column of the same dimensions, and the same quality of cement, the laitance will hardly be ¾ in. to 1 in. thick. If not removed carefully this laitance accumulating at the top of columns and sometimes at the bottoms of beams may cause trouble, and the success of winter-made concrete is to some extent dependent upon the careful removal of the laitance. If concrete work can be carried on successfully in winter, cement finish should not be attempted at all.

The success of a cement finish depends on the adhesion between the relatively thin coat of cement mortar and the concrete base. It is easy to understand that the freezing of the thin mortar finish will separate it from the base, and failure must result. It is the bond between the cement finish and the base, which is affected by frost, and not the cement finish itself.

The question of winter-made concrete is very important, especially for Canada, where in many provinces the winter season is longer than the summer, and it is now well established that concrete operations can be and are being carried on successfully in winter.

St. Michael's Church.—A striking example of the adaptability of concrete to complicated structure is given by the St. Michael's Church now being constructed at corner of St. Urbain and St. Viateur Streets, in Montreal.

The church proper covers an area of about 170 ft. x 90 ft. (exterior dimensions). There are really no columns in this church, and the whole structure is built of plain and reinforced concrete. The style is Byzantine. The layout, from the general engineering point of view, was made in detail by the architect, Mr. A. Beaugrand-Champagne. The design of the dome and supporting arches was by Prof. E. Brown.

The church is founded on rock. The basement ceiling is carried by flat arches 54 ft. clear span, having a rise of 30 ins. The arches are 18 ft. centre to centre, and are connected with a flat slab 7 ins. thick.

The main auditorium is covered by a dome 74 ft. diameter. This dome is carried by four full centre arches, each 52 ft. diameter, which arches are being carried down to rock by four strong tower abutments. The dome is about 118 ft. above the sidewalk and 110 ft. above the auditorium floor.

The tower is 170 ft. high. The outside walls are all covered with Greendale brick and terra cotta. The domes and roofs, however, are finished in concrete, the domes having received a colored waterproof cement finish about 1 in. thick, showing green shamrocks on a white field. The green color was obtained by mixing a green pigment with the ordinary cement, and the white coloring is obtained by the use of Atlas white cement.

The main cupola is carried on a series of semi-circular arches fixed rigidly into a heavy ring of concrete reinforced with steel bars in the form of circular hoops. There are six semi-circular arches, 36 ins. deep, 12 ins. wide at the bottom, and 6 ins. wide at the crown. At the crown the arches are connected by a disk 4 ft. diameter and 36 ins. deep.

For the computing of the stresses in the concrete and steel the total weight of the cupola, including suspended ceiling, wind, snow, etc., was taken at 150 lbs. per square foot, the cupola being of uniform thickness of 5 ins.

The six semi-circular ribs are reinforced with four 1⅛-in. square twisted bars, two near the top and two near the bottom and connected with stirrups about every 12 ins. The cupola, which is of a uniform thickness of 5 ins., is reinforced with half-round bars at 6-in. centre to centre.

To ascertain that under the most unfavorable conditions the stresses in the concrete and steel will always remain within the safe limits many assumptions were made.

The cupola was first designed without ribs and of a uniform thickness of 8 ins., following the theory given by E. Collignon "Cours de Mecanique, p. 631." The theory as given by Collignon shows that in a spherical cupola the stresses in the material used are independent of the thickness of the cupola, and are determined only by the diameter of the cupola and the specific gravity of the material used. With hoops made of ½ square bars, and placed 9 ins. centre to centre, the stresses in the steel concrete would be kept within the safe limits. The thickness of the cupola will be rather governed by the stiffness to be attained than by the safe stresses. However, taking into consideration the large proportions of the cupola, it was decided to provide arch ribs as described above, and making assumptions rather more severe than the actual conditions warranted, the stresses in the steel and concrete were kept within the safe limits. Notwithstanding this fact that the cupola was designed assuming unfavorable conditions, from an economical point of view the concrete cupola was the cheapest. As built, the cupola is about 40% cheaper than a Gostavino tile cupola, and about 50% cheaper than a steel structure fireproofed with concrete or tiles.

The half spherical cupola at the rear having a diameter of 52 ft. and the small 20-ft. cupola at the top of the tower are of uniform thickness, and are reinforced with hoops made of round ½-in. bars.

The four main arches carrying the cupola, the cantilevers and the arches in the basement were designed following the established methods. The winding stairs and the large windows were also made of reinforced concrete, although no established formula were available.

The Long Sault Development Co.'s project for the construction of a dam across the St. Lawrence River in connection with its power development scheme, has been finally quashed, the U.S. Supreme Court having dismissed the company's appeal against the ruling of the New York courts annulling its franchise. This matter has been before the courts for several years, and has been persistently fought at every stage by the Dominion Marine Association and the Shipping Federation of Canada, on the ground that it would interfere considerably with the safe navigation of the St. Lawrence River.

The committee on sewage works operation of the American Public Health Association has made an analysis of sewage treatment plants in the following fifteen states: California, Illinois, Iowa, Kansas, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Texas, Virginia and Wisconsin. The total number of plants reported was 1,294. Of these, one-third are designed for populations of less than 500; over one-half for populations between 500 and 10,000; and only 7 per cent. for populations over 10,000. Only 29 of the 1,294 plants are equipped with complete laboratories, and of this number 17 are in the State of Pennsylvania.

The Governor-General of Korea has issued new mining laws to supplant those of 1906. They consist of 64 articles based on the mining law of Japan. The most important provision is that in future foreigners as individuals will be prohibited from obtaining mining concessions in the country, and the granting of such concessions is to be limited to Japanese subjects born or "legalized," and the latter must have their head office in Korea. Mining rights already in existence and held by foreigners are not to be interfered with. Priority of application will probably no longer ensure the grant of mining rights, although this is not expressly stated in the new ordinance.