

University of California
Berkeley

College of Engineering
Department of Electrical Engineering
and Computer Sciences

Professors : N.Morgan / B.Gold
EE225D

Spring, 1999

Speech Analysis and Synthesis Overview

Lecture 3



Figure 3.13 : Map. Showing the Communications path described in “Agamemnon”.

Alexander Graham Bell

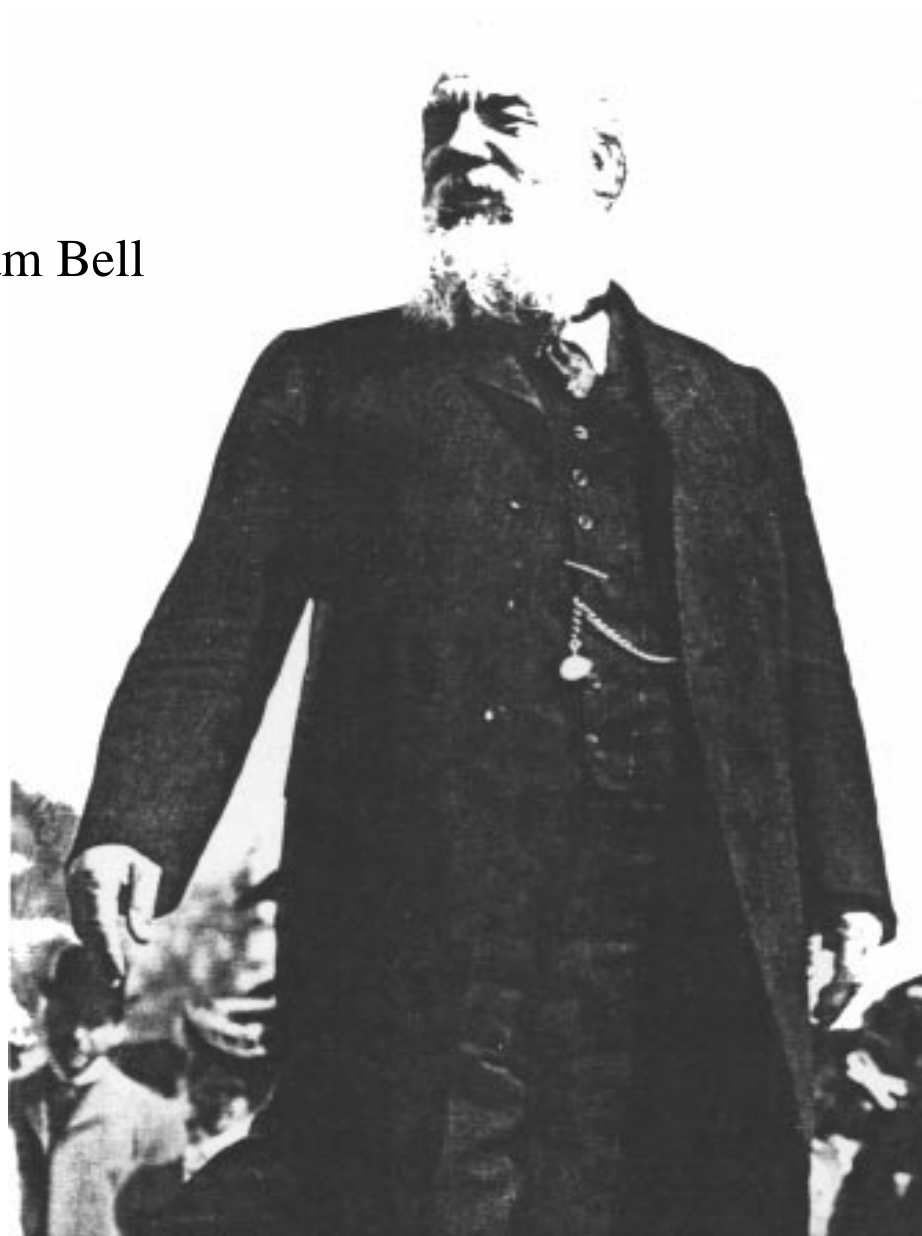




Figure 3.1 : Lower Broadway in 1887.

“ If I could determine what there is in the very rapidly changing complex speech wave that corresponds to the simple motion of the lips and tongue, if I could then analyze speech for these quantities, I would have a set of speech defining signals that could be handled as low frequency telegraph currents with resulting advantages of secrecy, and more telephone channels in the same frequency space as well as a basic understanding of the carrier nature of speech by which the lip reader interprets speech from simple motions.”

——— Homer Dudley, 1935

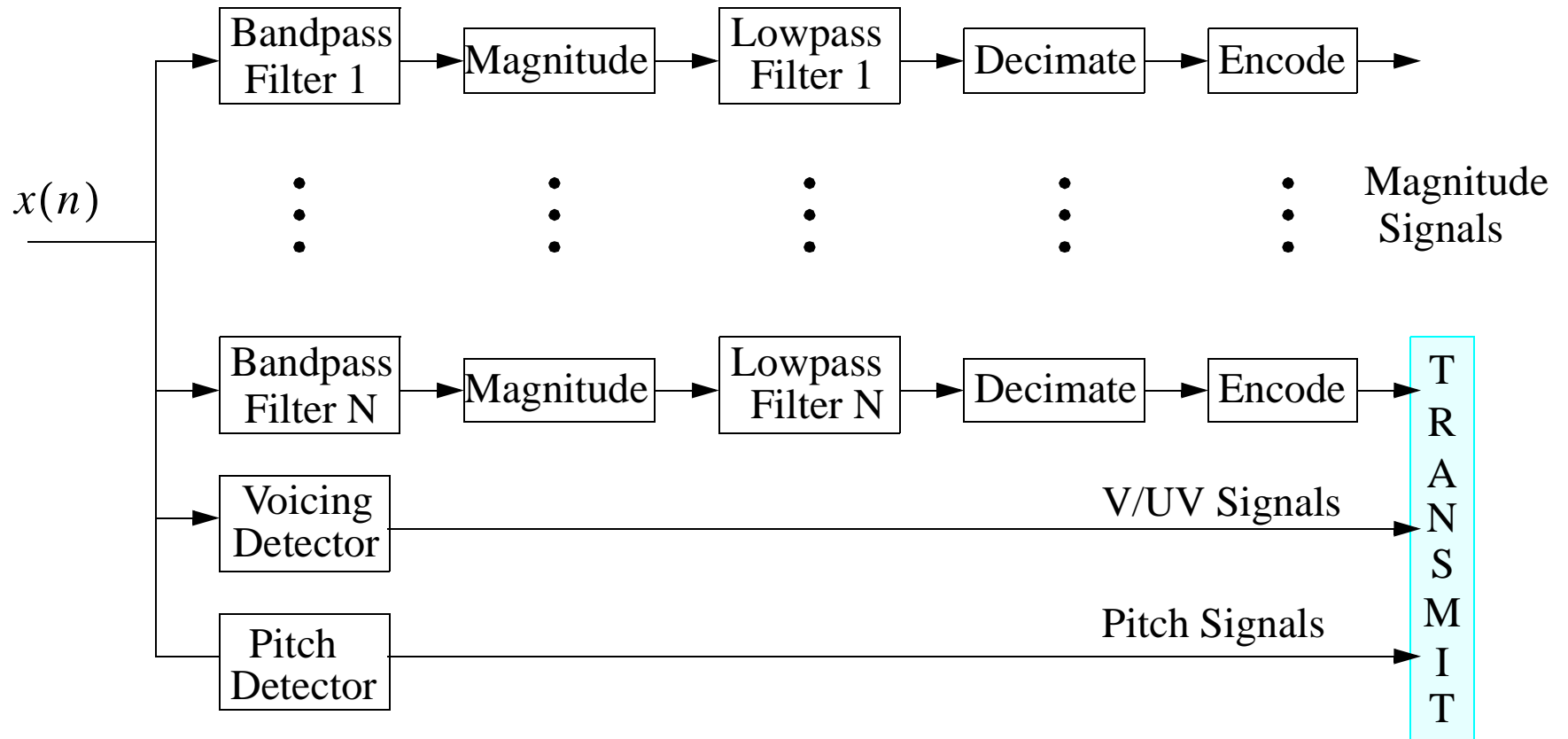


Figure 31.2 : Channel Vocoder Analyzer and Synthesizer

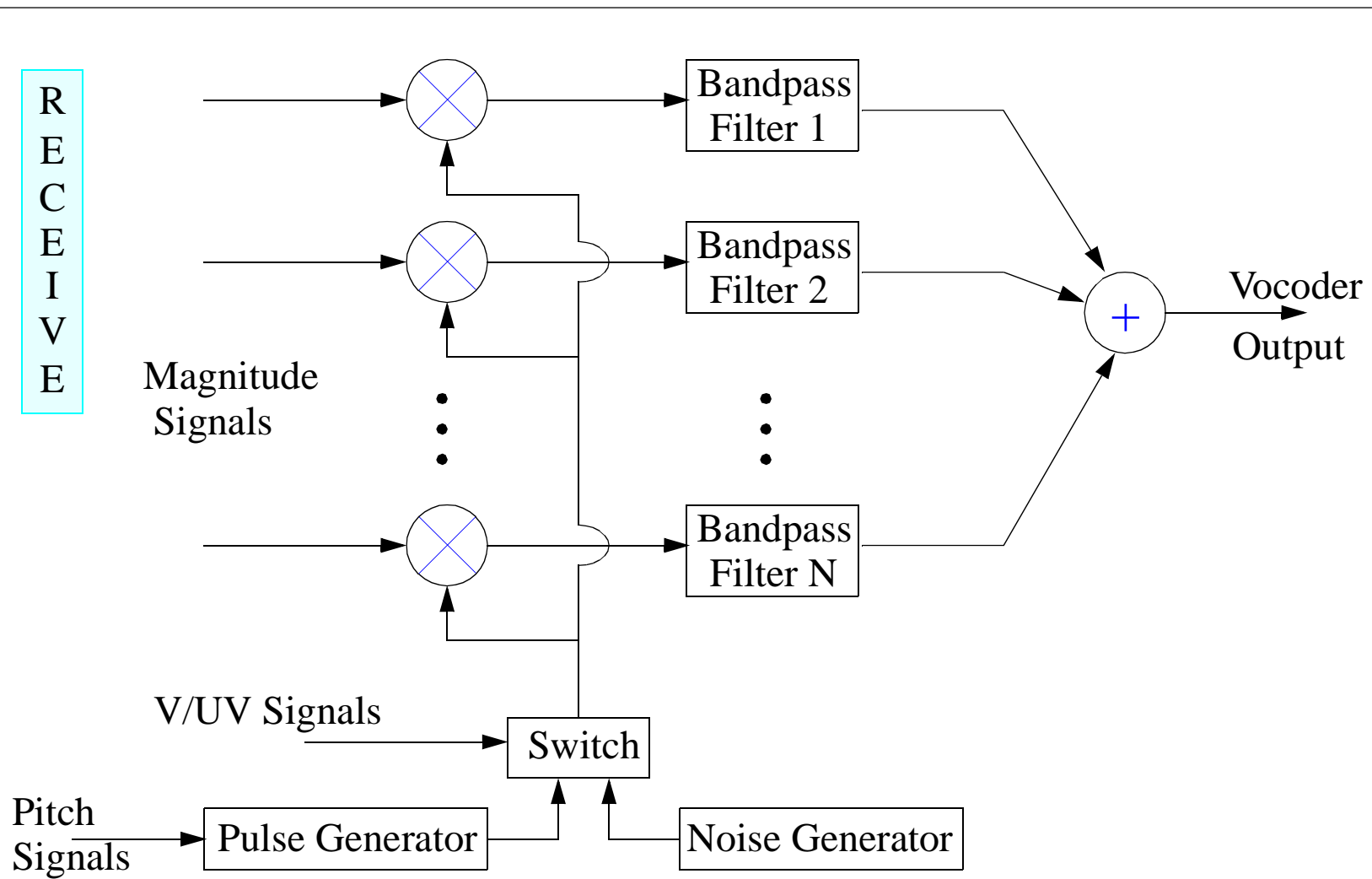
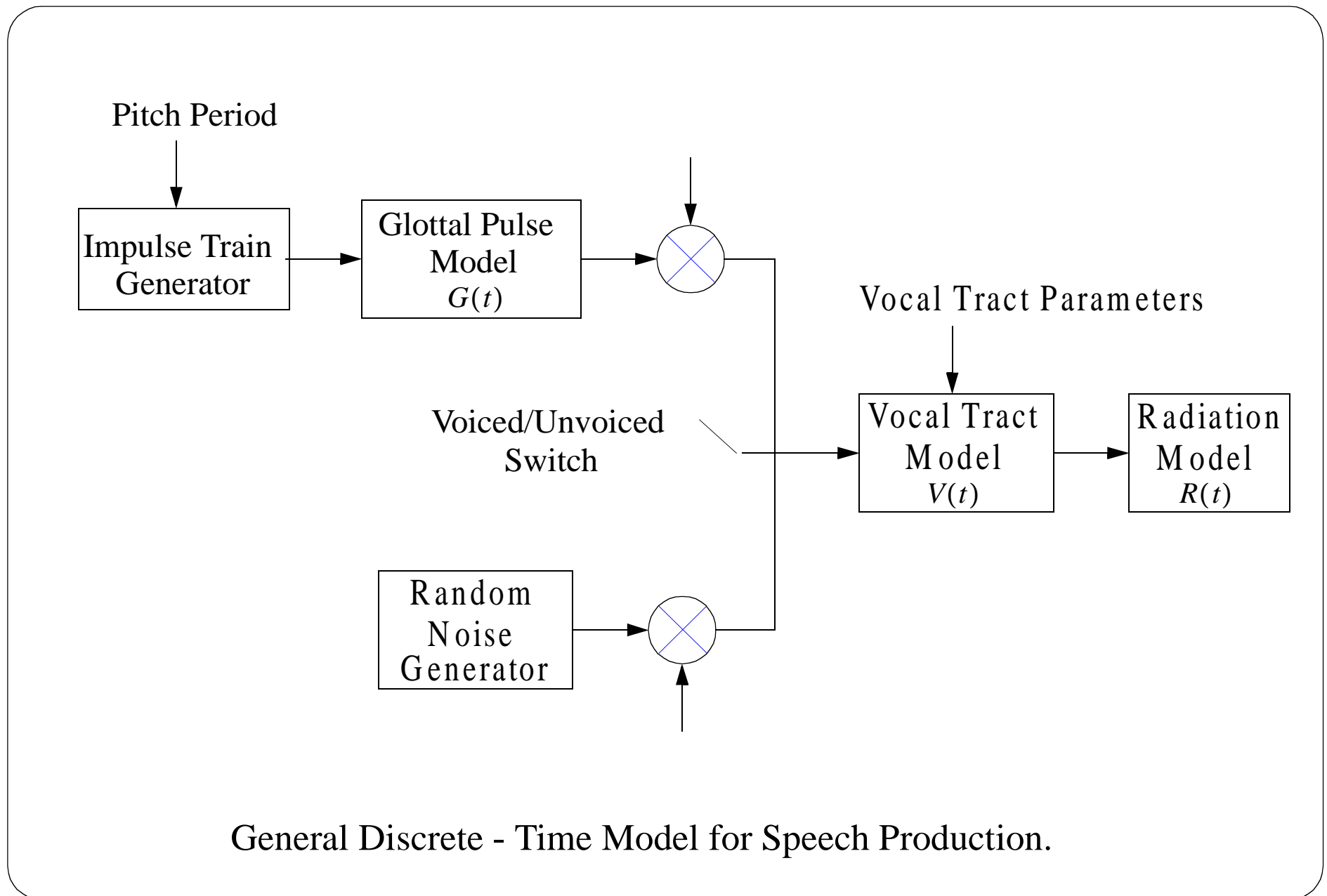
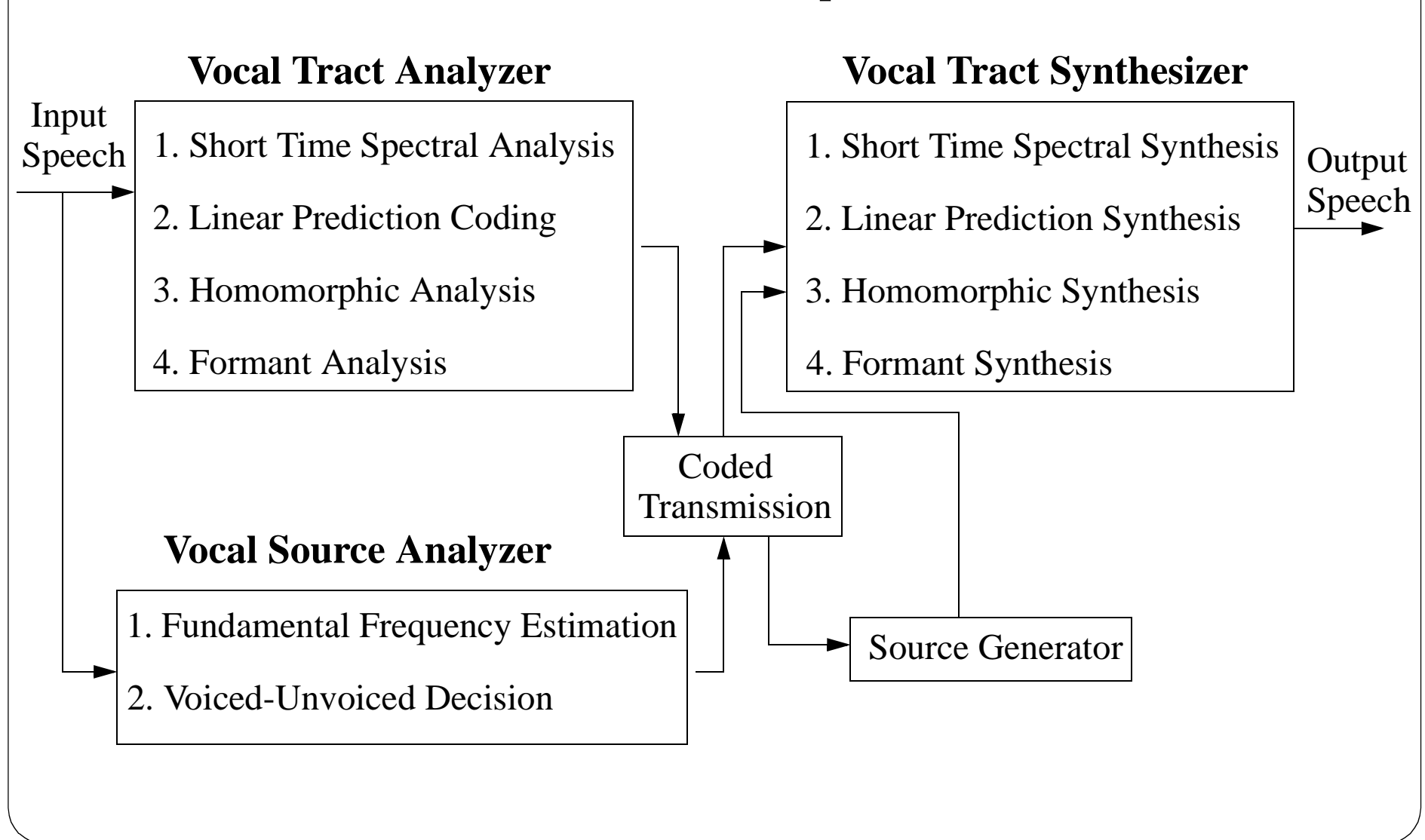


Figure 31.2 : Channel Vocoder Analyzer and Synthesizer



Vocoder Concepts



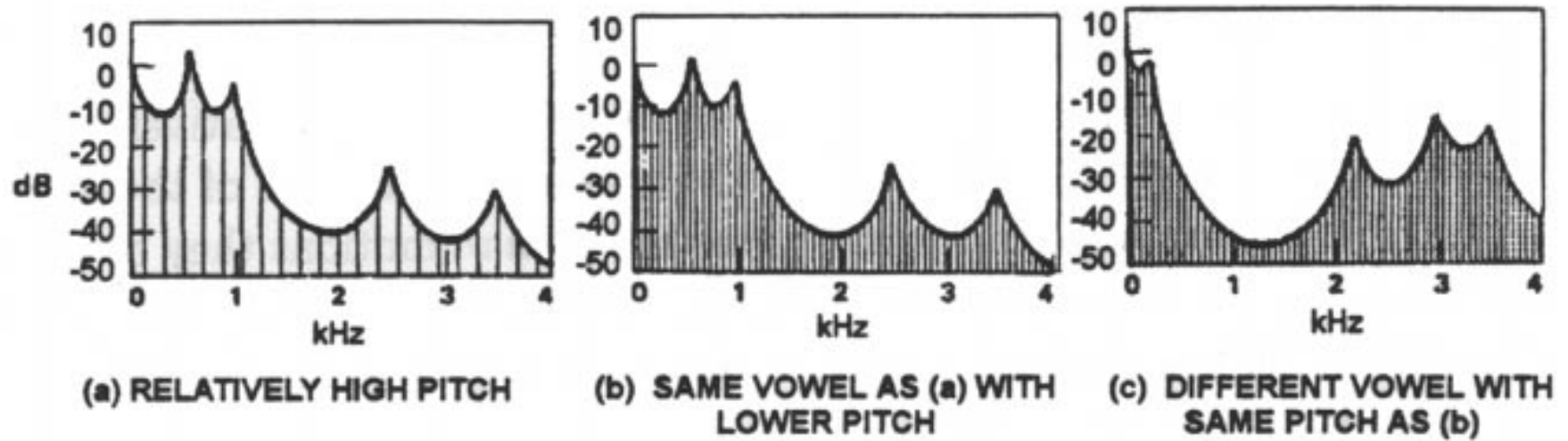


Figure 3.2 : Fine Structure and Spectral Envelope of Sustained Vowels.

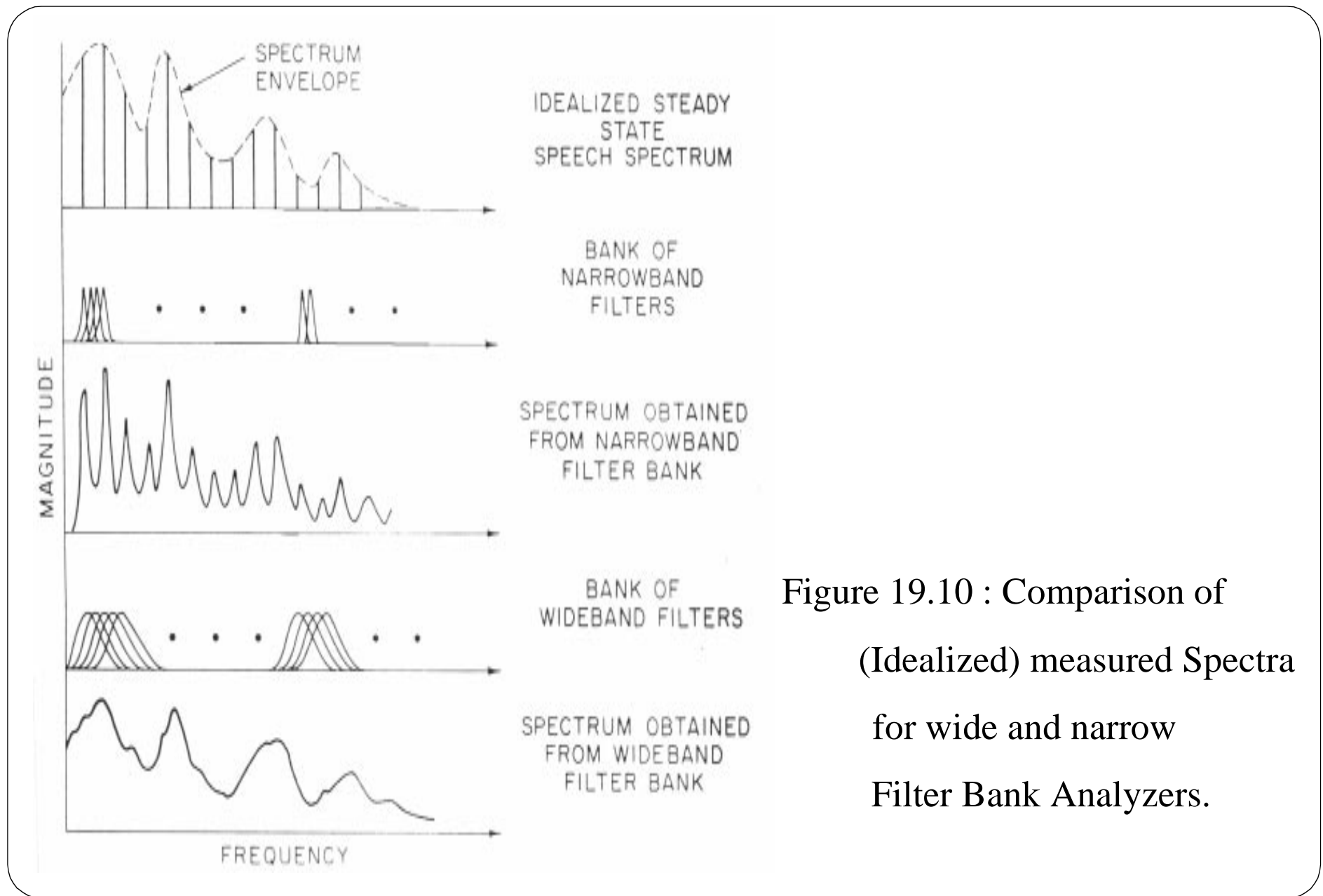


Figure 19.10 : Comparison of (Idealized) measured Spectra for wide and narrow Filter Bank Analyzers.

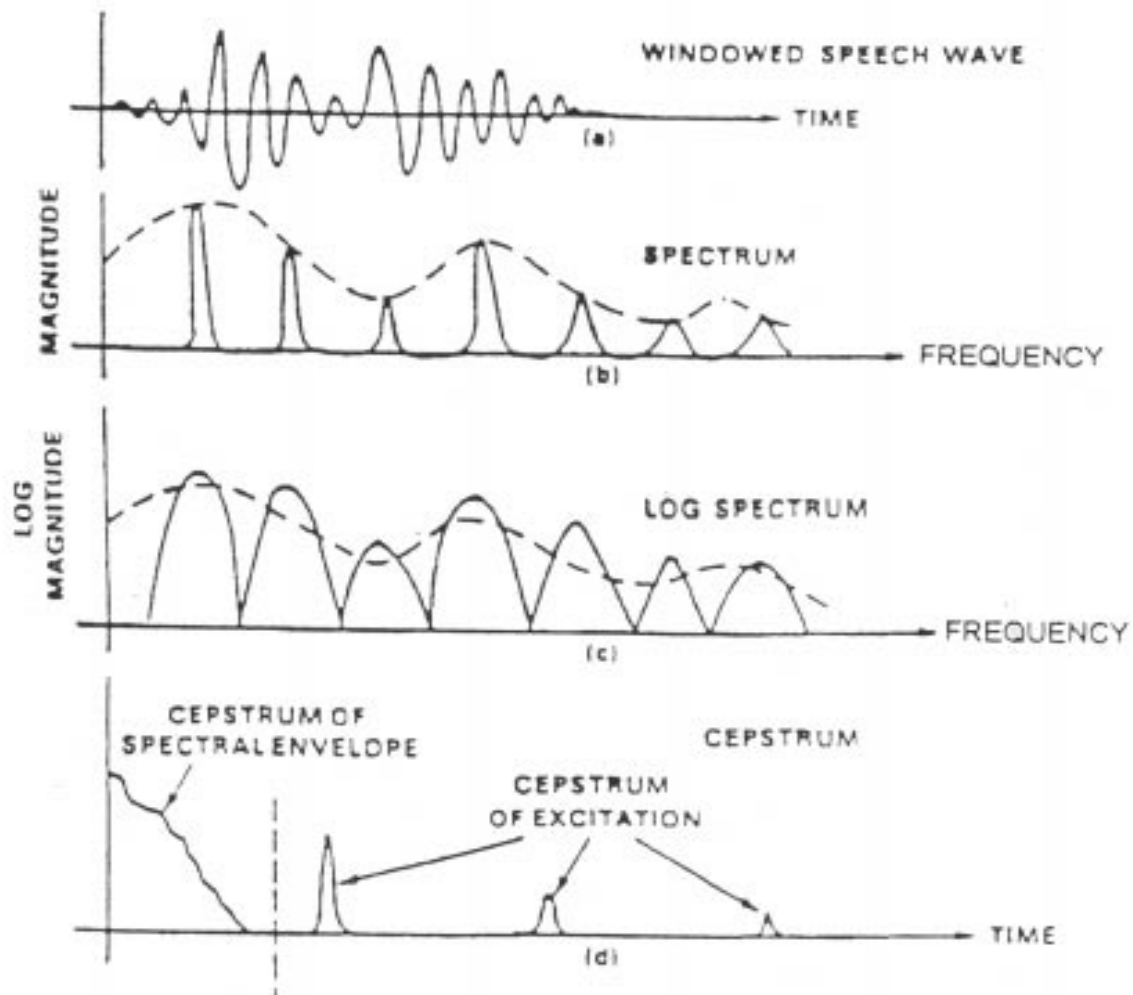
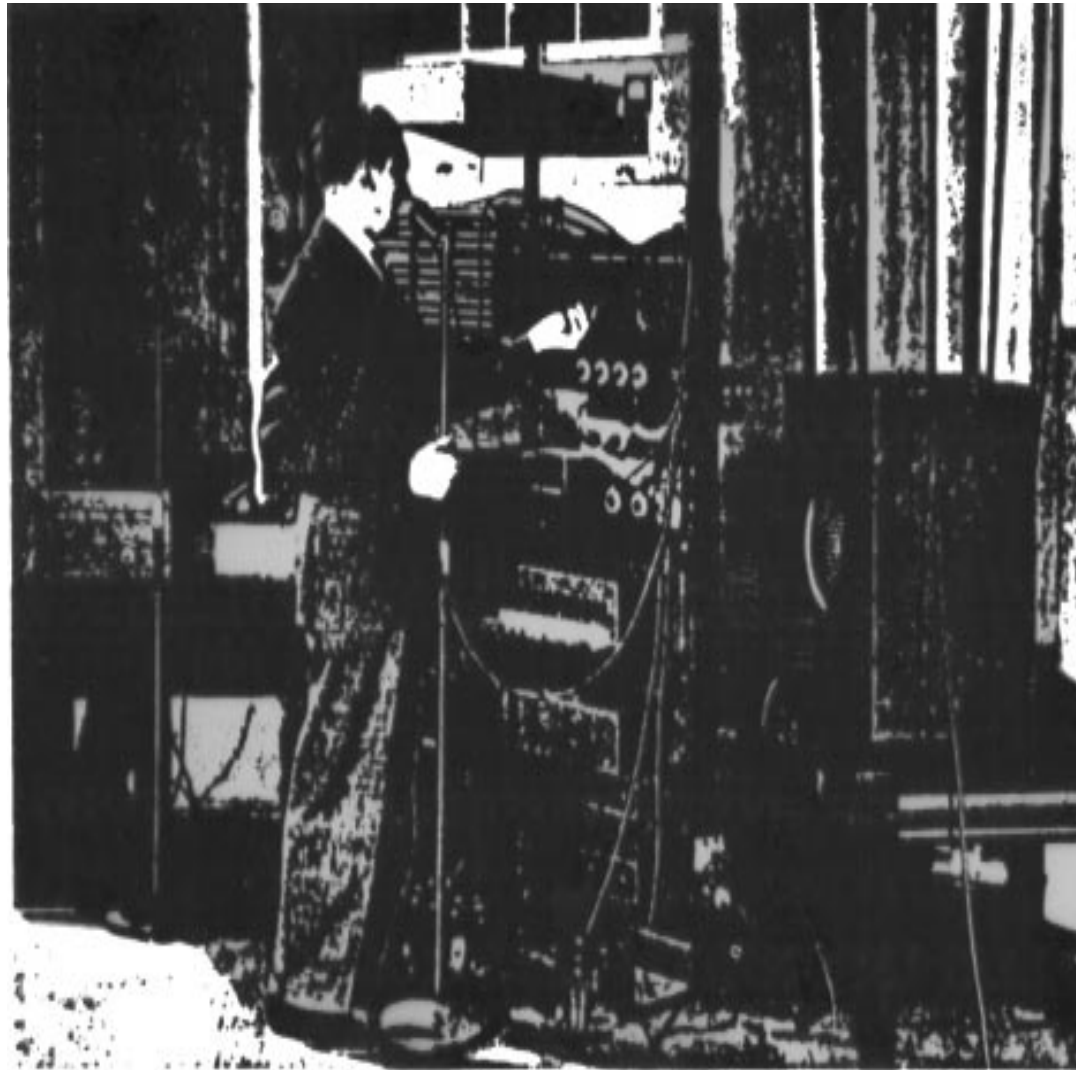


Figure 3.3 : Illustration of Source-Filter Separation by Cepstral Analysis.



The Vocoder
by Homer Dudley, *Circuit Research Department*

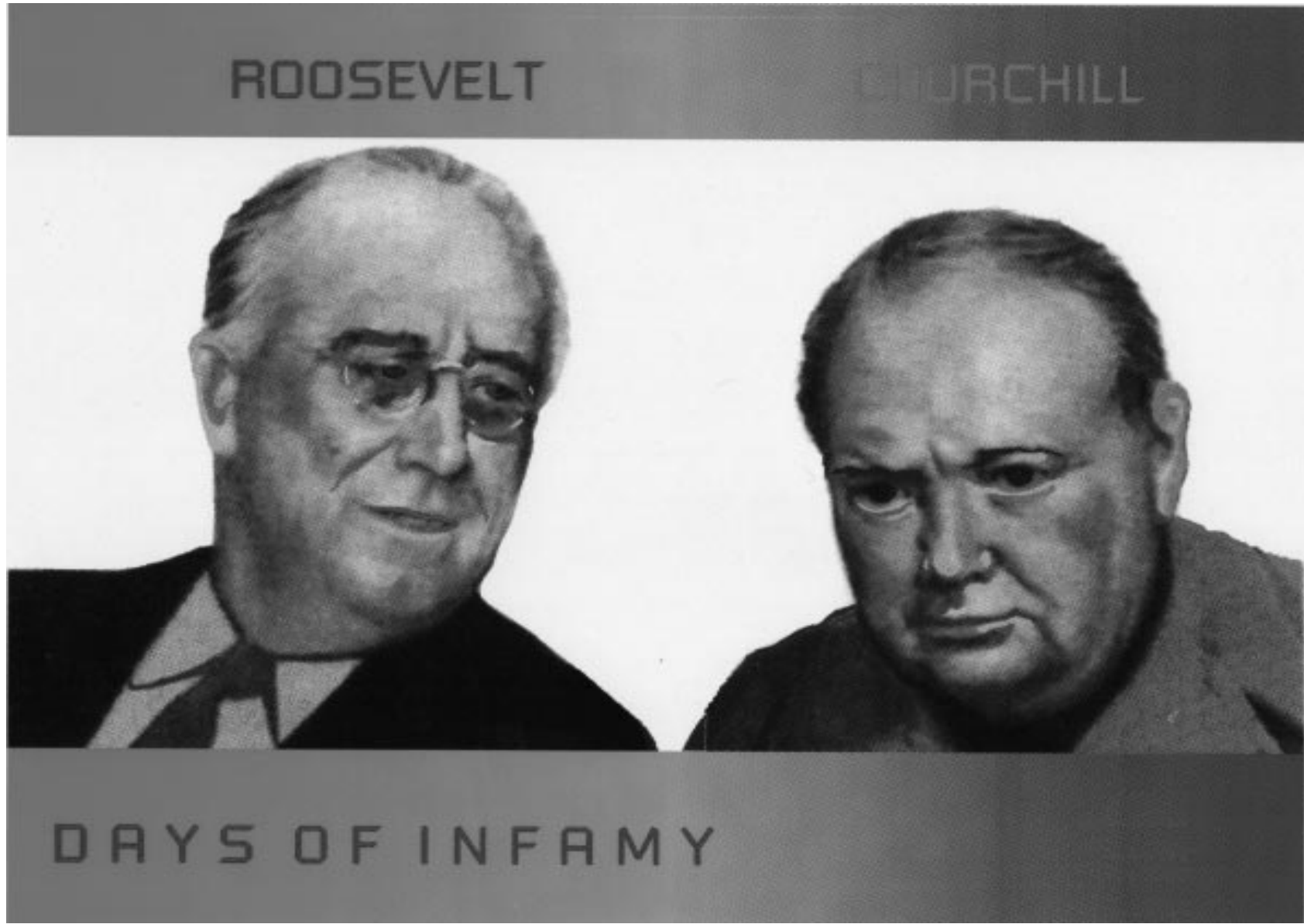




Figure 3.6 : Dudley's Waveform Display.

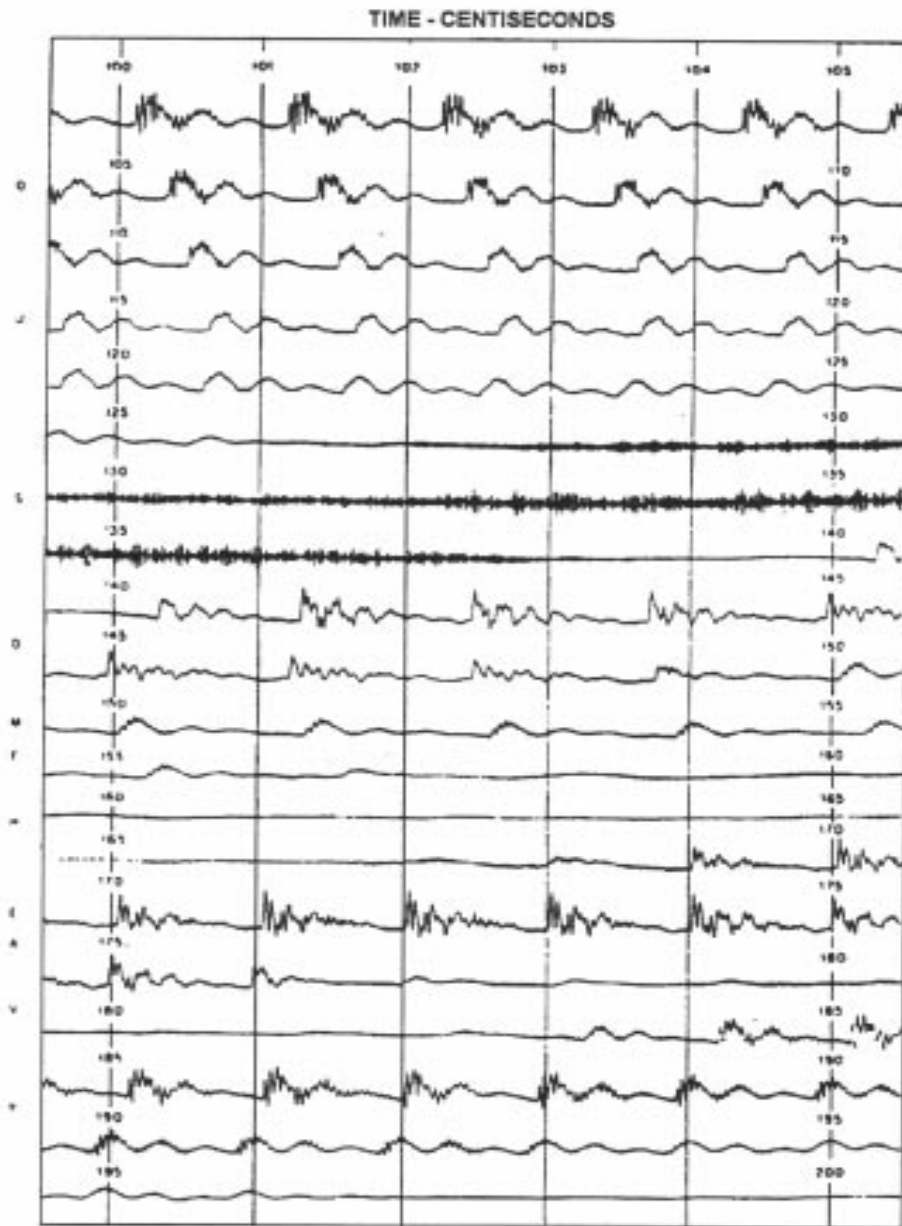


Figure 3.7 : Continuation of Dudley's Waveform Display.

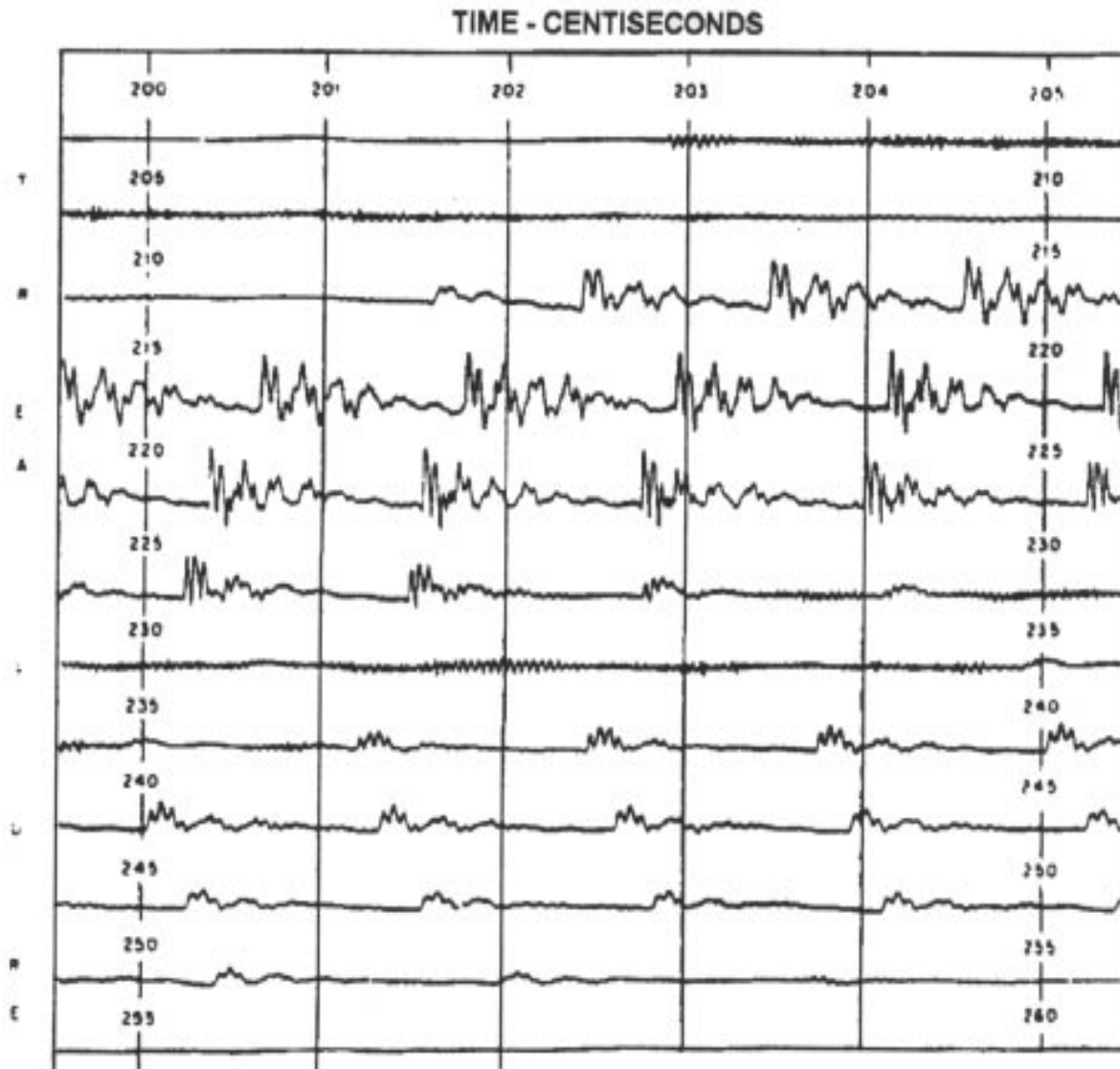


Figure 3.8 : Conclusions of Dudley's Waveform Display.

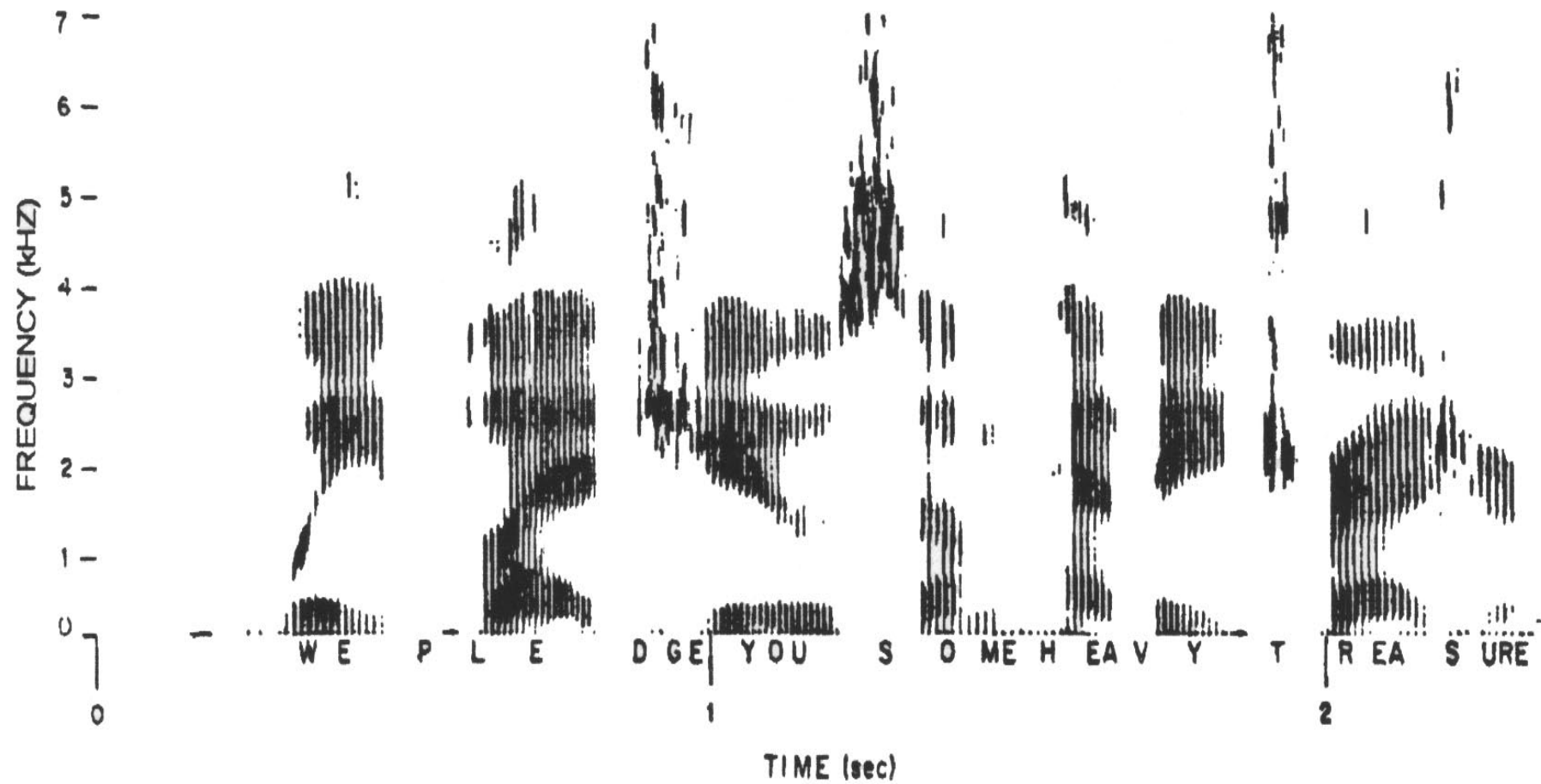


Figure 3.4 : Wide Band Spectrogram.