

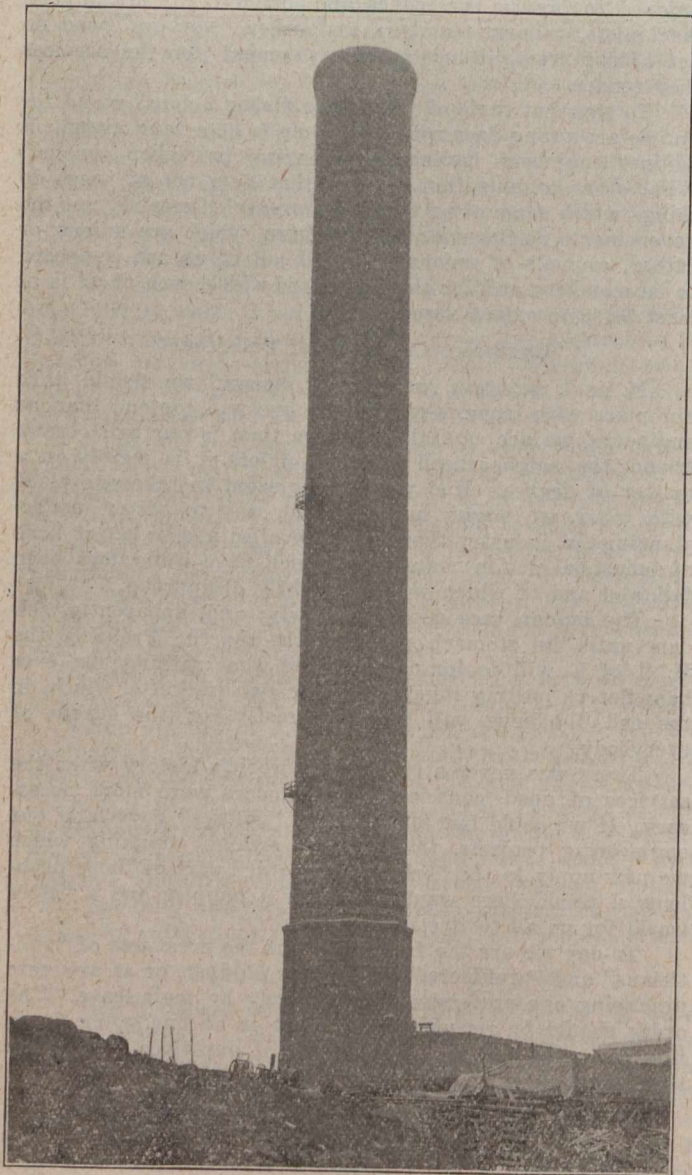
RADIAL BRICK CHIMNEY 300 FT. HIGH

Built for the British America Nickel Corporation, Ltd., at Nickelton, Ont.—Inside Diameter at Top, 25 Ft.—Special Precautions Against Sulphurous Gases

By J. G. MINGLE

Formerly District Engineer for Rust Engineering Co.

ONE of the largest chimneys in Canada was recently completed for the British America Nickel Corporation, Ltd., at Nickelton, near Sudbury, Ont. Owing to the hard use to which a smelter chimney is subjected, it was necessary



SPECIALLY DESIGNED TO RESIST SULPHUROUS GASES

to use more than ordinary care in its design and construction. Gases issuing from it contain from 3 to 4% of sulphurous acid. When the gases come into contact with the outside air they condense and the acid collects on the top and sides of the chimney.

This chimney, which is of the perforated radial brick type, is 300 ft. in height; the inside diameter at the top is 25 ft. and at the bottom, 27 ft. 6 $\frac{3}{4}$ ins. The lower 50 ft., or pedestal, is built of common shale brick, laid in an acid-proof mortar, and is a hollow octagon in section. The walls of the pedestal vary in thickness from 36 ins. at the bottom to 28 ins. at the top, and are built plumb with the offsets.

The upper 250 ft., or shaft, is built of perforated radial brick and is annular in section. The wall thickness at the bottom of the shaft is 26 ins. and decreases by sections to 13 $\frac{3}{4}$ ins. at the bottom.

The chimney is lined throughout with a 4-in. perforated radial brick lining, separated from the outer wall by a 2-in. air space. There are two flue openings, each 22 ft. 6 ins. high by 10 ft. wide, located at right angles to each other.

Brickwork for chimneys is usually laid in a mortar composed of 1 part cement, 2 parts lime and 5 parts sand. Owing to the constituents of the flue gases, it was inadvisable to use lime in the construction of this chimney, and as a consequence fire clay was used in its stead. The entire chimney, pedestal, shaft and lining, was laid up in a mortar composed of 1 part cement, 2 parts lime and 5 parts sand. Mortar of these proportions is dense and practically impervious to acids.

Lined in Twelve Sections

The chimney is reinforced horizontally throughout its entire height with $\frac{1}{4}$ -in. by 3-in. strap steel bands placed at intervals of approximately 20 ft. These bands are embedded in the walls of the brickwork to resist any circumferential stresses that may occur. There are inside and outside ladders of $\frac{3}{4}$ -in. diameter U-irons embedded in the brickwork at 15-in. centres. The outside ladder is equipped with guards. The step irons were painted with an extra-heavy coat of asphaltum paint. The chimney has two testing platforms (at approximately 75 ft. and 170 ft. above the bottom) from which samples of the gases may be taken. There is also an acid-resistant lightning-rod.

The lining is supported on corbels built out from the inside of the wall, and is divided into twelve sections ranging from 15 to 30 ft. in height, so that in case any part of it becomes damaged, that part may be removed and replaced without much harm to the remainder. In order to partially seal the air space between the top of each section of the lining and the bottom of the corbels directly overhead, a lead sheet of approximately 14-gauge material was embedded in the corbel brickwork about 15 ins. above the top of each section and then bent downwards over the opening and extending an inch below the top of the lining. These lead coverings prevent the gases from collecting and condensing in the air spaces.

The top of the chimney has a heavy sectional terra cotta cap about 2 ins. thick, which prevents the acids from collecting on and doing damage to the brickwork. Terra cotta is practically acid-proof and affords excellent protection to the most vulnerable part of the chimney.

Exposed Surfaces Are Coated

The inside surface of the lining and the outside surface of the top 50 ft. of the shaft were painted with silicate of soda as an additional protection against acid.

An 8-in. baffle wall, 30 ft. high, separates the two flue openings. The brickwork over the openings is supported by six 10-in. I-beams embedded in the masonry directly above the crown of the arch. Pilasters, 72 ins. wide, are built in each side of both openings to compensate for the reduction of area due to the openings. The pilasters are tied together by 1-in. diameter tie rods. Two clean-out doors were provided at the bottom.

The chimney was built on top of a small hill of solid rock. No special footing was necessary, the top of the hill being cleared of soft rock and then levelled with concrete. The chimney was designed and built by the Rust Engineering Co., Pittsburgh, Pa.

Several changes in the requirements governing the entrance of students to the Faculty of Applied Science, University of Toronto, were announced January 1st. The new requirements are higher and are thought to be in line with the suggestions made to Dean Mitchell by the executive of the Institution of Civil Engineers of Great Britain.