

partures occurring in New Brunswick and Western Nova Scotia. There was very little snow recorded during the month, the most noticeable fall being that which was experienced between the 15th and 17th, in a portion of Manitoba.

The table shows for fifteen stations included in the report of the Meteorological Office, Toronto, the total precipitation of these stations for April.

Ten inches of snow is calculated as being the equivalent of one inch of rain:—

Station.	Depth in inches.	Departure from the average of twenty years.
Calgary, Alta. ....	0.3	— 0.40
Edmonton, Alta. ....	0.4	— 0.45
Swift Current, Sask. ....	0.9	+ 0.15
Winnipeg, Man. ....	1.8	— 0.30
Port Stanley, Ont. ....	2.9	+ 0.30
Toronto, Ont. ....	5.1	+ 3.00
Parry Sound, Ont. ....	2.8	+ 0.65
Ottawa, Ont. ....	2.7	+ 0.10
Kingston, Ont. ....	2.8	+ 0.80
Montreal, Que. ....	2.8	+ 0.50
Quebec, Que. ....	2.9	+ 0.90
Chatham, N.B. ....	5.9	+ 3.15
Halifax, N.S. ....	8.2	+ 3.70
Victoria, B.C. ....	1.4	— 0.40
Kamloops, B.C. ....	0.1	— 0.37

#### PUTTING A CONCRETE JACKET ON A CRACKED CHIMNEY.

Two points of considerable engineering interest stand out from the facts of the work recently done by the Aberthaw Construction Company, of Boston, in putting a reinforced concrete jacket around a cracked and leaky chimney in the plant of the Winchester Repeating Arms Company, at New Haven, Conn. The job was of rather peculiar character, but the method by which it was done offers practical suggestions for handling work of different details.

The original chimney was of reinforced concrete, but it had developed large vertical cracks which allowed the escape of smoke and at times the inflow of air—both of these actions being harmful to the efficiency of the draft. This chimney rested on a brick foundation which was part of the power house building. Above this foundation it was about 80 feet, spread to an outside diameter of 8 feet at the bottom, and 6 feet at the top; it was four feet in diameter, inside, and was unlined. The old concrete, forming a wall about four inches thick in the cylindrical part of the chimney, had proved seriously defective aside from developing cracks.

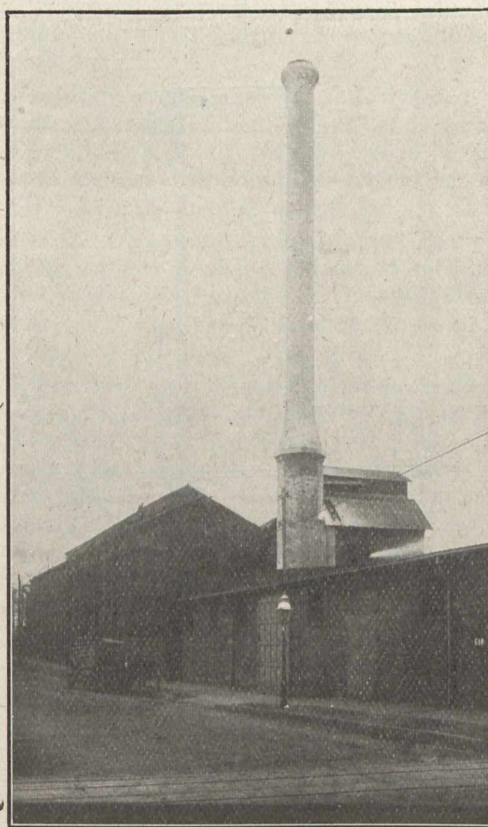
It had been laid as a stiff, dry mortar, without stone, and by the time the Aberthaw Company took hold of the job, the mortar had become so soft and "punky" that it crumbled easily under a blow and came away from the reinforcing metal with dangerous readiness.

The new concrete jacket put about the old chimney by the Aberthaw Company was five inches thick over the whole surface of the old structure. The vertical reinforcement consisted of four sets of square twisted steel bars with 32 in each set, equally spaced, and with the ends of the successive sets lapped. The lowest set of bars,  $\frac{5}{8}$  inch thick and 20 feet long, were upset at their lower ends to  $\frac{3}{4}$  inch diameter, and were screwed into an anchor ring 4 inches wide by  $\frac{1}{2}$  inch thick sunk in the brick work at the base of the chimney. The other three sets of vertical bars were  $\frac{1}{2}$  inch

square and 24 feet, 22 feet, and 20 feet long respectively. Outside this system of lapped vertical bars were placed a series of horizontal hoops of 3.8 inch square twisted steel, spaced 6 inches. The concrete of the shell was mixed 1:2:4 with the stone small.

Before the first section of the concrete jacket was applied the old chimney was carefully wrapped with asbestos felt. This served a double purpose, acting first as an expansion joint between the old and new structures, and serving also to protect the green jacket against too rapid drying by the heat of the inner shell, and against the drawing of moisture from the green concrete into the old chimney.

The other aspect of the work, which is of especial practical value, was the ingenious construction and operation of the form used by the Aberthaw Construction Company on the cylindrical portion of the chimney. The form proper consisted of a cylinder of 16 gauge iron 5 feet high, with an inside diameter of 5 feet 8 inches. This was made in three



equal sections divided vertically. The horizontal framing consisted of three 2 inch by 2 inch by  $\frac{1}{4}$  inch angles rolled to a true circular arc. Each section of the form proper, therefore, constituted a cylindrical surface of 120 degrees braced horizontally by the curved angle bars, one at the top, one at the bottom, and one midway between. Extending horizontally from the top of each of these sections was built a platform braced diagonally to the bottom of the form section with 2 inch by 2 inch by  $\frac{1}{4}$  inch angles, and resting on horizontal angle bars running to the upper corners of each section of the form. These three sections of form and staging combined were fastened together by bolts running through angle bars on the vertical edges of each section of the form and through the pairs of adjacent angle iron supports under the platform. The form and the working platform were suspended by heavy ropes from three 12-inch single blocks, which were themselves hung from a heavy ring set on top of the overhang of the chimney. The cylindrical portion of the jacket, in which the form was involved, was made in the following manner. The asbestos having been applied