

LABORATORY MANUAL OF ALTERNATING CURRENTS

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Laboratory Manual of Alternating Currents by Lloyd C. Eddy

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OF ALTERNATING
CURRENTS**

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OF
ALTERNATING CURRENTS

BY

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PREFACE

OWING to the dearth of alternating-current textbooks replete with simple experiments the writer has prepared the following pages for the use of students whose electrical training includes only the essentials of the subject. The manual presupposes a working knowledge of direct currents and magnetism and may be used as the basis for a supplementary course in alternating currents. For more advanced study the writer recommends, and uses in his classes at the Shawinigar Technical Institute, textbooks requiring special investigation and larger laboratory equipment.

LLOYD C. EDDY.

SEPTEMBER 18, 1915.

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MANUAL OF ALTERNATING CURRENTS

EXPERIMENTAL STUDY OF ALTERNATING CURRENTS

EXPERIMENT 1: TO DISTINGUISH AN ALTERNATING CURRENT FROM A DIRECT CURRENT

(a) Connect a carbon-filament lamp to a direct-current circuit and notice whether or not the filament vibrates when a magnet is held near the glass bulb.

(b) Connect the same lamp to an alternating-current circuit and repeat observations.

(c) Reduce the frequency of the current to a very low value (by reducing the speed of the alternator) and try to count the number of vibrations of the filament per minute. Is this equal to the frequency?

(d) Determine the highest frequency at which you can count the vibrations of the filament.

(e) What caused the vibrations of the filament?

(f) At which frequency did the lamps appear to give the best light?

(g) Try the same experiment, using a metallic filament lamp.

EXPERIMENT 2: EFFECTS OF CHOKE COILS

Connect ten 16-candle-power lamps, 3 voltmeters, and several coils of wire wound about a closed iron core to a 30-cycle alternating current as in Fig. 1.

(a) Measure the voltage drops, V_1 and V_2 , across the lamp bank and inductance coil and compare with the total voltage drop, V_t .