XIX.   LINGUISTICS

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A. MORPHOPHONEMIC CHANGE IN CROW AND HIDATSA

For the protolanguage of Crow and Hidatsa (1), the following three phonetic rules, from among others, are reconstructed. The phonetic rules of a language are ordered rules that indicate how sequences of phonemic, morphophonemic, and junctural symbols are phonetically interpreted (2).

P1.
$$\begin{Bmatrix} e \\ o \\ a \end{Bmatrix} a \longrightarrow a$$

This rule states that if a nondiffuse vowel — that is, $\underline{e}$, $\underline{o}$ or $\underline{a}$ — is immediately followed by the vowel, short $\underline{a}$, the nondiffuse vowel becomes $\underline{a}$ and the original $\underline{a}$ is lost. By this rule forms like hāthaaci, kunv́eaci, and phéaci become hāthaci, kunv́aci, and pháci.

P2.
$$\overset{+}{v} V_1 \longrightarrow \overset{\acute{u}}{V_1} ? V_1$$

This rule states that the morphophoneme $\overset{+}{\underline{v}}$ is replaced by a vowel that is accented, short, and in all other respects just like the vowel that follows it; and a glottal stop is placed between these two vowels. By this rule forms like kv́uaci, kunv́aci, and uv́ā become kú?uaci, kuná?aci, and uá?ā.

P3.   ua $\longrightarrow$ u

If a short $\underline{a}$ immediately follows the vowel $\underline{u}$, the $\underline{a}$ becomes $\underline{u}$ and the original $\underline{u}$ is lost. By this rule forms like kú?uaci, and uá?āci become kú?uci and ú?āci.

Observe the following protolanguage forms that are made up of the verb stems háthá (break), kv́u (give), kunv́e (carry), phé (eat), pv́o (blow), and uv́ā (climb), the noun stem pv́oki (feather), and the suffixes aci, which indicates that the action is like that denoted by the preceding verb stem, and ī, which indicates that the action denoted by the preceding verb stem is done repeatedly. These forms are arranged in three pairs of columns; the form of the first of each pair is in the phonemic representation — that is, the form that it has before the application of the phonetic rules — and the form of the second of each pair is its form after the application of the three phonetic rules P1, P2, and P3.

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hátha	hátha	háthaaci	háthaci	háthaī	háthaī
kv́u	kú?u	kv́uaci	kú?uci	kv́uī	kú?uī
kunv́e	kuné?e	kunv́eaci	kuná?aci	kunv́eī	kuné?eī
phé	phé	phéaci	pháci	phéī	phéī
pv́o	pó?o	pv́oaci	pá?aci	pv́oī	pó?oī
uv́ā	ú?ā	uv́āaci	ú?āci	uv́aī	ú?āī
pv́oki	pó?oki				

The forms that occur in Hidatsa can best be explained by postulating two innovations that are applied to the grammar of the protolanguage. The first of these innovations consists of the addition of a morphophonemic rule to the grammar. Morphophonemic rules precede phonetic rules in the grammar of a language and thus have the effect of changing the phonemic representation of the forms of the language; that is, the representation to which the phonetic rules apply. This added morphophonemic rule is

PH1. $o| \longrightarrow u|$

That is, morpheme-final o is replaced by u. With the addition of PH1 to the grammar of the protolanguage, a restructuring takes place; that is, the grammar of the proto-language plus the morphophonemic rule PH1 is replaced by an equivalent, but formally simpler, grammar: Equivalent in that the same sentences are generated, and simpler in that there are fewer rules. This new grammar is the same as the grammar of the protolanguage in all respects except that each morpheme in the grammar that ends with an o is replaced by another that is just like it except that it ends in u. For example, the verb stem pv́o is replaced by a verb stem pv́u. Thus, the sentences of the language do not have the forms of the stem pv́o, instead they have the forms

pv́u   pv́uaci   pv́uī

The phonetic rules P1, P2, and P3 have come into Hidatsa without any changes; but through the action of the added morphophonemic rule PH1 and the resultant restructuring there are no longer any forms of pv́o for them to apply to, whereas there are the forms of pv́u. Thus, the new sequences produced by P1, P2, and P3 are

pú?u   pú?uci   pú?uī

Note that although the protolanguage form pá?aci becomes, in some sense, Hidatsa pú?uci, it is not true that the phonetic entities of the protolanguage form become individually those of the Hidatsa form; rather, the verb stem pv́o is replaced by the verb stem pv́u, and the rules of the grammar apply to pv́u just as they do to any other verb stem of the language.

The second innovation that is applied to the grammar — that is, to the grammar that exists after the addition of PH1 and the resultant restructuring — is the addition of the

phonetic rule PH2, which follows all of the other phonetic rules of the language.

PH2. $\qquad$ $V_1 V_2 \longrightarrow V_1 ? V_2$

That is, a glottal stop is inserted between all sequences of two vowels.   Since PH2 is a phonetic rule, it applies to the sequences of phonetic entities that result from the application of the other phonetic rules of the language.   Thus, the phonetic rules of Hidatsa are those of the protolanguage plus PH2; and the results of the application of these phonetic rules are like those of the protolanguage in the first and second pairs of columns, and the third pair is now

háthaī	hátha?ī
kv́uī	kú?u?ī
kunv́eī	kuné?e?ī
phéī	phé?ī
pv́uī	pú?u?ī
uv́aī	ú?ā?ī

No restructuring takes place after the addition of PH2, for there is no equivalent but simpler grammar than that of the preceding grammar plus PH2.

The corresponding forms that occur in Crow are also explainable in terms of the grammar of the protolanguage plus several innovations.   I shall discuss just one of these innovations — the addition of the morphophonemic rule PC1 after the other morphophonemic rules of the language and before the phonetic rules.

PC1. $\qquad$ $\overset{+}{v} V_1 \longrightarrow \acute{\bar{V}}_1$

That is, the morphophoneme $\overset{+}{v}$ is removed, and the vowel following it is accented and lengthened.   With the addition of PC1 to the grammar, a restructuring takes place which consists of replacing each morpheme in the language that contains the sequence $\overset{+}{v} V_1$ with one that contains the vowel $\acute{\bar{V}}_1$ instead; and, since now the language no longer contains the morphophoneme $\overset{+}{v}$, the phonetic rule P2 can be removed.   Instead of forms of the stems kv́u, kunv́e, pv́o, uv́ā, and pv́oki, the language now contains forms of the stems kú, kuné, pó, uá, and póki; and the phonetic rules P1 and P3, which have come into Crow without any changes, apply to these forms:

kú	kú	kúaci	kúci	kúī	kúī
kuné	kuné	kunéaci	kunáci	kunéī	kunéī
pó	pó	póaci	páci	póī	póī
uá	uá	uáaci	uáci	uáī	uáī
póki	póki				

We have seen that by postulating innovations that are additions of morphophonemic rules to the grammar of the protolanguage — that is, changes that take place on the phonemic rather than on the phonetic level of the sentences of the language — we have been able to explain some of the sound correspondences of Crow and Hidatsa. In particular, we have explained why only three vowels need be reconstructed to account for the six correspondences in the following pairs, in which the first member of each pair is the Hidatsa form and the second member is the Crow form: kú?u/kū́, kú?uci/kū́ci, kuné?e/kunḗ, kuná?aci/kunā́ci, pú?u/pṓ, pú?uci/pā́ci, and pó?oki/pṓki. Note also that the description of the historical development of the forms of Hidatsa pv̇u is given in terms of regular sound change rather than sound change plus analogic change.

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References

1. G. H. Matthews, Syntactic change in Crow and Hidatsa, Quarterly Progress Report No. 58, Research Laboratory of Electronics, M.I.T., July 15, 1960, pp. 281-283.

2. M. Halle, Sound Pattern of Russian (Mouton and Company, 's-Gravenhage, 1959).