

economical quarrying and for cheap transportation by water of the crushed rock. There is no doubt that practically all the diabase will make excellent road material.

A Geological Survey party under the direction of Mr. W. H. Collins mapped strips of country from 5 to 10 miles wide along parts of the railway line between Bruce Mines and Sudbury. Areas of trap rock, of which there are many, were mapped within these strips and notes made on a few gravel deposits. A trunk highway following the railway is now under construction between Sault Ste. Marie and Sudbury.

The local road materials which are available for the lake port towns of south-western Ontario are, as a rule, of very poor quality, and as the population of this portion of Ontario increases the need for first-class road materials will be felt more keenly.

First-class trap rock can be transported by boat from the north shore of Lake Huron to points on Lakes Huron and Erie in old Ontario at a cost which will be very little higher, and in some cases lower than the freight charges by rail for inferior local material. When used in macadam roads subjected to heavy traffic, trap rock is very much superior to the local materials. Its greater durability in cases of that kind far outweighs its greater cost. It is of importance that builders of roads should realize the importance of the north shore as a source of supply for road material of high grade.

Essex and Kent Counties.—The bedrock in Essex and Kent counties is covered by from 50 to 200 feet of clay and sand, with occasional patches and ridges of gravel. The only bedrock available is at Amherstburg and on Pelee Island. The Amherstburg material is of poor quality. The limestone on Pelee Island has not yet been tested, but it is rather soft under the hammer and will probably not do for heavy traffic.

There is a ridge of sandy gravel between Essex village and Leamington, most of which is of poor quality. Scattered deposits of field stone were seen in the neighborhood of Kingsville and very sandy gravels at the town of Sandwich and to the south and east of it. Essex county contains no really first-class road material.

An area of gravels occurs in the south-eastern part of Kent county, south of the Pere Marquette Railway. These gravels lie in ridges which are all sand and gravel, or occur as patches of gravel in clay ridges. Most of these gravels, if not too sandy, make good light traffic roads, but are not durable enough for heavy country traffic, such as that between the villages of Blenheim and Ridgetown. The best gravel in the county seems to be that found on the Talbot road, a few miles east of Morpeth, which not only wears, but cements well. Good gravel is found on the Lake Erie beach, but it occurs in small amounts. Sandy gravels occur in the beds of the Thames and Sydenham Rivers, and areas of sand and gravel to the north-east of Ridgetown.

By far the greatest part of these two counties is underlain by boulder clay, and the roads in these sections are almost entirely unsurfaced, that is, they are clay roads. These clay roads are very sticky and slippery in wet weather, and, although most of the gravels found in Essex and Kent are too sandy and not durable enough for good macadam work, they will greatly improve a clay road if properly placed upon it. All the areas of sand and gravel in the two counties were, therefore, carefully examined and mapped.

The North Shore of Lake Ontario.—A narrow belt of gravel extends along the shore-line of Lake Ontario from Trenton to Niagara Falls and beyond. The gravels

lie with sand in long, narrow bars along the winding shore-line of an ancient extinct lake (Lake Iroquois). The old shore is from 2 to 7 miles from the present shore of Lake Ontario, and 116 to 400 feet in elevation over it. This belt lies along one of the principal avenues of traffic in Ontario, and the character of the gravels is, therefore, of particular interest. They have been examined and mapped from Trenton to Hamilton.

The deposits are practically entirely of sand and gravel, the sizes of the material varying greatly from place to place. Clay is present in a few deposits only, but lime is very frequently found in greater or less amounts as a coating on the gravel pebbles. A small percentage of clay is an advantage in gravel used for the building of gravel roads. In concrete work of any kind, however, clay is a distinctly undesirable ingredient, and it is probable that a coating of calcium carbonate pebbles is also a source of weakness.

The relative durability of the gravels in this belt has been estimated from the relative proportions of the hard and soft pebbles in them, and from the way in which they wear on road surfaces. The more durable gravels appear to be those at the east and west ends of the city of Toronto, and from there west to Erindale village.

From Trenton to Toronto they are rather uniform in composition and in probable wearing qualities. The poorest gravels lie in three bars between Burlington and Oakville.

The party under Mr. M. Y. Williams examined the broad belt in south-western Ontario, south-west of the Niagara escarpment. Their work was not primarily concerned with road materials, but they incidentally located and examined a large number of gravel deposits. The belt so mapped is from 25 to nearly 100 miles wide and stretches from the Niagara River to Bruce peninsula.

The work in general was under the supervision of Mr. Leopold Reinecke, of the Geological Survey staff.

At the close of 1914 there were 2,562 water meters in London, Ont., an increase of 486 during the year. Only 17 per cent. of services are metered, although 24 per cent. of the water consumed passes through meters and furnishes 40 per cent. of the revenue. The consumption is about 81 imp. gal. per capita, and costs \$34.15 per million gallons.

Should developments in the near future prove as highly successful as those during the past year, the United States is in a fair way to cast off the grip of the German Kali syndicate, which has had a practical monopoly of the world's potash salts industry. Experiments made in the Searles Lake basin of California have resulted in the production of potash salts at a cost under \$10 a ton, in competition with the German kainit, 50 per cent. pure potash, produced at a cost of approximately \$8 per ton. Other good potash prospects are those at Marysvale, Utah, and immense deposits in Wyoming, owned by a New York banking house, the latter claimed to run 10 per cent. potash as mined from the ground.

Costs of street repairs in Chicago have been reduced by the municipal asphalt plant. During 1913, according to the Municipal Record, asphalt pavements were repaired at a cost of 81.1c. per sq. yd., or 87.1c. per sq. yd., allowing for plant depreciation and interest on investment. At a total cost of \$62,637.03 or \$1.175 per sq. yd., 53,342 sq. yd. of brick pavements were repaired. Granite block pavements to the extent of 59,345 sq. yd. were repaired at 53.2c. per sq. yd., or a total of \$31,593.04. Macadam pavements cost 12.16c. per sq. yd., 1,880,365 sq. yd. having been repaired at a cost of \$227,443.03. Of cedar block pavements, 2,595 sq. yd. were repaired at a cost of \$524.49, or 20.25c. per square yard.