

by the Canadian General Electric Company which may be used for either single two or three phase operation; a 15 k. w. Stanley two phase alternator, made by the Royal Electric Company, which illustrates the inductor type with stationary armature, a 15 k. w. Warren inductor alternator, for single phase operation, a 12 k. w. Mordey inductor alternator made by the Brush Company; a 20 k. w. one, two or three phase double ended Westinghouse rotary converter, and two others of the same type of 10 k. w. each; a 10 h. p. two or three phase induction motor made by the Canadian General Electric Company, arranged for frequency changer through the variable speed of the driving motor.

In addition there are a number of alternating current motors from two to five h. p., as well as the direct current motors used for the generator drives, which vary from ten to forty h. p., of General Electric and Crocker Wheeler type. The instruments and accessories which

which will abundantly satisfy the most enthusiastic student, especially when it is noted that the power station and all the laboratory motors are also of the direct current types.

In addition, there is being installed at the present time a Chloride storage battery of 75 k. w. hour capacity, which is arranged to float on the circuit supplying the laboratory, which absorbs current when the load is light and gives it out when the laboratory demands are great. This battery will thus not only aid the regulation, which is so important where experiments are to be successfully carried out, but will be available for standardizing instruments and similar work where a very steady voltage is required.

The ampere meters, volt meters, condensers, transformers, voltage regulators, electric speed indicators, dynamo meters, etc., are of too great a variety to enumerate, and the resources of European and American



FIG. 5.—HIGH TENSION LABORATORY, McDONALD ENGINEERING BUILDING, MCGILL UNIVERSITY.

must of necessity be used in the work are of every variety and of representative types, and include a number of special instruments of precision not usually found in the laboratory. With the above equipment it becomes easy to meet any case which may arise, and power of any periodicity, phase or voltage is readily obtainable. It is here that the student gets his most practical experience in dealing with alternating currents.

The direct current laboratory, while representative of the older and more similar types of machines, will not demand from the student that study which he will have to devote to the alternating section, but as representing direct current machinery and practice it is very suitably fitted up. A glance at the types shows a 16 light Thompson Houston arc machine, a similar size Wood arc, and a ten light Brush arc machine. Of direct current motors there are many of all types and sizes from one-twentieth to 15 h. p., the latter size being a railway motor. These, with their numerous accessories, such as rheostats, switches, arc lamps, starting boxes, etc., allow of a scope for experiment in direct current field

makers have been drawn upon in the largest way to make the auxiliary apparatus complete.

With this commercial laboratory so thoroughly equipped, Professor Owens has at his disposal an instrument thoroughly suitable not only for instructive purposes but also for the commercial testing of lamps, transformers, meters, etc.

The high tension laboratory, with its transformers wound as high as 30,000 volts, its electrostatic instruments for measuring pressures of 150,000 volts, with accessories in the shape of meters, regulators, impedance coils, etc., is evidently no place for the freshman of an investigating turn of mind. It is here that all high voltage experiments are carried out, line insulators tested, and completed apparatus subjected to the searching thrusts of thirty thousand volts or so. To the high potential laboratory is due the advances in insulation which have made it possible to transmit power to long distances at high voltages, and it is this department which will be called upon in the future to extend the range of commercial voltages, so that this will be a more important department in the future than even at the present time.

The standardizing laboratory, where all instruments are calibrated and the most of the high class experiment-