The switches are very large and strong. They are power-driven, which is a good feature. The percentages of switches fitted at Brantford is seven. The calling-rate is low. If these were installed where the calling-rate is high, 10 per cent. at least would be required, and the switches would occupy considerable space. Between groups of switches four wires are necessary. This would render the system difficult of use in multi-office areas. Ringing is not automatic. The clearing of a call is not quite instantaneous. A couple of seconds elapse before the switches resume normal. The wear is negligible, and the repairs stated to be low. Only one mechanician is in attendance during the day at Brantford, and the exchange is without an attendant at night. This system has been in operation for some years, but does not seem to make headway. The company does not impress one as being able to undertake any considerable orders or to be depended on to continue supplies.

Altogether the impression formed was that this system would not fulfil our requirements.

Stromberg-Carlson Semi-automatic.

At Rochester the Stromberg-Carlson Telephone Company were found to have a semi-automatic system which had been in operation on about a hundred and thirty lines in their factory for about eighteen months and was giving satisfaction. They had equipped and erected switches for 1,100 lines in a sub-exchange about four miles from the Independent Company's main exchange. This was not, however, in operation, and although that is some months ago it does not appear that the system is yet operating as a part of the exchange service.

A description need not be given, as the system is only in the developmental stage, and is referred to only to emphasize how various companies are seeking automatic means of giving telephone service.

The Western Electric Company's Semi-automatic System.

The Western Electric Company in New York, after years of development-work, have installed a semi-automatic system in their factory at West Street as a private branch exchange, but so equipped that it represents an exchange unit of 2,000 lines forming part of the multi-exchange area of New York City. There are 450 subscribers' lines in operation, and there are trunks leading to two city exchanges—viz., to Cortland and Chelsea.

The ordinary common-battery telephones are used by the subscribers. The manual portion of the board, where the operators are, has five outgoing and two incoming positions. There are lamps to indicate the calls and jacks to plug into. There are no multiples used, and only single cords, about twenty-five each position. There are line and cut-off relays, meter keys, and supervisory lamps. B boards are not required. Each girl can attend to about three hundred and fifty calls an hour, and to more for a short period when necessary. Generally up to this stage the provision is the same as for manual C.B. with the exceptions stated.

On a subscriber's lamp lighting the operator plugs in. This automatically cuts in her headgear and a special keyboard. The line lamp goes out and she gets the number and strikes it up on the keyboard before her.

The keyboard has four rows of keys or plungers, each row numbered 0 to 9. The rows are for units, tens, hundreds, and thousands. There is a fifth row which has keys marked "W.E.," "Chelsea," "Cortland," "L.O.," "Error," and so on, as may be required. The ringing is automatic, with breaks in it. Subscribers connected together can flash in on the supervisories to recall the operator. After setting up a number on the keyboards the keys remain down only a short time. The operator, by pressing a key marked "L.O.," or "Listening out," can disconnect herself from any circuit. The plugging of any cord also automatically cuts her off a former circuit and connects her to the circuit plugged into. The operator can come in on any circuit by pressing a special key. When the conversation is finished subscribers hang up the receiver. The automatic apparatus does not disassemble until the cord is removed. There is an "error" key, so that if an operator has made a mistake on the keyboard, by pressing that key the automatic apparatus, so far as it has been set up, disassembles.

If a subscriber on being answered has forgotten the number, as the operator is busy she cannot wait for him, but she takes up another cord and answers another call. She can come to the former subscriber at any moment by pressing a key, or he can flash her back when he is ready.

Associated with the special keyboard there are two sets of "cord finders, registers, and senders." These are called "A" and "B," and "A" is always selected first in this board. It is intended in future to make these become used alternately. If "A" is in use, "B" is then automatically brought into use if one call quickly follows another. There is also a row of six green lamps connected with the cord-finders, &c.: these are low down on the manual switchboard-panel. As the automatic apparatus, set in motion and controlled by the keys struck, progresses, the lamps light and then extinguish, so that an operator has really a guide as to the progress of a call, and if a lamp remains alight she knows something has failed to act properly and she notifies the proper person of the trouble. She also knows that these subscribers are not connected, and she can cut in and explain. By leaving the cord in the jack the apparatus is held in place and the switchman can speedily locate the trouble. The keys remain depressed only until the impulses have been recorded by the registers; then they restore automatically.

As soon as a plug is inserted in a jack a cord-finder (away on the frame), which has three sets of wipers at 120 degrees apart, begins hunting for the cord used. It does this by circuits suitably arranged. This cord-finder switch moves always forward over the banks and remains in its last position until required to hunt for a cord—*i.e.*, really to respond to impulses. This arc movement is effected by a magnet becoming energized and a magnetic-clutch effect resulting so that the switch is taken round as long as the magnet is energized. Immediately the cord is found the switch stops. The stopping is