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A BIT OF NEWS FROM GLASGOW: USES OF SOUND SPECTROGRAPHY IN DETERMINING THE CONTENT OF DISPUTED UTTERANCES

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1. INTRODUCTION

This paper is in the form of a report of a criminal case where sound spectrography was found to be useful in determining the content of a section of disputed utterance consisting of 0.1 sec. of speech.

2. BACKGROUND TO CASE

A Glasgwegian man, who for the purposes of this paper will be referred to as "Jimmy", was accused of burning down a warehouse with a view to claiming insurance compensation for the property and its contents. Among evidence brought by the prosecution was a message which had been left on the telephone answering machine belonging to the co-accused in the case shortly after a news item had been broadcast reporting the fire. The accused and co-accused conceded that the voice in the recording was that of Jimmy but disputed the prosecution's assertion as to the linguistic content of the call. The sound quality of the tape was sufficiently good to allow auditory and acoustic analysis to be carried out but, because of the accused's articulatory characteristics, one section remained quite unclear.

The prosecution called for an opinion from a Voice Expert who concluded that the text of the disputed phone call was as follows: (the disputed section is typed in bold)

> Hey gaffer, will you give er will you give us a ring when you come back. I just heard **about our** news on the wireless there.

The receiver of the call, the co-accused, who claimed many years' familiarity with Jimmy's speech, asserted that what he understood him to have said was:

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> Hey gaffer, will you gie er will you gie us
> a ring when you come back. I just heard
> a bit o' news on the wireless there.

The co-accused, who was also a Scot, claimed that the words about our in Jimmy's Glasgow dialect would be pronounced aboo' oor /ʌbʊʔ ʊr/ which was not how they were heard in the call. The vowel in about was auditorily half-open and centralised in quality followed by a very brief glottal stop and a further vowel of similar quality to the first one. There was no trace of an 'r' which, in Scottish English, would be predictable at the end of the word our. Fig. 1 shows a spectrogram of the disputed segments.

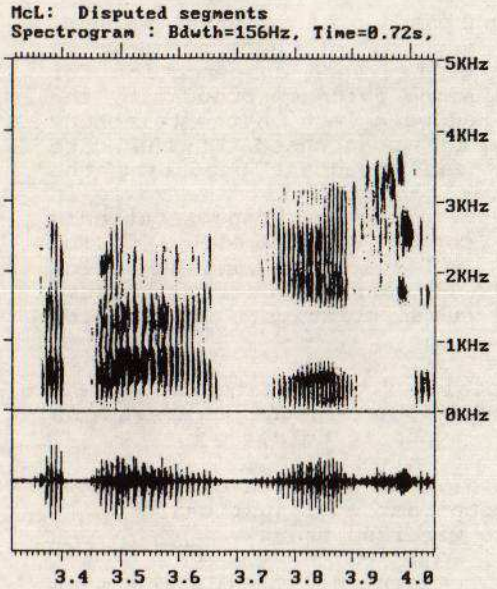

FIG. 1

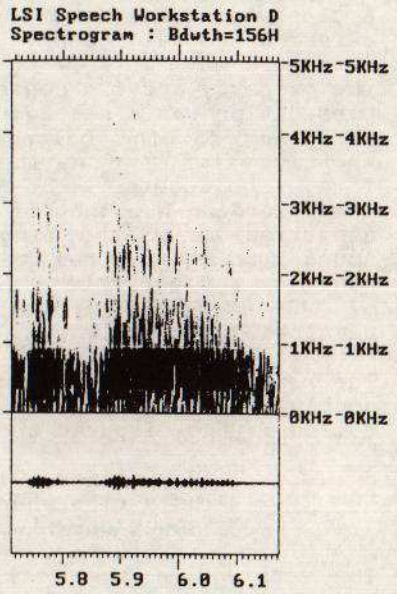

FIG. 2

The defence called a further Voice Expert who gave as her opinion that it was "more likely than not" that the disputed section should be interpreted as:

I just heard a bit o' news on the wireless there.

The importance of establishing the correct meaning of the disputed text lay in the fact that the prosecution wished to argue that the first interpretation **I just heard about our news on the wireless there** implied an admission of some degree of responsibility for the incident on Jimmy's part. The defence interpretation **a bit o' news** was far less incriminating.

3. PROCEDURE

The voice experts were provided with two C 90 audio cassettes. Tape 1 contained a first generation copy of the ansaphone message. Tape 2 consisted of a copy of a police interview with the accused and an interview between the accused and his solicitor in the course of which Jimmy repeats slowly and clearly the words **a bit o' news.**

Both experts had followed the procedure of listening repeatedly to digital re-recordings of the disputed segments and to sections of the more extended sample of the accused's speech available in Tape 2 in order to search for information about his phonological patterns which might shed light on the disputed segments. On-screen acoustic analysis of selected stretches of utterance had also been carried out.

Since the Courts considered the interpretation of the disputed segments as crucial to the accused's case, the experts was ordered to confer.

Accordingly, it was decided to extract from the interview data all tokens of the words <u>about</u>, <u>bit</u> and <u>our</u> for futher auditory and spectrographic analysis and comparison with the disputed sample. No tokens of <u>our</u> were found. Sixteen tokens of <u>about</u> and six of <u>bit</u> were extracted. Three samples of <u>about</u> and one of <u>bit</u> were discarded as being unsuitable for examination.

The extract of Jimmy saying **a bit o' news** (Fig. 2) in a slow, careful manner was treated with caution since both experts agreed that it was scarcely comparable in stylistic terms with the other available samples.

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Using the PC-based Loughborough Sound Images Speech Work Station, 10kz sampling rate with 6db per octave pre-emphasis, spectrograms were made of all the tokens <u>about</u> and <u>bit</u>.

4. RESULTS

Among the fourteen tokens of <u>about</u> found in the interview data, none replicated the phonological environment of the prosecution expert's interpretation of the disputed segments i.e. **about our.** All tokens of <u>about</u> were followed by a consonant segment.

Auditorily, the vowel elements of the second syllable of <u>about</u> fell into three categories: [ʌˈbʌʉʔ] [ʌˈbʉʔ] [ʌˈbʉ̞ʔ].
One token, which was marked as a tonic syllable, was closed by a voiceless, alveolar stop. In all other samples, the second syllable was closed with a glottal stop, irrespective of the subsequent sound. In two cases, the first syllable was elided into /b/.

Two of the <u>bit</u> tokens provided similar phonological environments to the defence interpretation, **a bit o' (news)**.
In auditory terms, the stressed vowel was half-close with varying degrees of centralisation in all five tokens and in the citation form. (i.e. that heard in Jimmy's interview with his solicitor in Tape 2). All tokens, apart from the last mentioned, were closed by a glottal stop in place of /t/. As with the differing realisations of the stressed vowel, non-systemic variation of this kind within an accent occurs frequently in Scottish speech of the type exemplified by Jimmy. The dropping of the fricative in <u>of</u> is also extremely widespread.

Examination of the spectrograms centred on three main areas:

- time bases of all phases of /b/
- duration of vowel element
- F1, F2 and F3 measurements of vowel

Of these parameters, the last proved the most productive. There was a comfortable match in terms of formant frequency distribution between three tokens of <u>about</u> and the disputed section of utterance. A further five spectrograms were to some degree comparable. None of the five tokens of <u>bit</u> provided an acceptable match except for the spectrogram shown in Fig.2 which was auditorily dissimilar to the disputed sample.

5. CONCLUSION

It was therefore concluded, on the basis of spectrographic evidence, that the disputed section of utterance was more likely to represent about our news than a bit o' news. The fact that the best spectrographic match was, in fact, auditorily dissimilar to the disputed sample confirms the importance of regarding auditory analysis as primary in formation of expert opinion in Forensic Phonetics.