

tory of the ease of working in the field of different combinations of aggregates whose flowabilities are the same.

2. Time of Set.—The rate of hardening of mortar or concrete from the time mixing water is added is measured by "flow" of separate specimens on the table at intervals. A practical application was the determination of the rate of hardening of two mortar floor toppings, one containing an accelerator, on actual construction work. The mortar containing the accelerator was finished in one-half of the time required for the other, and the rate of hardening as measured on the flow-table was twice as fast for the former.

3. Normal Consistency.—The apparatus shown in Fig. 4 has been in use in the cement testing laboratory of the Bureau for checking determinations of the quantity of mixing water required for normal consistency of neat cement and standard sand mortars. Results so far obtained indicate the method to be more accurate and consistent than determinations by the "ball method" or the Vicat Needle.

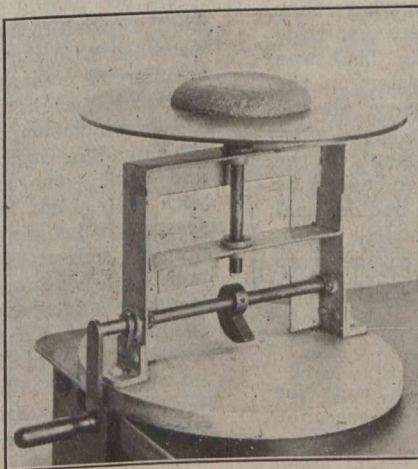
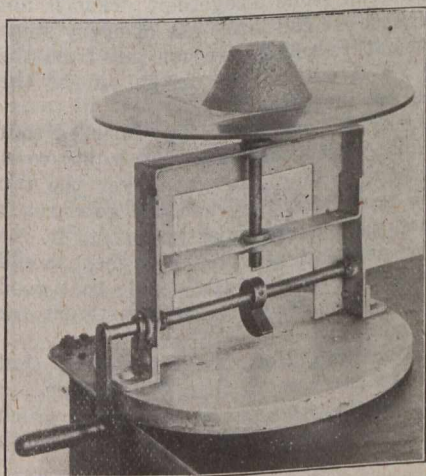


FIG. 4—FLOW-TABLE USED IN LABORATORY OF BUREAU OF STANDARDS FOR DETERMINING NORMAL CONSISTENCY OF NEAT CEMENT AND STANDARD SAND MORTARS

4. Selection of Concretes for Field Use.—The flow-table furnishes a means of measuring and expressing the missing factor "flowability" which is needed to permit of predicting in advance the approximate strength values which may be obtained for any given proportions of cement and aggregate. The ranges of strength values which may be expected for any aggregate when used with varying cement content and for the extreme ranges of consistencies needed in practice can be determined by a series of tests. Knowing in advance the type of construction, experience will permit the minimum usable flowabilities to be estimated, and for any required strength values the necessary ratios of cement to aggregate may be selected. The selections may be checked by the results of field tests of concrete, and a few trials will indicate strength variations which may result for the degree of thoroughness of field inspection employed, and permit of proper allowance for unavoidable variations in cements, aggregates, and curing conditions, etc.

The foregoing description of the flow-table and its method of use is given with the hope that those who are interested in the testing of concrete will give the method a trial. No doubt further tests under widely different conditions will point out modifications and changes in the method and apparatus which will increase its value, and any criticisms based upon its application under such conditions will be appreciated.

P. W. Burton, manager of the Caraqueet and Gulf Shore Railway has announced that arrangements are being made to transfer the road to the government as part of the Canadian National Railway System.

GOOD ROADS AS AN AID TO AGRICULTURE

Hon. F. C. Biggs Addresses Seventh Canadian Good Roads Convention at Winnipeg on Importance of Satisfactory Highways

HON. F. C. BIGGS, Minister of Public Works of Ontario, speaking on "Roads as an Aid to Agriculture" at the afternoon session of the Canadian Good Roads Convention on Wednesday, June 2nd, said that the basic production on which all else depended was agriculture, and something had to be done to keep people on the farms. One thing that was essential was education, and the Ontario government was endeavoring to work out a system of consolidated schools and continuation schools where a typical rural education would be given. To enable children to attend these schools, there must be roads. In such schools, they would pay particular attention to subjects bearing on agriculture, for if boys and girls had to go to the towns to complete their education, they returned with little taste for farm life.

Good Roads as an Investment

Any money spent on roads was a good investment, if properly spent, and the Ontario government expected to invest very large sums of money in roads as a paying proposition. There were 200,000 cars and trucks in Ontario, and if the upkeep on them were lessened by 10%, which would be entirely reasonable with better roads, it would represent an invisible income to the owners of two million dollars a year; while if the efficiency of the cars and trucks were increased by 10%, which was a very low percentage, it would add two million dollars more each year to the users of the roads. That would make an invisible income of four millions a year from good roads on the motor cars and trucks alone.

Furthermore, good roads would be a big time saver in production, for 100% of the time would be saved on a five-mile haul on a good road, as compared with a poor road, and on a ten-mile haul, double that percentage, because a farmer could use his truck and give more time to producing.

Increase in Land Values Due to Good Roads

Speaking of the increase in assessable value of lands through improved roads, the Minister of Public Works said that on the Toronto-Hamilton highway, before the road was built, land was assessed at \$200 an acre, and to-day they could not get a foot under \$500 an acre, an increase of \$150,000 a mile in value. Municipalities also got increased taxes from the higher assessment, so that the road that seemed to cost a lot had, as a fact, increased property value by five millions of dollars, or about three times what it cost. So when they had their two thousand miles of provincial highways in the province the cost of construction would not be a debt, since the value of adjacent property would be increased by two or three hundred per cent. They found that with roads in passable shape, land alongside county roads increased in value from \$100 to \$125 an acre, which meant an increase of \$20,000 a mile in land value.

Hon. Mr. Biggs remarked that they hoped soon to be free of statute labor, and instead of people being called out for the King's holiday, they were going to have to pay taxes for road improvement, and thus get away from the joker commonly known as statute labor. Another new thing was that all county superintendents would, from now on, have to be engineers, a thing which was not compulsory before.

The provincial highway system had been extended from 422 miles to 1,824, and they hoped soon to have 2,000 miles