

FALLING WORD TONES IN SERBO-CROATIAN

Per Jacobsen

In an earlier paper (ARIPUC No. 2/1967) I examined the Serbo-Croatian word tones. It turned out that the long falling and short falling word tones differ markedly in the tone contour of the accented syllable. The long falling word tone (^) has a marked rising-falling tone with a difference of up to one octave between the peak, which is in the first third of the vowel (syllable), and the final tone level of the vowel. The short falling tone ("), on the other hand, is not characterized by any particular tone movement but may be slightly rising, slightly falling, or slightly rising-falling with a peak in the middle or in the second half of the vowel (syllable). In polysyllables with " the tone level of the second syllable (^ as well as " can occur only on the first syllable) is lower than the final tone of the first syllable. Moreover, the second syllable of polysyllables with ^ or " has less intensity than the first syllable.

The falling word tones ^ and " are opposed to short and long rising word tones, which are characterized by higher tone and more intensity on the syllable after the ictus than on the ictus syllable.

The present paper deals with the two falling word tones, the purpose being to examine whether these differ first and foremost in length, or whether the very different tone contours are in themselves sufficient to establish a distinction between the tones.

The best way to answer this question would be to produce minimal word pairs by means of speech synthesis, the parameter of tone being kept constant whilst the parameter of duration was varied, and vice versa. Since this was not

possible, I had a native Serbo-Croatian, Mira Adum, M.A., who teaches Serbo-Croatian at the University of Copenhagen, speak some minimal pairs of words:

- a) kìm [kìm] 'caraway'
- b) kîm [kì:m], instr. sing. of ko 'who'
- c) dùga ['dùga] , nom. sing. fem. 'long'
- d) dûga ['dù:ga] , gen. sing. 'debt'

These words were recorded on tape, using the sound treated room of the Institute of Phonetics. They were spoken in two ways: in normal pronunciation (examples of set I) and with deviating duration, the words with a short falling tone (kìm, dùga) being drawn out while the tone in the accented syllable was kept as constant as possible (level tone contour), whereas the words with a long falling tone (kîm, dûga) were spoken with a shorter duration but with preservation of the characteristic rising-falling tone contour (see Fig. 1 - 4).

Among a great number of "pseudo-synthetic" words produced in this way I chose a set of examples (II) in which the words of each contrasting pair (kìm-kîm and dùga-dûga) had physically equally long (accented) vowels but exhibited a difference of the kind described above between short falling and long falling tone contour. Similarly, I chose a set of examples (III) in which the vowels with rising-falling tone contour (characteristic of \wedge), had the same physical duration as the vowels in the corresponding words with \smile in normal pronunciation, and in which the vowels with a level tone contour had the same physical duration as vowels in the corresponding words with \wedge in normal pronunciation (i.e., the examples of III were selected in such a way that the durations were opposite to what would be expected). The tone movements and durations measured in these examples (Fig. 1 - 4) are given in Tables 1 and 2 below.

The examples were recorded on tape in a quasi-random order and played back to a number of native speakers, who

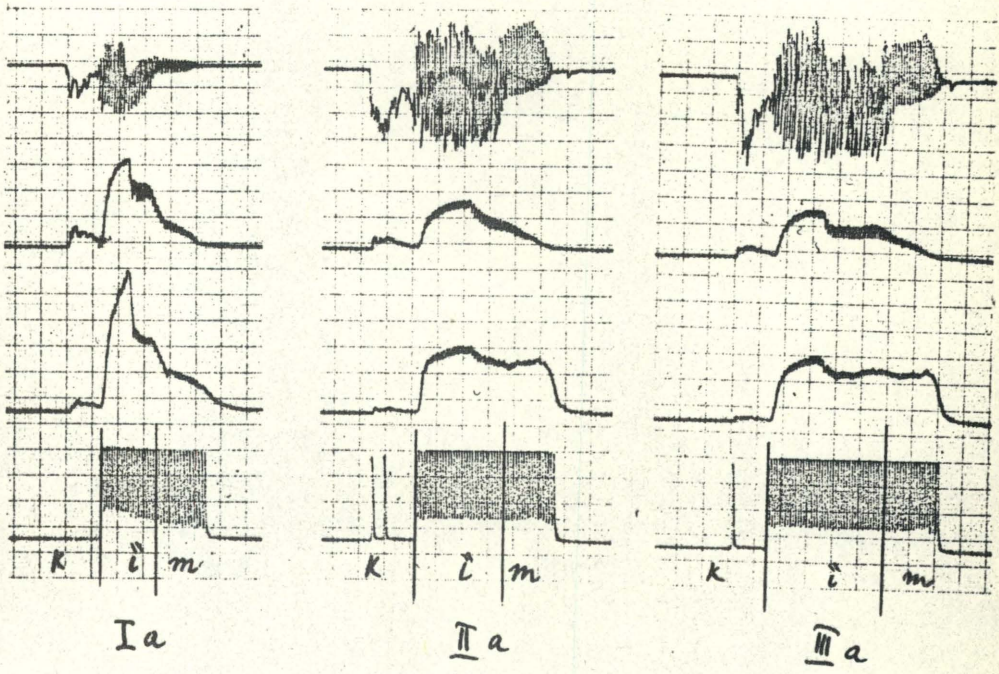


Fig. 1

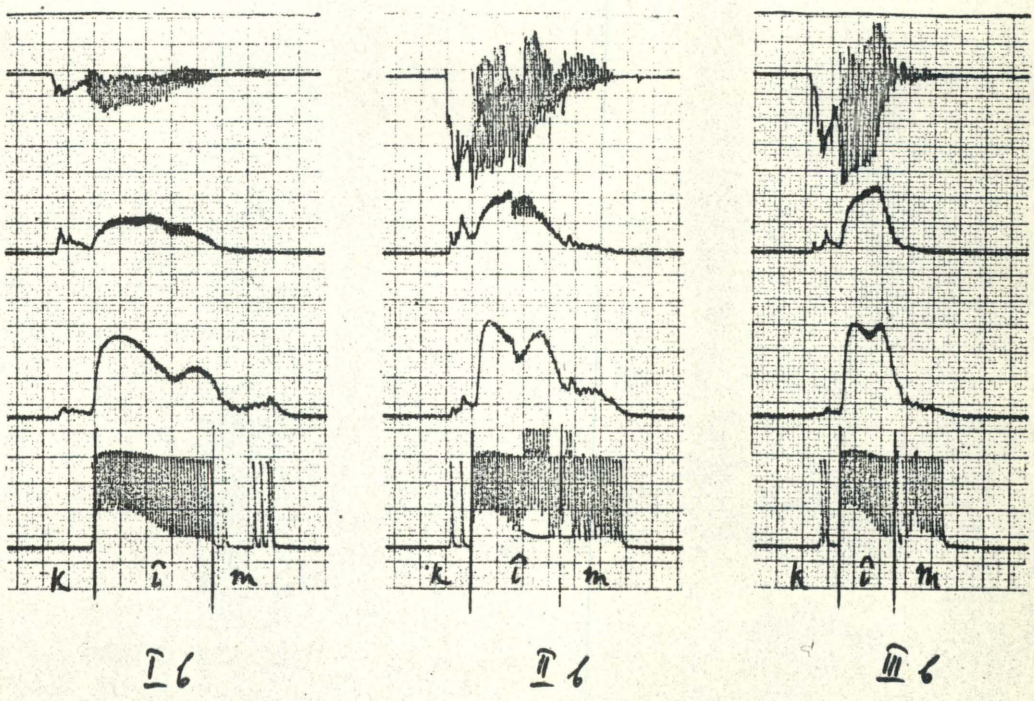
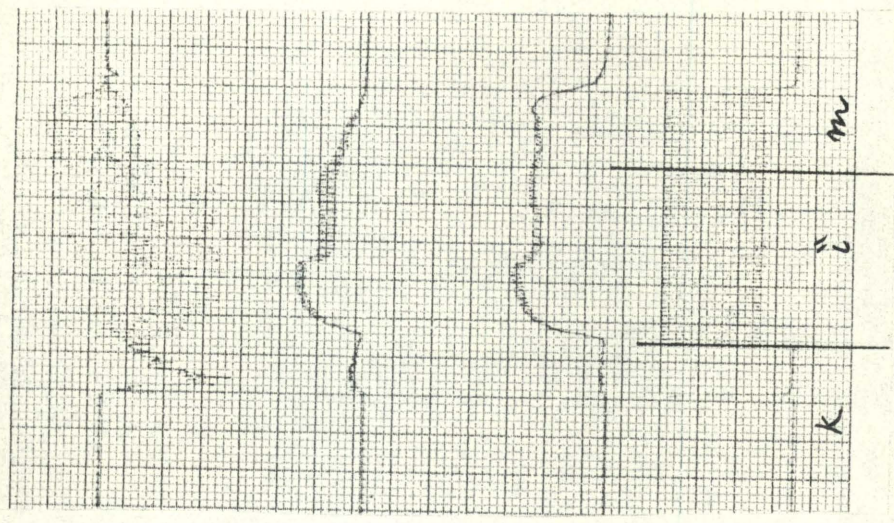
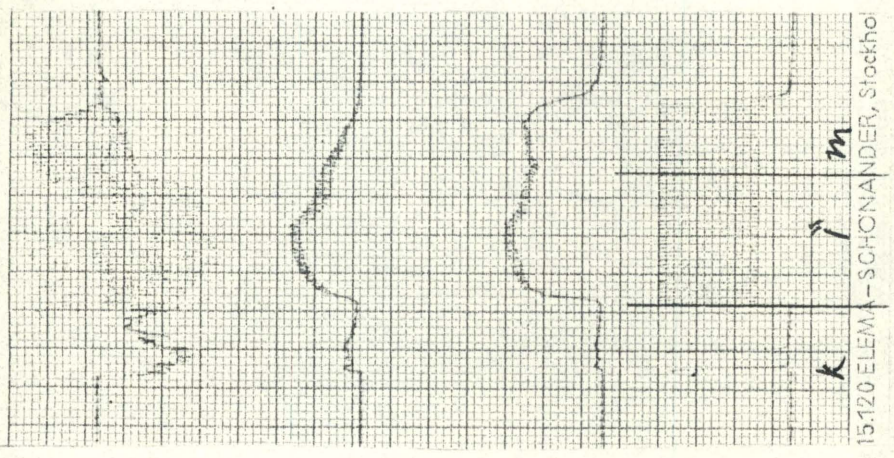


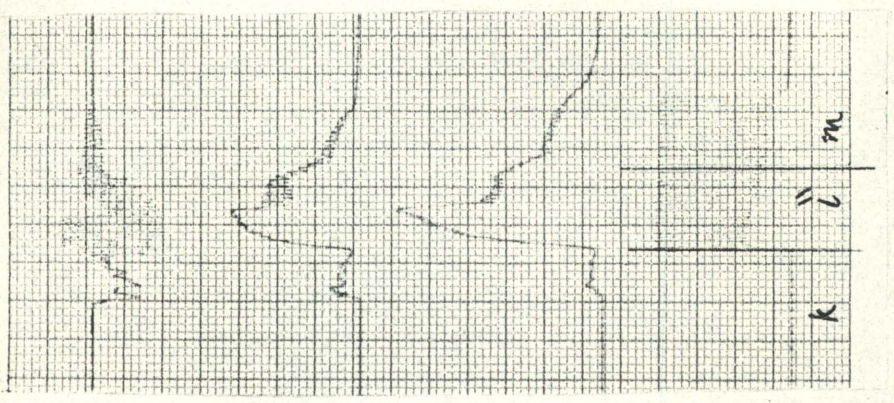
Fig. 2



Ia



IIa



IIIa

Fig. 1

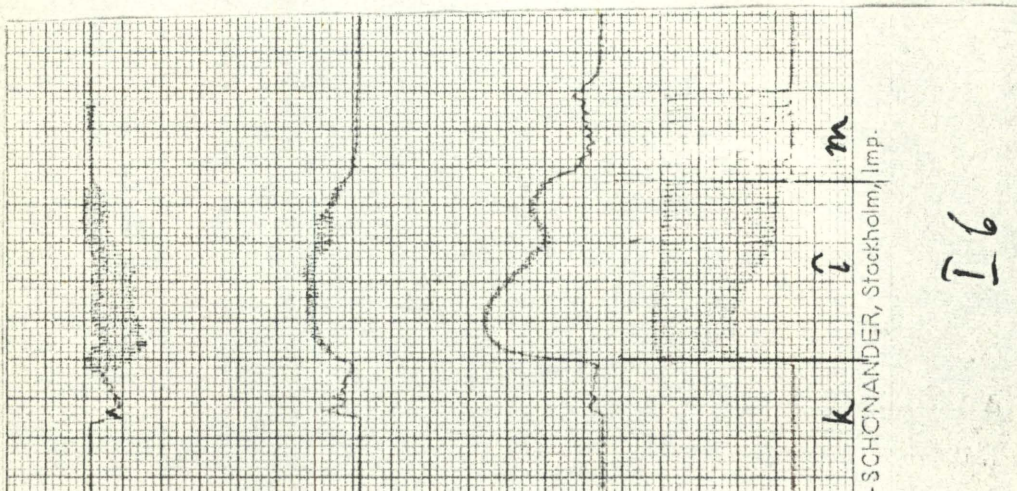
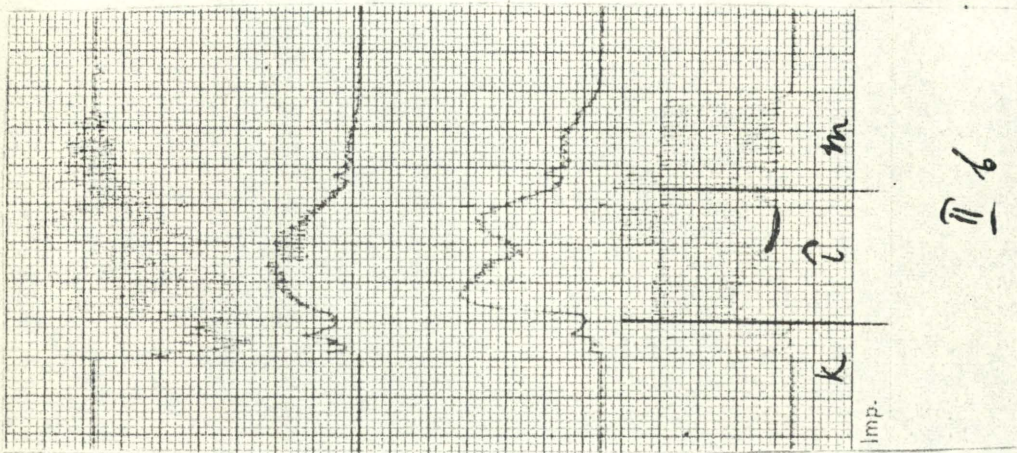
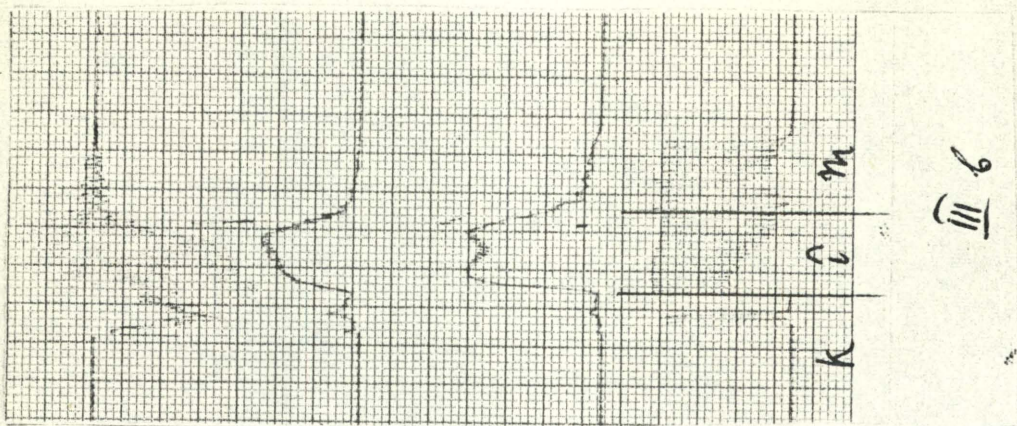


Fig. 2

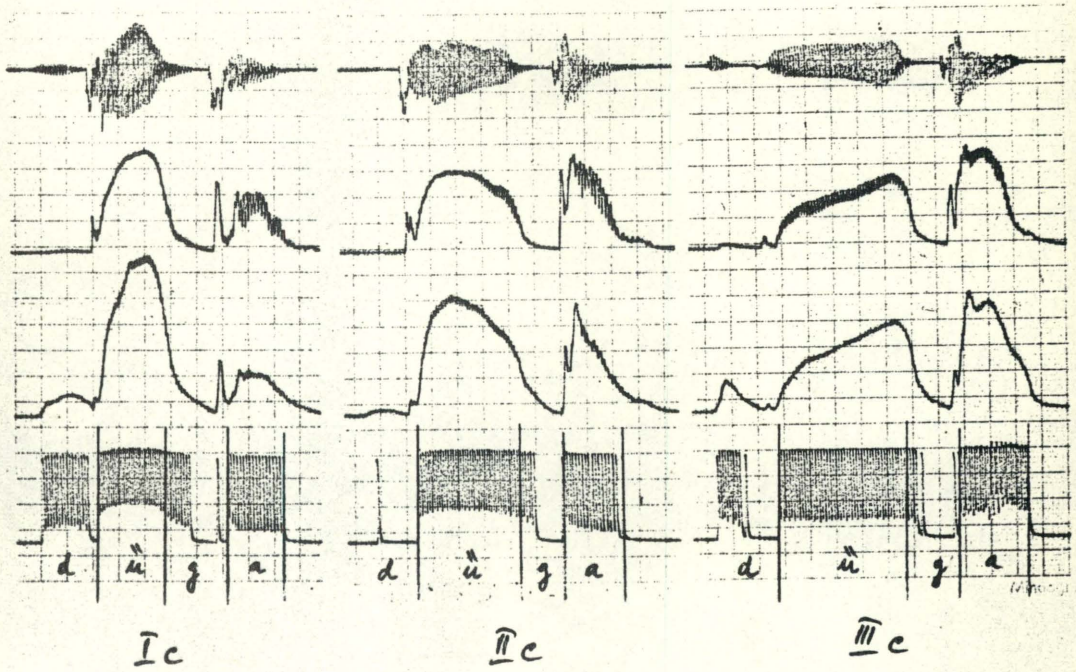


Fig. 3

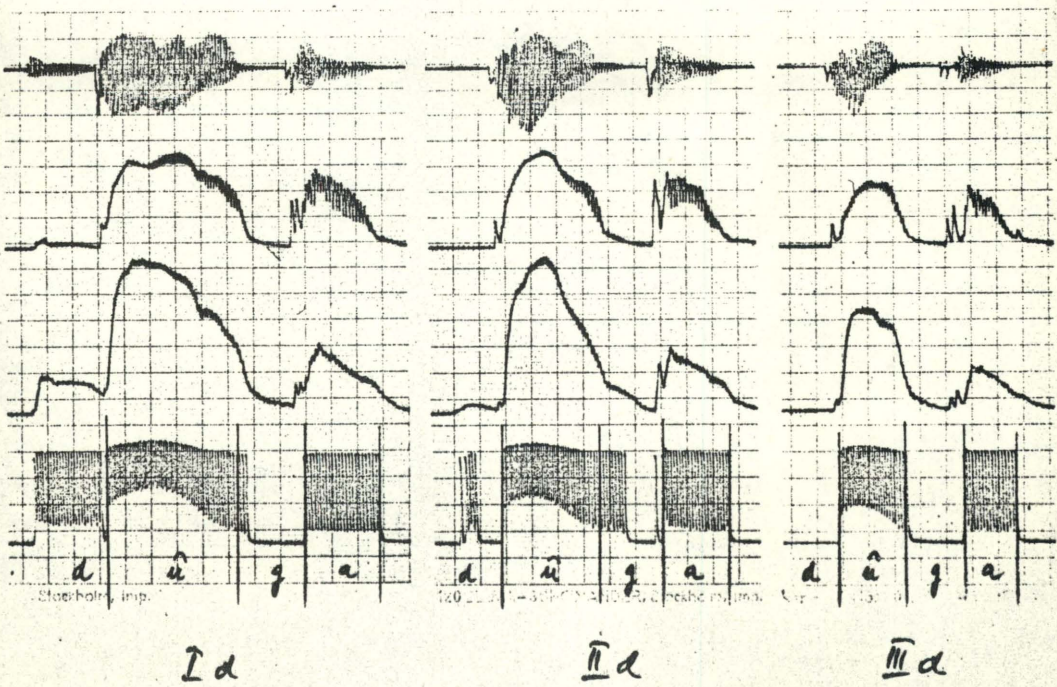
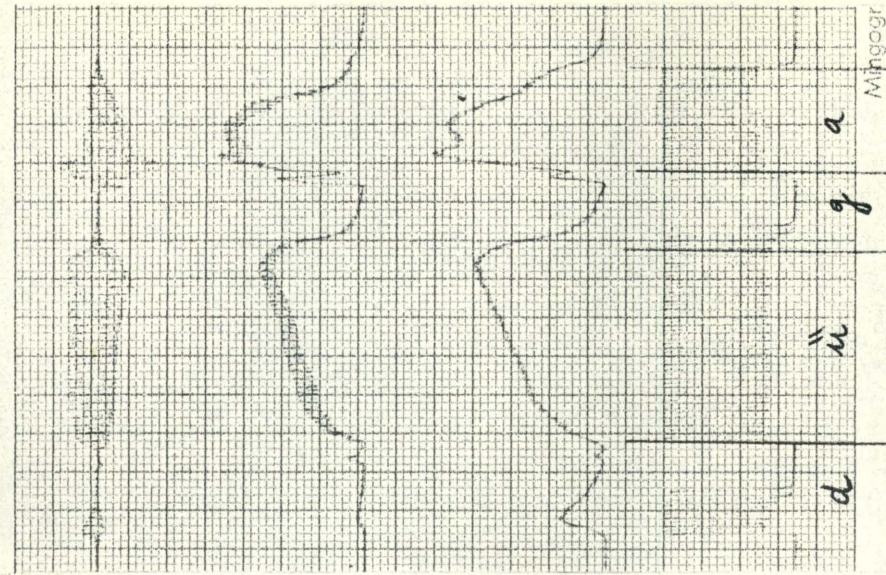
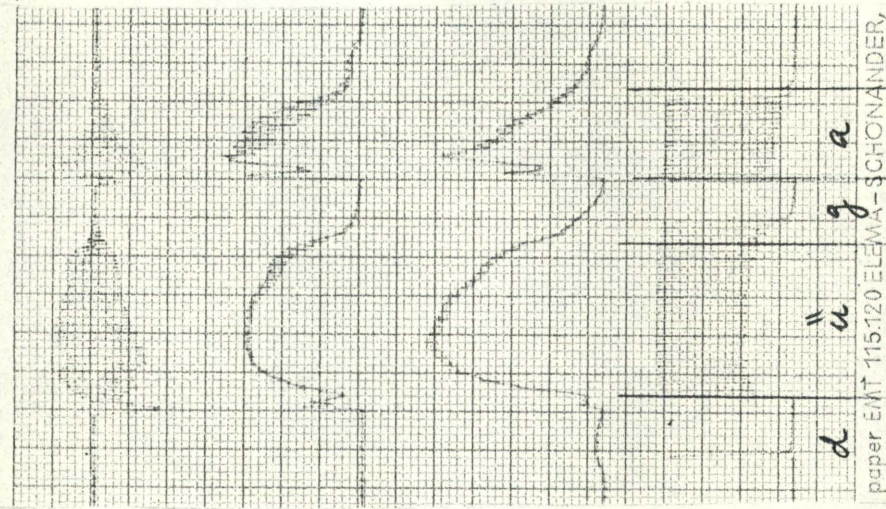


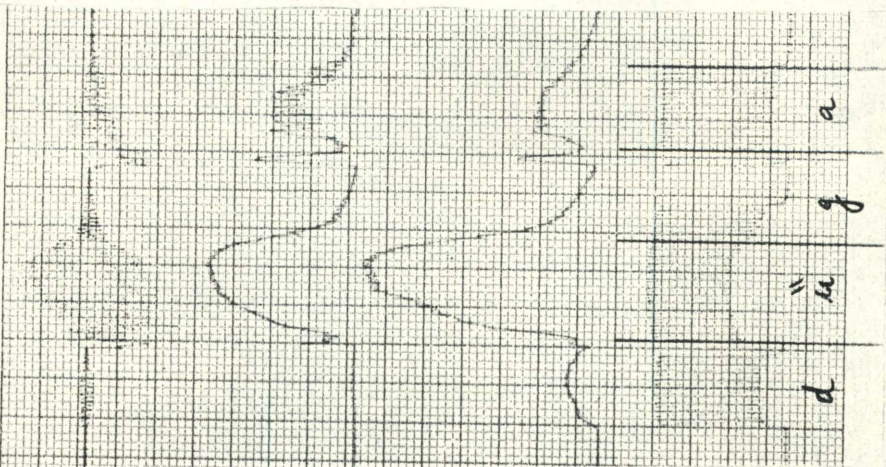
Fig. 4



IIIc

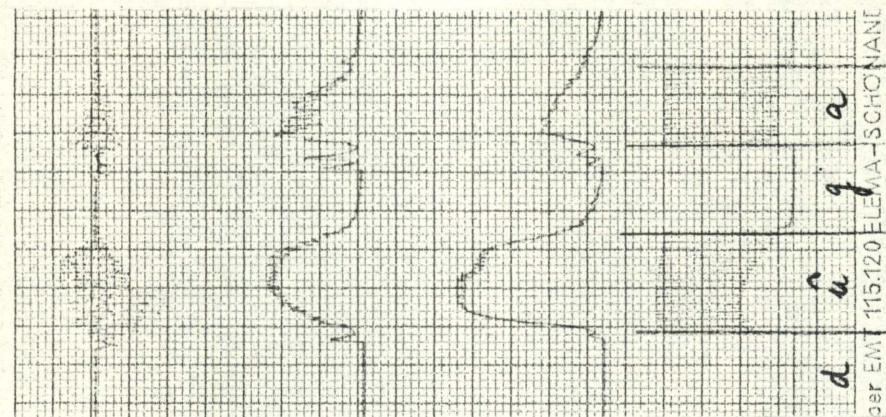


IIc

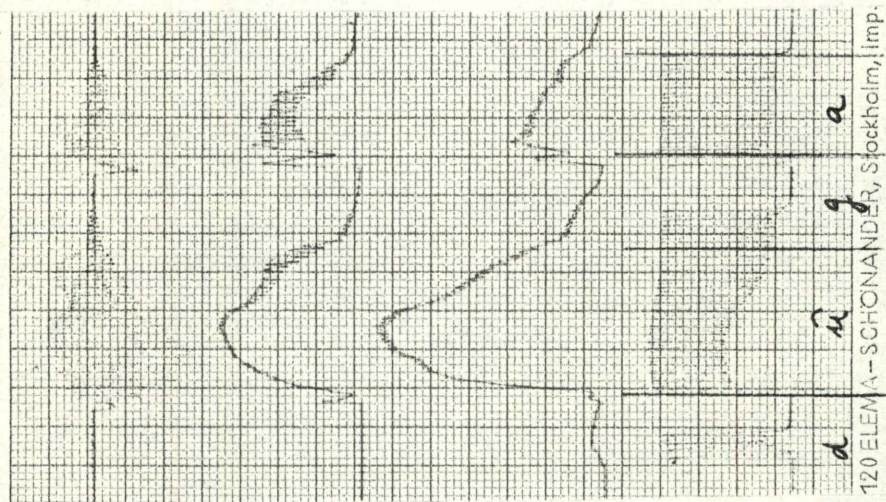


Ic

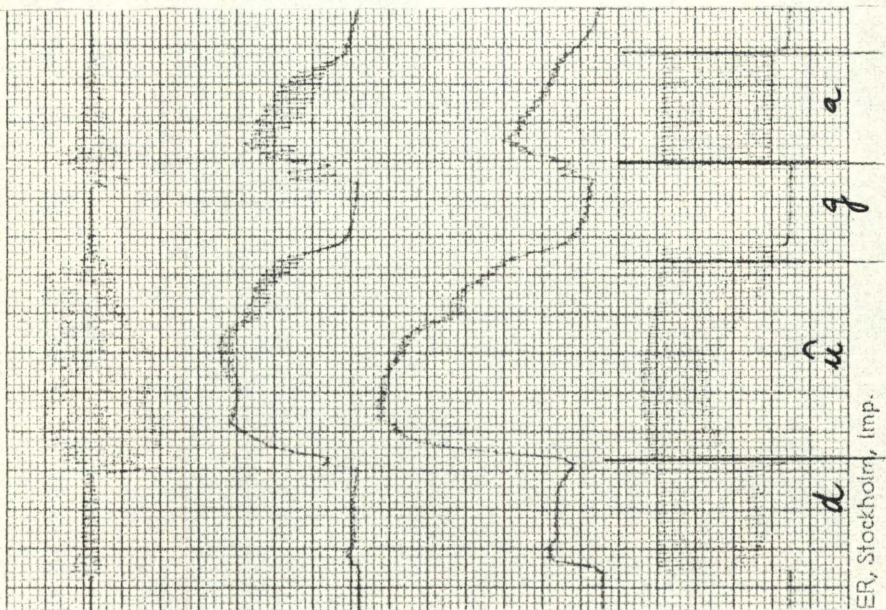
Fig. 3



III d



I d



I d

Fig. 4

TABLE 1.

TONE MOVEMENT IN CPS

		1st syllable				2nd syllable	
		beg.	peak	end	peak in per cent	beg.	end
<u>a</u>	kim I	200		180			
	kim II	190		190			
	kim III	190		190			
<u>b</u>	kim I	200	225	140	20		
	kim II	190	225	140	17		
	kim III	225	238	140	20		
<u>c</u>	duga I	200	225	200	50	180	140
	duga II	190	213	190	50	170	140
	duga III	180		180		180	200
<u>d</u>	duga I	225	263	160	33	160	160
	duga II	225	250	160	33	160	160
	duga III	200	225	140	33	160	140

TABLE 2.

DURATIONS IN CS

		1st syllable	2nd syllable
<u>a</u>	kim I	11	
	kim II	17	
	kim III	23	
<u>b</u>	kim I	23	
	kim II	17	
	kim III	11	
<u>c</u>	duga I	13	11
	duga II	20	12
	duga III	25	13
<u>d</u>	duga I	25	14
	duga II	19	13
	duga III	13	10

were to decide on the meaning of each test item. They were requested to place each word presented to them in one of 5 sentence contexts, which clearly defined the meaning of the word. It was also permitted to answer: 'I don't know'.

As for kìm-kîm there is no third way of interpreting these two words, but in the case of dùga-dûga there is a third possibility: dúga ['dúg:a] 'rainbow'.

All listeners distinguished clearly between Ia and Ib, but there was much uncertainty about IIa and IIb. Thirty per cent of the listeners thought that IIa meant kìm, sixty per cent thought it meant kîm, and ten per cent answered: 'Don't know'. Forty per cent thought that IIb meant kìm, forty per cent thought it meant kîm, and twenty per cent answered: 'Don't know'. Ten per cent thought that IIIa meant kìm, and ninety per cent thought it meant kîm. All listeners thought that IIIb meant kìm.

In the case of the examples duga there were four possibilities: dùga, dûga, dúga, and 'Don't know'.

All listeners distinguished between dùga and dûga (Ic-Id). Thirty per cent thought IIc meant dùga, whereas seventy per cent thought it meant dúga. Twenty per cent thought that IId meant dùga, sixty per cent thought it meant dûga, and twenty per cent answered 'Don't know'. All listeners thought that IIIc meant dúga. Ninety per cent thought that IIId meant dùga, whereas ten per cent thought it meant dûga.

The conclusion to be drawn from these data must be that duration and not tone movement is the distinctive feature of the falling word tones in Serbo-Croatian. This conclusion is clearly substantiated by the uncertainty in the identification of the examples of the second set, and by the universal agreement in the identification of the examples of the third set.

Admittedly, the intensity contours of the examples in IIc and IIIc differ from those of Ic. With the material

available and with the somewhat primitive method used here it has not been possible to eliminate this difference of intensity, which may have influenced the result. However, this difference affects mainly the relationship between falling and rising word tones; it is not so relevant to the relationship between short and long falling word tones. Experiments with synthetic speech will, of course, make it possible to arrive at a definitive conclusion on this point, and also to check the results of the present investigation.