the merit of making this one of the strongest points in the transformer. The cases of all these transformers are provided with sight gauges at the top to show the height of the oil level. Gauges are also placed at the bottom of the case in order that the presence of water may be detected.

A thermometer is furnished with each transformer, its bulb extending into the oil just below its surface. This thermometer has electrical contact devices, whereby an alarm may be sounded in case the temperature of the oil exceeds any predetermined value.

Too little attention has ordinarily been paid to the consideration of adequate means for handling large transformers. In some instances no provision is made, a great deal of temporary rigging being required in order to install the transformers or to remove them from their cases for inspection or repair. Sometimes a travelling crane is provided which renders the lifting of the transformers very simple. Both the temporary lifting device and the crane, however, interfere very seriously with any high tension wiring which may be located above the transformers. Inasmuch as the logical position for the high tension wires is overhead, any method of handling the transformers which will not interfere with this wiring or which could be employed while the wiring is alive, is of decided advantage. Each of the Shawinigan transformers is placed upon a heavy cast iron base which normally rests upon six flanged wheels let into the foundation proper, cast in the bottom of the base. In front of the transformers parallel with the line in which they are placed is a track on which is a shifting or transfer truck supplied, in addition to the four wheels on which it moves, with six wheels placed in exactly the same manner as those on the transformer foundation. When for any reason a transformer is to be removed from its case, the truck is run up directly in front of the transformer, from which the leads and piping have been disconnected. The transformer, moving easily on the fixed wheels, is then pulled out on the truck. The truck and transformer may then be moved to a point beneath a permanent hoisting device. If the travelling crane has been installed for other apparatus in some other part of the building, the above scheme can ordinarily be employed to bring the transformer within range of this crane. A novel feature was introduced into the design of these transformers which lessens to a great extent the risk to surrounding property from the presence of the quantities of oil in which the transformers are immersed. This scheme, which was suggested by Mr. R. D. Mershon, involves the safe and rapid transfer of the oil to a place of safety in case of fire in the transformer building. The transformer cases are made of heavy iron. The top is of cast iron, heavily ribbed and arranged to bolt to the tank, an air-tight joint being effected by means of a lead gasket. The manholes in the top are also made with air-tight joints, and all the leads and cooling coils are brought out through the stuffing boxes. At the bottom of the tank is placed a large valve which connects direct with the water mains. If a fire occurs in or near the building in which the transformers are housed, and apprehension is felt lest their cases be damaged and the oil be ignited from the heat of the burning building, the emergency water inlet valve may be opened and the oil forced out of the top of the transformer into the sink hole. In this place it will be safe from destruction and the danger of great damage to surrounding property through the release of hundreds of gallons of burning oil will be averted. The substantial construction of the case, together with the water which will then fill it, will protect the transformer itself from harm, the only damage liable to occur to the transformer being the wetting which it will receive. A wet transformer, however, may, by proper treatment, without any great difficulty, be put again into condition for operation.

(To be continued.)

The town engineer has been ordered to have the streets of Outremont surveyed, and the crooked streets straightened.

The city of Sherbrooke has offered to purchase the plant, water power, and franchise of the Sherbrooke Power, Light & Heat Co., for $150,000.

SINGLE PHASE MOTORS AS A MEANS OF INCREASING STATION EARNINGS.

PART I.

An electrical central station with its auxiliary distribution system, is a manufacturing plant, and the same general principles of operation apply to it as to any other form of factory. There must be the greatest possible simplification of output; production must be maintained on as nearly uniform basis as possible; and the full productive capacity must be sold, if possible. Economical operation of central stations is therefore inevitably drifting toward the ideal basis of generation of one form of current, and the development by every means possible, of a high load factor. Further than this, operating engineers are specifying the installation of consuming devices, which afford the lowest first cost, and the simplest possible system of distribution. The single phase alternating current motor lends itself readily to the development of this general scheme of economic production in ways it is the purpose of this paper to briefly set forth. The following concise statement of facts will be accepted—the writer believes—by all central station men who are familiar with the performance of the single phase alternating current motors, as built by the Wagner Electric Mfg. Co.

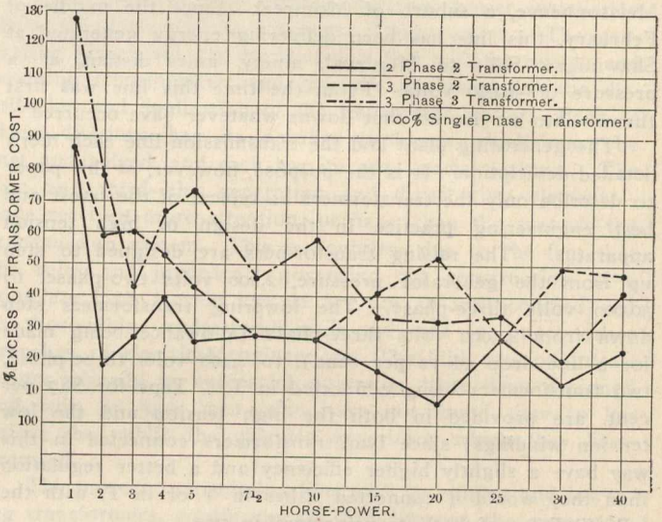

Fig. 1.

Curves showing excess of first cost of transformers for multiphase motors as compared with single phase. (These curves are based on price list of one of the large companies).

1st. The single phase motor has reached a high stage of mechanical and electrical development, and is to-day thoroughly reliable for all kinds of power service, not involving frequent starting and stopping, and speed variation.

2nd. The average single phase motor is equal in its electrical characteristics to the average polyphase motor.

3rd. The single phase motor calls for no larger degree of inspection and maintenance expense than the polyphase.

4th. The operating engineer of a large alternating current station would prefer an equipment of polyphase generators, with single phase distribution system, for service of all kinds, if possible. Difference of opinion exists between operating engineers of polyphase plants as to the extent to which single phase distribution may be judiciously employed, based upon the results obtainable with single phase motors.

5th. The operating engineer of a small station would prefer single phase generators, and single phase distribution exclusively.

The writer of this paper is an advocate of the following arrangement of station service:

(a) For large plants. Polyphase generators, with switchboard arranged for operating:

1st. Polyphase feeders for all large power and rotary converter service.

2nd. Single phase feeders for all general lighting service, and for all small power work, the switchboard facilities being such that any single phase feeder may be switched to either phase of the generator busses.