

In addition to the above, a storage battery has been installed for the purpose of lighting the building when the plant is not running, and for charging purposes a Sprague motor generator is used to raise the voltage about forty volts over the 110 volts of the dynamo plant. The absence of wires is noticeable, all wires and cables being carried in ducts under the tessellated floor, but as these ducts are covered by iron plates they are as readily accessible as if exposed in the unsightly manners so often adopted. In short, the well lighted, airy, clean power house with all necessary appliances, but without any gingerbread fittings for show, is a model of what such a plant in an educational institution should be.

Probably the most important part of the laboratory which is intended for the education of practical engineers, is what is called the commercial laboratory, and it is well named, for not only are all classes and types of machines here gathered together, but are noticeably

nels under the raised floor upon which the machines are set. This floor being equipped with slots and plugs like an iron planer table, is suitable for the base of any machine, and also ensures that the belts may be kept tight without unsightly and cumbersome tightening apparatus. Movable tables of solid construction are provided upon which can be mounted the necessary local instruments and switches which may be found necessary for any particular test which may be undertaken.

As will be seen by the illustrations (Figs. 3 and 4) this laboratory is divided into sections called the alternating current room and the direct current room. While really the same room, these names are adopted to indicate the classification of the apparatus, for on the one side the alternating current dynamos driven by direct current motors are placed, while on the other the direct current generators and arc machines are set, and as each of these sections has its own travelling crane,



FIG. 2.—GENERATOR ROOM, McDONALD ENGINEERING BUILDING, MCGILL UNIVERSITY.

arranged for commercial work in the most practical way. The test room of a manufacturing establishment, and the usual college laboratory, are generally very dissimilar; the one bearing evidences of the hasty and unscientific methods which are apt to prevail in a commercial establishment, while the other very often partakes of the nature of a scientific kindergarten. In this case, the arrangements for good practical engineering work are unsurpassed, not only by reason of the great amount of apparatus, but notably by reason of the thoroughly practical way in which the work can be carried on. For instance, each test can be operated independently of any other without that confusion which would inevitably result from an improper and unpractical lay-out of the apparatus, while flexibility of the apparatus is increased to the maximum by the ease by which the machines may be moved from place to place by the travelling cranes and the facility of connection to the circuits, which run in easily accessible chan-

cables switches, etc., the two divisions of the laboratory are independent. The alternating current laboratory containing, as it does, examples of the best types of single two and three phase machines, as well as special apparatus for phase and periodicity changing, is probably the more interesting of the two, while the direct current laboratory contains types which are familiar by long association to any one acquainted with the average lighting and power station for commercial purposes. It may be noted that while the size of the machines is not such as to command attention, the largest unit not exceeding 40 k.w., none of them are toys, but of a size sufficient to demonstrate the peculiar features of each type, and are arranged and connected so that the distinctive features of each may be best shown. A glance at the principal pieces of apparatus will illustrate this fact, for we find driven by appropriate variable speed direct current motors the following types :

A 15 k.w. alternator, with revolving fields, made