

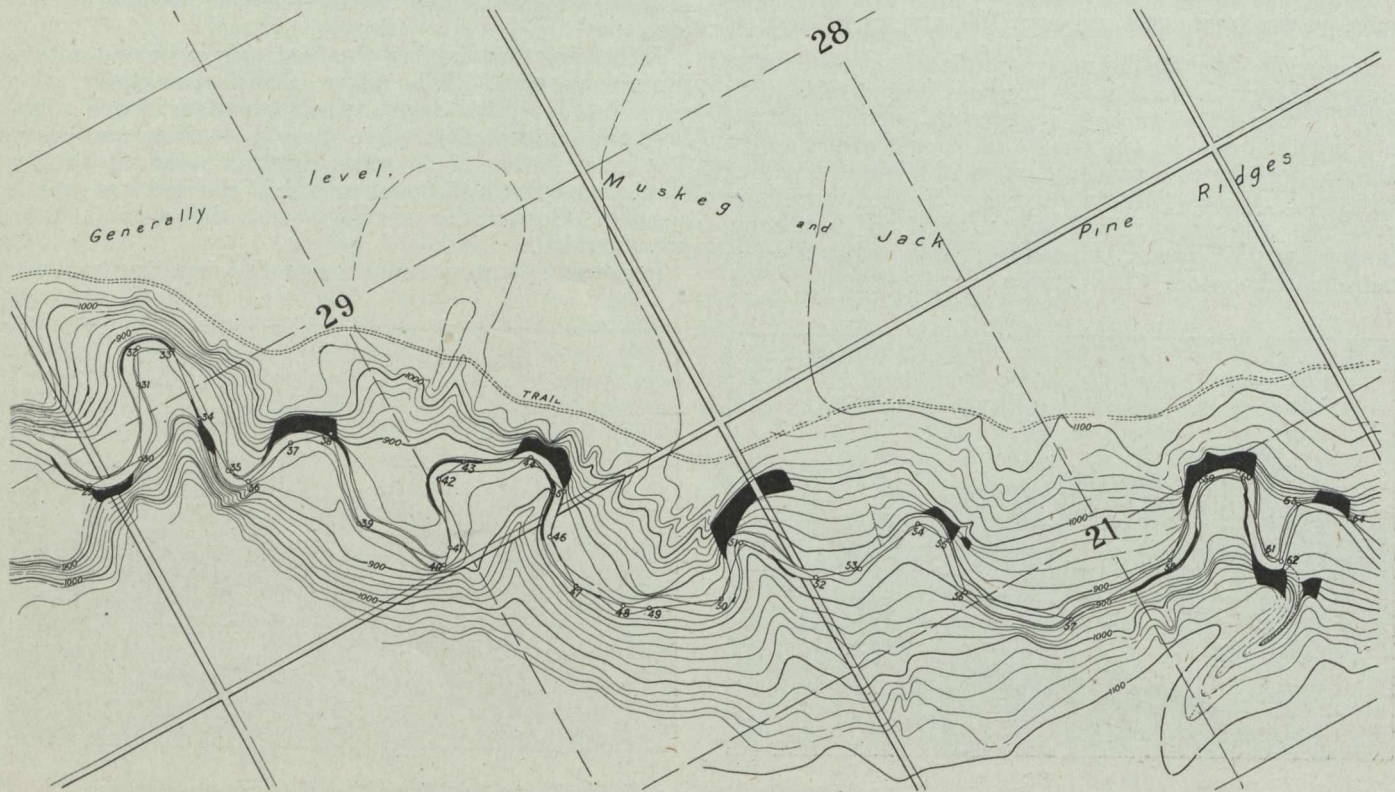
roller almost immediately after the wearing surface mixture had been spread. As soon as the temperature permitted—usually within three hours—a small quantity of Portland cement was sprinkled, and the surface thoroughly compacted by means of a 7-ton roller (250 lbs. per linear inch width of tire).

In the case of the bituminous concrete and bitulithic, the usual flush coat, with $\frac{1}{4}$ " stone screenings, was spread upon the surface, and all superficial voids filled.

The experimental pavement referred to above was opened to traffic on August 26th, 1915, and up to the present time, (December 20th), is in a satisfactory condition. It is obviously quite possible that defects may develop in this initial work with new and untried materials.

In considering past attempts, the writer considers that under favorable conditions, commercial extraction as applied to the McMurray deposits will be found practicable. Further, it should be remembered that, owing to freight and other charges on imported asphalts, extraction in Alberta would be on a much more favorable basis than has, for example, been the case in California where competing residuum can be sold at a very low figure.

It is of importance to note that, in December, 1915, grading along the Alberta and Great Waterways Railway was practically completed as far as the proposed terminus at McMurray townsite. In descending into the Clearwater valley near McMurray, railway cuttings have been made at three points in the bituminous sand itself. With-



Example of topographic maps recently completed by S. C. Ells, illustrating typical mode of occurrence of bituminous sand deposits in Northern Alberta. All streams tributary to the Athabaska river in the McMurray district have been mapped in this manner. The maps were originally drawn on a scale of 1 inch equals 400 feet, but have been reduced to the present scale of 1 inch equals 1000 feet.

Outcrops of bituminous sand are almost altogether confined to slopes of older valleys, and to cut banks along present water courses. Elsewhere the surface of the country is level, and represents a plain.

On the maps, outcrops of bituminous sand are indicated to scale, at certain points. It should however, be remembered that these outcrops represent a single deposit which is practically continuous throughout the whole area.

Nevertheless, there are strong indications that, with minor modifications in manipulation, Alberta bituminous sand can be successfully adopted as a basis for satisfactory asphaltic pavements.

From a comparative study of cost data based on the use of Alberta bituminous sand and of imported asphalts, it appears that the application of the former in the crude state will be restricted within comparatively narrow limits in Western Canada. Indeed, extensive development of the McMurray deposits will probably depend on the commercial application of an extraction process whereby the bitumen can be marketed in a more or less pure form. Such a process would doubtless ensure for the McMurray product a wide market, not only as a paving material, but in many other recognized applications for high grade bitumen.

At various places in the United States during the past twenty-five years, the commercial extraction of bitumen from bituminous sands and sandstones has been attempted. Owing to various recognized causes, none of these attempts have met with commercial success. Nevertheless, in view of the various factors that must be taken into account

in a radius of one mile of the terminus of the road, a number of other outcrops are readily accessible. It is expected that track laying and ballasting will be completed during the winter and summer of 1916. The distance from Edmonton to McMurray over the new railroad will be approximately 305 miles.

In a pamphlet recently prepared by the writer, reference was made to the occurrence in the McMurray district of certain of the higher grade clays. In addition to deposits there noted, samples secured during the past season indicate the presence of stoneware clay, suitable for the manufacture of pottery, such as jugs and crocks, or for sewer pipe.

During the past season, topographical mapping of the area underlain by bituminous sand was also carried on. On this map are shown extent and position of individual outcrops, as well as thickness and extent of overburden. The map also indicates those areas which may most advantageously be developed, and will serve as a basis for an approximate estimate of the total tonnage of bituminous sand available.