EXPERIMENTAL WIRELESS STATIONS: THEIR THEORY, DESIGN, CONSTRUCTION AND OPERATION

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Experimental Wireless Stations: Their Theory, Design, Construction and Operation by Philip E. Edelman

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EXPERIMENTAL WIRELESS STATIONS: THEIR THEORY, DESIGN, CONSTRUCTION AND OPERATION

Trieste

EXPERIMENTAL WIRELESS STATIONS

THEIR THEORY, DESIGN, CONSTRUCTION AND OPERATION

INCLUDING WIRELESS TELEPHONY AND QUENCHED SPARK SYSTEMS.

A complete account of sharply tuned modern wireless installations for experimental purposes which comply with the new wireless law, with more than 80 illustrations.

By

PHILIP E. EDELMAN

Author, "Inventions and Patents," "Simple Experiments in Chemistry," "An Experimental Quenched Arc System," "How to Comply with the New Wireless Law," and many other articles in the technical press.

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BOOKS BY PHILIP E. EDELMAN.

(Now ready, or in preparation.)

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To the faculty of the West High School, Minneapolis, and particularly to Mr. John H. Cook of the Physics Department, as an appreciation of the interest taken in the Author.

FOREWORD.

This book was written to fill a noticeable gap in the literature on the art of wireless telegraphy. As its name implies it is intended particularly for experimenters, that sane body of voluntary workers who take up the art as a hobby, study, or spare time vocation and who are generally misnamed, "amateurs." It is intended particularly as a guide to a rational worth while study of the art and only matter which directly contributes to the practical presentation of the art has been included.

One of the main objects of the book is to provide a standard design for so-called "Amateur stations," which will take the place of the many varieties of hit and miss apparatus constructed and purchased by experimenters.

This book is intended for experimenters who regard the art as more than a mere idle plaything, and it is hoped that it will serve as a stepping stone to a serious preparation for high positions in the practical field of the art. The earnest experimenter is separated from the wireless engineer and commercial wireless inventor by a very small space of time and application to study, while the position of an expert wireless operator is even easier to attain. Wireless today offers opportunities which are perhaps not exceeded by any other art or trade. The field is open and ready for serious workers, the work of absorbing interest, and the remuneration limited only by the capabilities and temperament of the individual and the circumstances concerned.

Inasmuch as both innocent and wilfull interference with other stations has to a large extent hindered experimenters as well as commercial operators, the design in this book is directed particularly to standard apparatus and stations of sane sharp tuned wave lengths which will not interfere with others. As far as the author is aware this is the first book to appear in which standard designs are given. On account of the new wireless law, experimenters are now forcefully restricted to this rational type of apparatus. In any case, serious workers will realize that it is only fair and even desirable. At the present stage of development, wireless experiments must be conducted on a strict basis of live and let live.

The matter in this book has been written with particular regard to clearness, simplicity, and direct usefullness. Makeshifts have been suggested in some cases and it is hoped that experimenters with limited means will welcome them. It is quite possible to have a wireless station at an outlay of less than one dollar. The approximate cost of the apparatus is given in some cases.

The author will be pleased to receive suggestions and corrections from his readers, but cannot promise or agree to give individual advice, further individual instructions, or answer other communications which require much time, since his time is all taken up with other activities.

In order to get directly to the pith of the subject little or no preparatory history and elementary matter has been given, as the readers are assumed to have some little knowledge of the fundamentals of electricity, magnetism, and mathematics. (This does not mean an extensive or complete knowledge.) The important principles upon which the wireless systems depend together with the working principles of the separate instruments have, however, been treated in some detail and in most cases "How

it works and how to make it," have been combined. It is believed that several items are presented for the first time in this volume and the best modern practice has been presented, so that it comes within the limitations of the average experimenter.

The majority of the material given is the result of the author's own experiences together with the experiences of others, and it is believed that credit has been given for the important items or abridgements from other sources, which have been included. In many cases only the vital points for an instrument have been given, so that the individual can use his own ingenuity in working out the details. The reader is thus given an opportunity to be original without the usual waste of "cut and try." Every ambitious reader will very likely read from cover to cover, but the matter has been so arranged that each chapter is complete in itself. The advanced reader can turn to the particular subject in which he is interested without going through matter already familiar to him.

Although several manufacturers have offered cuts for this book, it has seemed best to give simple line drawings to illustrate constructional details rather than half tones which only show the general appearance of a particular type of instrument. Most of the drawings have been prepared specially for this book and the few taken from other sources have in most cases been credited.

In conclusion it may be remarked that no author is insensible to appreciation, and if you obtain more than the mere intrinsic worth from this book, the author will appreciate your courtesy in telling others so.

Philip E. Edelman.

Minneapolis, Minnesota,
October 15, 1912.

CHAPTER I.

NATURE AND THEORY OF WIRELESS TRANSMISSION OF INTELLIGENCE.

Before beginning the details of equipment, a brief outline of the essential theories which aid in understanding the art will be given. To begin with, it should be understood that many of the elementary theories have only been partially substantiated and that in any case they serve more for convenience than as scientific fact. It should

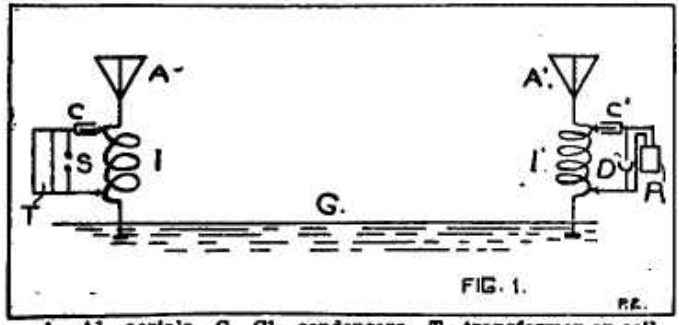

FIG. 1.

A. A1—aerials. C. C1—condensers. T—transformer or coil. D.—detector. I. I1—inductances. S—Spark gap.—G.—ground. R.—telephone receiver.

also be remembered, that while lines of force and similar terms are used as though the lines were visible and a matter of fact, they are merely imaginary and used for convenience.

In the practical wireless station with which we are concerned, electromagnetic waves are utilized to transmit intelligence in a telegraph code without the use of a conductor or wire between the transmitting and receiving sta-