are ordinarily sufficiently devoid of colloidal matter, and there is no trouble in obtaining correct "relative stabilities" by the simple addition of methylene blue, followed by incubation at 20° C. for ten or twenty days. In waters carrying clay and other colloidal suspensions, the determination of correct "relative stabilities" necessitates the incubation of two samples, one to determine the residual free oxygen, the other to determine the residual nitritenitrate oxygen. This procedure is rather tedious but no substitute can be offered at present.

## NEW 300-MILE RAILWAY FOR ONTARIO.

The National Engineering Company, Marshall Building, Cleveland, O., has been awarded a contract by the Lake Huron & Northern Ontario Railway Company for the construction of 300 miles of railroad, including telegraph lines, stations, repair shops, engine houses, and office buildings. The railroad will begin at Bruce Mines on the Soo branch of the Canadian Pacific Railway, and will run northeasterly along the Missisaga River through the Missisaga Forest Reserve through the district of Sudbury crossing the main line of the Canadian Pacific, thence across the Canadian & Northern Ontario Railway Company, terminating at its junction with the Grand Trunk Pacific at Alexandria in the district of Timiskaming, whence it is proposed to continue northeasterly to the outlet on salt water on James Bay. Present project from Bruce Mines to Alexandria comprises about 300 miles. The National Engineering Company has the general contract for all engineering and all construction of this road. There are about 14 bridges to be built on this route, one of which will be in the neighborhood of 700 feet long.

The chief revenue derivatives of the railroad will be timber, iron ore, copper ore, pulp wood, wheat and coal.

## DAMAGE TO GOVERNMENT PROPERTY ALONG RED DEER AND NORTH SASKATCHEWAN RIVERS IN ALBERTA.

The abnormal floods in the valleys of the Red Deer and North Saskatchewan rivers have washed away a large number of bridges and ferries belonging to the provincial government, according to the latest information in the possession of John Stocks, deputy minister of public works. The floods in the southern part of Alberta were not beyond their usual seasonal height, but the Red Deer and North Saskatchewan rivers and their tributaries rose to record proportions. Over the Clearwater River there was a steel bridge retaining two spans, 80 and 125 feet respectively, and the 80-foot span was carried away on a raft of driftwood and washed up on an island in the Saskatchewan River, where it is now high and dry.

At least one steel bridge on the Clearwater was washed away, and another further up stream is believed to have been lost.

Two steel bridges over the Red Deer River were driven down stream—one west of Olds and the other west of Innisfail. A third steel bridge was not lost, the valley being very wide at that point and the current leaving the main channel and passing around the bridge, but the flood took away several small timber bridges and grades leading to it.

Below the city of Red Deer a number of ferries have been washed away. In some cases the towers were knecked down by driftwood. The ferry at Rocky Mountain House, though washed away, was landed upon the bank and saved. At one point between Rocky Mountain House and Edmonton the ferry scow went down the river. Below Edmonton several ferry cables were struck by floating debris and pulled from their supports, *viz.*, at Pine Creek, Bruso, and at some other points from which definite information has not yet been received.

On the Athabasca, Peace, Smoky, and other large rivers in the north the floods do not appear to have been nearly as bad as on the Red Deer and North Saskatchewan rivers.

Steps have been taken by the public works department to replace bridges and ferries as quickly as possible.

## DEFINITION OF OTTAWA (ILL.) SAND.

Ottawa sand is so often spoken of as the standard of comparison that the following information regarding it will be of interest. This information was brought out in the discussion of a paper by Mr. F. M. McCullough before the Engineering Society of Western Pennsylvania.

The silica sand which is produced in such large quantities in the vicinity of Ottawa, Illinois, comes from the St. Peter sandstone, one of the formations in the lower portion of the Ordovician in the Upper Mississippi Valley region. The St. Peter formation is a very pure quartz sandstone often containing over 99 per cent silica. It has little or no binding material between the grains, so that it can usually be crumbled readily between the fingers into a loose sand. In size the individual grains range from one millimeter down to 0.01 of a millimeter in diameter, the bulk of the material falling between 0.4 and 0.05 millimeters. The large grains are usually well rounded. In thickness the formation varies from a few inches to 225 feet.

This sand was deposited on a low-lying coastal plain left exposed when the sea, which had occupied the greater part of the Mississippi Valley region during the beginning of the Ordovician period, retreated. Part of the sand was spread over the area by the sea during its gradual retreat; part of it was washed onto it by streams which derived the sand from sandstones and other rocks containing quartz grains which were undergoing weathering and erosion along the northern margins of the area; and a portion of it was blown across the coastal plain by prevailing northerly winds. The wind was also very active in transporting the sand already deposited so that the area presented the aspect of a slowly shifting sand plain, the sand gradually moving southward in the form of dunes. This resulted in the removal of all the finer, lighter, clayey material, leaving behind a very fine quartz sand. The action of the wind also accounts for the rounded nature of the grains. Later, when the sea again advanced over the area the upper portion of the sand was re-worked by the waves, and finally limestones and other strata were deposited on top of it. It is only in places where erosion has removed these overlying beds that the St. Peter sandstone can be worked to-day.

The literary programme, which is being prepared for the Pan-American Road Congress, covers the entire range of subjects connected with the construction and maintenance of country roads and city streets. The men who will present papers or deliver addresses are the best known authorities in the United States and Canada.