

# **Similarities and Dissimilarities between the Phonemic Inventories of RP and Cameroon English: An Analysis at the Interface between Phonetics and Phonology**

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## ***Abstract***

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*The paper aims to show that although the inventory of vocalic phonemes in the English variety spoken in Cameroon differs quite a lot from that of the so-called “Received Pronunciation” (hereinafter referred to as RP), whereas the consonantal phonemes of Cameroon English do not differ markedly from that of RP. There is some variation though at the subphonemical level which makes Cameroon English distinct. This work is meant to be an analysis at the interface between phonetics and phonology, using Praat software.*

## ***Keywords***

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*fricatives, formants, stops, liquids, acoustic.*

## **1. Introduction**

Situated in one of the most complex multilingual areas in Africa, thus being one of the most multilingual nations in the world [9], Cameroon is affected by and displays the effects of diverse language contacts. There are two official languages, the legacy of the colonial period, namely English and French. As for the indigenous languages, according to [1, 44], Cameroon has a “confusion of tongues” which belong to three out of the four language families in Africa, i.e. the Congo-Kordofanian, the Nilo-Saharan and the Afro-Asiatic families. The only African linguistic family not attested in Cameroon is that of the Khoisan languages [1, 17]. However, nobody can specify the precise number of the indigenous languages spoken in Cameroon: most of them do not have a written form (an alphabet or any kind of formal codification), some of them are dying out as speakers willingly give up their home languages and shift to new ones (either indigenous or foreign) in the pursuit of their economic and social welfare, but more importantly, because one cannot differentiate between a dialect and a language<sup>1</sup>.

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<sup>1</sup> Cameroonian indigenous languages do not have the word ‘dialect’ in their lexicon [2, 71].

In [2, 71], the available figures range between 90 and 285 languages, but a fair number to be assumed as plausible, according to most researchers, is somewhere around 248. A prominent place among the languages spoken in Cameroon is held by Cameroon Pidgin English<sup>2</sup>, which is widely used as a means of interethnic communication in the Anglophone part of Cameroon [11, 6]. Not surprisingly, Cameroon English (henceforth CamE) is one of the most studied non-native varieties in Africa. However, no phonetic analyses have been carried out in order to confirm or disconfirm the findings or features that researchers list for this variety.

It is noteworthy to mention that I will include here and discuss mostly the sounds which display dissimilarities and a case in which the behaviour of the two varieties is similar. The speech samples used for the spectral analyses are either from International Dialects of English Archive (IDEA) or from Speech Accent Archive (SAA). In processing the sound files I have used the Praat software [3]. For contrastive spectral analyses either male or female samples are used simultaneously for reasons having to do with formant settings, i.e. for females samples formants are set at 5500 Hz, while for male samples formants are set at 5000 Hz<sup>3</sup>.

The purpose of this paper will be, therefore, to bring some phonetic evidence in support of the phonological assumptions made regarding CamE, and, at the same time, to highlight the similarities and dissimilarities between the CamE and RP phonemic inventories by interpreting the spectral behaviour of the sounds at issue.

## **2. The analysis**

### **2.1 Vowels**

I will adopt here as a model of comparison for the vocalic inventory the standard lexical sets of J. C. Wells from *Accents of English*. The author [16, 127 - 165] classifies words of the English language into the 24 lexical sets on the basis of the pronunciation of the vowel of their stressed syllable.

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<sup>2</sup> Also known as Kamtok.

<sup>3</sup> As per user manual instructions on formant settings for Praat software [3].

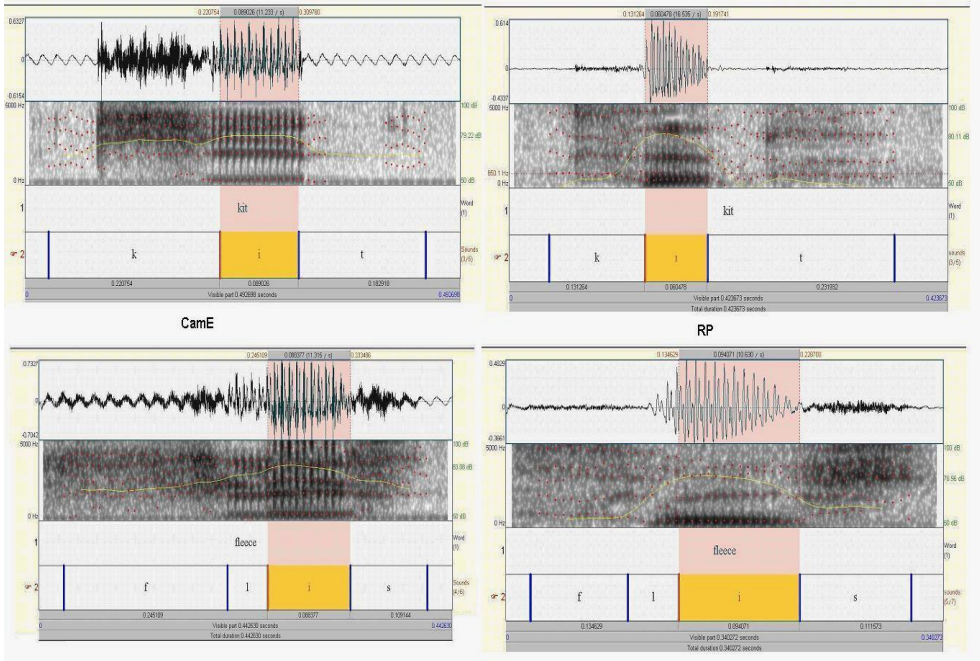
2.1.1 KIT and FLEECE

The KIT and FLEECE vowels have merged into a single vocalic element in CamE, i.e. /i/, leading to the emergence of homophones<sup>4</sup>, as illustrated by the examples below.

|     |                      |                |                        |
|-----|----------------------|----------------|------------------------|
| (1) | <b>Word</b>          | <b>RP</b>      | <b>CamE</b>            |
|     | a. <i>hit / heat</i> | [hɪt] / [hi:t] | [hit]                  |
|     | c. <i>sit / seat</i> | [sɪt] / [si:t] | [sit] [2, 84; 13, 143] |

An acoustical analysis shows that the FLEECE vowel is relatively shorter as duration in CamE than its RP counterpart (see figure 1), but it retains the feature [+tense] of the long vowels. Compare the samples in the figure below for a contrastive spectral analysis:

Figure 1: KIT and FLEECE in CamE vs. RP  
(Cameroon1 vs. England 33, IDEA)

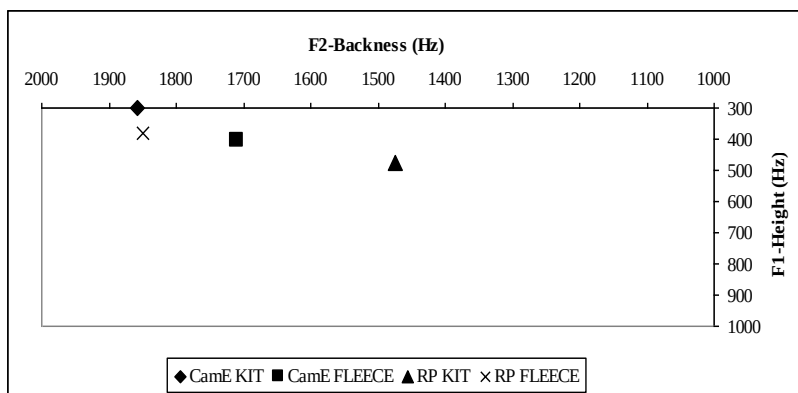


<sup>4</sup> See [10].

The data in the spectrograms on the left-hand side of figure 1 show that the KIT vowel and the FLEECE vowel are more or less equal in length in CamE, i.e. the former has approximately 89 ms, while the latter has more or less 88 ms. The formants of the two vowels have the following mean values: for the KIT vowel the mean F1 value is around 301 Hz, while its F2 mean value is around 1858 Hz; for the FLEECE vowel the mean value of F1 is 406 Hz, and the mean value of F2 is 1709 Hz. In the spectrograms on the right-hand side, where the RP samples are displayed, the KIT vowel the duration is around 60 ms, while the FLEECE vowel of the same subject sample (England33) has around 94 ms. The mean values of their first two formants are 474 Hz for F1 and an F2 of 1474 Hz for the former, and 382 Hz for F1, and a F2 of 1850 Hz for the latter.

Consider chart 1 below in which I have plotted the KIT and FLEECE vowels of the IDEA samples England33 and Cameroon1 for ease of comparison. The X axis is for F1<sup>5</sup>, i.e. height, which ranges between approximately 300 Hz and 1000 Hz, and the Y axis is for F2<sup>6</sup>, i.e. backness, which ranges between approximately 1000 Hz and 2000 Hz. Figure 2 shows that the RP FLEECE vowel and the CamE KIT and FLEECE vowels are quite close to each other, with a F1 around 300-400 Hz. Tense vowels are said to have lower first formants than their lax counterparts<sup>7</sup>. What I am mostly interested in this situation is to establish that the CamE KIT vowel is tense. It has the lowest F1 if we compare with the FLEECE instances. Moreover, its RP counterpart is far lower in the spectrum because of its higher F1.

**Figure 2: KIT and FLEECE in CamE and RP**



<sup>5</sup> Some researchers give it values below 300 Hz [15], and its upper limit can also vary between 1000 Hz and 1500 Hz depending on the researcher.

<sup>6</sup> Most phoneticians agree that it starts somewhere around 1000 Hz but its upper limit is sometimes set at 2500 Hz or even higher.

<sup>7</sup> Jos Pacilly (personal communication, January 2010).

## 2.1.2 FOOT and GOOSE

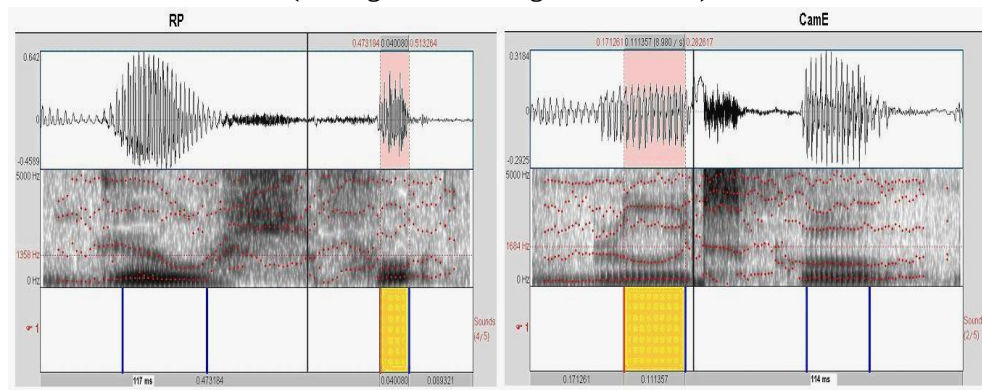
These vowels, like KIT and FLEECE, have merged into a single vocalic phoneme. They are generally rendered as [u]. The length distinction has been lost as well so that the CamE /u/ is shorter than RP /u:/, but it retains the [+tense] feature, just like in the case of /i/.

| (2) | Word               | RP             | CamE                                |
|-----|--------------------|----------------|-------------------------------------|
| a.  | <i>pool / pull</i> | [pu:l] / [pʊɪ] | [pul]                               |
| b.  | <i>put / could</i> | [pʊt] / [kʊd]  | [put] / [kut] [13, 143 and 14, 118] |

As can be seen in (2a and b), the merger of the FOOT and GOOSE vowels is conducive to homophony (see also [10]).

In figure 3, I have cut and pasted two words to represent the FOOT and GOOSE set from the speech samples of the same speaker who produced the RP sample in figure 1 (England33), and two for CamE produced by Bafang2, so as to illustrate the realizations of the FOOT and GOOSE vowels in RP and CamE. The measurements show, as expected, that the CamE FOOT and GOOSE vowels behave similarly in terms of quantity: they are close in duration (111-114 ms), and, at the same time, both are much longer than the RP FOOT vowel (40 ms), but a bit shorter than the RP GOOSE vowel (117 ms).

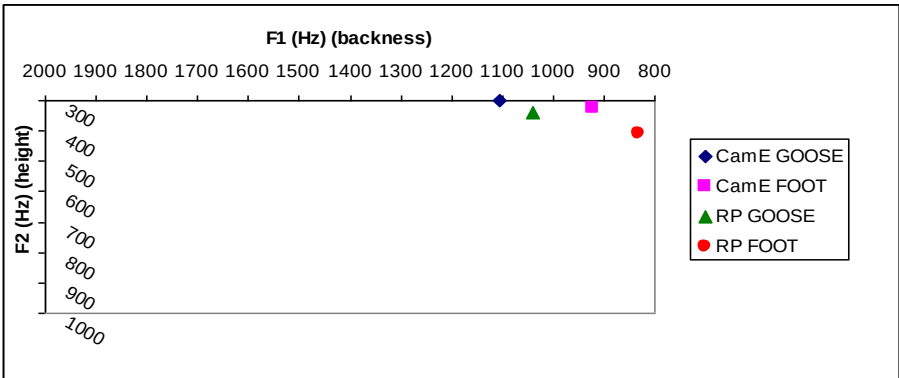
**Figure 3: FOOT and GOOSE in CamE vs. RP  
(Bafang2 SAA vs. England33, IDEA)**



The scatter plot of the first two formants in the chart below, illustrating the phonetic realizations in figure 3, shows that the CamE FOOT and GOOSE vowels have lower F1s than the RP FOOT vowel (actually even lower than the RP GOOSE

vowel). This indicates again that the vocalic phoneme into which the two have merged in CamE preserves the tenseness specification of long vowels (see the discussion in 2.1.1).

Figure 4: FOOT and GOOSE in CamE and RP



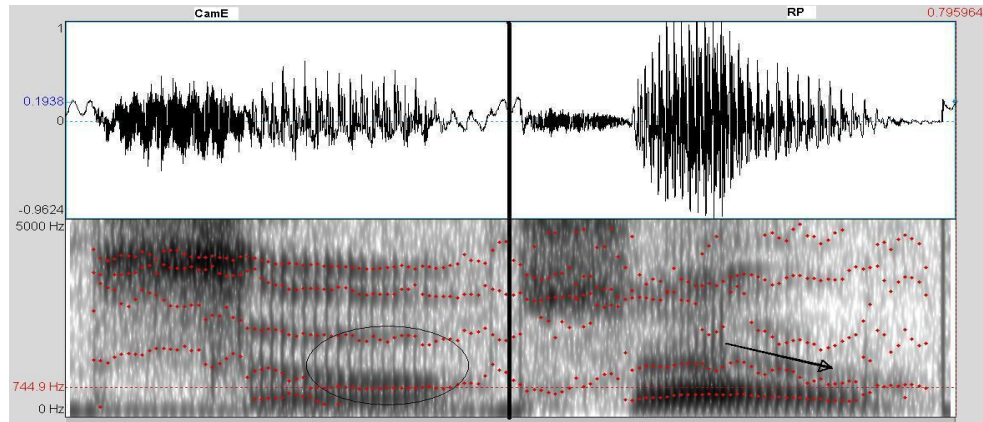
### 2.1.3 GOAT

According to Simo Bobda (13, 149, 14, 120), the GOAT vowel undergoes monophthongization and it is realized as a tense [o] in CamE in word-final position:

|     |                 |           |             |           |
|-----|-----------------|-----------|-------------|-----------|
| (3) | <b>Word</b>     | <b>RP</b> | <b>CamE</b> |           |
|     | a. <i>most</i>  | [məʊst]   | [mos(t)]    |           |
|     | b. <i>close</i> | [kləʊs]   | [klos]      |           |
|     | c. <i>go</i>    | [gəʊ]     | [go]        | [13, 149] |

Consider figure 5 below, in which I have cut and pasted the word so from the corresponding sound files in order to illustrate the monophthongization of the GOAT vowel in CamE. Why have I chosen precisely this word? Deterding [4] suggests that in analyzing clear instances of a desired sound one should avoid examples where the respective sound is preceding or following /r/, /w/, /j/, as well as following /l/, /ŋ/. These sounds usually have an influence on the neighbouring sounds or make it hard for researchers to read and interpret neighbouring sounds because they usually imply transitions of their second and third formants.

**Figure 5: so in CamE and RP  
(Cameroon1 vs. England33, IDEA)**



Reverting to figure 5, the left half of the spectrogram presents the CamE sample for which one can safely assume that we are dealing with a monophthong as the formants are steady throughout the portion following the fricative (see the elliptic shape), whereas in the RP sample on the right side the arrow clearly indicates that there is a transition of the second formant towards the end of the vocalic sound. Moreover, the formant tracks indicate that we are not dealing with the same sounds as the vowel in CamE has a higher F2 than the one in RP (throughout the glide from the initial position to the end portion of the constitutive parts of the diphthong).

## 2.2 Consonants

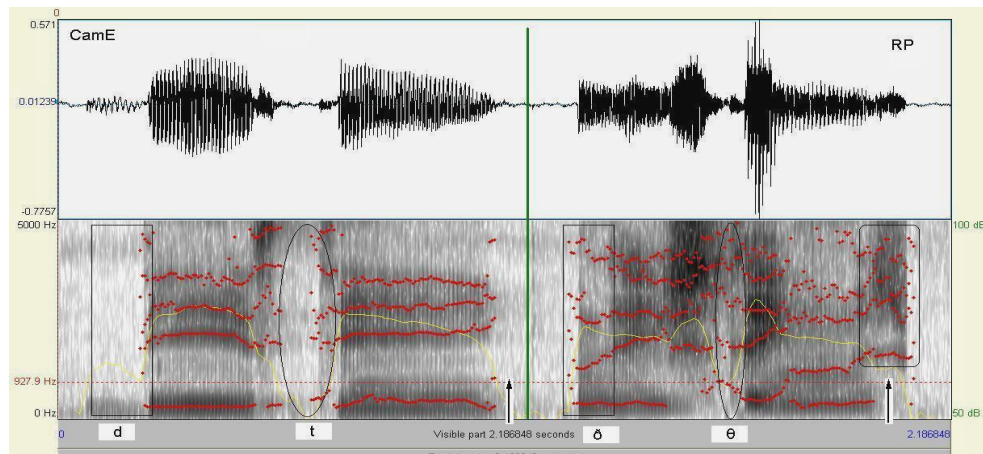
In terms of the inventory itself, CamE does not differ markedly from RP. The differences lie in the actual distribution of the consonantal phonemes.

**2.2.1** First, the dental fricatives are often phonetically realized as alveolar stops in CamE, especially in casual speech, but speakers make a sustained effort to correct this “deviation” because this kind of pronunciation is usually stigmatized [13, 155]. Although speakers make conscious efforts to render the dental fricatives, even in careful speech or in the pronunciation of speakers who have been exposed to native varieties, alveolar stops can occur instead of the dental fricatives. The examples below illustrate such pronunciations:

|                  |                   |           |                      |
|------------------|-------------------|-----------|----------------------|
| (4) <sup>8</sup> | <b>Word</b>       | <b>RP</b> | <b>CamE</b>          |
|                  | a. <i>other</i>   | [ʌðə]     | [ɔdə]                |
|                  | b. <i>this</i>    | [ðɪs]     | [dis]                |
|                  | c. <i>the</i>     | [ðə]      | [də]                 |
|                  | d. <i>atheism</i> | [eɪθiɪzm] | [eteizəm]            |
|                  | e. <i>further</i> | [fɜːðə]   | [fɔdə] [13, 403-405] |

Consider next a comparison of the same CamE and RP sequence of the SAA samples Bafang2 and English40 in figure 6. The samples compared have been cut from the corresponding sound files and they have been pasted onto the same spectrogram for a contrastive analysis. The two corresponding samples are delimited by the vertical green line on the spectrogram, with CamE represented on the left side and RP on the right side. The two left-handed rectangles indicate the voiced CamE and RP counterparts, whereas the elliptic shapes delimit their voiceless correspondents. If I take a look at the left half of the spectrogram first, I can see that the two CamE sounds are plosives or stops.

**Figure 6: *these things*  
(Bafang2 vs. English40, SAA)**



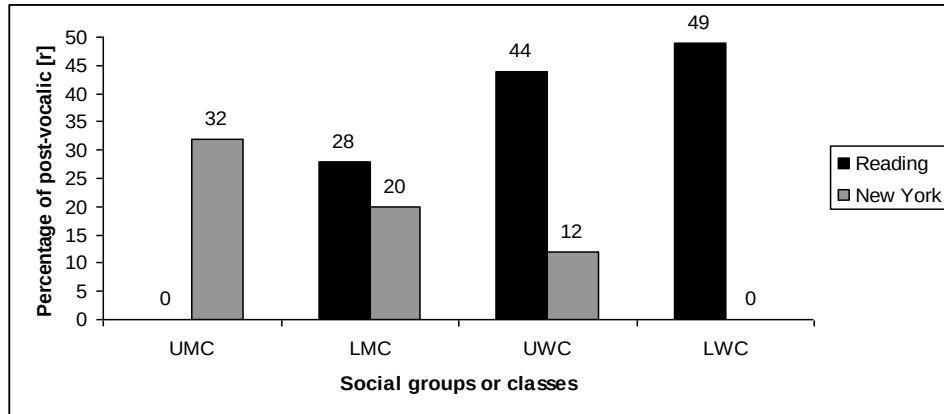
<sup>8</sup> These are all forms produced by advanced users of CamE [13, 403].

As is well known, plosives involve an explosive burst of acoustic energy following a short period of silence; because of the silence during which the vocal tract is completely blocked, these phonemes are also called stops [8, 47]. The signature of plosives is an almost instantaneous passage from little or no acoustic energy (indicated by the lack of activity on the spectra) to a short burst of high-energy in a wide frequency band. Now, the formant frequencies on the right half of the spectrogram indicate that I cannot be dealing with the same type of sounds. The corresponding sounds on the right are fricatives. The signature of fricatives is in their high-frequency regions, which are random in their energy distribution [8, p. 54]. Fricatives do not necessarily involve any voicing, although the voiced fricatives may have a low voice bar as we can see in the RP [ð]. Although it is irrelevant for the phenomenon at issue, i.e. the substitution of dental fricatives by their corresponding alveolar stops, two arrows have been used to indicate the simplification of the consonant cluster in CamE, i.e. the fricative [z], roughly delimited by the rounded-corner rectangle in RP, is missing in CamE.

**2.2.2** An important similarity between RP and CamE consists in the realization of post-vocalic [r], i.e. both are non-rhotic. A lot of sociolinguistic studies have been conducted on this variable (the absence or presence of post-vocalic [r]), for different varieties of natively spoken Englishes so as to establish which is the standard or the prestige pronunciation in the respective varieties. In other words, the behaviour of this phonological variable distinguishes between rhotic and non-rhotic accents. Labov [7] carried out such a study of New York English (NYE) in which he demonstrated the social stratification of [r] pronunciation, i.e. the higher the social class of the informants, the more they pronounced the post-vocalic [r]. Later on, comparative sociolinguistic studies between British accents and American accents were performed in order to show that the presence of post-vocalic [r] constitutes the prestige realization pattern for American dialects of English, but not for British dialects of English. Consider, for example the data [5], in which the post-vocalic [r] is used as the variable which sets apart the prestige pronunciation among social groups in Reading versus New York.

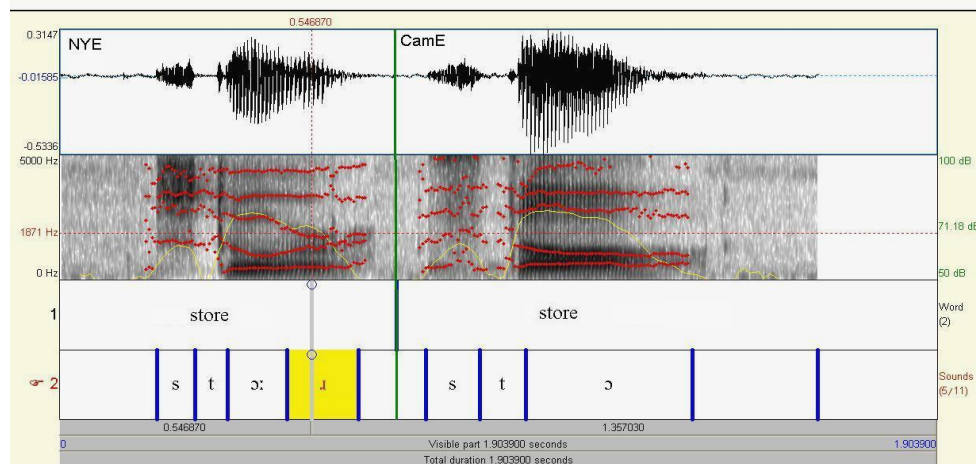
The data plotted in figure 7 reflect the difference between the realizations of the two variants of the phonological variable studied, i.e. [r] and  $\emptyset$ . The X axis reflects the social stratification in a descending order, from left to right: upper middle class (UMC), lower middle class (LMC), upper working class (UWC), and lower working class (LWC), whereas the Y axis shows the percentage of [r] pronounced by the respective social groups. The results show that in New York post-vocalic [r] is the prestige form, whereas in Reading the absence of [r] is the standard.

**Figure 7: Post-vocalic [r] in Reading and New York social groups<sup>9</sup>**



In light of the data above, I have, therefore, selected a NYE sample to compare it with the CamE corresponding sample in order to prove the non-rhoticity of the latter. Figure 8 contrasts the pronunciations of the word *store* of two male speakers, i.e. English53 (for NYE) and Bafang1 (for CamE). Like in the case of the previous acoustical analysis (figure 6), the portions rendering the word selected for the elicitation of the respective feature have been cut from the corresponding sound files and they have been pasted onto the same spectrogram for a contrastive analysis. Again, the two corresponding samples are delimited by a vertical black line on the spectrogram, NYE being represented on the left side and CamE on the right side.

**Figure 8: *store* (English53 vs. Bafang1, SAA)**

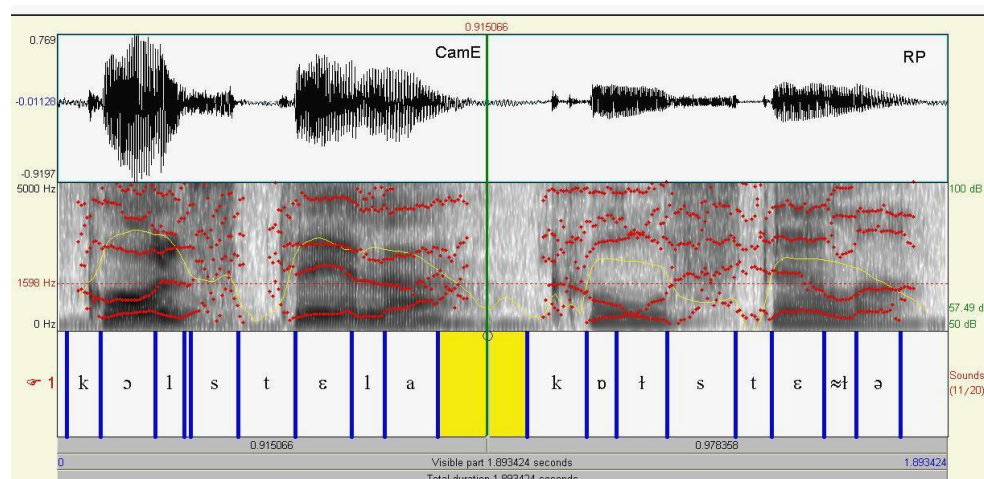


<sup>9</sup> Slightly adapted from [5, 146].

The presence of the [r] sound in NYE is characterized by the low frequency of the third formant. Ladefoged [8, 53] writes that whenever an [r] sound occurs in a word, the third formant will be below 2000 Hz. Note that the left side of the spectrogram displays a drop of the third formant below 2000 Hz towards the end of the word which indicates the presence of a rhotic approximant, whereas on the right side of the spectrogram the formants are quite stable between the stop and the end of the word, which shows that there is nothing there but a prolonged vowel.

**2.2.3** Finally, CamE differs in part from RP in the nature of the lateral liquid. The RP lateral liquid has two contextual allophones: clear [l] occurs when the following sound is a vowel or [j], while dark or velarized [ɫ] occurs when a consonant (other than [j]) or silence follow. CamE has only clear [l]. Consider next an acoustical analysis of two words containing lateral liquids from some SAA samples of two female subjects (Bamun1 and English2). The black line delimits CamE on the left-hand side of the spectrogram and RP on the right-hand side. Now, Ogden [12, 88] shows that usually “F2 during the lateral portion is just about visible at around 1600 Hz; this value is consistent with a relatively clear lateral”.

**Figure 9: call Stella (Bamun1 vs. English2, SAA)**



A dotted line was plotted in the spectrogram at about 1600 Hz to indicate how the second formants of the lateral liquids behave in one word or another. Both lateral sounds in CamE meet this line tangentially at times, the F2 of the lateral liquid in the word *call* having a mean value of 1595 Hz, while the F2 of the [l]

sound in the word *Stella* has a mean value of 1633 Hz<sup>10</sup>. These values certainly indicate that the two CamE laterals are instances of clear [l]. Conversely, Ogden [12, 88-89] argues that a velarized lateral implies a low F2, visible at about 1000 Hz. As can be seen on the right half of the spectrogram, the RP lateral in the word *call* goes much below 1600 Hz; it goes even lower than 1000 Hz; i.e. it is very close to F1 at a certain point (somewhere around 630 Hz) and its mean value is of 765 Hz, which clearly shows that it is a dark [ɫ]. Interestingly enough, even the F2 of the lateral in the word *Stella* goes much below 1600 Hz, in the RP sample. Its mean value is 1096 Hz. This can be explained by the nature of the following, word-final vowel *schwa*, which is weak and unstressed and, consequently, does not have the power to raise the F2 of the lateral so as to make it a clear [l]. So, it is not as if silence follows, but the quality of the final vowel accounts for the slight velarization of the preceding lateral.

### 3. Conclusions

The analysis offered here has shown that the phonetic findings are consistent with the phonological assumptions made on CamE so far: the vocalic length difference is leveled so that it does not have phonemic status in distinguishing between pairs which would be otherwise in complementary distribution and which end up sounding homophonous; the [+tense] feature of long vowels is preserved; the dental fricatives are replaced by alveolar stops; post-vocalic [r] is not heard in CamE; the lateral liquid phoneme occurs invariantly as clear [l] in CamE, i.e. it does not have any allophonic realizations as in RP anymore. Further investigation is still needed to see what happens inside the vocalic space in order to clear up the questionable status of the schwa vowel. Also, a more quantified study on a larger number of subjects could be indicative of the proportion of some of these features on the lectal continuum, as they are frequently treated as tendencies.

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<sup>10</sup> It is influenced by the transition from the preceding vowel [ɛ] which has a higher second formant than [ɔ].

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