

been constant trouble in keeping the low tension network balanced and up to standard pressure. The area supplied at present is about 25 square miles, but the company have powers which will eventually treble that total.

The low tension mains, comprising about sixty miles of complete three-wire, are all linked up into one network, fed at suitable points by rotary transformers, and, of course, largely from the central. The generating station is situated in about the centre of Twickenham, about two miles from one end of the district now operated, and between six and seven miles from the other. The transmission is by direct current at 2,750 volts, with future intentions of making it three-wire at 5,500 volts.

*Generating Station Equipment.*—The present H.T. equipment consists of two 200 K.W. 2,750-volt generators and one 100 K.W. 2,500 : 500-volt rotary transformer, with booster attached for raising the low tension side for transforming up, so that whilst during the day one H.T. set is run, supplying the two principal sub-stations and the home rotary transformer, during heavy loads the home rotary transformer is taking current from the L.T. board and transforming up. This has saved installing another generating set.

*Generators.*—The generators are four pole, direct coupled, running at 475 R.P.M. They are shunt wound, with shunt separately excited at 500 volts. These machines have now been running for about five years, and it is a curious fact that, although they have continually been in trouble from flashing over and other causes, the armatures have never had even a new former. For two years each machine was running without a break for eighteen hours on each alternate day.

*Switchboard.*—The switchboard (Fig. 1) consists of nine panels. They are of iron throughout, with mica washers and bushings. There are two generator panels, six feeder panels, and a voltmeter panel. The circuit breakers are D.P. air break, and are ranged along the top, with a slate division between each set. Immediately behind are the change-over switches, and above these the busbars. The generator switches are fitted with maximum and minimum cut-outs, the minimum coil being fed from the 500-volt shunt circuits. The feeder cut-outs are simple overload. At the bottom of the generator panels are the field rheostats and field breakers. Five of the feeder panels are fitted with line regulating resistances, L.T. long-range operating switch, and paralleling voltmeters for running the automatic sub-stations. The method and connections are shown on Fig. 3, and will be referred to later. Each feeder is fitted with a surge arrester, consisting of a series of spark gaps in series with an oil tank resistance. These arresters were installed after one of the lines had been twice broken down on charging. Lastly, the volt-