

NORTH
YONGE
RAILWAY

TORONTO AND
YORK RADIAL

Toronto and York Radial Railway.

The Metropolitan Division of this line from Toronto to Newmarket, Ont., has been extended to Jackson's Point, Lake Simcoe, a further distance of 24.72 miles.

The line has been built entirely on the company's own right of way, 66 ft. wide, with greater widths where heavy cuts required them. One cut is 31 ft. deep. The right of way cost about \$1,500 a mile. The heaviest curve outside the town of Newmarket is a 5° curve. The next is a 3° 50' curve at Roach's Point. All others are 2° curves or under. All curves of 1° or over have transition curves at each end. The maximum gradient outside of Newmarket is 1½ per cent. The grading amounted to a little over 8,000 cubic yards per mile. There are two long trestles on the line; one at Newmarket at the overhead crossing of the G.T.R., 800 ft. long, including a plate girder span 82 ft. long over that railway, resting on concrete piers. The trestle is of wood, with a wooden Howe truss span of 50 ft. in the middle over the Holland River. The other is a pile trestle 332 ft. long over the Jersey River near Keswick. The line is well ballasted, having 10 inches of ballast under the ties. The rails are of 60 lbs. section made by the Algoma Steel Co., and are 33 ft. long. Cedar ties are used throughout. There are five through sidings, giving 700 ft. of clear siding room, and one through siding at Newmarket 1,300 ft. long. These sidings all turn out on the same side, and leave the main line on the proper alignment. No. 9 fangs are used. The points reached by this line are Newmarket, Sharon, Queensville, Ravenshoe (about one mile to east), Keswick, Orchard Beach (summer resort), Roach's Point (village with large summer population), Morton Park, Stouffville-on-the-Lake (summer resort), and Jackson's Point, with the village of Sutton one mile south. About 17 miles of the line is in view of Lake Simcoe throughout, and in most places is only far enough from the

line at the station and two going south, a distance of four miles, and the switchboard is wired to allow of these circuits being cut and independent of each other, and with trolley breaks at proper places. There is also a 4-0 feed and 4-0 trolley the full length of the line, which is in addition to any other feeder mentioned. A high pressure air pump pumps air at 350 lbs., for the air brake on the cars, to a tank located at the track. The injection water is taken direct from Lake Simcoe, and the condensed steam is pumped through a heater to the boilers, 1½ in. injectors are also used in case the boiler pump should happen to fail. The building is well lighted with windows by day and 5 arc lamps at night, and is located about 11 miles south of Jackson's Point. This station, although not built along the lines of the latest electrical engineering, was considered good practice by the company on account of the close proximity of Niagara power.

The sub-station at Newmarket, 14 miles south of Keswick, contains 2 Westinghouse rotary converters with step-down transformers and switchboards, with necessary switches, circuit-breakers, etc. The rotaries are 125 k.w. each, and start from the a.c. side, and synchronize dark. The current on the a.c. side is 350 volts, and is delivered to the line at 570 d.c. Two 500,000 c.m. lead-covered cables bring the current from the lightning arrester in the basement here to the first trolley post, where it is taken up and joins the regular feeder, one going each way. A car compressor is situated in the basement, and compressed air is used for cleaning the machines. The entire equipment of this station was furnished by the Westinghouse Co.

The station at Bond Lake, 10 miles south of Newmarket, contains four horizontal tubular boilers of 150 h.p. each, and one Scotch marine boiler of 250 h.p., built by the Polson Iron Works. The boilers are hand fired and connected to a 14 in. steam main by 6 in. leads. The steam is taken

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The feeder system of this line seems somewhat erratic at first glance, but this is caused by the peculiar gradients that had to be encountered in laying the track over one of the highest points in Ontario—the Pinnacle Hill—some 600 ft. higher than the southern terminus. The power for this line is supplied partly from Niagara Falls and by two generating stations and one sub-station. The generating stations are situated at Bond Lake and Keswick, and the sub-station in Newmarket. The power station at Keswick contains three Scotch marine boilers of 250 h.p. each, built by the Polson Iron Works, and equipped with automatic stokers, and fans driven by ideal engines. The coal is brought in at the back of the boiler room and emptied into the bins, and from there fired by hand to the hoppers of the stokers. A steel stack 50 ft. high and 50 ins. in diameter takes off all flue gases. Three 8-inch leads connect to a 15 in. main, and from there 2 ft. 7 in. headers are taken to two 500 h.p. cross compound condensing engines. Steam separators are installed above the throttle valves and steam is used at 130 lbs. pressure. A vacuum of 25 ins. is maintained by an independent jet condenser located in the basement, which is large enough to take care of both engines. The engines are 18 x 36 x 18 ins., and are belted direct to four compound wound d.c. generators built by the Canadian General Electric Co., and supply current at 625 volts to the switchboard, on which is located all the necessary switches, circuit breakers, ammeters, etc., for distribution of current to the line. Six 4-0 feeders leave this station, two going north five miles, two going direct to the

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Recording steam gauges and recording volt meters are used at Keswick and Bond Lake Stations. The cars are despatched by means of the company's own telephone system. A bare copper circuit is strung on the same cross arms as the feeder.

The extension was announced to be opened for traffic June 1, with a service of four trips a day.

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JUNE 1907

MAY, 1907]

THE RAILWAY AND MARINE WORLD

Pere Marquette Rd.—Wm Griffith has been appointed acting general foreman St. Thomas, Ont., shops, succeeding F. C. Pickard, resigned.

Quebec, Montreal and Southern Ry.—J. Leslie, heretofore roadmaster G.T.R., Ottawa, has been appointed General Roadmaster Q., M. and S. Ry., Headquarters, Sorel, Que.

T. Brennan will continue to act as roadmaster, reporting to the General Roadmaster.

Rutland Rd.—F. E. Barbour, heretofore general agent at Montreal, has been appointed General Passenger Agent, succeeding C. A. Nimmo, resigned. Office, Rutland, Vt. C. Hartigan has been appointed General Agent Passenger Department, Montreal, succeeding F. E. Barbour, promoted.

L. E. Vosburg has been appointed General Eastern Passenger Agent at New York. J. H. Jagoe, having been transferred to the New York Central and Hudson River Ry., the office of General Southern Passenger Agent at New York has been abolished.

Toronto and York Radial Railway Cars.

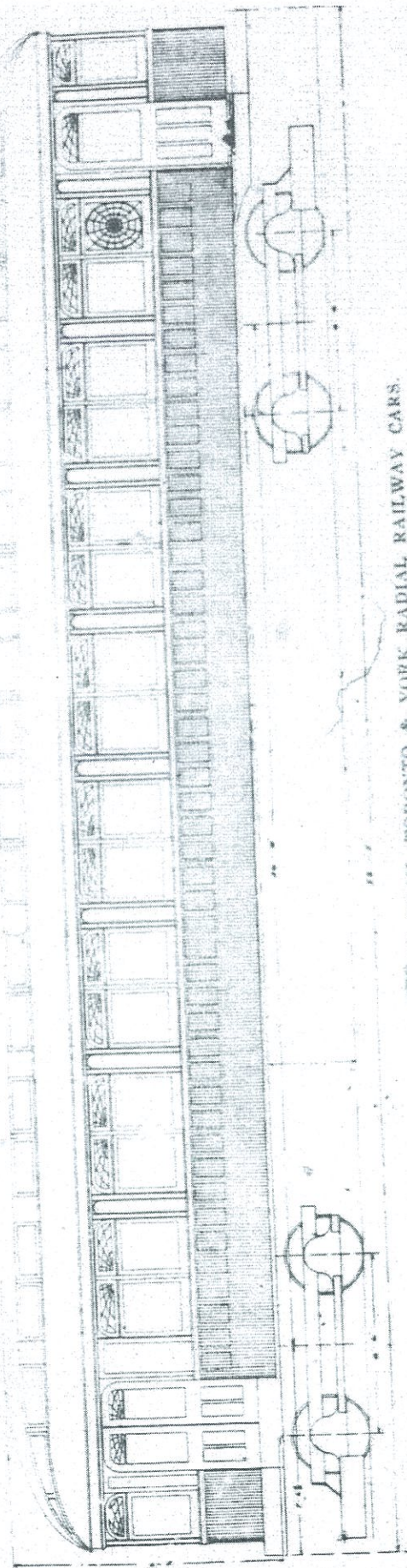
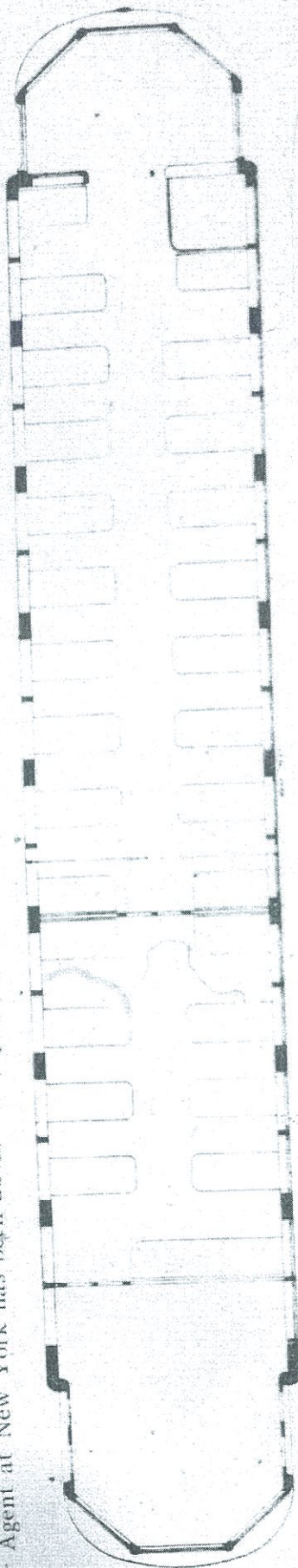
By A. M. Grantham, *Superintendent of Construction and Purchasing Agent.*

This company is building for the long through run between Toronto and Jackson's Point, the Lake Simcoe terminus of the Metropolitan Division, a distance of about 55 miles, a number of essentially up-to-date cars, constructed especially for speed, comfort, and safety. The sill construction is principally steel, and double floors with several thicknesses of felt between deaden the sound from beneath and add warmth to the car. The seats are high roll-back, rattan-covered "walk-overs," and the heating is by hot water pipes from a small furnace in the baggage vestibule. A glance at the plan will show the sub-dividing. The front vestibule, in which the motor-man stands, is large enough to carry the heating apparatus, and allows plenty of space for baggage, etc. The smoking room comes next to this, seating 24 persons, and lastly, the main passenger compartment, which seats com-

J. H. JAGS, General Agent at New York has been abolished.

baggage, etc. The surplus to this, seating 24 persons, the main passenger compartment, which seats com-

Briefly, the type M. consists of a motor car, a motor controller, the latter being



ELEVATION AND FLOOR PLAN, TORONTO & YORK RADIAL RAILWAY CARS.

under the

IN AND FLOOR PLAN, TORONTO & YORK RADIAL RAILWAY CARS.

fortably about 38 people, and contains lavatory, drinking-fountain, hat-racks, coat-hooks, etc. The interior finish is in antique quarter-cut oak, and all color work, such as the leaded glass transoms, deck lights, etc., are in subdued tones of brown and green, giving to the cars a very restful sensation. In fact they possess all the comforts and conveniences of the modern up-to-date railway coach, and are probably the finest cars of their kind that have yet been put in commission in Canada.

The motor equipment is composed of four of the new C.F. no. 73 machines, of 75 h.p. each, especially designed for this class of work by the Canadian General Electric Co., and giving 300 h.p. per car. The motors are of the box-frame type, and have large bored openings in each end into which the frame heads which carry the armature shaft bearings are bolted. Oily wool waste is packed into the frame head castings, giving lubrication to the shaft through openings cut in the bearing linings, and the motor frame being unsplit, effectively prevents oil or water getting into the motor. The same method of lubrication is employed for the axle bearings. The excellence of this method of lubrication is attested by the fact that the armature shaft bearings have run as much as 137,000 miles before it was necessary to renew the linings. The commutator is of hard drawn copper segments, insulated with the very best qual-

located under the car, and not under the direct control of the motorman. It consists of a number of switches electrically operated, called contactors, and their object is to directly handle the power circuits for the motors, that is, to change the electrical connections so as to give the necessary motor connections for starting, running and reversing. The contactors each consist of a switch which cuts in and out the various resistances, powerful and magnetic blow out coils which instantaneously blow out any arc which may form, and an operating coil which opens or closes the switch. The master controller is a small affair, weighing only about 130 lbs., and is placed in the motorman's vestibule. A special feature of this master control is that should the motorman take his hand off the operating handle for any reason, the current is immediately cut off, which is accomplished by means of auxiliary contacts which are operated by a spring when the button in the handle is released. As this master controller can be connected to any number of main motor controllers, a number of cars can be made into a train and operated by one motorman simply by means of cables and couplers.

The accompanying illustrations of these new cars show their general appearance. The total weight of the car equipped with trucks and motors is about 28 tons. Car length over all 55 ft. 7 ins., and width, 9 ft. 3 ins.



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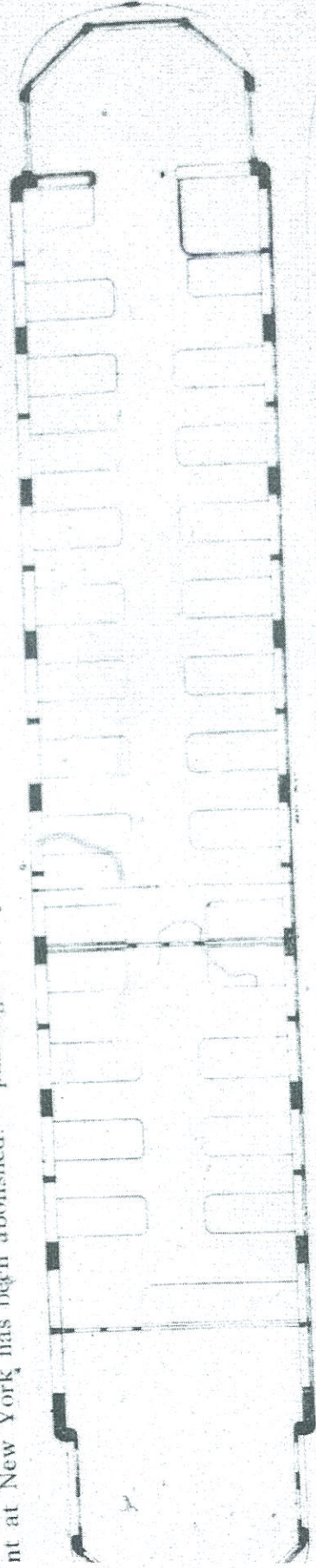
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ity of mica, and has been proved to have long life and keep its shape well under hard service. In general, the various parts of this motor are of an improved type, and especially designed to withstand the excessive vibration of heavy interurban service, and they successfully meet the demand for rapid acceleration, at the same time enabling the cars to be run at a speed of from 40 to 50 miles an hour on the level, as well as handling the loads with ease on heavy grades.

Perhaps the most interesting feature of these cars is the type M. master control system which is said to be supplied now for the first time in Canada, by the Canadian General Electric Co. The advantages claimed are simplicity, ease of handling, and flexibility, requiring little effort on the part of the motorman, and a minimum of space in the vestibule of the car. It is also possible with this system, for one motorman to handle a train of motor cars from one controller. Briefly, the type M. consists of a master controller and a motor controller, the latter being



Toronto Transportation Commission's Track Extension on Upper Yonge Street.

Electric Power Commission of Ontario for operation, and by which it was made possible for the Toronto Transportation Commission to build and operate a double



Fig. 1.—Looking south on Yonge St., near Farnham Ave.

The Toronto and York Radial Ry's Metropolitan Division single track line down the west side of Yonge St. from the northern city limits to its terminus near Farnham Ave., had long been inadequate and a source of danger, about which complaints were bitter and numerous, while the condition of the street itself, due to the postponement of repairs until a decision was reached as to trackage for future rail traffic, was extremely bad. For these reasons, the laying of a double track street car line, and the re-surfacing of this portion of the city's main north and south artery, had been eagerly looked forward to by North Toronto citizens. The beginning upon the consummation of the transaction known as the "clean-up deal" under which the Toronto & York Radial Ry's Metropolitan Division north of Toronto city limits is being turned over to the Hydro-

Prior to the commencement of actual construction, a temporary grade had been prepared at the extreme west side of

The original radial railway track was not released between Lawton Blvd, loop

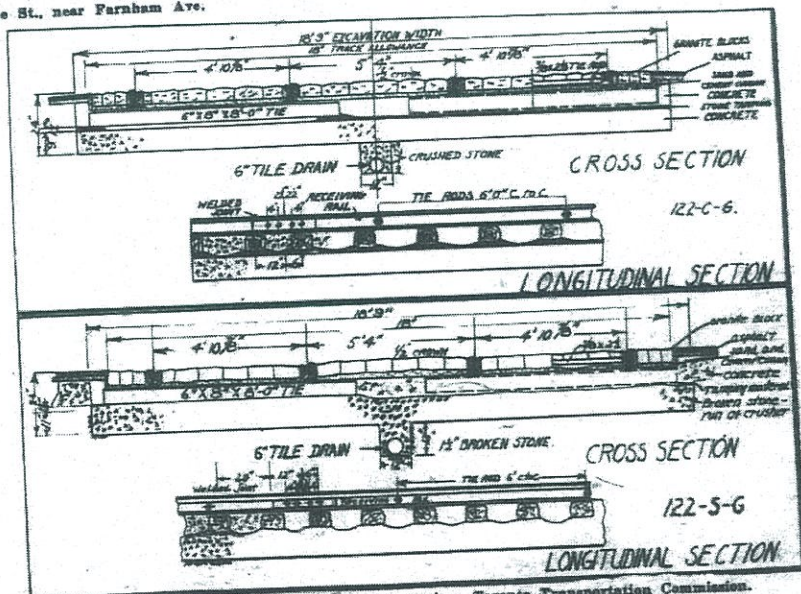


Fig. 2.—Standard types of track construction, Toronto Transportation Commission.

ton Aves., and by Sept. 5 the excavation between these two avenues had been completed. The total depth of excavation below finished grade of top of rail was 2 ft., and the width 18 ft., which affords some idea of the material to be removed. In many places the amount was increased as some grade revision was introduced. Pneumatically operated drills were used to break the old road paving at the excavation side limits, while the excavation was done by steam shovel and the removal of the material by motor trucks. After Sept. 5, excavation quickly proceeded northward, and Radial Ry. service was at all times maintained by using the temporary track and unreleased portion of the original radial track till this was all released, when the temporary track was used exclusively, as stated above. Closely following the excavation came the laying of the foundation for the new permanent double track. By Sept. 8 the stone foundation was laid, the ties laid and tamped, and the steel in place, between Farnham Ave. and the Lawton Blvd. loop.

The track between Farnham Ave. and the Lawton loop was built to the Commission's 122-S-G standard, which includes broken stone foundation, 122 lb. steel and granite block surfacing. North of Lawton loop, the Commission's type 122-C-G construction was used, having concrete slab foundation, 122 lb. steel and granite surface. Cross and longitudinal sections of both types are shown in fig. 2, and detailed descriptions of both were given in Canadian Railway and Marine World for Dec. 1921, pg. 656. Between Lawton Blvd. loop and Eglinton Ave., the concrete slab foundation was in place by Sept. 6; by Sept. 9, it was in place between Eglinton Ave. and Glencairn Ave., and by Sept. 25 the foundation was completed over the whole section, from Farnham Ave. to the northern city limits.

During the first part of the work's progress, the radial railway cars were able to use their original barns south of St. Clair Ave. for repairs. By Sept. 7 the 122-S-G double track line had been completed from Farnham Ave. to Lawton Blvd., and on that date the Radial Co. began operation, with some cars furnished by the Toronto Transportation Commission, on the new double track line from Heath St. to Farnham Ave. Removal of the original radial track south of Heath St. was not commenced till Sept. 24.

With a service maintained by the Radial Co.'s own standard gauge cars operating on the temporary track from the north city limits to Heath St., and the 4 ft. 10 7/8 in. gauge cars furnished by the Transportation Commission operating on the new permanent line south from Heath St. (4 ft. 10 7/8 in. being the gauge of all Toronto Transportation Commission lines), completion of the remaining portion of the new double track line was soon accomplished. As stated above, the new track was completed from Farnham Ave. to the Lawton Blvd. loop by Sept. 7. By Sept. 13 it was completed from the Lawton loop to Eglinton Ave.; by Sept. 20 between Eglinton Ave. and Glencairn Ave., and by Sept. 29 the entire section between Farnham Ave. and the turnout to the loop at the north city limits had been completed. On Sept. 24, the Radial Co. began to operate the cars furnished by the Transportation Commission on the new track from Eglinton Ave. to Farnham Ave., allowing the temporary track to be removed between those points, while the temporary track

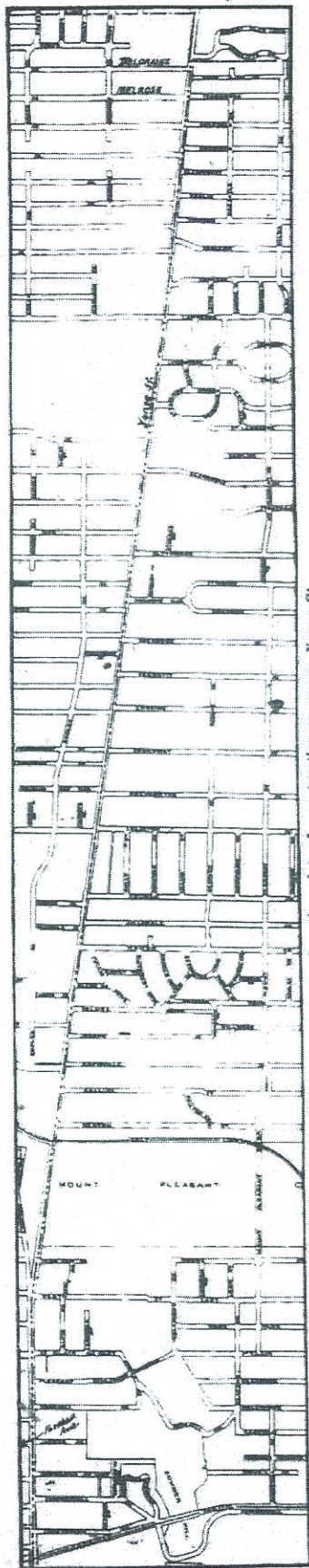


Fig. 1.—Location of track construction on upper Yonge St.

between Eglinton Ave. and the north city limits remained in operation.

Accompanying the laying of the main line track, the installation of required special work proceeded rapidly. A permanent cross-over was installed near Farnham Ave. on Aug. 31. A double track 3-part Y was put in at the intersection of Yonge St. and St. Clair Ave. on Sept. 9. The loop near Lawton Blvd. was completed Aug. 31; to be used for turning cars which, on account of lower traffic density at the northern end of the line, will not proceed to the city limits. At Berwick St. two units of special work for the Eglinton car house entrance were completed on Sept. 26 and 28, the main line portions having been installed some days previously. The special work at Yonge St. and Eglinton Ave. was completed Sept. 21, the main line portions being completed Sept. 15. The Yonge St. portion of a Y at Glencairn Ave., an additional facility for short-routing some cars, was installed Sept. 21, and by the end of September the construction of the loop at the northern city limits was in progress. This loop is being built east of Yonge St., on Glenecho Road and Doncliffe Road. The T.&Y.R.Ry.'s Metropolitan Division will have its southern terminus immediately adjoining this loop.

The Commission introduced a new factor in its electric railway construction in Toronto by laying, as an experiment and with special construction, 0.95 mile of double track with steel ties. Of this distance 0.45 mile was laid with International steel twin ties and the remainder with Carnegie sec. M 24 steel ties.

The following statistical information in connection with the work is of interest: number of steam shovels used, 4; concrete mixers, 4; air compressors, 5; welding machines, 6; motor trucks, 100; number of men, 500 on day and 500 on night shift; steel rails on straight track construction, 122 lb. section, 1,343 tons; special work, 251 tons; number of welded joints, 1200; standard wooden ties, 32 ft. b.m. per tie, 14,325; special ties, 30,500 ft. b.m.; international steel twin ties, 800, or 108,000 lb.; Carnegie steel ties, sec. M 24, 2600 ties or 160,550 lb.; excavation, 30,000 cu. yds.; concrete for track base, 7714 cu. yds.; concrete for paving base, 1386 cu. yds.; granite blocks for wearing surface, 1,097,000.

Fig. 1 gives a good idea of the work's nature, showing the new double track line at the south end of the section, with the ties and rails laid on the stone foundation. An indication of the depth and width of excavation, and the work still necessary to obtain a surface between rails and tracks is also given. The original radial track is at the right.

As stated, the Toronto & York Radial Ry. furnished a service from Sept. 24 on the new double track line between Eglinton Ave. and Farnham Ave. with cars supplied by the Transportation Commission, the service from Eglinton Ave. northward being furnished by radial cars on the temporary track. A week later the radial line extended its service on the new line, with the T.T.C. cars, to as far north as Glencairn Ave., thus releasing the section of temporary track between Eglinton and Glencairn Aves., and on Oct. 15, the loop at the northern city limits being completed, the service on the new track was extended to the northern city limits, releasing the remaining section of the temporary track. During this period the T.&Y.R.Ry. cars were maintained and repaired at temporary sheds at the northern city limits.

while any machine work necessary was done at the old shops at St. Clair Ave. and Yonge St., the work being brought to and from the shops by motor truck. Operation by the T.&Y.R.Ry. with the cars furnished by the Transportation Commission on the new double track line was continued till Nov. 2, when the Transportation Commission took over the new line, and when a celebration to mark the introduction of the city street car system into North Toronto was held. Four motor cars with trailers were run down Yonge St. to Front St., the first train, in charge of J. McCulloch, Traffic Superintendent, Toronto Transportation Commission, carrying a band, and members of the North Toronto Ratepayers' Association, the second train, consisting of an old type motor car and trailer, introduced into the celebration to emphasize the remarkable strides made in equipment construction, carrying Toronto Transportation and City and Provincial Hydro-Electric Power Commission officials, the third carrying other members of the North Toronto Ratepayers' Association, and the fourth carrying members of the North Toronto Business Men's Association. The trains were turned by the Scott St. loop, and then proceeded north on Yonge St., through the new Eglinton car house yard, around the loop at the north city limits, and back to the North Toronto town hall, where speeches were made by numerous civic officials. H. H. Couzens, General Manager, Toronto Transportation Commission, and D. W. Harvey, Assistant Manager, were greeted with enthusiasm, and Mr. Couzens, in a short speech, paid a tribute to the efficiency of the Commission's staff, which had made possible the work's rapid completion. Other participants in the celebration included Sir Adam Beck, Chairman, and F. A. Gaby, Chief Engineer, Hydro-Electric Power Commission of Ontario; P. W. Ellis, Chairman, and Geo. Wright, member, Toronto Transportation Commission; other Transportation Commission officials, and many civic officials and aldermen. In speeches made, the Transportation Commission was highly praised for the efficient work done by the officers and staff in charge of the work, under the direction of A. T. Spencer, Engineer of Way; A. E. Gibson, Construction Engineer; J. Neild, Electrical Engineer; and C. E. Schwenger, Engineer of Distribution. It was made entirely evident that North Toronto citizens thoroughly appreciated the advantages which will accrue to their part of the city through the advent of efficient street railway transportation, providing a non-transfer service between the north and south city limits.

Fort William Municipal Railway Matters.

The report of G. L. Guy, of Winnipeg, who was engaged by the Fort William, Ontario, Committee to in-

Car

The Motor Car has been built for its dimensions:

Length over
Length over
Length over
Distance between
Width over
Width over
Height of top
Normal seat

The car is vertically of motor sash, open glazed windows and sash are stationary.



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SHAWINGAN
FALLS
TERMINAL
RAILWAY

years at \$100 a year, to the

Shawinigan Falls Terminal Ry.—This company owns and operates 6.25 miles of railway and does the local switching business at Shawinigan Falls, Que. It operates on the tracks of the Canadian Northern Quebec Ry., and the St. Maurice Valley Ry., as well as on its own tracks. The rolling stock consists of two electric locomotives, a snowplow and a number of dump cars. It does not do any passenger business at present. The officers of the company are: President, J. E. Aldred; Vice-President, R. Mackay; Secretary-Treasurer, H. Murray, all of Montreal; and the operating is under the charge of S. L. Smith, Superintendent, Shawinigan Falls.

St. John (N.B.) St. Ry.—Work has been progressing in the double tracking of the line in Union St., but it is understood that an extension is being sought to prevent the

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Shawinigan Terminal Ry. Locomotive.

The Shawinigan Terminal Ry. Co., Shawinigan Falls, Que., is having built a single phase electric locomotive, which will have a steeple cab with sloping end cabs, and will be supported on swivel trucks with 44-in. wheels, and equipped with 4 alternating current, compensated type motors. The approximate weight of the electrical equipment is 24 tons and the balance of the locomotive weighs about 27 tons, a total of 51 tons. All the wheels are driving wheels, so that the weight on drivers is 51 tons. The motor trucks will have cast steel side frames carried on journal boxes by semi-elliptic springs and hangers. The side frames, end frames and pedestals of the truck, also the longitudinal sills, cross sills and buffers of the locomotive platform, will be riveted and bolted together so as to secure a rigid structure capable of taking the maximum hauling and buffing strain for which the locomotive is designed. The springs will be of steel tempered in oil and proportionate to the weights to be carried. The wheels will be of cast steel, having spoked centers and removable tires. The axles will be of forged steel, and will have a diameter of $7\frac{1}{2}$ in. at the wheel seat and 7 ins. between the wheels and in the motor axle bearings. Under the gear the diameter will be $7\frac{3}{8}$ in. The motors will be inside hung, half the weight of each motor being carried on the axles and the other half carried by nose suspension on the truck bolster. The platform framing will be built up of steel panels with suitable cross sills and the flooring of steel $\frac{1}{4}$ in. thick. The bumpers will be of cast steel riveted to longitudinal sills, with push pole pockets cast in near the ends. The draw head casting will be supported from the bumper castings and the center sills. No pilots will be provided, the locomotive being equipped with wooden end steps. The

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other half carried by nose suspension on the truck bolster. The platform framing will be built up of steel panels with suitable cross sills and the flooring of steel $\frac{1}{4}$ in. thick. The bumpers will be of cast steel riveted to longitudinal sills, with push pole pockets cast in near the ends. The draw head casting will be supported from the bumper castings and the center sills. No pilots will be provided, the locomotive being equipped with wooden end steps. The main cab will be $9\frac{1}{2}$ ft. by 8 ft. The end cabs will each be $5\frac{1}{2}$ ft. by $10\frac{1}{4}$ ft. The roof and sides will be of sheet steel and the framing of angles suit-ampères with 30 cycle frequency. The rated maximum draw-bar pull of the locomotive is 11,000 lbs., and its maximum instantaneous draw-bar pull for starting purposes will be approximately 18,000 lbs. The above is for 30 cycles. With 15 cycle current, these values will be increased considerably. It is expected that the locomotive will pull a train of approximately 100 tons gross weight, running free on a grade of $5\frac{1}{2}\%$ at approximately 19 miles an hour. On a level track it is expected that the locomotive will be able to operate a train of 110 tons gross weight at a speed in the neighborhood of 45 miles per hour. The current will be collected by means of a pantagraph trolley, from a trolley wire located centrally above the tracks. Following are the approximate general dimensions: Length over bumpers, 31 ft.; length over cab, 28 ft. 6 ins.; height over cab, 11 ft. 6 ins.; height with trolley down, 12 ft. 10 ins.; width over all, 9 ft. 6 ins.; total wheel base, 22 ft. 6 ins.; rigid wheel base, 8 ft. 0 ins.; track gauge, 4 ft. 8 $\frac{1}{2}$ ins.

The locomotive's electrical equipment is being built by the Canadian General Electric Co., and the balance of the work by the Canada Foundry Co.

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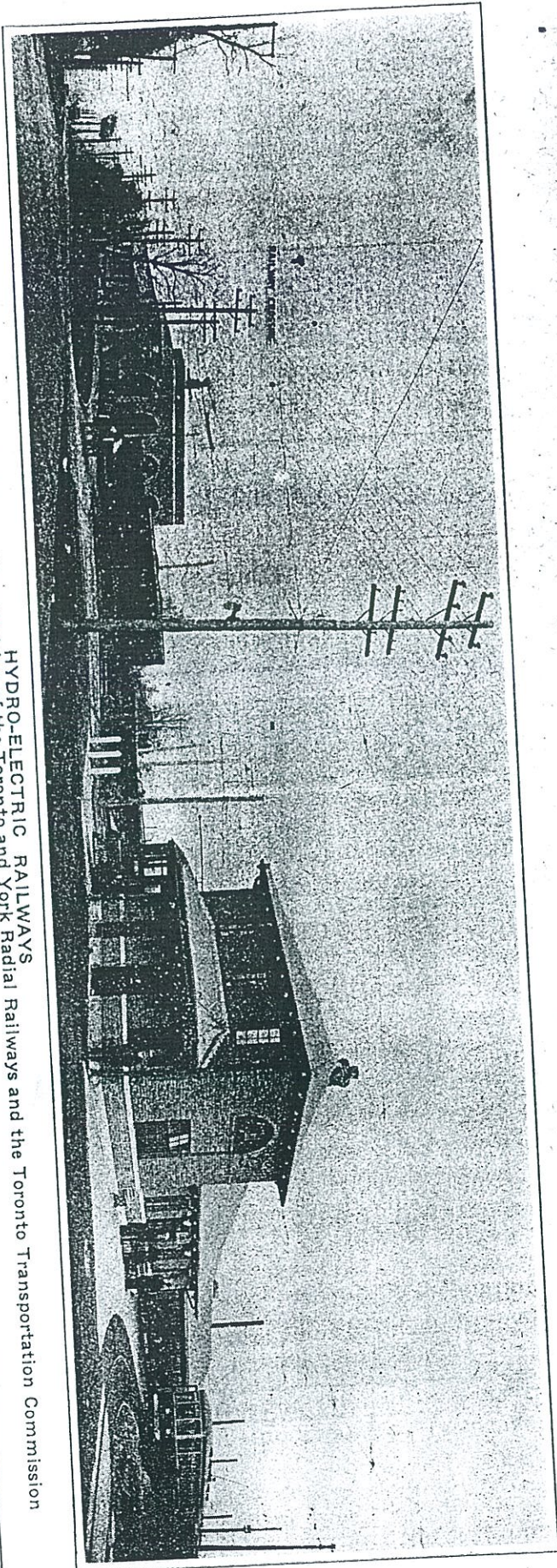
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The Hibbard Co. has been incorporated with

October
1907

Hydro-Electric System



HYDRO-ELECTRIC RAILWAYS
Joint Terminal at North Toronto of the Metropolitan Division of the Toronto and York Radial Railways and the Toronto Transportation Commission