directly beneath which lies a deposit of moderately hard and shaly clay for a depth of from 2 to 3 ft. Upon sinking through this (or to about 33 ft. below sidewalk level) as the clay walls were self-sustaining. Consequently these excavations were made exactly of the size and shape required, and on bottom being reached, were filled

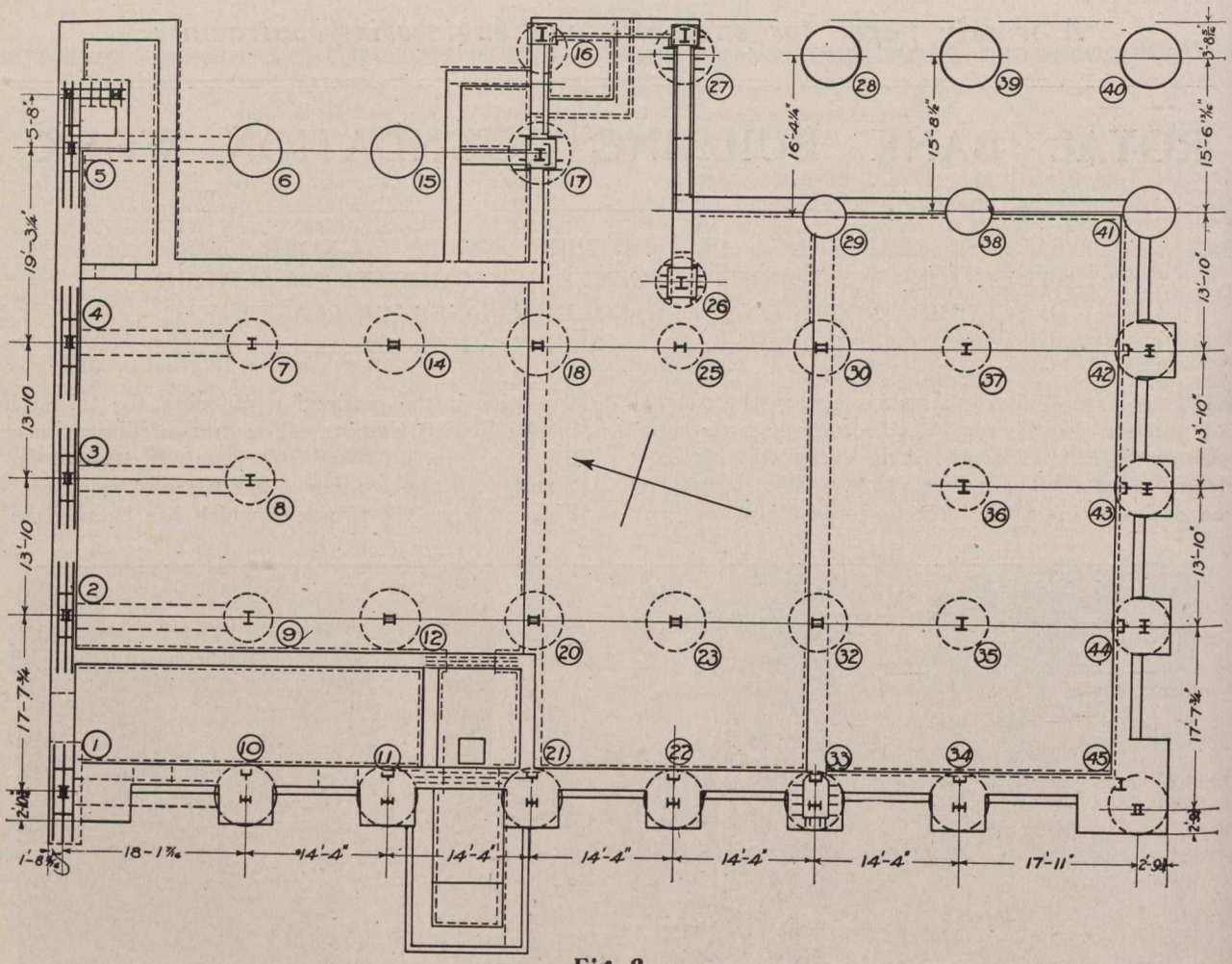

Fig. 2.

a very hard, dense shale is reached which, from borings that have been made in the vicinity, has not been found to change much in character in six hundred feet of depth, according to Professor Parks, of the department of geology, University of Toronto.

A test made on an isolated sample of this shale, in the testing laboratories of the University of Toronto, showed first signs of crushing when a load of 70 tons per square foot had been imposed. It is upon this hard shale of rock that the foundations of the building rest.

Caissons.—As no part of the basement is excavated down to the shale, caissons were sunk through the clay until bed rock was reached at each of the 41 points where a column foundation was required. Each column is carried upon a separate pier, with the exception of those which are carried on cantilever girders, or on plain girders, as shown on Fig. 2. All piers, with the exception of those along the extreme north end of the building, are circular in plan, and vary in diameter from 4 ft. 4 in. to 6 ft. 8 in. at the top, according to the proportion of the load that is transmitted to them.

These piers are increased in diameter at the bottom by an additional 2 feet in each case, the enlargement tapering through a height of 3 feet. On an average, each pier carries a load of about 14 tons per sq. ft. Owing to the nature of the soil, in sinking for piers it was found unnecessary to use any form of hollow caisson or piling in with concrete to the requisite height to take the grillages. The concrete used was of a 1:2:4 mix, the stone being about 1½-in. gauge.

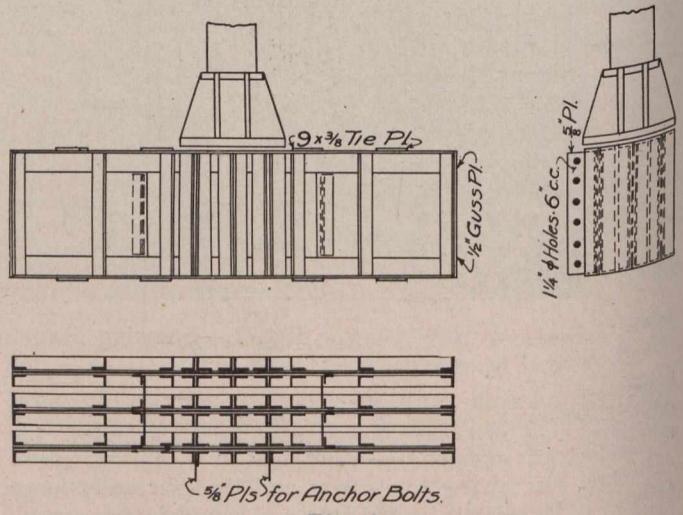

Fig. 3.

Grillages.—The grillages were composed of steel I-beams varying from 10 in. @ 30 lb. to 24 in. @ 100 lb., those for the main columns being composed of two sets of four 15-in. @ 50 lb. I's, and each set of 4 beams being