VISIBLE PATTERNS OF SOUND

By RALPH K. POTTER

BELL TELEPHONE LABORATORIES

The automatic representation of speech sounds by visible traces or symbols has long been a subject of interest to acousticians and phoneticians, and especially to those concerned with the development of electrical communication. Techniques for automatically recording the wave forms of sounds have been very highly developed; but there has remained unsolved, until recently, the problem of recording sounds in a manner permitting their ready visual interpretation and correlation with the auditory sense. An outstanding difficulty with the interpretation of the records of wave forms is the effect of phase relationships between fundamental and harmonics. These effects may produce a marked difference in the appearance of the wave forms of two sounds that are quite indistinguishable to the ear. Consequently, wave traces of even simple vowel sounds do not permit of easy identification by the eye.

The facts are that wave traces contain too much information. To portray sound in a form that the eye can encompass in a glance requires that some means be provided for selecting the essential information and displaying it in an orderly fashion. A form of display that meets these requirements has been developed in the Bell Telephone Laboratories as described below.

The work here described was begun before the war. Because of related war interests it was given official rating as a war project, and has progressed far enough during the war period to justify its being brought now to public attention.

The possible uses of an automatic system for translating sound into patterns which may be readily interpreted by the eye are very numerous. It opens the prospect of some day enabling totally deaf or severely deafened persons to use the telephone and the radio or to carry on direct conversation by visual hearing. [The latter, incidentally, was an objective
Editor's Summary

This copy is for your personal, non-commercial use only.

**Article Tools** Visit the online version of this article to access the personalization and article tools: [http://science.sciencemag.org/content/102/2654.citation](http://science.sciencemag.org/content/102/2654.citation)

**Permissions** Obtain information about reproducing this article: [http://www.sciencemag.org/about/permissions.dtl](http://www.sciencemag.org/about/permissions.dtl)