MR. THOMAS—On the lower part on the first, 12 ft. 6 ins. in 12 ins. on the ends, and on the sides, 1 in. in 12 ins. for the first 12 ft., and ½ in. in 12 ins. from there up.

MR. FINLEY—Is it not a matter of fact that we have always had considerable difficulty in borings and soundings on account of the inaccuracy of locating rock?

MR. THOMAS—I do not know that it is. I did some work for Mr. Morison, and I do not think I varied ¼-in. there. I think a man should ascertain, as General Smith has said, the exact location of the rock. I have never heard of any of Mr. Morison's borings being found faulty. The borings that were made across the Colorado river, at The Needles bridge, were made by competent engineers, but they did not strike it correctly by 40 odd ft.

GEN. SMITH—As there are a good many young engineers here this evening, I will say that there is nothing, it seems to me, more important, in preparation for the building of any bridge, than to ascertain, with the greatest accuracy, all the conditions and surroundings not only with regard to the difficulty of doing the work, but the good judgment to be exercised in planning it. Very often economical methods can be used when you know perfectly the conditions with which you have to deal. Those of us who are gray-headed have learned these things by sad experience, and here is a notable example of a very great deal of difficulty growing out of the want of knowledge of the conditions and want of adaptation of the plans to the conditions.

MR. THOMAS—I would like to say that some time ago I put up a lighthouse on the coast of the Bay of Fundy, near the New Brunswick line, and the specifications read something like this (it was for the Government): Seventeen feet of water; cylinder was to be landed and then dredge out about 5 ft. of soft material on the surface, when there was to be 18 ft. of concrete put in and then pumped out. I went up there to find out all I possibly could in regard to the conditions, and from the condition of the material I found there I concluded that it was no place to put a lighthouse, 75 ft. above water. I called the Government's attention to it, but they simply ignored me and thought I did not know what I was talking about. I finally decided to write to my firm in New York, and had no further trouble, as I received instructions to go ahead and do what I had proposed. In place of going down 5 ft. I drove piles in that cylinder 76 ft. long, driving piles which I had to splice. Some days we would drive one pile, and some days not any, but I put the lighthouse up, complete to the lantern.

MR. FINLEY—I recall a case of a foundation, a few years ago, where the engineers located rock within 6 ft. of the bottom of the river; this was done by two engineers at different times, so we thought we had a pretty sure check on it, and yet we drove 30-ft. piles in each foundation.

MR. GERBER—I would like to ask the chairman why he thinks the Missouri river is a particularly easy place to locate rock. I have had a little experience there and in one place we failed to locate it.

MR. FINLEY—I think so by comparing it with other places. I was under the impression that in the Missouri river it would be somewhat easier to definitely locate rock.

MR. GERBER—In about '87 there were some borings made in the Missouri river near Sioux City, which were made in pretty good shape. I saw the work being done at various times, and I think they went down 130 ft. and did not find any rock. Two years after, I made some more borings at the same bridge. My predecessor, who made the first borings, found clay at a depth of 40 ft., and after going through 5 or 6 ft. of clay he encountered sand until he got to the bottom of his borings. I did not find any clay at 40 or 50 ft.; I did find clay at 90 ft. The only thing in which our borings agreed was that we had no rock at 140 ft., and subsequently we put down four caissons, and then the difficulty with the borings was very easily explained. When we got down 50 ft. we found plenty of clay, some of it in chunks 15 ft. square, but in between these pieces of clay there would be fissures of sand 6 or 8 ft. wide, and as to rock, when we got down about 70 ft. we found plenty of large boulders on which we could have landed with our pipe and found what we might have supposed to be rock.

The American Association of Travelling Passenger Agents meets for its 30th annual convention at the Windsor hotel, Montreal, Sept. 15 and 16. The programme of the convention states that the special train carrying the great proportion of the members will leave Dearborn st. station, Chicago, at 1 p.m., Sept. 12, and, travelling over the G.T.R., will reach Muskoka wharf at 6 a.m., Sept. 13. The party will be entertained at Muskoka during the day, and will leave Muskoka wharf station at 8.30 p.m., reaching Kingston at 5 a.m., Sunday, Sept. 14. One of the R. and O. Navigation Co.'s steamers will then be boarded, and the party carried to Montreal through the Thousand Islands and the rapids, reaching Montreal at 6 p.m. The business session of the convention will open Sept. 15, at 10 a.m., when, after the members have been formally welcomed by the Mayor, there will be a discussion on "The benefits derived from convention meetings by the Travelling Passenger Agent and the company he represents." At 2 p.m. the party will be driven round the city, and in the evening there will be a ball. On Sept. 16 the business of the convention will be concluded, and the afternoon will be devoted to sightseeing. On Sept. 17 there will be a trip to Ottawa via the G.T.R. and Canada Atlantic Ry., returning via the C.P.R.; then via R. and O. Navigation Co.'s steamer to Quebec, where Sept. 18 will be spent; on Sept. 19 the party will leave by R. and O. N. Co.'s steamer for the Saguenay river, returning to Quebec on Sept. 21, when the C.P.R. route will be taken for the return train trip to Chicago. Members may travel by other routes if it is not convenient to take the special from Chicago, those from the eastern states being able to travel by Quebec Central or Central Vermont routes, and others may reach Toronto and join the special there by the G.T.R. from Detroit or Suspension Bridge, or by Niagara Navigation Co.'s steamers, while the Pacific coast members may return home all the way by C.P.R.

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