Similarly, if the defect was originally traced to the starter, separate out the various coils such as resistance coils, no-volt release coil and overload coil and test these separately.

In the above description a simple rheostat starter has been taken to illustrate the principles of fault location. The exact procedure will vary with the type of starter. Thus with a contactor operated starter which, in the "off" position, disconnects *all* the lines to the motor, it is necessary to make tests to earth on both the incoming and outgoing terminals of the starter.

It is sometimes found that the insulation resistance is low all round without a definite fault on any section. This can usually be remedied by careful cleaning of the machine, for, when electrical machinery has been in service some time, it is liable to become coated in places with metallic or other conducting dust—in particular a mixture of metallic and carbon dust, often mixed with oil, from commutators or slip rings. Such deposits form leakage paths.

(b) *A.C. motors and generators*

These should be tested in a similar manner to D.C. machines with contactor operated starters, isolating the various circuits until the defect is located.

TESTING HOUSE WIRING

Electricity Supply Regulations 1937

In the above regulations the Electricity Commissioners prescribe in effect (Section 26) that the Electricity Supply Undertakings shall not permanently connect an installation unless they are satisfied that the connection would not cause a leakage exceeding one ten-thousandth part of the maximum current to the installation.

Now this regulation pre-supposes that some form of test be carried out, and whilst no specific tests are mentioned it is usual in practice to measure the insulation resistance of an installation prior to connecting it up.

Further, in Section 27 of these regulations it is stipulated that the Supply Undertakings shall not be compelled to give a supply of energy to any consumer unless they are satisfied that all conductors and apparatus are constructed, installed and protected so as to prevent danger.

The precise nature of the requirements are not specifically mentioned except in so far as this regulation is qualified by the statement that:

> " Any consumer's installation which complies with the provisions of the Institution of Electrical Engineers Regulations shall be deemed to fulfil the requirements of this regulation."

Now, according to the I.E.E. Regulations, it is necessary to carry out the following tests to make sure that an installation is safe:

1. Insulation tests (Regulations 501-503)*
   (*a*) Between each conductor and earth;
   (*b*) Between the conductors themselves.
2. Continuity tests (Regulations 219A, 401-410).
   To ensure that the conduit or lead sheathing is electrically continuous throughout and connected to earth.
3. Polarity of switches (Regulation 504).
   To ensure that all single pole switches are on the live side of the apparatus they control.

**I.E.E. Regulations for the Electrical Equipment of Buildings (Thirteenth Edition).*