A PHONETIC ODDITY IN THAI

Eugénie J.A. Henderson

Technological advances in phonetic research in recent years have greatly increased our understanding of the production and perception of the tones of Standard Thai. From Abramson (1962) onwards there has been a stream of publications on this topic. It is noteworthy, however, that apart from the examination of the voice and aspiration distinction in initial plosives (see Lisker and Abramson's important 1964 paper on Voice Onset Time) research into the segmental elements of Thai has not availed itself of the resources of the modern phonetics laboratory to anything like the same extent.[1]

The reason for this comparative neglect is not far to seek. To linguists in general, the phonological treatment of the consonant sounds of Thai has seemed to present few problems. There has been some disagreement over the most appropriate treatment of syllable final consonants, but broad general agreement over the initials, which have in consequence not attracted much attention from laboratory phoneticians. Details of pronunciation *regarded as phonologically 'redundant' or 'irrelevant' have not* been thought worthy of serious attention. One such detail, which strikes the ear of any phonetician, is the velarisation by Standard Thai speakers of certain consonant sounds before a following close front vowel. This is often perceived as a very short **ɯ**-like on-glide to the vowel.

The phonetician Jimmy G. Harris has described this feature for initial **t**, **s**, and **f**. He describes unaspirated velarised **t** as 'the most common pronunciation syllable initially before close front vowels' (Harris 1972:13),[2] velarised **f** is described as occurring 'usually before close front vowels' (*ibid.*,17), but is also noted before other vowels as an occasional variant for initial **khw** 'in the speech of some speakers' (*ibid.*,11),[3] velarised **s** is described as the common pronunciation 'before close front vowels in emphatic speech' (*ibid.*,17).

I have discussed elsewhere (Henderson 1985:11-12) the **f ~ khw** variation in Songkhla, a Southern Thai dialect, and shall not be referring further to the velarised fricatives in this paper.

In 1976 an opportunity arose at the School of Oriental and African Studies in London to make spectrograms of utterances by five Thai students (2 male, 3 female) of words containing denti-alveolar and labial plosives before the vowel **i**, viz:

Set A:	**-pi:** 'year'	**-phi:** 'fat'	**-bi:** (name of English letter B)
Set B:	**-ti:** 'to beat'	**-thi:** 'time'	**-di:** 'good'

Some of these spectrograms are shown in Figs.1-5.

Such a brief and limited investigation cannot, of course, claim to offer a definitive account of the acoustic correlates of the perceived velarisation, but it is hoped that it may suggest the lines along which future research might be conducted.

Thai presents special problems when one seeks guidance for comparative purposes from earlier spectrographic work on initial plosives. The relevant publications in this field deal in the main with European languages, e.g. English, Swedish, French. Such languages have only a twofold plosive contrast, not a threefold one as in Thai, i.e. between voiceless aspirated versus voiced unaspirated in English and Swedish, and between voiceless and voiced unaspirated in French. Nevertheless, we may reasonably expect to find similar spectrographic markers of the place of articulation.

There is general agreement by phoneticians who have worked on the acoustic analysis of initial CV sequences in European languages that the most important acoustic cues for the perception of the place of articulation are to be found in the transitions to the second and third formants of the following vowel (hereafter F_2 and F_3) (See, e.g., Liberman, 1954). Labials may 'with a good deal of generality' (cf. Fry, 1979:139) be expected to show rising F_2 and F_3 transitions. With denti-alveolars the F_2 and F_3 transitions may be expected to show a less rapid rise or none at all ('zero' transition), depending upon the quality of the vowel. This correlation of vowel quality with the direction of the F_2 and F_3 transitions poses problems of comparison with labials before close front vowels since the denti-alveolar transitions are regularly rising in this context. In general, initial labial transitions tend to rise more rapidly than the denti-alveolars, with what Fant in writing of Swedish has called 'an emphasis on lower frequency' in the formant pattern for the whole stop plus vowel sequence (Fant 1969; repr. 1973:135).

Looking at the Thai spectrograms from the point of view of the place of articulation only, we might therefore expect rising F_2 transitions in all cases, with a relatively stronger rise in the case of the labials; and a rising F_3 transition for the labials, with a rising or zero F_3 transition at a somewhat higher frequency for the denti-alveolars. These expectations

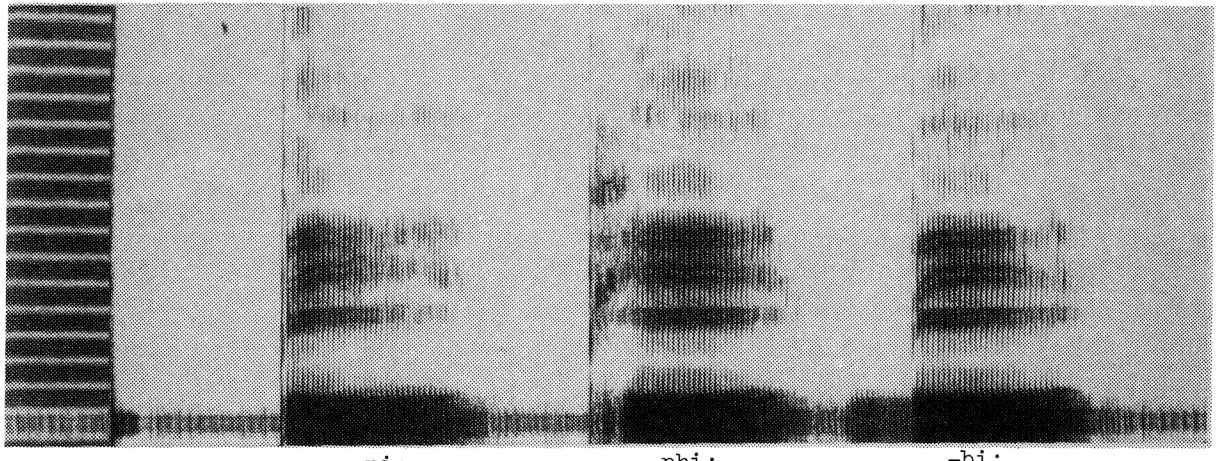

Fig.1A

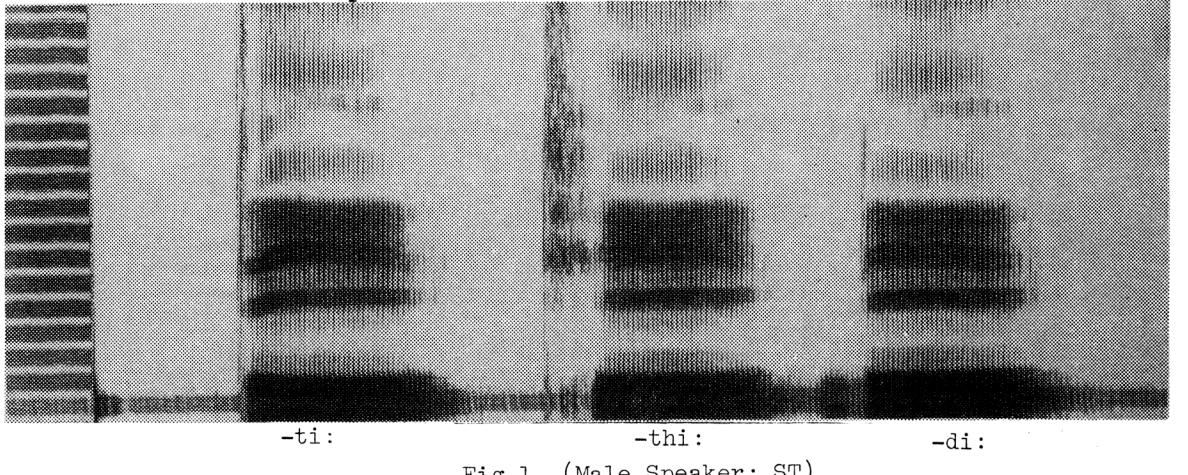

Fig.1B

Fig.1 (Male Speaker: ST)

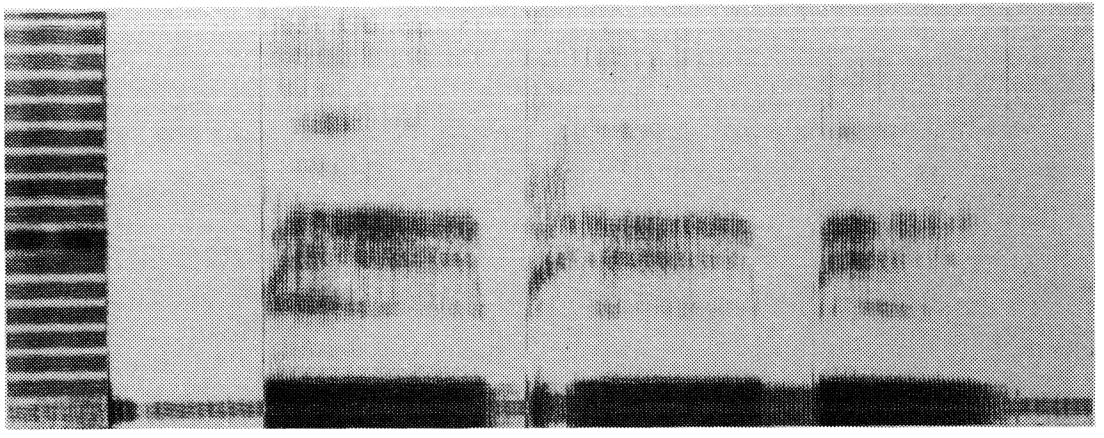

Fig.2A

-pi: -phi: -bi:

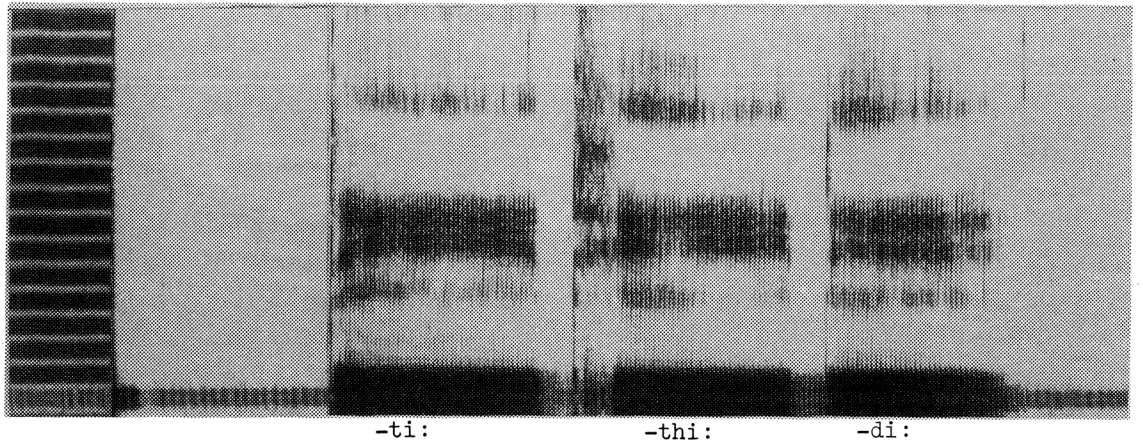

Fig.2B

-ti: -thi: -di:

Fig.2 (Male Speaker: NP)

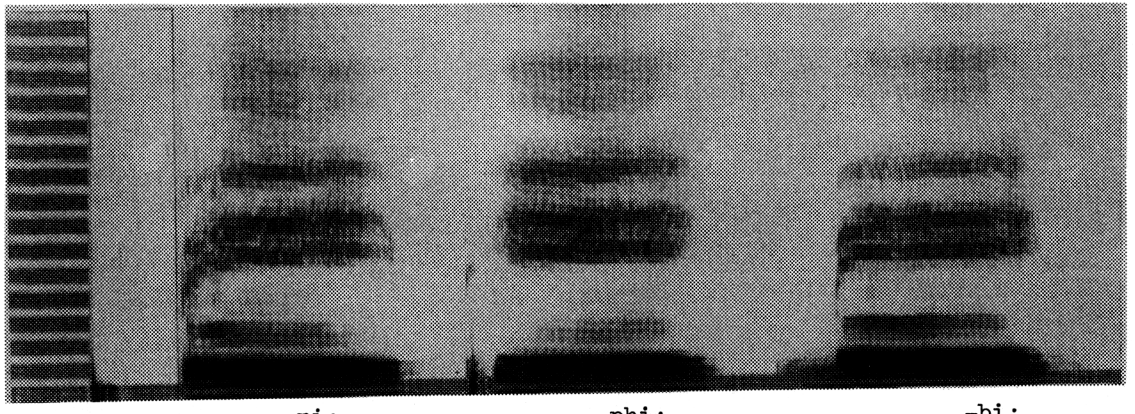

Fig.3A -pi: -phi: -bi:

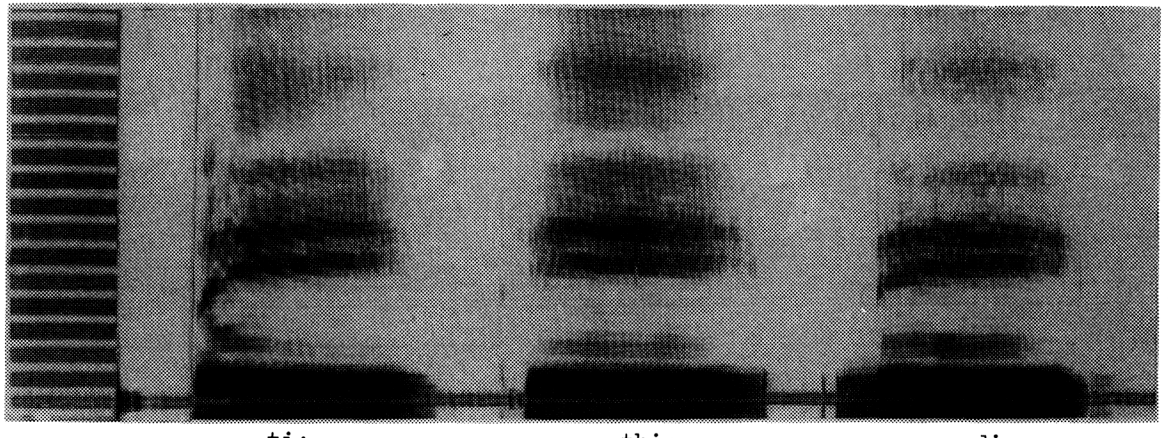

Fig.3B -ti: -thi: -di:

Fig.3 (Female Speaker: DC)

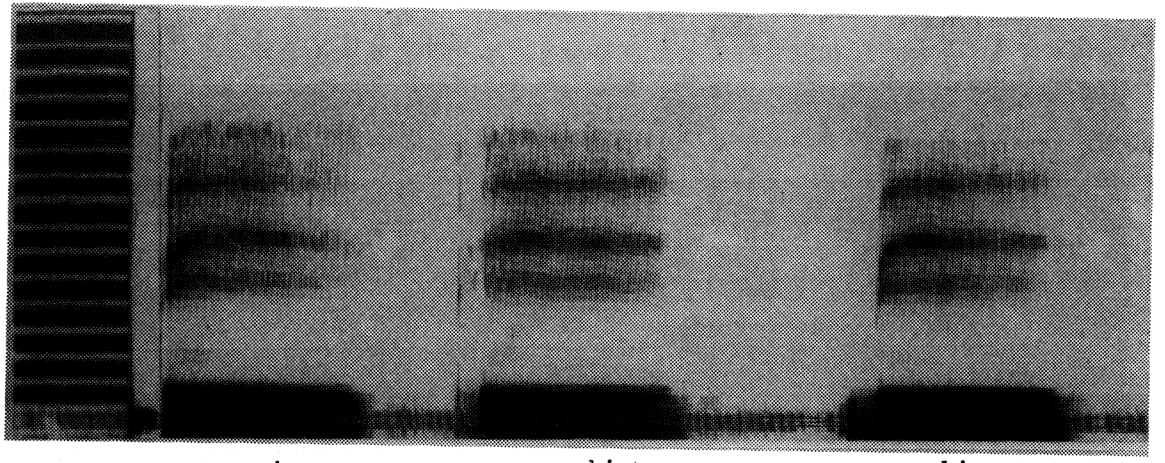

Fig.4A -pi: -phi: -bi:

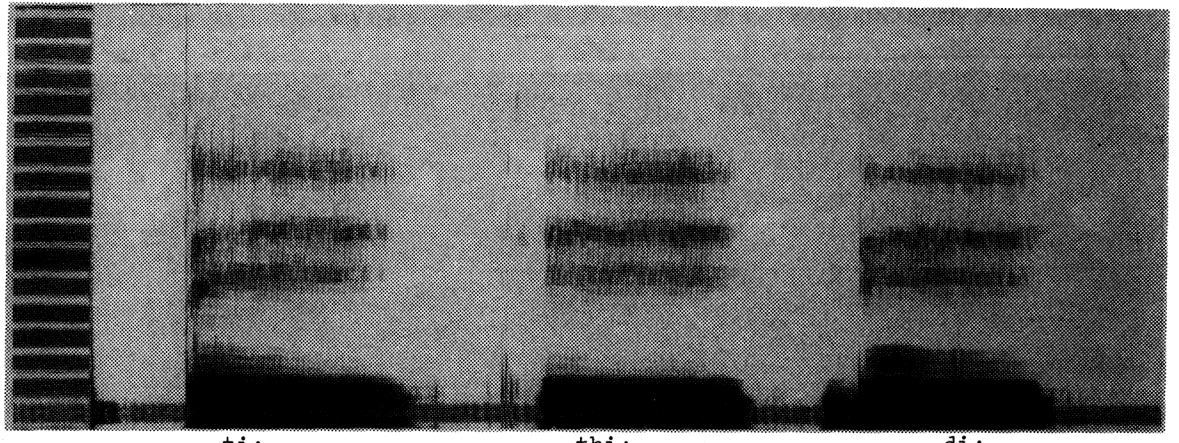

Fig.4B -ti: -thi: -di:

Fig. 4 (Female Speaker: PT)

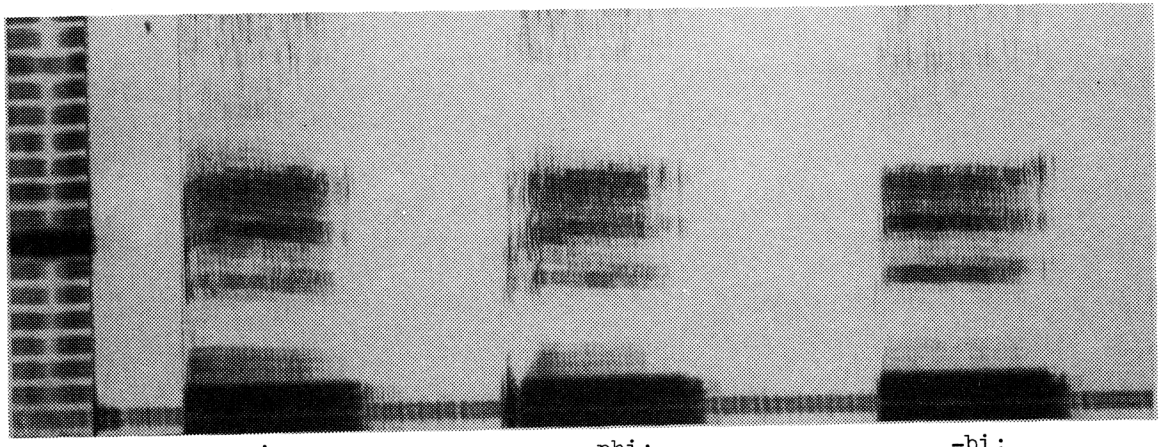

Fig.5A

-pi: -phi: -bi:

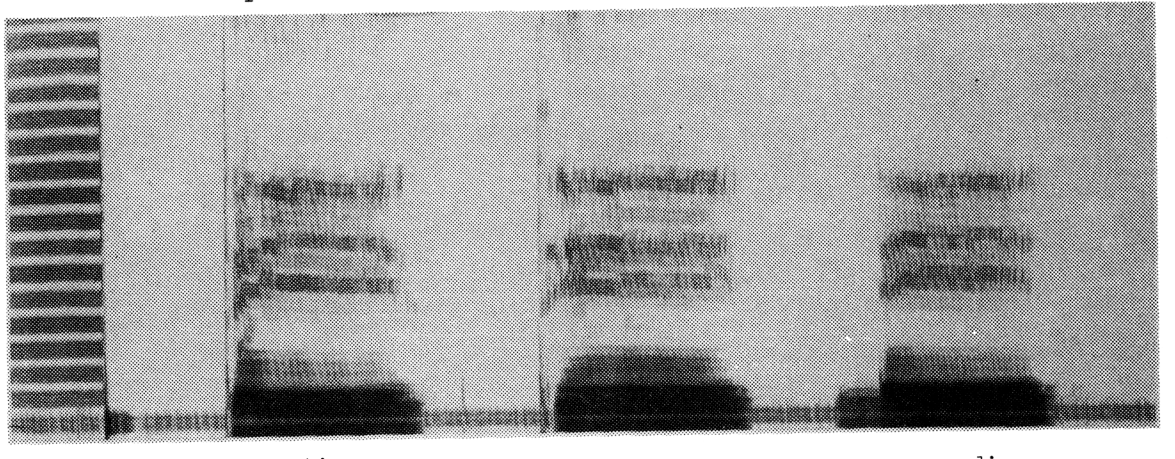

Fig.5B

-ti: -thi: -di:

Fig. 5 (Female Speaker: KU)

must, however, be modified to take account of features that may be associated with velarisation. In considering the acoustic characteristics of French vowels, Delattre (1951; repr. 1966: 230ff.) associates a lowering of F_2 with the 'tongue-backing' of **u** as compared with **y**. This accords with the research of Abramson (1962) on Thai and Nhự (1963) on Vietnamese; both have shown that the close back vowel **ɯ** in these languages regularly has a lower F_2 than the close front **i**. This relative lowering of F_2 is associated with the acoustic feature 'flatness', whose articulatory correlates may include pharyngealisation or velarisation. A further factor that we might expect to be reflected in the acoustic picture is that the velarisation quality observed for the unaspirated **t** is not perceived for the corresponding aspirated and voiced plosives.

In Fig.1 the most striking difference between the labials and the denti-alveolars appears to be in the rising F_3 for the former in all these types of plosive. F_2 and F_3 rise for **t**, but not for **th** and **d**. A similar pattern is discernible for the second male speaker in Fig.2. What is interesting in both cases is the absence of the expected rising F_2 transition in the labials. The male speakers do not bear out Delattre's expectation of strongly rising F_2 and F_3 for labials, nor Fry's that the transitions will be smaller for denti-alveolars than for labials. The picture we have is closer to that given by Fant for Swedish.

The female speaker at Fig.3 showed marked rising F_2 transitions for all labials and for **t**, with indications of a rise during the aspiration phase of **th**, and a slight rise also for **d**. Fig.5 shows quite marked rising F_2 in all three denti-alveolars, though the rise is steeper and longer for **t**. By contrast the labial F_2 transitions are not so steep.[4] Fig.4 presents a clear picture of a distinction in the transition patterns for **t** as against **th** and **d**. In all the female speakers the F_2 transition for **t** appears to start at a lower frequency than that for **p**. There is thus a suggestion here that the velarisation of the **t** may be reflected in the steepness of the rise in the F_2 transition as compared with **p**, and that the absence of such velarisation in **th** and **d** shows up in some speakers as a zero or much weaker F_2 transition.

It is emphasised, however, that before firm conclusions about the relations between the acoustic characteristics and articulatory movements could be drawn, much more work needs to be done. We would need more spectrograms of a range of different CV combinations with measurements of the frequency of the stop bursts and of formant frequencies. It would also be useful to confirm (or refute, as the case may be) radiographically that tongue movement from back to front is indeed involved in what is here perceived as 'velarisation'.

Linguists other than impassioned phoneticians may feel prompted to ask what relevance such research could have for less specialised studies of the Thai language. It is suggested that such phonetic minutiae cannot safely be ignored by, for example, dialectologists and historical linguists. Sub-phonemic features may sometimes offer 'phonetic explanations' of sound changes and correspondences. A slight variation in the timing of the tongue-tip and tongue-body movements in the pronunciation of a velarised apical consonant followed by a front vowel might give rise to a diphthong, e.g. **tɯi** instead of **ti**. An approximation of the acoustic features of labials with those of denti-alveolars, such as might arise from the 'flattening' effect of velarisation, might be expected on occasion to lead to their fusion, or indeed to their confusion. The Latin and Greek correlation **kw ~ p** as in *equus ~ hippos* 'horse' (<PIE *ekwōs) is often cited. Closer to Thai geographically, though probably not genetically connected, we find **f ~ t** cognates in some Tibeto-Burman languages, e.g. in Central Chin as contrasted with Northern Chin dialects. Compare **fa ~ ta**^{5} 'offspring, child' (cf. Sino-Tibetan **za*, Benedict 1972:27,n.86), **fa(:)r ~ tak** 'fir', **fi:m ~ ti:m** 'clear', but note **thar ~ thak** 'new'.

It is, of course, not suggested that the origin and historical development of these Chin forms have any direct connection with what has happened or is happening in Thai; the point of the example is to remind us that sound correspondences which may be difficult to account for in purely articulatory terms may nevertheless be entirely plausible when viewed in acoustic or perceptual terms.

NOTES

1. Since this paper was written, Professor Jørgen Rischel has drawn my attention to an earlier paper which mentions the 'velarized quality' of **i**: after both **t** and **p** (Egerod 1961: esp. 65, 75), and to two more recent investigations of the same phenomenon by Gandour and Maddieson (1976) and by Rischel and Thavisak (1984).

2. Unaspirated voiceless stops are also noted as being 'glottalised', i.e. pronounced with 'simultaneous oral and glottal closure'.

3. This pronunciation is, according to Harris (1972:11), regarded as 'low class' by most educated Siamese speakers.

4. In Fig.5A, the spectrogram of **-bi**: does not show the expected voice-bar for the initial stop. It is assumed that this was probably a chance rather than a characteristic

utterance for this speaker, since in Fig.5B we have a clear voice-bar for the **d**.

5. Tone marks are omitted, since tone may vary from dialect to dialect.

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