Joints of sanitary pipe sewers below the normal water table shall be made with a compound approved by the chief engineer. The compound shall preferably have a bituminous base, shall adhere firmly to the glazed surfaces of the pipes, shall melt and run freely at a temperature as low as 250° F. and when set shall be sufficiently elastic to permit of a slight movement of the pipes without injury to the joints or breaking the adhesion of the compound to the pipes. The compound shall not deteriorate when submerged in fresh or salt water or normal domestic sewage; it shall show no deterioration of any kind when immersed for a period of five days in a 1-per-cent. solution of hydrochloric acid or a 5-per-cent solution of caustic potash.

Table IV.—Minimum Depths of Socket and Annular Spaces.

Diameter of Pipe, in.	Depth of Socket, in.	Annular Space, in.	Diameter of Pipe, in.	Depth of Socket, in.	Annular Space, in.
6	2½	⅝	22	3¾	⅝
8	2¾	⅝	24	4	⅝
10	2¾	⅝	27	4	¾
12	3	⅝	30	4	¾
15	3	⅝	33	5	1¼
18	3¼	⅝	36	5	1¼
20	3½	⅝	42	5	1¼

After a joint is properly caulked, a suitable runner shall be placed and the compound, heated to a temperature of approximately 400° F., shall be poured into it in such a manner that the annular space shall be completely filled to within ½ in. of the outer rim of the bell of the pipe.

Unless otherwise permitted, at least four finished joints shall be left exposed for inspection throughout the working day, and the necessary staging for the protection of the exposed sewers and for the handling of excavated material shall be provided. The joints on the inside of all pipe sewers larger than 15 ins. in diameter, shall be carefully filled with mortar and wiped smooth and flush with the surface of the pipe.

TO ACT ON NICKEL REPORT

That nickel refineries can be successfully operated in Ontario, and that a tax should be made on the net profits of the producing companies, are important suggestions contained in the report of the Ontario Nickel Commission, made after eighteen months' research.

The legislation to be based on the commission's report will provide for taxes on all Ontario mines the annual profits of which exceed $10,000, which are to be raised from 3 per cent. per annum to 5 per cent. per annum upon the annual profits in excess of $10,000 and up to $5,000,000. On all annual profits over $5,000,000 and up to $10,000,000, the tax will be 6 per cent. per annum; on all annual profits over $10,000,000 and up to $15,000,000 the annual tax will be 7 per cent.; and on the annual profits in excess of $15,000,000 a percentage increasing with each additional $5,000,000 in the same proportion as in the case of the second and third five million dollars.

On nickel and nickel-copper mines the new taxation is effective as from the 1st January, 1915.

SLAG AS AN AGGREGATE FOR CONCRETE.

INVESTIGATIONS and tests made to determine the availability of slag as an aggregate for concrete were described by Mr. Sanford E. Thompson, Consulting Engineer, Boston, Mass., in a paper presented at the thirteenth annual convention of the American Concrete Institute. The investigation by Mr. Thompson covered the following:—

The use of slag for plain and for reinforced concrete.

The relative value of slag versus gravel for building construction.

The relative characteristics of slag made from different processes.

The relative value of the same slag under different conditions of age, size and porosity.

The strength of slag concrete, with the permissible proportions and stresses to adopt.

The durability of slag concrete.

To properly treat these various questions, several series of tests were undertaken. The data derived from these tests and from a study of previous investigations are summarized in the paper as follows:—

The strength of concrete made with slag, such as is obtainable commercially in eastern and northern Ohio, was on the average about 50 per cent. higher at the age of 28 days than gravel concrete made with first-class materials.

Using the same proportions by volume as for gravel concrete, about 15 per cent. more cement on the average was required per cubic yard for slag concrete than for gravel concrete of the same proportions.

No authentic cases of deterioration of slag concrete made with Portland cement or of rusting of steel embedded in such concrete have been discovered.

Porous slag produced a concrete of substantially the same strength at 28 days as dense slag. At later ages, the dense slag is probably stronger.

Slag made by different processes and under different conditions showed no marked difference in strength and other characteristics.

An extremely hard, dense, acid slag did not produce a concrete of greater strength than porous, basic slag on a 28-day test.

The weight of the slag concrete tested averaged about 6 per cent. lighter than an average gravel concrete. On the other hand, very dense acid slag concrete was heavier than gravel concrete.

Granulated slag sand produced a mortar of inferior tensile strength on short-time tests.

Crushed slag screenings produced a mortar appreciably higher in strength than standard sand mortar.

No tests of watertightness of slag concrete were made in this series nor of protection of metal. Tests by other authorities and examinations of structures of slag concrete and tests made with concrete of other aggregates show that when properly laid the steel is protected from rust, even although the aggregate is porous.

Tests thus far made of permeability of slag concrete are insufficient to determine its availability for thin, watertight work, such as tanks.

The weathering qualities of slag concrete are indicated as satisfactory by examination of structures which have been built for a number of years, but further experimental investigations along these lines with different types of slag are needed before the conclusions as to its use can be considered final.