closed to traffic. A similar change in lights takes place on the bridge operator's signal lamp panel, the lights changing from "lock closed" to "lock open." At the same time the lock signal switch closes the circuit of the operating coils of the contactors in the circuit of the main operating motors.

As soon as the "lock open" signal light has shown up, the handle of the controller should be moved to the "off" position and the circuit breaker opened. If the controller handle is not thrown to the "off" position in time, the low voltage release coil of the circuit breaker will be short circuited through a set of contacts on the lock signal switch in series with a set of auxiliary contacts on the controller. It will be noticed that the circuit breaker of the lock motor must either be opened by hand or tripped automatically as above, before the oil switch for the main operating motors can be closed, for the auxiliary switch on the circuit breaker opens the circuit of the low voltage release coil on the oil switch when the circuit breaker is closed.

After closing the oil switch, the emergency brake is released by closing another switch. The main operating motors can then be started and the bridge raised by moving around the handle of the controllers. The first notch on these controllers releases the solenoid brakes only on the motors and this notch can be used at any time when it is desired to allow the bridge to coast. As soon as the bridge starts to open, the arm of the bridge signal switch moves from the position marked "closed" and thereby opens the contactors in the lock motor circuit. This prevents the end lock being operated while the bridge is open. As long as the bridge is closed the "fully closed" light (white) on the signal lamp panel shows up, but as soon as the end of the bridge lifts off of the pier, this light is extinguished. An auxiliary indicator switch mounted on the end of the moving leaf of the bridge was used for this light as it was found impossible to obtain a definite indication of the "closed" position of the bridge by means of the bridge signal switch operated by the movement of the bridge. The remaining lights, however, on the signal lamp panel, which show up in turn as the bridge opens, are operated from contacts on the bridge signal switch. The channel lights which change from red to green when the bridge opens are also operated from this switch. If the operator fails to throw the controller handle to the "off" position after the "nearly open" signal light has shown up, the low voltage release coil of the oil switch is short circuited by means of a set of contacts in the bridge signal switch in series with contacts in the controller. This arrangement trips the oil switch, cutting off current from the motors and setting the solenoid brakes. If through any cause switch mechanism should fail to operate and open the switch, an alarm bell, which is connected in place of the usual series resistance of the low voltage release coil, rings continuously until the operator throws the handle of the controller to the "off" position.

In closing the bridge the handle of the main controller is, of course, moved around in the reverse order. No automatic cut-off is used when closing the bridge as a set of air buffers are provided to prevent shock to the structure when the end of the bridge strikes the pier. If the bridge is traveling too fast, these air buffers will cause the motors to be overloaded and so trip the oil switch. The bridge can, if necessary, be held down on the pier by keeping the controller on the second or third notch until the emergency brake is set—thus holding the bridge in position. The controller handle is then moved to the "off" position and the oil switch is opened. The circuit breaker of the lock motor is then closed and the lock moved into place. In closing the lock, the circuit breaker will also be tripped out unless the controller handle is moved to the "off" position as soon as the "lock closed" signal light shows up. When the lock is closed all signal lights show up white, indicating that the bridge is safe for traffic. During those times when the bridge is closed and the locks in place, the lock motor circuit breaker is closed so that the auxiliary switch disconnects the alarm bell and low voltage release coil of the oil switch from the 110-volt busses. A set of emergency knife switches are provided on the switchboard panel, which, when closed, cut out the main motor and lock motor contactors respectively. These switches are normally sealed in the open position and would only be made use of in case of damage to any of the contactors or some other emergency condition requiring operation of the bridge independently of the interlocking system.

The bridge signals described above are interlocked with the railway company's interlocking system in such a way that a train would be derailed if it attempted to cross while the bridge was in the open position.

Erection and Details.—The bridge was erected in the open position by means of a stiff-leg derrick mounted on top of a wooden erection tower 125 ft. high. The pouring of the concrete for the counterweight was carried on simultaneously with the erection of the steel so as to balance the structure at all times during erection.

The current for operating this bridge is obtained from the Kaministiquia Power Company and is 2,200-volt, 3-phase, 60-cycle, A.C. current, stepped down to 550 volts for use on the bridge.

The electrical control apparatus is housed in an operator's house on one side of the bridge.

The bridge is also equipped with a hand operating mechanism for use in case of an emergency.

The total weight of the steel work and machinery is approximately 660 tons.

The bridge was designed by the Scherzer Rolling Lift Bridge Company, of Chicago, under the direction of Mr. P. B. Motley, engineer of bridges for the Canadian Pacific Railway Company.

The bridge was fabricated by the bridge department of the Canada Foundry Company in their Toronto works and all calculations in regard to counterweight, etc., were worked out in their engineering department after the shop drawings were made.

The entire electrical equipment was furnished and installed by the Canadian General Electric Company.

PROSPECTIVE C.P.R. DEVELOPMENT IN THE WEST IN 1914.

The Canadian Pacific Railway appropriations for Western Canada in 1914, are almost entirely confined to the laying of steel on over 600 miles of track now graded and waiting for it; to branch line extensions, and to the building of Rogers' Pass Tunnel. There will be a continuation of the double-track work, which was pushed so vigorously in 1913, and the close of the year will find great strides having been made toward connecting Winnipeg with Vancouver by a double track line.

The appropriations also provide for the completion of the terminals at Winnipeg, Calgary and Vancouver.