T. & N.O. right-of-way, crossing the latter by an overhead crossing at Argentite, thence along the Cross Lake Road to the Townsite of North Cobalt, thence along King Street, Lakeview Avenue, and Main Street, thence across private right-of-way to Georgina Avenue, Haileybury, thence northerly along Georgina Avenue to Blackwell Street, easterly along Blackwell Street to Ferguson Avenue, northerly along Ferguson Avenue to Browning Street.

Service.—A regular half-hour service is maintained between Cobalt and Haileybury from 6 a.m. to 11 p.m. At rush hours and on holidays the service is increased as may

be necessary to accommodate the traffic.

Rolling Stock.—The following rolling stock was taken over with the Nipissing Central Railway:

3 42-foot double truck closed passenger coaches, each equipped with 40 h.p. motors, air and hand brakes, air whistle, arc headlamps, pilots, snow flangers, traffic recorders, and all necessary appliances necessary for an up-to-date electric trolley system.

1 combination baggage and passenger car, equipped with appliances similar to passenger coaches referred to above.

- 2 trailers of the same composition as the coaches, but having, of course, no motors.
  - I four-wheel van.
  - 2 thirty-foot flat cars.

small industrial standard gauge locomotive.

The locomotive referred to being practically of no use to the Nipissing Central Railway, was disposed of to advantage, brought down to North Bay Junction, where it is at present undergoing a general repair in the T. & N.O. shops, at the request of the firm purchasing same.

The other equipment referred to is all at present in very good condition, some slight repairs having been made to the passenger coaches; air brakes inspected and necessary overhauling done during the months of September and October.

Buildings.—The only buildings in connection with the Nipissing Central Railway are the car barn, which is situated between Haileybury and North Cobalt, and an office and waiting room. The car barn is a galvanized iron structure 150 feet by 60 feet, being 20 feet high at the eaves. A single track runs into this building which branches off into three, one track running over an inspection pit. Considerable repairs were made during the summer months to the roof of barn, rendering it in good serviceable condition.

The sub-station located in car barns consists of two motor generator sets of 400 h.p. and 200 h.p. capacity re-

Transmission System.—Power is obtained from the British Canadian Power Company's sub-station at Cobalt. A 2,200-volt transmission line connects the Power Company's sub-station with the Nipissing Central Railway sub-station in the car barns at North Cobalt. Another transmission line connected the sub-station at North Cobalt with power plant of the High Falls Power Company, but this transmission line is not in use, as the High Falls Company is not operating.

The trolley wire is No. 000 grooved section and, having no feeders, carries all the current used. The overhead system is composed of span wire type, with the exception of eighteen pole lengths of bracket type.

Roadbed.—The roadbed was never properly ballasted and some heavy expenditures for ballast will be necessary in the coming year.

Extensions.—An extension of the Nipissing Central Railway from its present terminus, Browning Street, Haileybury, to New Liskeard, also a freight spur to the Government wharf and Foster's Mill, are under consideration. Sur-Veys for these have been completed, and negotiations are now being carried on for the necessary franchises from the towns of Haileybury and New Liskeard and Township of Bucke.

## CANADIAN ROAD SYSTEMS.\*

## By W. A. McLean.†

Efficient system and organization form the key to highway improvement. If the laws and plan of administration are properly arranged, all details will be taken care of. If the system is well designed, ratepayers and citizens will have at their service a powerful machine, perfect in all its parts, that will produce finished highways, durably built, adapted to the service they are to perform, well maintained, and at a minimum cost.

System implies an effective means of procuring necessary funds, a fair and just method of distributing the cost, a general management based on good business principles, the application of engineering skill to design, and construction carried on with the best utilization of power and labor.

The creation of a thoroughly efficient system of highway construction and maintenance is a task which, in Canada and the Canadian Provinces, is being actively considered and dealt with. While some satisfactory progress has been made, measures to the present time have been those of the formative stage. Evolution rather than revolution has been the history of legislation in countries of the north, and highways systems and measures of Canada are following that general rule.

The Canadian form of government is similar to that of the United States in some respects. Canada is a union of Provinces, with a Federal administration at Ottawa, just as the United States is a federation of States with seat of government at Washington. Each of the nine Provinces has its own legislature, as have each of the States; and the provinces are again divided into local municipalities-the rural being townships and counties, and the urban are villages, towns and cities-but as in the States, local government varies in the different provinces.

The Canadian Constitution, "The British North America Act," defines the powers and jurisdiction of the Provincial and those of the Federal or Dominion Government. Under that Act legislation respecting public roads and municipal organization is within the authority of the Provinces, although the Dominion Government has power to subsidize road construction. The tendency in each Province (with certain exceptions) until recently has been to regard the opening and grading of roads in new territory as a Provincial function, while the real improvement and construction of these roads is a municipal function as settlement becomes established and municipal organization is created.

Canada has a geographical backbone, a rocky mineral region about the centre of the continent, extending northerly from Lake Superior to Hudson's Bay. West of Lake Superior the four Provinces of Manitoba, Saskatchewan, Alberta, and British Columbia are comparatively new, having been developed since the construction of the first Canadian transcontinental railway, the Canadian Pacific Railway, in 1886. East of the Lake Superior region are the old Provinces of Ontario, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island.

British Columbia.—British Columbia, on the Pacific coast, is traversed by the Rocky Mountains, and municipal organization is, therefore, interrupted. In consequence, the Provincial Government has always contributed largely to road-building. At the present time a special fund is being spent on the construction of trunk roads at the rate of \$5,000,000 annually under the direction of the Department of Public Works. Stone for macadam roads is plentiful, but the grading of mountain highways is expensive. The trunk roads now being built have an important scenic value,

<sup>\*</sup> Paper delivered at American Road Congress, Atlantic City, October 5th, 1912.

<sup>+</sup> Chief Engineer of Highways for Ontario, Canada.