i > es̄ (preverb) 'thus; thither'

b. in initial syllables after C, except before a Men. laryngeal:

*kečipisowa > keče·pesow 'he speeds forth'
 *me|we·leme·wa > meni·nemew 'he likes him'
 *nekya > nekiah 'my mother'

Before a laryngeal (h, ?) *e lowers, even in initial syllables after C:

*šenkiššina·ne > sehke·hsenan 'if I lie down'
 *tehkina·kani > tehke·na·kan 'cradle-board'
 *keθpakya·wi; cf. Men. kəhpa·kan 'it is thick'
 *keʔčikami > keʔčekam 'sea, ocean'
 *meskwa·kamyiwī > mehkuakamiw 'it is red liquid'

Note that *nk, *θp, *sk, etc. all become hC in Menominee; the environment for lowering in initial syllables after C is unified only if this lowering followed the merging of these clusters. If the lowering occurred before the merging of proto-clusters, we would have trouble explaining, for example, why lowering in initial syllables after C took place before *sk (Men. hk) but not before *šk (cf., for instance, *neški·nšekwi > neske·hsek), which did not become a laryngeal cluster in Menominee.

This evidence that the lowerings took place after the evolution of the Menominee clusters suggests that the entire vowel shift was a recent phenomenon. See 6.0 for further evidence of this.

The third environment in which *e failed to lower is

c. after a Menominee long syllable, except before a Menominee laryngeal:

*aθa·mepyē·ki > ana·mepik 'under water'
 *kanawe·leme·wa > kana·we·nemew 'he takes care of him'
 *pema·tešiwa > pema·tešew 'he is alive'

Before a Menominee laryngeal, *e lowers even after a long syllable:

*ka·nesehkamwa > ka·hsehkam 'he shoves it with his foot'
 *kaška·peθkahamwa > kaška·pehkaham 'he locks it
 with a key'
 *kepiθenčve·hsinwa > kepi·nehčī·hsen 'he lies with his
 hand covering something'

5.0 Relative chronology of the lowerings.

5.1 There is internal evidence that the short vowel lowerings preceded the lowering of the long vowels.

5.1.1 Cases like the following suggest that the lowering *i > e preceded *i· > e·:

*ki·kitowa > ke·ketow 'he talks'

*pi·nčihšinwa > pe·hčehsen 'he falls into an enclosed place'

In such words, since *i· failed to lower if followed later in the word by a high vowel or post-consonantal glide (2.1.2), had the *i not lowered first, the *i· would not have lowered. Cf. the item:

*ki·kitowikamikwi > ki·ketowikamek 'council house'

Irregularly, the first *i in *-wikamikw- 'house' does not lower; here it prevents lowering of *i· earlier in the word.

5.1.2 There is also evidence that the lowering *e > ε preceded the lowering *i· > e·; consider the following:

*ki·kitowilenyiwa > ke·ketoweneniw 'councilman'
 *ki·menečya·kana > ke·mencčičakan 'bastard'
 *ki·škiθenčye·wa > ke·skene·hčiw 'he has had a hand cut off'
 *ki·waškwe·pye·wa > ke·waskepiw 'he is drunk'

In each of these cases, due to the special condition on lowering of *i· noted in 2.1.2, if the *e had not first lowered to ε, the preceding *i· would all have failed to lower due to the following high vowels and post-consonantal glides.

5.1.3 One example indicates that *e > ε preceded *Cye· > Ci·:

*pye·teθkwe·we·wa > pi·tehkiwe·w 'he brings a woman or women'

Here, if *Cye· > Ci· first, the resulting i· would have lowered after *e > ε. That is, derived ε does not cause i· < *ye· to lower, whereas it would have lowered original *i·.

6.0 Chronology of the lowerings relative to other changes.

6.1 The lowerings seem to have followed, in general, the changes in segmental composition of words.

6.1.1 The following examples suggest *hwe· > he· (or more precisely, *hwe· > he·; cf. note 3) prior to *i· > e·:

*ki·škikahwe·wa > ke·skekahe·w 'he chops him through or off'
 *pi·nlahwe·wa > pe·hnahew 'he enclosed him in something'

Had the *w not dropped first, the *i· would not have lowered.

6.1.2 The following examples show loss of material word-finally prior to *i· > e·:

*ki·šekwi > ke·sek 'sky'

*kyi·ʔsehkamwa > ki·ʔsehkam 'he doffs it'
 *wi·kopyi > we·kop 'basswood bark'
 *ni·waši > ne·was 'my pack'

6.1.3 One example shows the change *Cwiw > Cow, as well as loss from word-final position, prior to *i· > e·:

*mi·ka·twiwaki > me·ka·towak 'they fight each other'

6.2 The lowerings seem also to have followed the length changes.

6.2.1 The following examples show second vowel lengthening (1.3.4) prior to *e > ε:

*esi^uh^uenwi > ese·hnen 'it falls or lies thus'
 *ke^ute^uene > ke^uε·nen 'I say so to thee'
 *kešipesiwa > kese·pesow 'he speeds'
 *okeš^ukemani·ʔsiwa > oke·skemani·ʔ 'kingfisher'

In each case, a vowel lengthened in Menominee prevented lowering of an *e in the following syllable.

6.2.2 The following show either second vowel lengthening or even-numbered syllable lengthening (1.3.2) prior to *e > ε, by the same reasoning:

*kepi^uh^uenwi > kepe·hnen 'it lies or falls so as to block s.t.'
 *ke^uteškenamwa > ke^uε·skenam 'he gets it free'
 *wekw^uiʔseme·wa > oki·ʔsemew 'he has him as a son'

6.2.3 There are two apparent counter-examples to the generalization that the lowerings followed the length changes. The first of these is *a·ʔte·wi > a·ʔte^uw 'it is extinguished'. Here if post-cluster shortening (1.3.1) had occurred first, the resulting e should not have lowered. The second counter-example is perfectly parallel: *le·hle·wa > ne·hnew 'he breathes'. Bloomfield (1962:§4.64) gives following glide as a synchronic condition on raising in Menominee (the synchronic alternation reflecting historical lowering); it probably should be added to 3.0c above as a factor that causes lowering of *e even after a long syllable, along with following laryngeal. I have not done so since there are only two examples.

Another seeming difficulty is *aθa·mepye·ki > ana·mepik 'under water'. Here, if even-numbered syllable shortening (1.3.3) were prior to the contraction *Cye· > Ci·, the latter would seemingly not have operated. However we need merely add to Bloomfield's (1946:§5) list of vowel contractions the development *Cye > Ci. This is given by Bloomfield (1962:§18) as a synchronic contraction in Menominee, but apparently, since it in this case followed Menominee shortening, it must also be seen as an historical contraction: *aθa·mepye·ki > ana·mepyek > ana·mepik.

It is fairly important to be able to order the contractions

chronologically with the lowerings per se, since this establishes that they are related to the lowerings as part and parcel of the same process - somewhat as in the case of the Great English Vowel Shift, where a converse process produced vowel-glide sequences from former high vowels.

6.3 Summary. I noted earlier (4.0b) that the development into Menominee of the PA clusters seems to have preceded the vowel lowerings. Since changes in the segmental composition of words clearly preceded the length changes, we have, in general, the following sequence:

development of Men. clusters; segmental composition changes
length changes
short vowel lowerings
long vowel lowerings

This places the long vowel lowerings relatively late in the PA > Menominee developments, which accords well with the fact that the alternation $i \sim e$ (as well as the new back alternation $u \sim o$) is still active and productive in the language, giving the high variants before high vowels and post-consonantal glides later in the word, and the mid variants otherwise:

ke•ketow	'he talks'
nekī•ketim	'I talk'
so•pomah	'maple sugar'
su•pomahkwan	'maple sugar making'

As Bloomfield noted (1962:§§1.8,13; 4.66), the alternation in long non-low vowels between mid and high variants is to a large extent what we might now call a "Labovian rule", in that the alternation is more or less free, with the high variants "favored" or "encouraged" in the high environments. In several striking cases we encounter modern doublets such as ki•spen beside ke•spen 'if' (*kyi•špene); many of these can be attributed to analogy of course, but they are rather surprising in view of the probable influence of neighboring languages which did not undergo lowering (Ojibwe kišpin, Potawatomi kišpən, etc.).

7.0 Possibility of a push-chain. Although we have looked at evidence for the lowering of the short vowels before the lowering of the long vowels, there is no internal evidence of this sort for the lowering of any particular short (resp. long) vowel before any other particular short (resp. long) vowel.⁸ I assume, on the basis of the possible relevance of this data to claims made by Foley (see below), that it was a drag-chain; however there is one piece of evidence for a push-chain, rather than a drag-chain, in the short vowel lowering. This is the fact that in PA, *i never occurred in the initial syllable of a word. If lowering of *i were the first or an early event in a push-chain, then the fact that lowering of *e was inhibited in just this same environment could be attributed to the fact that PA had no *i in this position to lower and thus bring about lowering of *e. However, the account which sees

Menominee lowering as "strengthening" appears to be more explanatory, and the latter calls for the assumption of a drag-chain.

3.0 Foley's "strength" hypotheses. Foley 1977 makes, and offers very interesting arrays of evidence for, several claims regarding the relative strength of various vowel series and of various sorts of phonological environments. Those relevant to the Menominee data we have presented are:

- (a) Low vowels are stronger than high vowels (1977:44-48, 146)
- (b) "Strong elements strengthen first and most extensively and preferentially in strong environments" (1977: 107, part of what Foley terms the "inertial development principle")

A drag-chain of lowering in Menominee is very much in accord with (a) and (b): the relatively low vowels, which are stronger than the high ones, strengthen, i.e., lower further; subsequently the high vowels lower. This leaves "phonological space" for new high vowels, which then develop out of consonant-glide-vowel sequences.

Consider now again the three exceptions to lowering of PA *e (which, under the drag-chain hypothesis, would have been the first lowering):

- (a) when initial in the word,
- (b) when in initial syllables after C, except before a laryngeal,
- (c) when following a long syllable, except before a laryngeal.

Putting aside for a moment the first environment, consider the probable sequence of lowering of medial *e. First, *e lowers before laryngeals - a strong environment on various grounds, though not a claim made by Foley: Menominee short vowels, for instance, in odd-numbered syllables, vacillate a great deal, tending strongly toward reduction and neutralization of contrast, except before laryngeals (h, ?), where they maintain their distinctive qualities. Even in even-numbered syllables, Menominee /a/ and /o/ are realized respectively as lax [ə] and [ʊ] except, again, before laryngeals, where they are realized as [ɑ] and [o].

Second, *e lowers after short syllables - also a strong environment, if one may extrapolate a bit from Foley (1977:61, 66). Especially in languages which exhibit alternate-syllable phenomena, as does Menominee, we would expect a syllable following a weak syllable to be a strong syllable. Perhaps the matter is best stated negatively: strengthening fails after a long syllable, because position after a long (strong) syllable is a weak environment.

For medial (i.e., non-word-initial) *e the lowering is thus fairly well in accord with Foley's claims. This does not hold for word-initial position, in which *e does not lower, nor for position in initial syllable after C, where *e also does not lower (except where the supposedly prior lowering before laryngeal has taken place).

In the Menominee case, apparently, initial position in the word (and no doubt the position in initial syllable after C as well) is to be considered a weak position, while in Foley's data word-initial position is a strong phonological position (1977:109, 146).

Foley's examples in support of regarding word-initial position as a strong position are convincing enough; the point is simply that Menominee lowering suggests non-compliance on the part of this particular language.

There is considerable evidence from language decline that word-initial position is a weak position in Central Algonquian. It is from this position that loss of material tends to occur. For examples in Fox see Bloomfield's Fox notes (1925:§7). Loss of short initial syllables has been noted in Wisconsin Ojibwe (Chippewa). In Menominee, I found among modern speakers *pe·ni·hseh* (1920s: *ahpe·ni·hseh*) 'boy'; *ski·pemi·?sow* (1920s: *paski·pemi·?sow*) 'fry bread'; *sa·?cekana·htek* (1920s: *asa·?čekana·htek*) 'pencil'; etc. When permanently lost, these initial short syllables do not show up under prefixation, as they apparently did in the 1920s. Moreover, even in the 1920s Menominee as recorded by Bloomfield (1962), initial short vowels vacillate (1962:§§1.17, 19) except before laryngeals (cf. above), a strong position which also in the case of the lowering of *e overcame the weakness of initial position after C.

We also have the rather striking evidence from Fox, where PA *e actually (and otherwise quite inexplicably) raises to i in initial position only - a weakening, in an apparently weak environment.⁹

9.0 Conclusion. Again research on general universals, this time within Foley's controversial format, unearths instead "family universals". That such conclusions appear necessary even given Foley's theoretical machinery, which allows both parochial conditions on universal rule schemata and language-(family-)specific interpretations of abstract phonological elements, militates for the notion "restricted theory" defended in Miner 1978 (argument from realism with regard to linguistic data), Matthews 1972:§7.5, pp 154-6 (argument from fundamental morphological variation among languages), and Greenberg to appear (argument from diachronization of linguistic theory).

10.0 Appendix: Synchronic effects. This final section is intended mainly for readers familiar with Bloomfield 1962. There is a residue of vowels which failed to lower, which require the special treatment Bloomfield has given them in his synchronic description of Menominee. It will be useful, therefore, to link up what I have posited here to Bloomfield's analysis.

10.1 Changes in the segmental composition of words. Corresponding to 1.1.1 and 1.1.2 there is synchronic alternation between long Cua (<*Cwa·) and short Cwa (<*Cwa), and between long Cia (<*Cya·) and short Cya (<*Cya):

ohpwan 'smoking tobacco' (+//ohpwa·-n//)
 neṭu·pwan 'my smoking tobacco' (+//neṭ-o·hpwa·-n//)

kesiaham 'he paddles (it) fast' (+// kɛsy-ah-am//)
 nekɛ^εsyahan 'I paddle (it) fast' (+// nɛ-kɛsy-ah-an//)

10.2 Length alternation. Corresponding to 1.3 there are synchronic alternations in vowel length. See Miner 1978 for examples and discussion of Bloomfield's (1962) formulation and ordering. The synchronic rules are, essentially, the same as the historical changes.

10.3 Height alternation. Corresponding to 2.1.2, Menominee e^{*} raises to i^{*} when followed in the same word by a high vowel or a post-consonantal glide. This "rule inversion" has resulted in an analogous raising of o^{*} to produce a new high back vowel, u^{*}, in the same environment:

ke•ketow 'he talks' (+// ke•keti-w//)
 neki•ketim 'I talk' (+// nɛ-ke•keti-m//)
 so•pomah 'maple sugar' (+// so•pomah//)
 su•pomahkwan 'maple sugar making' (+//so•pomah-kwan//)

The synchronic raising usually does not take place if ε, ε^{*} intervene between the e^{*}, o^{*} and the following high vowel or glide, corresponding to the complication mentioned in 2.1.2:

ke•waskepi•w 'he is drunk'
 ke•wɛ•tua? 'when they go home'

10.4 Corresponding to the lowering of *e discussed in 2.2.1 and the exceptions of 5.0, synchronically e raises to e (a) when initial in the word, (b) when in initial syllable after C, except before a laryngeal, (c) when after a long syllable, except before a laryngeal or glide (cf. 6.2.3, first part):

ehka•htam 'he drinks it up' (+// ehk-ah-t-am//)
 cf. netɛ•hkahtan 'I drink it up' (+// nɛt-ɛhk-ah-t-an//)

pem•hnew 'he walks along' (+// pɛm-ohNɛ•-w//)
 cf. nepɛ•mohnem 'I walk along' (+// nɛ-pɛm-ohNɛ•-m//)

but: nɛ?new 'he kills him' (+// nɛ?N-ɛ•-w//)

ota•hpenam 'he picks it up' (+// ota•hp-ɛn-am//)
 pɛ?tenam 'he picks it up by mistake' (+// pɛ?t-ɛn-am//)

10.5 Non-lowering *e.

10.5.1 There are some *e which irregularly failed to lower in Menominee; e.g., those in *-es-, *-ete-, *eke-, *enki (see below for a detailed list). These *e of course show up as e in Menominee, but have the following properties distinguishing them from e < *i:

- a. They do not cause mutation.¹⁰ This is of course because in PA *i caused mutation while *e did not.
- b. When lengthened (say, by Second Syllable Lengthening), they show up as ε*. This also we expect, since the length changes preceded the lowerings, as we have argued. Once lengthened in Menominee, all PA *e seem to have lowered (except perhaps one; see 10.5.3 below).
- c. They pattern with ε in merging and contraction, synchronic processes which partly reflect 2.1.3 and 2.2.3 and which we will not discuss in this paper. Since both ε and these particular e are from *e, and since changes in the segmental composition of words preceded the lowerings, this is also what we would expect.

The non-lowering *e are designated synchronically in Bloomfield's description by the special morphophonemic symbol E. The examples I have found follow:¹¹

*-enki (locative)	Men. -Eh
*-eθankw 'he-us (incl)' (TA conjunct infl.)	Men. -Enah
*-eke (inverse theme sign and passivity marker in secondary derivation)	Men. -Ek
*-wen (extension of noun final *-n)	Men. -wen, with e treated synchronically as epenthetic (1962:§§3.19; 14.56, 57, 92)
*-e·lent TI final 'by thought'	Men. -ε·nEht
*-ekeθe AI abstract final	Men. -Ekεne [so in Bloomfield; should be -EkεnE?]
*me?tekw- root: 'wood'	Men. me?tEkw-
*-(eθ)ene ¹² 'I-thee' (TA independent inflec- tional aff.)	Men. -(En)Enε
*-es TI final 'by heat'	Men. -Es
*-ete· II middle reflexive final 'by heat'	Men. -Ete·

Since most of these items occur in inflection and secondary derivation, it is tempting, considering Proulx 1977, to see the non-lowering *e as having been epenthetic in PA. However, the last vowel in Men. neni·čianeh 'my little child' would according to Proulx be epenthetic in PA, but according to Bloomfield it is low. Apparently the matter requires further study, if we are to find a solution to the non-lowering *e.¹³

10.5.2 A few other *e which failed to lower behave in Menominee like those of 10.5.1, except that they lengthen to e· rather than ε*. These presumably represent *e which, when lengthened, were analogically

raised in Menominee. They are represented in Bloomfield 1962 by the special morphophonemic symbol æ. There are two examples:

*-ent 'he (passive)' (TA Men. -æht
conjunct infl.)
*-enkw- prefinal: 'sleep' Men. -æhkw-

Apparently no complete words have been reconstructed for PA showing that either of these *e failed to lower when lengthened in Menominee, but the form *seki·hkwamow* 'he wets his bed' (+// sck-æhkw-am-i-w//) shows //æ// lengthened to e· which is then raised to i· by synchronic raising; compare also *kane·h* (+// kan-æht//) 'when one escapes from him'.

10.5.3 Bloomfield 1962 also utilized a third special morphophonemic symbol æ·. These do not condition mutation but behave like e· and pattern like e· in synchronic merging. They would therefore represent PA *e· which failed to lower. The only example that reconstructs is Bloomfield's -æ·we, a variant of -e·we, A1 and I1 final which makes verbs of being from nouns. According to Bloomfield (1946:§67) these both go back to *-e·wi. Apparently *e· in *-e·wi did not lower. But analogically (?) the e· of Menominee -e·we usually causes mutation, as if it were from *i·wi. Whenever it does not, apparently, Bloomfield writes -æ·we.

10.5.4 The E, æ of Bloomfield 1962 are more or less equivalent to the æ of the Bloomfield 1939.

FOOTNOTES

1 In Foley's approach to phonology, relationships obtain not among units or features with phonetic content, but rather among abstract elements ("phonological elements") which may receive language-specific or (more commonly) language-family-specific phonetic interpretations. However those of Foley's hypotheses which refer to such things as position in the word do not receive such interpretations, but are rather phonetics-oriented from the outset: the notion "word-initial position", for example, is a concrete, rather than an abstract, notion. It is therefore these particular hypotheses that are most liable to empirical falsification, whatever one may conclude about the rest of this interesting theory.

2 Reconstructed PA forms are taken from Aubin 1975, the ultimate sources being in most cases Bloomfield 1946 and Hockett 1957; the corrections of Miner ms. are presupposed.

3 This change merely amounts to the deletion of *w, since *e· lowers to e· elsewhere (2.1.1).

4 As mentioned in Bloomfield 1924, there are a number of cases in which PA short vowels are instead retained in final position, especially in short words, in which cases Menominee adds -h: *ekwa > ekuah 'the other says so to him', etc. This -h is not to be confused with -h reflecting a reduced final cluster, e.g., in ate·h 'caribou' (<*atehkwa).

5 The length changes are most simply stated if their relative chronology is as I suggest below (except that no ordering is implied between 1.3.2 and 1.3.3). This ordering of the length changes differs from orderings implied by Bloomfield 1924, 1939, and 1962, and is ultimately due to C. Douglas Johnson 1972, who proposed it as a synchronic ordering. See Miner 1978 for a critique of this latter proposal and some possible light on Bloomfield's descriptive principles.

6 The long back vowel u· is, other than in interjections and borrowings, a derived vowel; u is, oddly enough, required for just one morpheme. Otherwise the high back vowels are not phonemic. Similarly, of the high front vowels, i can be regarded synchronically derived, but not i·. Thus it seems that the phonemic status of the Menominee high vowels is based, in Bloomfield 1962, chiefly on symmetry: by the evidence, we need /u/ and /i·/ but not /u·/ and /i/. For some discussion see Bloomfield 1962:§§1.13, 16, 24 and Miner 1975, Ch. 3, §2.

7 How to state the exact role of ε, ε· in relation to *i· > e· is not clear. We cannot say that ε, ε· conditioned lowering of *i· when *i· lowered regularly with no conditioning environment. Perhaps lowering of *i· was first conditioned by following ε, ε· (previously lowered from PA), and was later generalized except in words with following Ci, Ci·, Cw, Cy.

8 One might think that the case of *š^vi·?š^vi·pa > se·?sep 'duck' furnishes such an example, since the lowering of the second *i· could be seen as necessarily prior to the lowering of the first one. However, since the length changes (here, post-cluster shortening, 1.3.1) are prior to the lowerings, this is simply another case of *i· > e before *i· > e·.

9 Word-initial position may not have been the only weak position; historically material was lost from word-final position as well, in most of the Central languages. On the other hand there are examples of historical loss in Menominee from word-initial position: *awiyaka > weyak 'someone'; *ne·šwa·šika > suasek 'eight'; *apwi·yi > pi·h 'canoe-paddle'.

10 Reflecting the PA alternation of *θ with *š before *i, *i·, *y, Menominee changes N to s before e, e·, y.

11 Of course, once Bloomfield's special morphophonemic symbols are set up, they are often made to do extra service, so that their role in his synchronic description is wider than these examples suggest.

12 The Menominee reflex seems to suggest that Goddard's (1967) *eθe(ne)- should be *-(eθ)ene.

13 Goddard (1977:246) accounts for what I have termed "non-lowering *e" somewhat differently: "*e gives ε or e, depending on complex conditioning rules, and the resulting alternations between ε and e have in some cases been leveled to e..." This implies that all *e lowered in the proper environments, and in the morphemes in question the alternations were leveled to e. First of all it is necessary to show that there is in fact alternation in these particular morphemes. However, it seems to me there is a matter of principle involved here. For any sound change which has exceptions, and which gives rise to synchronic alternations (as in this case), one could always "explain" the exceptions by renaming them a result of leveling of the alternations. But this would be vacuous, since the same items behave exceptionally in either case; moreover the account in terms of failure to lower, in the Menominee case, has only to explain why this failure occurred only in these particular morphemes, while the account in terms of leveling of the alternations has to explain, not only this, but also the direction of leveling.

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