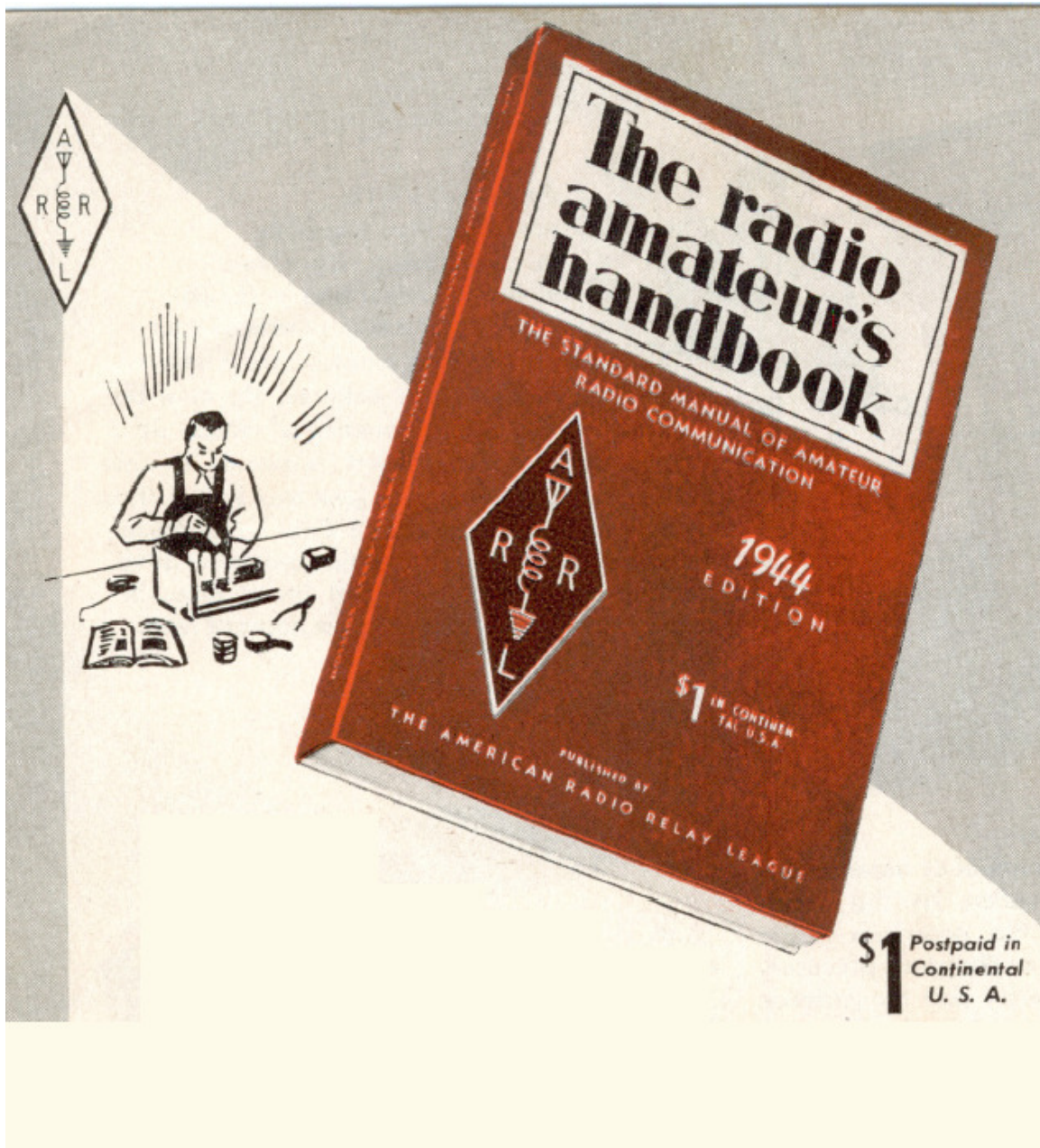


The radio amateur's handbook

Twenty-First Edition 1944



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TWENTY-FIRST EDITION

NINETEEN FORTY-FOUR

THE RADIO AMATEUR'S HANDBOOK



BY THE HEADQUARTERS STAFF OF THE
AMERICAN RADIO RELAY LEAGUE

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE,
INCORPORATED, WEST HARTFORD, CONNECTICUT

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copies were published in forty printings.)

THE RUMFORD PRESS
CONCORD, NEW HAMPSHIRE

Foreword

THE *Radio Amateur's Handbook* has had a remarkable history. Back in 1926 we of the headquarters staff of the radio amateur's organization, the American Radio Relay League, set about the writing of a small pamphlet of operating instructions intended to improve the performance of amateur stations. When it was finished we found that, with the necessary additional material on technical topics, we had written a considerable-size book. Upon its publication it enjoyed an instant success and quickly became an important factor in the literature of the radio amateur. As successive reprintings were undertaken new material was added, and an evolutionary process began which became the policy of the *Handbook*: to present the kind of information required to get *results*, rather than the academic intricacies of the classroom, and to refine and perfect the explanations so that they were thoroughly helpful to practical amateurs. Thus the book grew through the years — in size, in value, in acceptance. It became the right-hand guide of practical radio amateurs in every country of the globe. As war came on, it was inevitable that a book written as the *Handbook* was written would be found to provide exactly the kind of information required to make practical radiomen for the military services and to help those who were training themselves for wartime radio work. This book certainly has: not only is it used directly in many training programs, either as basic text or reference, but its information has provided source-data for many of the service-written special courses.

With the *Handbook* thus doing a wartime job, with its total distribution now well over a million copies, we have had a heavy sense of our responsibilities as writers and publishers as we approached the present revision: the twenty-first edition, the forty-first printing. Our editorial problem in this annual revising has always lain largely in so adjusting its scope and perspective that the book would be of maximum usefulness to the reader in his problems and activities of that particular year. In the happier pre-war days of active amateur operation that task was chiefly one of selecting the ideas and creating the apparatus designs upon which the greatest operating reliance could be placed, the latest and best "construction" information of which we had knowledge. To-day, with amateur stations silenced and all our people geared to the needs of war, the perspective necessarily shifts sharply. The world to-day puts a premium upon *knowledge* of radio. The amateur studies his art to improve his proficiency in his present wartime job as well as for the day when his station re-opens. Hundreds of thousands of additional men and women are being trained to useful proficiency in the radio field, to meet the nation's needs — a job in which the *Handbook* is proving a potent aid. We believe, then, that we best serve our readers this year by putting more emphasis on the "how-it-works" part of the book than on the "how-to-make-it" — although both are indispensable.

In this new edition we are using an enlarged page format which, despite wartime paper restrictions, happily permits us to make this by far the largest edition yet published, in point of editorial content. This edition is divided into two main parts. In the first is grouped all the material treating of principles, theory and design considerations — the enduring basis of the art. In the second part, embodying the best current practical employment of the basic knowledge of the first part, are the examples of practical equipment — in general with at least one representative example of each accepted type or combination — together with essential constructional data and instructions for adjustment and use. Mention should be made of the new chapter on carrier-current communication, the alternative field which the amateur has found most interesting and fruitful during the war's restrictions. The chapter on the War Emergency Radio Service has been re-written and considerably expanded to provide the best possible guidance to those engaged in this essential service. The classified tube tables, always an important feature of the *Handbook*, have been revised to include data on all released types, and remain the most comprehensive

compilation available. A new convenience, to facilitate locating a tube whose classification is not known, is a cross-index by type numbers.

The first main part of this book, Chapters Two to Ten, inclusive, constitute a textbook on the theory of radio. The present treatment represents a considerable expansion over previous editions, with new material and amplified information added where practical teaching experience using the *Handbook* as a text has disclosed their desirability. It is the culmination of several years of work by George Grammer, *QST*'s technical editor (now on leave), not only in the writing but in the refining of the writing in the crucible of actual use — by teaching experimental classes and by surveying the progress of typical self-taught students. The aim has been to write an understandable nonmathematical treatment for busy, practical people of average education. Necessarily compact (as is any good text), information is deliberately presented without sugar-coating, but every effort has been made to make it understandable and to avoid saying things in such a way that they are intelligible only to those who already know the subject! The material has been so arranged in topical sections as to make it readily possible to find what is wanted, a multitude of sub-headings identifying subjects at a glance. The information is presented concisely but with copious cross-references, to permit the background always to accompany the subject under consideration. We have endeavored to employ cross-references in such quantity that no treatment of any subject can be considered "too technical," since the references will lead the reader, if he needs it, to the applying fundamentals. Finally, this portion of the book arranges subjects in a logical order which can serve as the basis for a well-ordered radio study course. Indeed, Mr. Grammer's companion work, *A Course in Radio Fundamentals*, also published by the League, is written around this portion of the *Handbook*, providing for the student a proved and effective series of study assignments, directions for experiments, and examination questions.

The second part of the book is that which has been dearest to the heart of the practicing amateur. That amateur to-day may be engaged in rebuilding his station to improve its performance after the war, but much more probably he is working for Uncle Sam — in the armed forces or in a laboratory. Wherever he is, he and his similars need a reliable guide for the construction of various pieces of radio apparatus. The second part of the *Handbook* deals only with practical considerations, but reference to the first part of the book always will lead the reader quickly to any needed information on the whys thereof. The apparatus designs are the best we know for their respective jobs and they will be found reliable. At the end of many of the constructional chapters is a bibliography of articles in *QST*. In these will be found more extensive descriptions of some of the pieces of apparatus. References to the bibliographies in these cases take such a form as (*Bib. 5*), which means that the fifth item in the bibliography at the end of that chapter gives reference to a *QST* article describing the particular piece of gear in somewhat greater detail.

A word about the reference system: It will be noted that each chapter is divided into sections and that these are numbered serially within each chapter. The number takes the form of two digits or groups separated by a hyphen. The first figure is the chapter number, the second the section number within the chapter. Cross-references in the text take such a form as (§ 4-7), for example, which means that the subject referred to will be found discussed in Chapter Four, Section 7.

Throughout the book, illustrations are serially numbered in each chapter. Thus Fig. 1107 can be readily located as the seventh illustration in Chapter Eleven. There is an extensive, carefully prepared index at the rear of the book.

Most of the technically skilled specialists on the League's headquarters staff at West Hartford — men who have earned their spurs in amateur radio — have participated in the present revision. It has already been mentioned that the first part of the book was written by Mr. Grammer. The revision of the second part is the work largely of Donald H. Mix, *QST*'s acting technical editor, Clinton B. DeSoto, the editor of *QST*, and George Hart, the League's acting communications manager, with Mr. Grammer's hand again appearing in some of the chapters. The production of the book has fallen on Mr. DeSoto's office, with special credit due Louisa B. Dresser, *QST*'s editorial assistant. All of us will be very happy if this edition of the *Handbook* can be of as much help to its wartime readers as earlier editions have been to the amateurs of peacetime.

KENNETH B. WARNER
Managing Secretary, A.R.R.L.

WEST HARTFORD, CONN.
October, 1943

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THE AMATEUR'S CODE



1. *The Amateur is Gentlemanly*

He never knowingly uses the air for his own amusement in such a way as to lessen the pleasure of others. He abides by the pledges given by the ARRL in his behalf to the public and the Government.

2. *The Amateur is Loyal*

He owes his amateur radio to the American Radio Relay League, and he offers it his unswerving loyalty.

3. *The Amateur is Progressive*

He keeps his station abreast of science. It is built well and efficiently. His operating practice is clean and regular.

4. *The Amateur is Friendly*

Slow and patient sending when requested, friendly advice and counsel to the beginner, kindly assistance and coöperation for the broadcast listener; these are marks of the amateur spirit.

5. *The Amateur is Balanced*

Radio is his hobby. He never allows it to interfere with any of the duties he owes to his home, his job, his school, or his community.

6. *The Amateur is Patriotic*

His knowledge and his station are always ready for the service of his country and his community.

