

## Preface

THIS BOOK is intended to describe the principles of communication technology in a way which will make them easily understood by readers whose training is in other fields. It is the outgrowth of notes prepared for a course designed to provide teachers of basic science with a concise fund of up-to-date background information which is otherwise widely scattered. It may also be of interest to trained engineers and scientists who have to do with the subject matter of one or two of our chapters and are curious to see how their specialty plays its role in communication systems.

Communication technology is a branch of electrical engineering. The electrical engineer who earned his degree a generation ago will find the following chapters quite surprising. It will seem to him that about half of the book has nothing to do with electrical engineering, or has at best a remote connection with it. On the other hand, a young electrical engineer with the ink fresh on his diploma may not realize the extraordinary fecundity of his subject. Indeed, an organized understanding of a major part of the book's content has been brought about only during the past generation. The pace of change is so great that it behooves us from time to time to try to explain ourselves and our works in words which will speak to a broad circle of interested but unspecialized persons.

The authors all work in the telephone industry. Naturally we have drawn the great majority of our examples from this field. This may lend a somewhat parochial air to the book. To us "communication" is the sending of a signal from one point to another, usually in a way which permits a two-way "conversation" to take place. We have little knowledge of the

technical problems of those parts of the communications industry where a one-way message is "broadcast" to a large number of recipients, so we do not speak at all of newspapers or advertising, and only to a limited extent of radio and television broadcasting.

The book has been written by a committee, which makes it modern in a second sense. None of us thinks that this is the best way to write a book, but in this case it was the only way it could be done in the time available. Although this has led to some unevenness, we offer the book in the belief that it will be useful.

We would be remiss if we did not acknowledge the debts we owe our colleagues, at the Bell Telephone Laboratories and elsewhere, who in recent years have created the subjects which we here summarize. We would also like to thank all those who helped so substantially in the preparation of the manuscript.

Chapters 13-15 are based on sections of *Symbols, Signals and Noise*, by J. R. Pierce (New York, Harper & Brothers, 1961), and include material from that book.

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THE AUTHORS