As to precautions to insure thorough mixing, the belief is apparently quite general that if the mixture is left in the mixer long enough, no other precaution is necessary to secure good mixing. The inspector or supervising foreman is left largely to his own devices on hand-mixing. If he is an experienced and competent man he will get the desired results, but there will undoubtedly be many variations in the methods adopted by different men to obtain the same results.

Machine mixing is generally required on all work of sufficient magnitude to justify a mixer, and batch mixers are quite generally specified. Continuous mixers are apparently not in good standing among the engineers who write the specifications and prescribe the methods. When hand-mixing is done, the manner of mixing is sometimes specified in detail, requiring the sand and cement to be mixed dry, then the stone added with some water, and the mass shovelled until all of it has been turned a specified number of times, water being added during the mixing until the required consistency is obtained.

The cement gun (using compressed air) and the the atomizer (using steam) have been developed within the last few years. They are not intended for use in placing concrete where the ordinary equipment will serve, and where concrete of the usual quality is wanted. The duty required of them is to place the material where it is not practicable to deposit it in forms, and to give a dense and impervious product. The deposited mixture is mortar. The cement gun uses no stone. The atomiser uses stone up to ¾ in. in the mixture, but the stone rebounds from the surface to which it is applied. Its only function is, apparently, to pack and tamp the mortar against the surface to which it is applied.

These machines can be used to good advantage when applied to the kinds of work to which they are adapted. It appears from the reports received, however, that these appliances are in use on only a very few roads, and the engineers in charge of concrete construction cannot speak from personal experience. Twenty-six roads report not having used either kind, but the roads which have used them nearly all report satisfactory results. One road reports that in one instance, at least, the results were unsatisfactory. The kind of work or the nature of the defect was not stated.

It appears to be the common practice to leave it to the engineer in charge to determine the time when forms can be removed safely, without handicapping him with detailed instructions. The weather conditions and the kind of structure enter largely into the considerations. A few roads report tests, such as breaking off exposed portions of the work, or using test pieces that are made at the same time and exposed to the same conditions as the work.

There is a wide range in the time allowed for setting, even under the same weather conditions. This may be accounted for by assuming that structures of entirely different character were in mind when the different replies were written.

A general review leads to the conclusion that in summer weather, mass concrete, such as retaining walls, abutments and piers, should have two to three days, and a little more if the structure is high or massive. When weather is cold, but not freezing, the time should be from one to two weeks. Forms for slabs, arches and culverts should remain in place in warm weather from one to two weeks, and the structure should not be loaded for 30 days. In cold weather the time should be correspondingly longer.

COAST TO COAST

Camrose, Alta.—Canadian Northern Railway is now laying steel on the branch southeast from Camrose to Battle River, a distance of 60 miles.

Calgary, Alta.—The annual convention of the Western Canada Irrigation Association had its opening session on November 23rd at Bassano. Hon. R. G. Brett, the new Lieutenant-Governor of the province, conducting the opening ceremony.

Montreal, Que.—The council of the Board of Trade has unanimously endorsed the suggestion of the Canadian Society of Civil Engineers relative to a report by independent experts upon the proposed extensions to the waterworks system.

Grand Forks, B.C.—The Great Northern Railway has completed a $60,000 bridge across the north fork canyon into the Granby Smelter. The C.P.R. completed a $100,000 bridge over the same canyon a year ago for a similar purpose.

South Vancouver, B.C.—Up to the end of October over $43,330 have been spent on sewer construction in the municipality this year. Concrete pipe is being made by the Pacific Lock Joint Pipe Co. and the Dominion Glazed Pipe Co. for the work.

Guelph, Ont.—A new concrete reservoir which has been under construction for several months, is now completed. It is 150 ft. x 70 ft. deep and designed to hold 500,000 gallons. The contractors were Messrs. Brennan and Hollingsworth, of Hamilton.

Winnipeg, Man.—Good roads enthusiasts are advocating an international thoroughfare from New Orleans to Winnipeg. An organization known as the Jefferson Highway Association has been formed with representatives of the province of Manitoba and 11 Mississippi Valley States.

Port Arthur, Ont.—The C.N.R. has practically completed the construction of three coaling stations situated respectively at Capreol, Hornepayne and Rideau Junction, east of Port Arthur. The contractors were the Roberts and Shaver Co., of Chicago, with Mr. E. V. Van Sickle as superintending engineer.

Victoria, B.C.—Commencement on the construction of the Rock Bay bridge has been delayed owing to the requirements of the Federal Department of Public Works that a 70-ft. movable span be included. The city submitted plans for a 60-ft. span, but this has been deemed inadequate. It is expected that the bridge will be constructed early next year.

Vancouver, B.C.—It is stated that an agreement has been reached regarding the harbor crossing into Vancouver of the Canadian Northern Pacific Railway which has its present terminus at Port Mann, B.C. It is also stated that the company will immediately proceed with the construction of a bridge. Mr. D. O. Lewis is district engineer for the railway.

Moose Jaw, Sask.—According to Mr. George D. Mackie, city engineer, repairs have been practically finished to the infiltration pipe at Caron through which the city receives its water supply. A break occurred in the pipe line some four weeks ago. The McManus Construction Co. are making the repairs, and in the meantime the city is receiving its supply through a 60-ft. by-pass.

Regina, Sask.—In the report of a board of special auditors into the affairs of the city for the years 1909 to 1914 inclusive, it is stated that no tests have as yet been