ROAD MATERIAL SURVEYS.

MEMOIR 85 of the Department of Mines, Ottawa, entitled "Road Material Surveys in 1914," by L. Reinecke, has just been published. The volume contains 244 pages, a considerable portion of which is consumed in compilation of general matter. These include the cost of various quarrying operations, transportation facilities from important rock deposits to sections where road metal is required, and local costs of various types of roads. The author's desire in furnishing this information is that it may be helpful to communities improving their road systems.

The preliminary discussion of various types of roads is somewhat elementary and may in sections merit friendly criticism. In the main, however, the data is good and furnishes valuable basic information.

The object of the surveys which have since been and are now being further extended, is to acquire a greater knowledge of our resources of good rock for road metal, thus rendering available more accurate data to assist highway departments in solving the difficult problem of supplying good roads of the highest economic quality at minimum cost.

The territorial surveys recorded are limited sections of the north shore of Lake Huron and adjacent islands, Essex County, Kent County and the north shore of Lake Ontario between Port Hope and Hamilton.

Previous geological surveys showed that large areas of diabase rock existed along the north shore of Lake Huron. In fact, for some years past quarries have been operated in this section. A large amount of rock is crushed, the greater portion of which is exported. The rock has been known to the trade as "trap." This term is somewhat general. According to this report, it includes the "fine-grained, dark, volcanic rocks, the andesites, augite andesites, basalts and other more basic black volcanic rocks, and the porphyritic equivalents of these rocks, including diabase."

The Lake Huron diabase deposits were found to be of high quality. Samples taken from various sections generally showed a toughness of 18 or over. Those taken from the quarry at Bruce Mines ran as high as 27. The "per cent. of wear" test ran from 2 to 4.37. The major portion of samples stood close to 2.5. The rock showed from 40 to 100 in cementing value. Such tests would indicate, as past experience has also proven, that much of this rock is suitable to withstand "heavy traffic" as this term is applied to macadam roads. It is also of excellent quality to be used in asphaltic concrete pavements.

The extensiveness of the deposits permits production on a large scale at relatively low cost. It must be understood, of course, that the very qualities of this rock which make it so valuable for road work cause it to be difficult and expensive to quarry and crush. Veins of epidote and quartz, moreover, render drilling slow, and large fragments of rock constantly fail to shatter until additional small shots are used. The quarrying expenses will, accordingly, always prove high as compared with those of the softer and poorer types of rock.

The location of this material is somewhat distant from central Ontario. However, deep channels facilitate cheap water transportation to the various lower Ontario points of discharge.

Essex County contains little road material of high quality. Gravel deposits, however, are abundantly distributed throughout various sections and are of no mean economic importance in the development of better roads. Field stone, moreover, could be made to yield considerable material. In addition there are supplies of gravel in adjacent territory and also limestone deposits on Pelee Island.

In Kent County, again, the gravels, many of which are of good cementing quality, form the bulk of the local road material.

A territory of 130 miles in length and from one to seven miles in width was investigated along the north shore of Lake Ontario from Port Hope westward. The gravel deposits proved extensive. They carried a uniform average of 70 per cent. limestone, 20 to 30 per cent. hard pebbles, and 0 to 10 per cent. soft pebbles. The cementing value of this material is high. Local roads constructed of these gravels unprotected by a bituminous

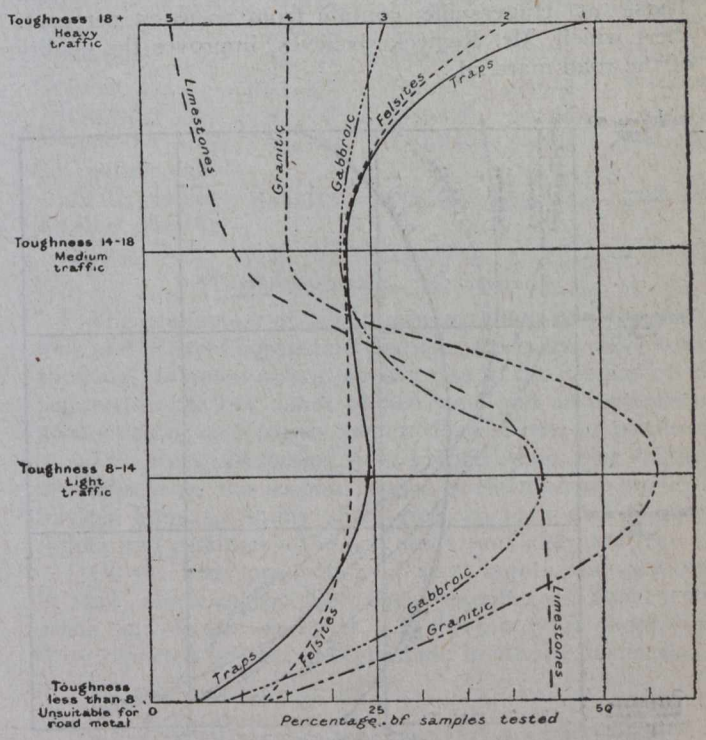

Fig. 1.

Curves showing the relative toughness of various groups of rocks and their consequent behavior under traffic (based upon tests made in the laboratory of the Office of Public Roads, U.S. Department of Agriculture, Washington, D.C.).

Rock grouping used in the diagrams.

1. Traps, including the finer-grained, dark-colored igneous rocks; andesite, augite andesite, basalt, diabase, basaltic and andesitic tuff, breccia, etc.
2. Felsites, including the finer-grained, light-colored igneous rocks; rhyolite, quartz-porphyry, trachyte, etc.
3. Gabbroic rocks, including the coarser-grained, dark-colored igneous rocks: diorite, augite-diorite, anorthosite, gabbro, peridotite, pyroxenite, etc.
4. Granitic rocks, including the coarser-grained, light-colored igneous rocks, granite, syenite, monzonite, granodiorite, quartz-diorite, etc.
5. Limestones, including all varieties of limestone and dolomite.

covering stand up under medium traffic from 2 to 3 years. They do not prove satisfactory, however, with simply