

PHYSICAL PATTERNS OF SPEECH

Visible Speech

By Ralph K. Potter, George A. Kopp and Harriet C. Green. (Bell Telephone Laboratories Series.) Pp. xvi + 441. (New York: D. Van Nostrand Co., Inc.; London: Macmillan and Co., Ltd., 1947.) 25s. net.

AS pointed out by Dr. Oliver E. Buckley in the foreword to this book, improvement in the telephone and extension of its service are the principal aims of research in the Bell Telephone Laboratories. It is well known, however, that from these Laboratories have come many other devices which have been of very considerable value to the community quite apart from the use of the telephone. It will be recollected that, shortly before the War, Homer Dudley published the results of fundamental research which had been carried out there on the formation of speech sounds. This may have applications in the future in the field of long-distance telephony. A little later another instrument was devised for the analysis of speech sounds and named the 'sound spectrograph'. This background, which does not appear in the book, makes the development which it describes the more interesting.

The title of the book, "Visible Speech", is the same as that of a book published by the father of Alexander Graham Bell, the inventor of the telephone. The elder Bell's work, however, was only concerned with the use of hand-written symbols which would define the accenting of words more precisely. The sound spectrograph, on the other hand, is essentially a device for making recorded patterns showing the frequency and intensity of the components in short samples of speech. As a first stage in its operation, the speech is recorded on a magnetic tape or by other means. The recorded sample of speech is then scanned electrically many times in succession by means of a circuit which includes a variable-frequency band-pass filter. The result of this analysis may be presented as a photographic record in which time is represented horizontally, frequency vertically and the intensity of the sound by the density of the record. Such records are useful in a study of speech sounds; but in order to enable the deaf to carry on a conversation more direct presentation of the speech in visual form is needed. Various means of doing this are possible: the final result in one case is presented on the screen of a cathode ray tube.

The techniques do, however, make possible methods of depicting speech sounds in such a way that they can be comparatively easily recognized. They have been explored as a means of conveying the information in speech sounds to the totally deaf, and of teaching them to speak by way of training them to reproduce the patterns. It is interesting to note that some of the most useful contributions to the later work have been made by a congenitally deaf engineer. The early part of the book is largely concerned with the description of the patterns which are produced by the basic sounds in speech. The relationship of these fascinating patterns to the use which the speaker makes of his different speech organs, and the basic phonetic principles underlying the patterns, are discussed; information bearing clues which enable a student to recognize and interpret them are pointed out. Although to a beginner the vowel sounds are distinctive, it would seem to him that long practice would be needed to pick out the consonants which convey so much of the information in speech.

The second part of the book, and the bulk of its pages, are occupied by lessons units copiously illustrated with patterns of American speech. This part has been written to be studied by the adult who wishes to learn how to read visible speech, and is adapted to one who either has hearing, or has relatively recently lost hearing, so that sounds and words may be recalled. To be appreciated it must be studied carefully and the various sounds practised and imitated from the patterns.

The experimental work that has been done so far has provided assurance that the patterns of visible speech are distinctive and can be interpreted. It has indicated that visible speech can possibly be used in the speech and general education of the deaf. It is fair to say, however, that a great deal of work so far has been with subjects who have been capable of quickly appreciating the speech patterns; but the practical value of visible speech as a means of making contact with the normal deaf person of no more than average education and intelligence has yet to be evaluated. As the authors say, the primary purpose of the book is that of turning over to all those who would carry on the work the major results and development to date.

This book can be unreservedly recommended to all those who have a specialist's interest in speech sounds, and in particular to those who are intimately concerned with the interests of the deaf. 'Visible speech' may also have other more varied applications, both as a research tool or for more widespread use; but these will emerge later.

W. G. RADLEY

MODERN RADIO TECHNIQUE

(1) A Survey of the Principles and Practice of Wave Guides

By Dr. L. G. H. Huxley. (Modern Radio Technique Series.) Pp. xi + 328. (Cambridge: At the University Press, 1947.) 21s. net.

(2) Radio Aids to Navigation

By Dr. R. A. Smith. (Modern Radio Technique Series.) Pp. xii + 114 + 7 plates. (Cambridge: At the University Press, 1947.) 9s. net.

THE introduction of radar and the widespread development of radio wave technique during the past ten years have resulted in a considerable addition to our knowledge and experience, the records of which were confined during the war years to confidential and secret reports. Much of this information has recently been published in the form of scientific and technical papers in the proceedings of societies and institutions. There is clearly a need in addition, however, for a more compact form of publication in which the information on various aspects of the subject is collected together in separate volumes or books. It is therefore gratifying to note the proposal by the Cambridge University Press to publish a new series of monographs under the editorship of Mr. J. A. Ratcliffe and dealing with the advances in radio technique made during the War. All the monographs are being prepared by men who were personally responsible for important advances in the subjects they write about; two volumes have already been published, and some six more are in active preparation.

(1) Although the subject of the propagation of electric waves in metal tubes—or wave guides as they are now called—has been studied theoretically