

ELECTRICAL INSTRUMENT MAKING FOR AMATEURS: A PRACTICAL HANDBOOK

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Electrical Instrument Making for Amateurs: A Practical Handbook by S. R. Bottone

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S. R. BOTTONE

**ELECTRICAL INSTRUMENT
MAKING FOR AMATEURS:
A PRACTICAL HANDBOOK**

ELECTRICAL
INSTRUMENT MAKING
FOR AMATEURS.

A Practical Handbook

BY

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Enlarged by a Chapter on the Telephone, &c.

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P R E F A C E

THE amateur, especially if he be young, inexperienced, and unblest with "filthy lucre," must ever command our sympathy and respect. He, without any hope of reward, except that gratification which follows the acquirement of knowledge, works on, under the greatest difficulties, to the attainment of his end—an end which, in nine cases out of ten, tends directly to the benefit of his fellow-creatures.

Nearly all the really useful inventions and discoveries, which have rendered the 19th century so remarkable as a season of progress, must be attributed to amateurs. For this reason, if for no other, we should render every assistance in our power to the *bond-fide* amateur, and for this reason, along with another, have I attempted, in the following pages, to guide the tyro in his attempts at the construction of the more useful pieces of electrical apparatus. The other reason is that "a fellow-feeling makes us wondrous kind," and as I myself felt acutely the need of assistance at the beginning of my amateur-scientific career, so I am pleased to suggest when

PREFACE.

and how much trouble may be saved, and expense spared by the adoption of certain simple modes of procedure.

In the following pages no attempt has been made to describe the production of such highly finished "brass and glass" instruments as those which adorn the windows of our opticians' shops. Such a high degree of finish requires a technical knowledge of French polishing, lacquering, burnishing, etc., as is not usually possessed by the amateur. The tools used, also, are supposed to be of the simplest description, such as may be found in every home, however humble. Not one of the instruments described necessitates the employment of a lathe or other expensive tool in its manufacture; though, of course, much truer and finished circular work can be done on the lathe than in any other manner. But the instruments produced as described in this book, may be relied upon to *act* efficiently; and this is, after all, the end for which every instrument is constructed. It must be borne in mind that this work does not profess to *teach the science* of electricity: and no attempt is made to enter upon the domain of scientific speculation.

PREFACE TO THE SECOND EDITION.

THE rapid sale and flattering reception accorded to the first edition of this little work prove that it has met a want generally felt. Nearly all the Press criticisms have been favourable. Many kind letters of approbation have been received by the Author, and, in compliance with several of these, he has added a short article on the Telephone, which he trusts will meet the requirements of Amateurs. Any suggestion, either as to matter or treatment, will be gratefully received, and carefully considered in future editions, by the Author.

Carshalton, Surrey.

May, 1888

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ELECTRICAL INSTRUMENT MAKING FOR AMATEURS.

§ 1. TOOLS.—The true amateur, as a rule, has not a large assortment of tools. Little by little he gets together, or constructs those which are necessary for his purpose; but he seldom aspires to the complete paraphernalia of a workshop. Still there are certain tools that are indispensable, of which the following is a list in order of utility :—

- 1 Large pocket-knife.
- 1 Fine penknife.
- 1 Archimedean drill and bits.
- Pair of cutting pliers.
- Pair of large scissors for metal.
- Pair of small scissors.
- Several files, large and small.
- 1 Hammer.
- 1 Mallet.
- Bradawl, gimlet, pincers.
- Small bench vice.
- Small tenon saw.
- Soldering iron.
- Spirit lamp.
- 1 Wheel glass cutter or diamond.
- Pair of compasses.
- 2ft. rule.

2 ELECTRICAL INSTRUMENT MAKING FOR AMATEURS.

I should like to have put a lathe at the head of this list, for that is really the king of tools ; but I would not deter the student from making electrical apparatus because he has not a lathe, as most may be made well without, though better with one.

Besides tools, the materials mentioned below will be found useful. They need not be procured all at once, but as occasion demands. If the amateur adopts the plan of keeping up a little stock of his materials and tools, as they are worn out or consumed, and more especially if he remembers that, "Order is Nature's first law," and that there should be "a place for everything, and everything in its place," he will turn out better work, keep his temper, and work better than if he allows himself to degenerate into a slipshod style of doing things. Let him never say "that'll do" to anything capable of improvement.

§ 2. MATERIALS.—The following will be found useful in carrying out the instructions given in the ensuing pages :—

Glass rods from $\frac{1}{8}$ to $\frac{1}{2}$ in. in diameter.

Ebonite rods from $\frac{1}{8}$ to $\frac{1}{2}$ in. in diameter.

Glass tubes from $\frac{1}{8}$ to $\frac{1}{2}$ in. in diameter.

Guttapercha.

Glass bottles, preferably green glass.

Sheets of glass ; every piece is useful.

Bottoms of broken wine-glasses as stands, &c.

Tinfoil.

Sheet zinc and sheets of tinned iron.*

* Clean beef tins, sardine tins, &c., may be worked up very well and economically.