

HAMILTON RADIALS

C. H. RIFF

Hamilton Terminal Company's Station.

The station which has been built by the Hamilton Terminal Co., Ltd., on King St. East, Hamilton, Ont., is one of the most imposing structures in that city and stands out in bold relief to its surroundings.

It is thoroughly fireproof, being constructed of solid masonry and terra cotta with metal frames. The outside is of Indiana blue limestone for the first story and of pressed brick with trimmings of terra cotta above. The cornices and balustrades are all of terra cotta, richly ornamented. On the roof is a large clock with a dial 6 ft. in diameter, surmounted by a flag pole. The interior column and beam construction are of reinforced concrete surrounded by terra cotta blocks. The floors are hollow 8 x 10 tile and reinforced beams 6 ins. wide, alternating, allowing of large floor slabs, 22 ft. x 70 ins. On top of these is laid the usual construction of binder concrete as a filler in between the 2 x 3 sleepers, on which is nailed the ward wood flooring for office rooms and solid Terrazzo construction 3 ins. thick for corridors and public spaces.

The main entrance doorway is a very handsome affair of richly carved stone, and at either side stand two magnificent bronze electroliths on stone pedestals. The entrance vestibule is 22 x 22 ft., and in the floor is a large monogram R.P. & T. Co., standing for Dominion Power and Transmission Co., which controls several companies whose offices and terminals are in the station building. The station floor consists of one large room 68 by 108 ft. Its floor is laid in ceramic tile with borders. The ceiling is 20 feet high, and the walls are wainscoted to a height of 10 ft. with English veined Italian marble. In the front part of the building is the ticket office, which is entered through the vestibule door. Immediately behind it is a large fire and burglar proof vault 16 ft. square, which runs from the basement to the second floor, which also has its mezzanine floors, making four stories high inside and connected with each other by spiral iron staircases. To the right of the main entrance is an electric passenger elevator leading to the upper floors. The station floor is lighted throughout by electric glow lamps, placed in the ceiling and around the columns. Five double doors from the main room lead to iron fenced inclosures leading to the tracks outside, so as to control traffic to and from the cars. All the doors are

arranged so that traffic must pass to the right in every case, thus avoiding conflict of passengers. The station room is very handsomely finished, the woodwork is of quarter-sawn oak, highly polished, and the metal work is of brush brass finish on bronze metal. In the basement are located the toilet rooms.

On the upper floors are the general offices of the company with its subsidiary companies. They are large and airy and finished in quarter-sawn oak, except the board room at the corner, which is finished in mahogany and commands a fine view up King St.

The entire wiring for the building is laid in conduit and is on the 4-wire system with 8-ampere outlets 1,000 circular-mils for each ampere. The main distributing panel, located on the station floor, and the sub-panels on the upper floors are all controlled by main cut-out switches in the motor generator room in the basement. The entire wiring of the building is made especially heavy in order to provide for any future electrical development. The front of the station building is supplied with outlets for illuminating purposes so that when desired the entire front of the building may

be covered with lights. The covered saweways at the front and the vents at the rear are built of steel and copper, are brilliantly lighted by nearly 1,000 incandescent lamps.

A battery of three boilers located under the tracks outside heat the station and office building, and also the Bennett Theatre, which is shown in one of the accompanying illustrations in the rear to the right.

The new station will be used by the Hamilton & Dundas Electric Ry., the Hamilton & Dundas Street Ry., the Grandford & Hamilton Electric Ry., and the Hamilton & Brantford & Brantville Electric Ry.

Grain Elevator Notes.

The elevator heretofore owned by A. A. Wright at Kingston, Ont., has been purchased by the Bentinck Roller Mills Co.

The grain elevator at Colborne, Ont., was destroyed by fire, Nov. 13, at the same time as the C.T.R. station was burned.

The name of the Imperial Elevator Co., Winnipeg, has been changed to that of the Imperial Elevator and Lumber Co., by order in council.

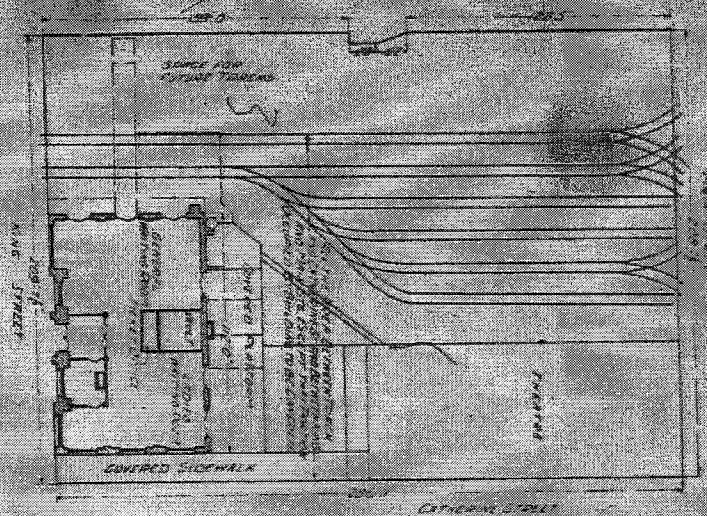
D. J. Murphy, for six years foreman of the Great Northern elevator at Quebec, accidentally shot himself while cleaning a revolver, Nov. 11.

The capital of the Zenith Grain Co., Ltd., has been increased from \$25,000 to \$50,000, by supplementary letters patent under the seal of the Secretary of State in Canada.

The partnership of R. Murray, A. M. Lyle, A. E. Veaton, and G. R. White, carrying on business at Lynden, Min., under the name of the Lynden Elevator Co., has been dissolved as far as regards G. R. White.

The Chicago and Northwestern Granaries Co., Ltd., organized in London, Eng., in 1889, and owning a number of elevators in Minnesota, and North and South Dakota, has sold the whole of its interests therein to the Van Dusen Harrington Co., of Minneapolis, Minn.

The Great Northern elevator at Superior, Wis., was recently destroyed by fire, together with 700,000 bush. of grain, three flour mills, 40 houses, two bays, two scows, and a derrick. The cause of the fire has not been discovered. The damage done is estimated at \$1,000,000.



HAMILTON TERMINAL CO.'S STATION—GROUND PLAN OF TRACK LAYOUT.

529
185
794
529
185
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529
185
794



THE HAMILTON TERMINAL CO.'S STATION, HAMILTON, ONT.

— Hamilton Radial Ry.—The extension of this line from its present terminus at Burlington to Oakville, Ont., will be constructed on an acquired right of way, adjoining and to the road allowance between the 4th concessions south of Dundas & township of Nelson to lot 21 in the township of Trafalgar. At this point the line will run parallel course with the road, passing through private property to the southerly limit of Oakville, then through Rebecca and Randal streets to the limits of the town, where connection will be made with the extension of the Toronto & Mimico Ry. The distance from the present terminus to Oakville is 10 miles. The route described is the most direct, running through the centre of Oakville. The alignment and gradients have been established with a view to advantageously meet the requirements of a fast electric passenger service. The best curve has a radius of 1,146 ft. and the ruling gradient is 1%, aggregating 1.5% of the length of line. The road bed will be constructed to standard widths, and for single track, the grading will be light, and there will be no heavy cuttings. All stream crossings will be with steel beams and girders, supported by concrete abutments. The crossing of Twelve Mile Creek, at Bronte, and of Six Mile Creek, Oakville, will be supported by steel towers carrying alternating spans with a trussed span over the creek and the sub-structures will be carried upon pile foundations. The dimensions of the bridges, in the order given, will be 100 ft. long and 45 ft. above high water level in Lake Ontario and 63.4 ft. and 41 ft. respectively. The piling for these bridges has been completed, but the concrete work will be deferred until spring. All abutment and sub-structures will be built for double track, but steel superstructure for a single track only will be erected at first. This also applies to track construction for freight, which the company purposes to construct. The contract for grading, clearing, foundations and concrete work has been awarded to F. Dickenson, Hamilton. His contract has also been awarded for steel superstructures. It is the intention of the company to vigorously push on the construction as early in the spring as possible, and completion by July. T. E. Hillman is the engineer. (Sent., 1904, p. 1)

JANUARY
1905

Details

Search Again (Advanced) >> Results >> Details << Previous >> Next Search:

Go

John Dudley Williamson -- Eleanor with JDW, view 1

Details

Comments (0)

Description:

In 1909, JDW spent summer vacation as a motorman on the Hamilton Radial Railway, on # 305.

Date of Original:

1909

Geographic Coverage:

Canada - Ontario -
Halton; Wentworth -
Burlington

Image No.:

32011

**Local
identifier/accession/call
number:**

32011s.jpg

Contact:

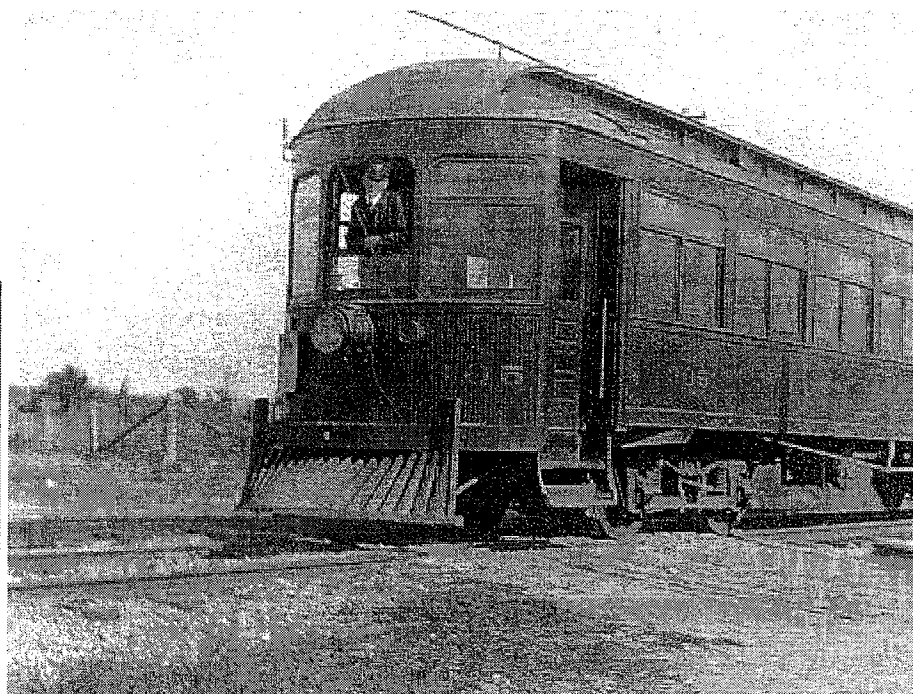
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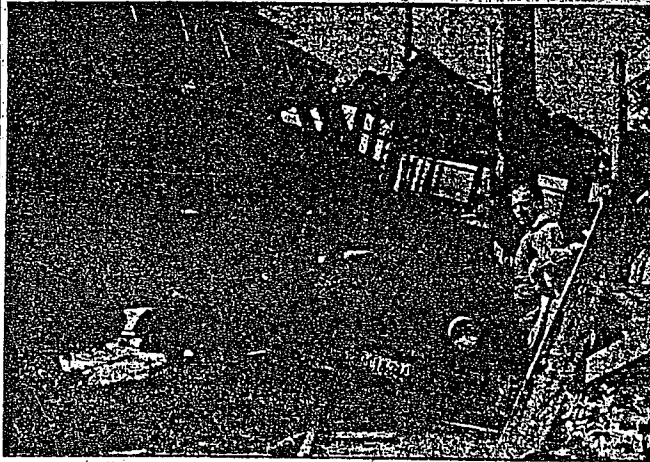
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THE HAMILTON HERALD

HAMILTON, CANADA, FRIDAY, JULY 28, 1922

CAMERA'S STORY OF THIS MORNING'S WRECK



Picture shows what happened this morning when a Dundas bus and an H. & D. radial car met on the level crossing on the Dundas road near West Hamilton.

EIGHT HURT AS BUS AND CAR CLASH

Twenty-Three Other Passengers in Crowded Bus Have Narrow Escape in Early Morning Collision at Dundas Road Crossing Near West Hamilton

IMPACT FORCES BUS OFF ROAD INTO POLE

Injuries of Three Passengers Are Serious—Assistance Rendered by Dr. W. E. Berry—Driver C. Gravelle Blames Crash on Failure to Hear Car Whistle

SERIOUSLY INJURED
Miss Hattie Dickenson, Dundas.
Mrs. Houston, Dundas.
W. Scott, Dundas.

SHAKEN AND BRUISED
Miss Friedella Warner, Dundas.
Miss Marion Houslander, Dundas.
Miss Lucille Barry, Dundas.
C. Gravelle, Dundas.
Mrs. Lornell, Dundas.

Six of the 23 passengers on the Dundas bus, which was travelling from Dundas to Hamilton, were injured when it was involved in a collision with a radial car on Dundas road near West Hamilton this morning. The bus was travelling from Dundas to Hamilton, and the radial car was travelling from Hamilton to Dundas. The collision occurred at the level crossing on the Dundas road near West Hamilton. The bus was forced off the road and into a pole. The radial car was also damaged. The driver of the bus, C. Gravelle, was injured. The driver of the radial car, W. E. Berry, was also injured. The passengers of the bus were injured. The passengers of the radial car were not injured.

All Dundas People
All those hurt in the crash were Dundas people. Those who were seriously hurt were Miss Hattie Dickenson and Mrs. Houston, who sustained fractured collar bones and W. Scott whose back was badly hurt.

Miss Friedella Warner, Miss Marion Houslander and Miss Lucille Barry were badly shaken up and suffered cuts and bruises.

The whistle of Dundas was doing the bus at the time of the accident. Mr. W. E. Berry, driver of the radial car, was in charge of the radial car.

Victims Taken Attention
The accident victims were rushed to the office of Dr. W. E. Berry in West Hamilton, where they received attention being later removed to their homes.

Didn't Hear Whistle
C. Gravelle, driver of the bus, says that he was driving the bus from Dundas to Hamilton when the accident occurred. He says that he did not hear the whistle of the radial car. He says that he was travelling at a moderate speed, which perhaps saved it from toppling over, with probable fatal results. As it was, the bus was forced off the road and into a pole by the radial car.

Gravelle, driver of the bus, received a painful cut behind the ear and both legs were bruised. Mrs. Lornell, a passenger, was also slightly injured.

July 28
1922

Details

Search Again (Advanced) >> Results >> Details << Previous >> Next Search:

Passenger car, Hamilton Radial Electric Railway Company

Details Comments (0)

Item Type:

Photograph

Description:

Radial Car no. 303, Hamilton Radial Electric Railway Company

Notes:

Hamilton Radial was an interurban electric line that operated from July 1896 to January 5, 1929. The line ran from Hamilton via Wilson Street and Birch Avenue and the Beach Strip beside the hydro towers, up Maple Avenue from the Brant Inn to Elgin Street, then east to Lions Club Park, where the car barns were. From 1904 it ran to Oakville along the north side of New Street.

Place Of Publication:

Burlington: The Growing Years, Ch. IV, p. 140

Date of Original:

ca 1920

Dimensions:

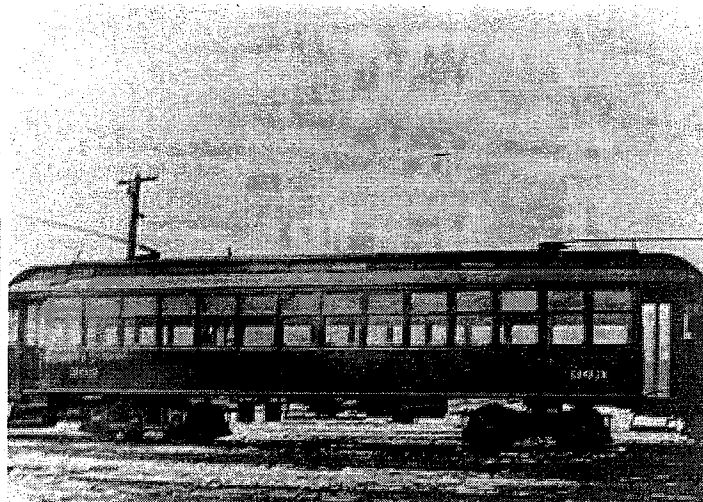
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Subject(s):

Electric railroads
Railroad cars

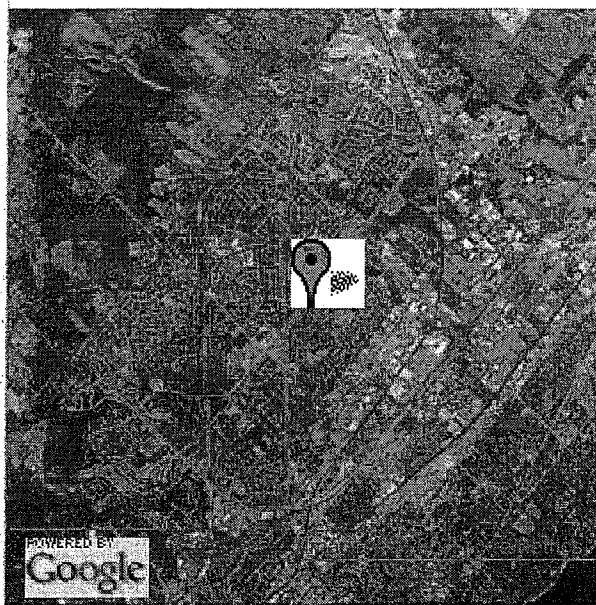
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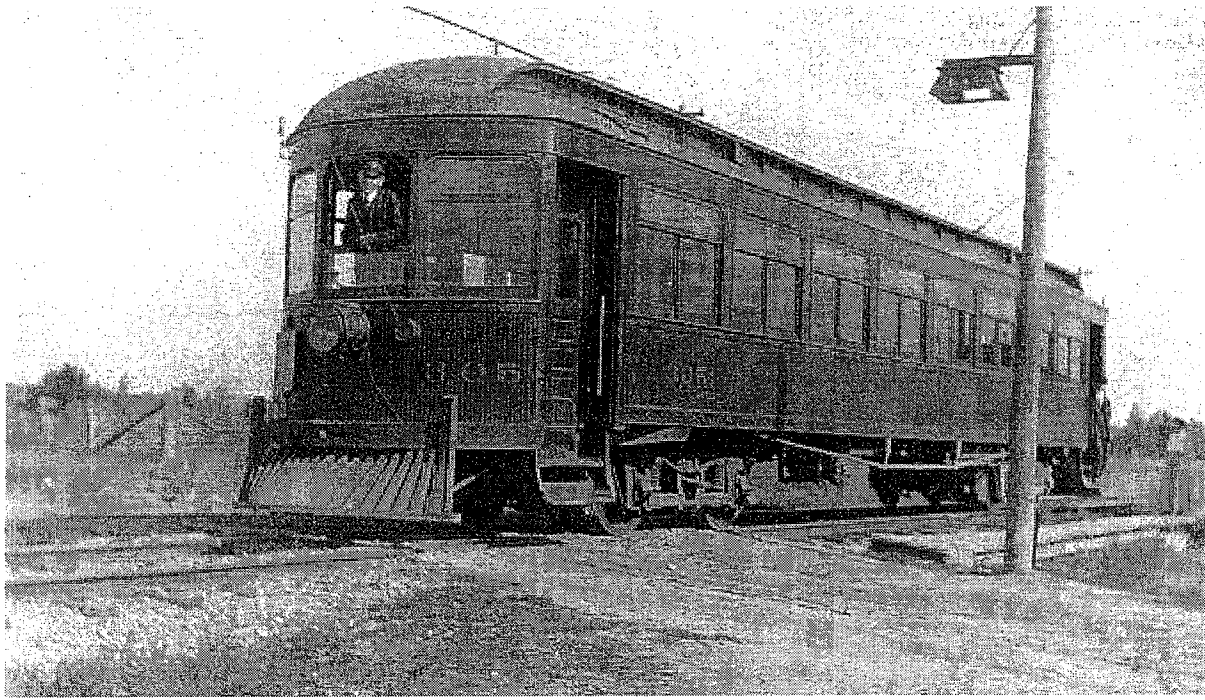
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John Dudley Williamson -- Eleanor with JDW, view 2

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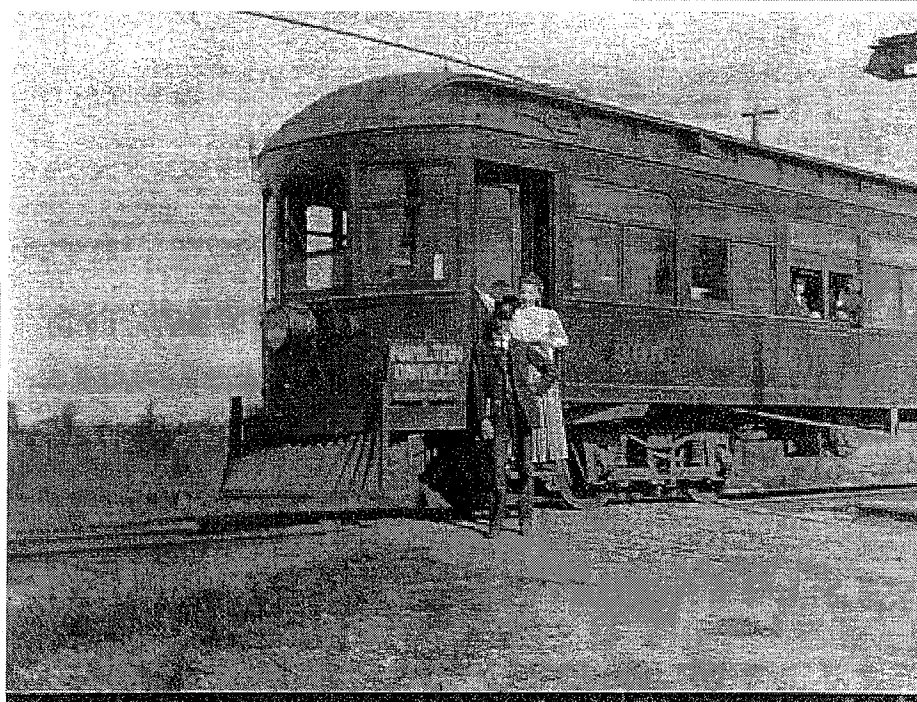
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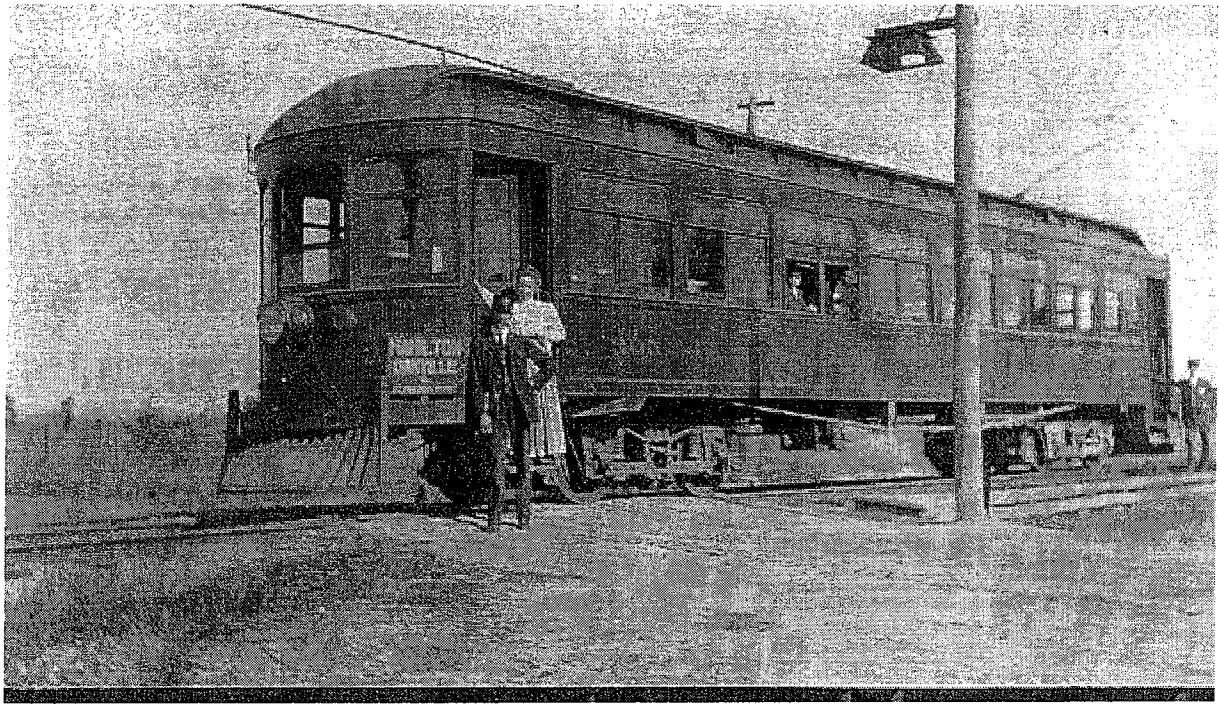


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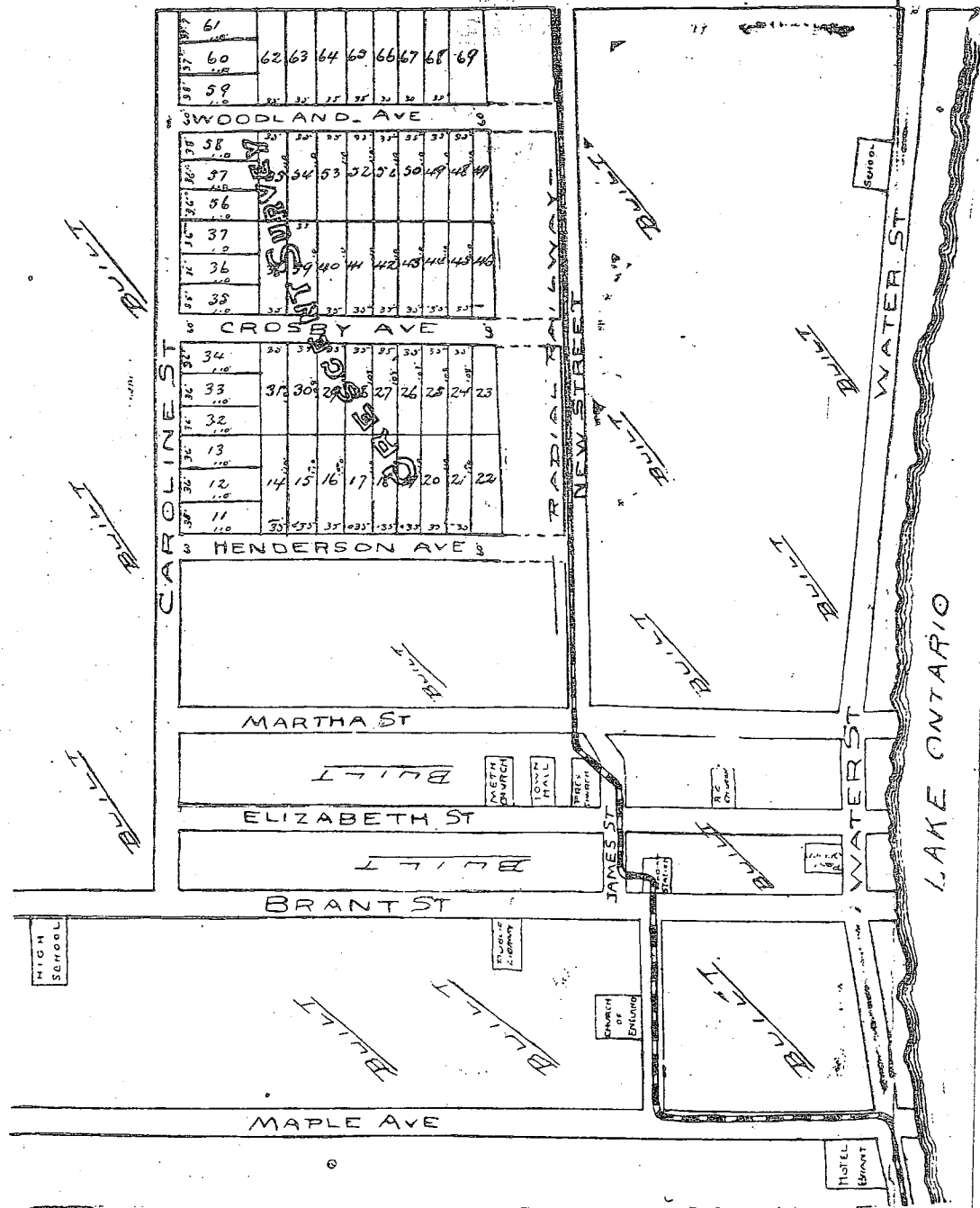
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Sale of 59 Choice Building Lots.

At Exceptionally Low Prices and Easy Terms in New Residential Section
and a Free Ride for Prospective Buyers on Radial Train to See Same



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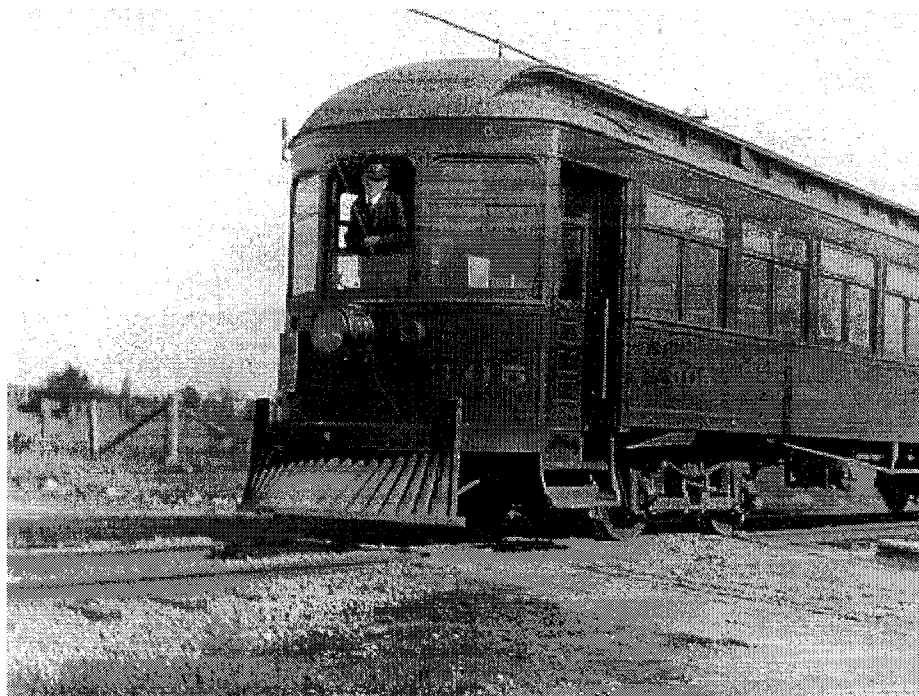
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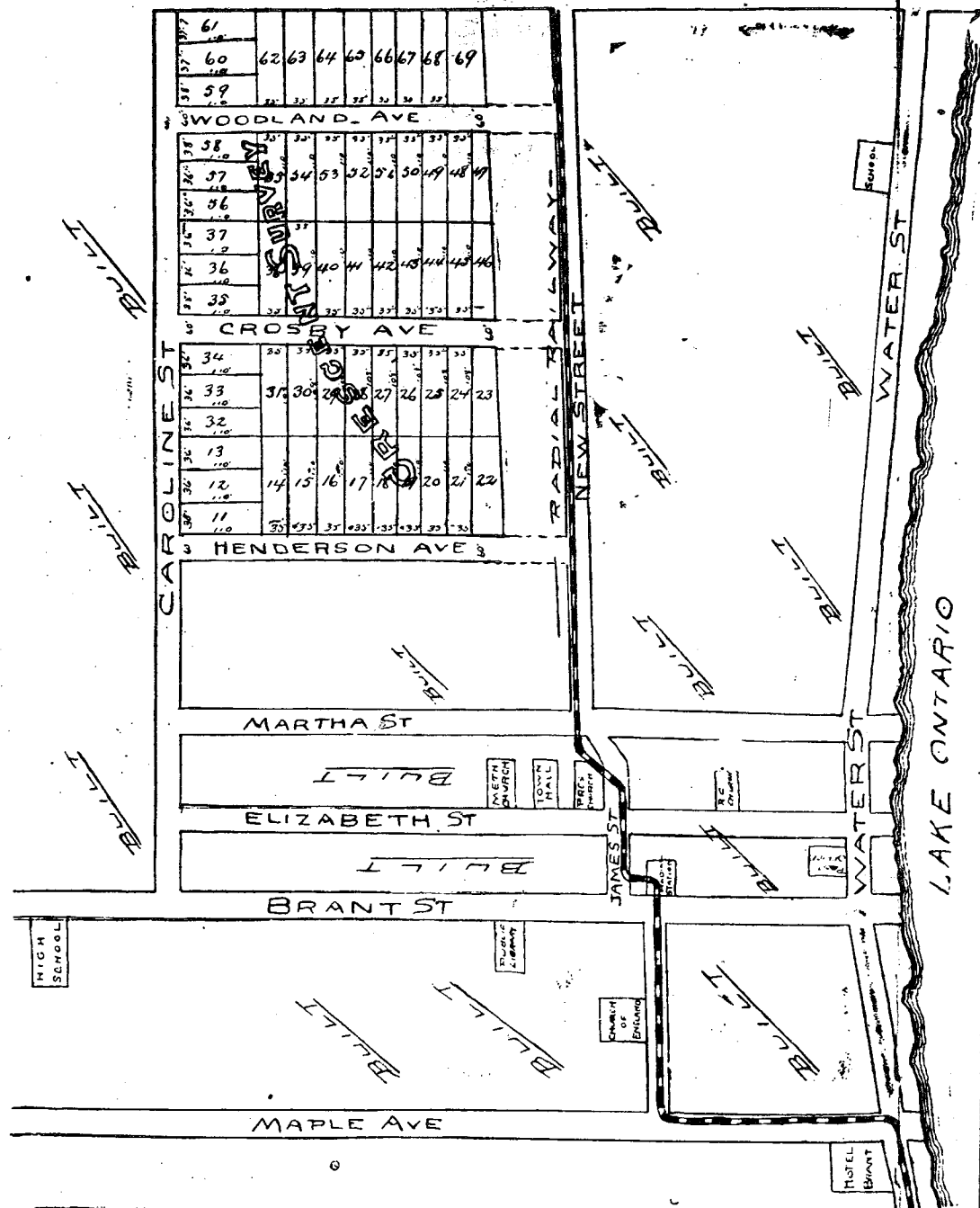
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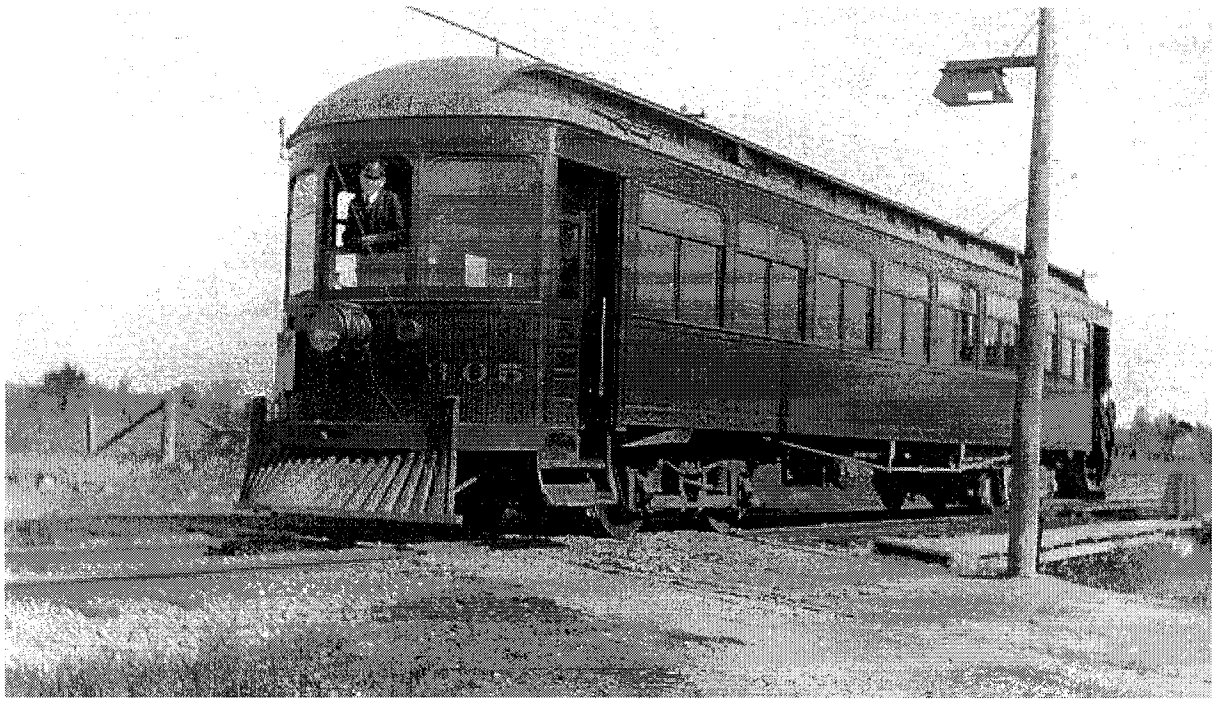


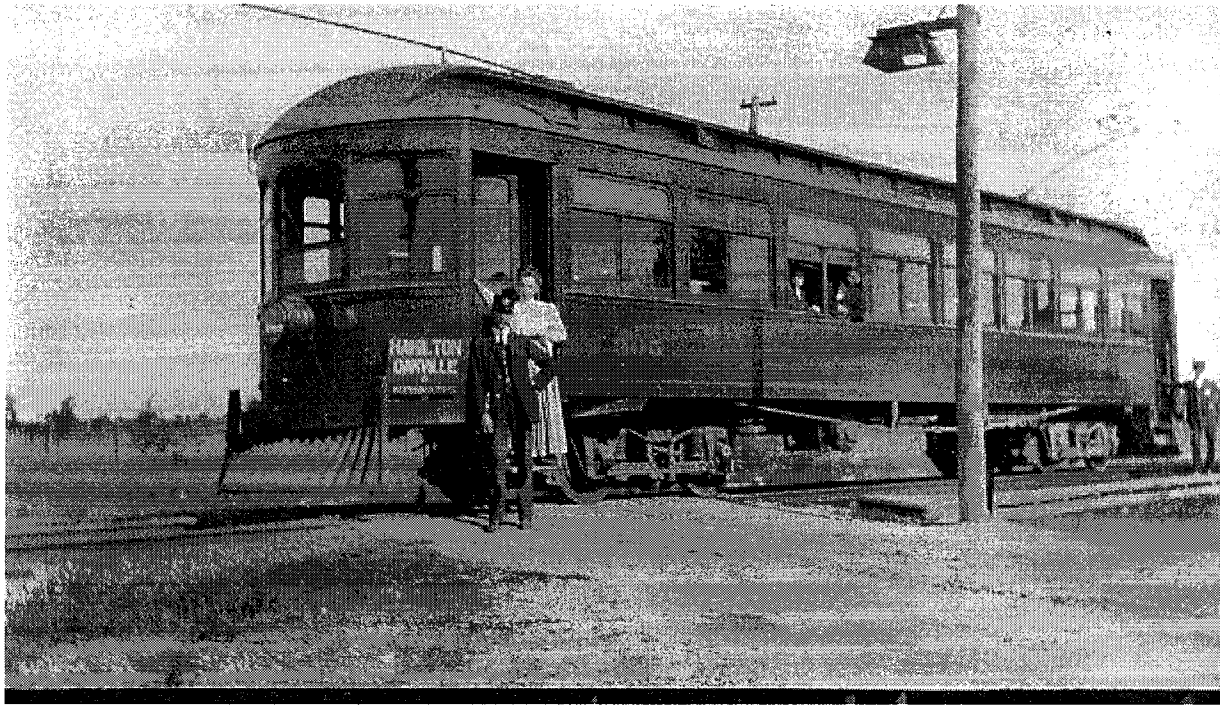
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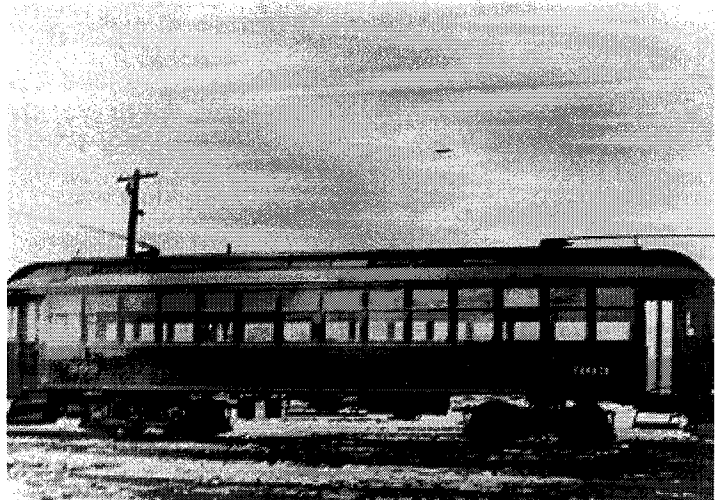
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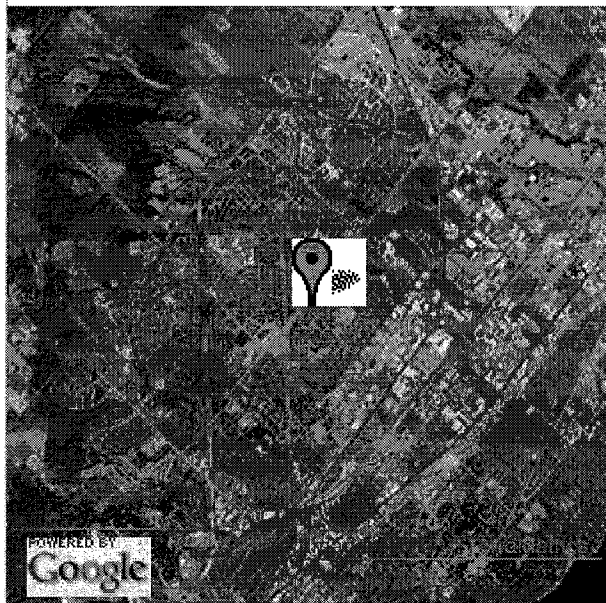
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Hamilton Spectator
October 3 1919

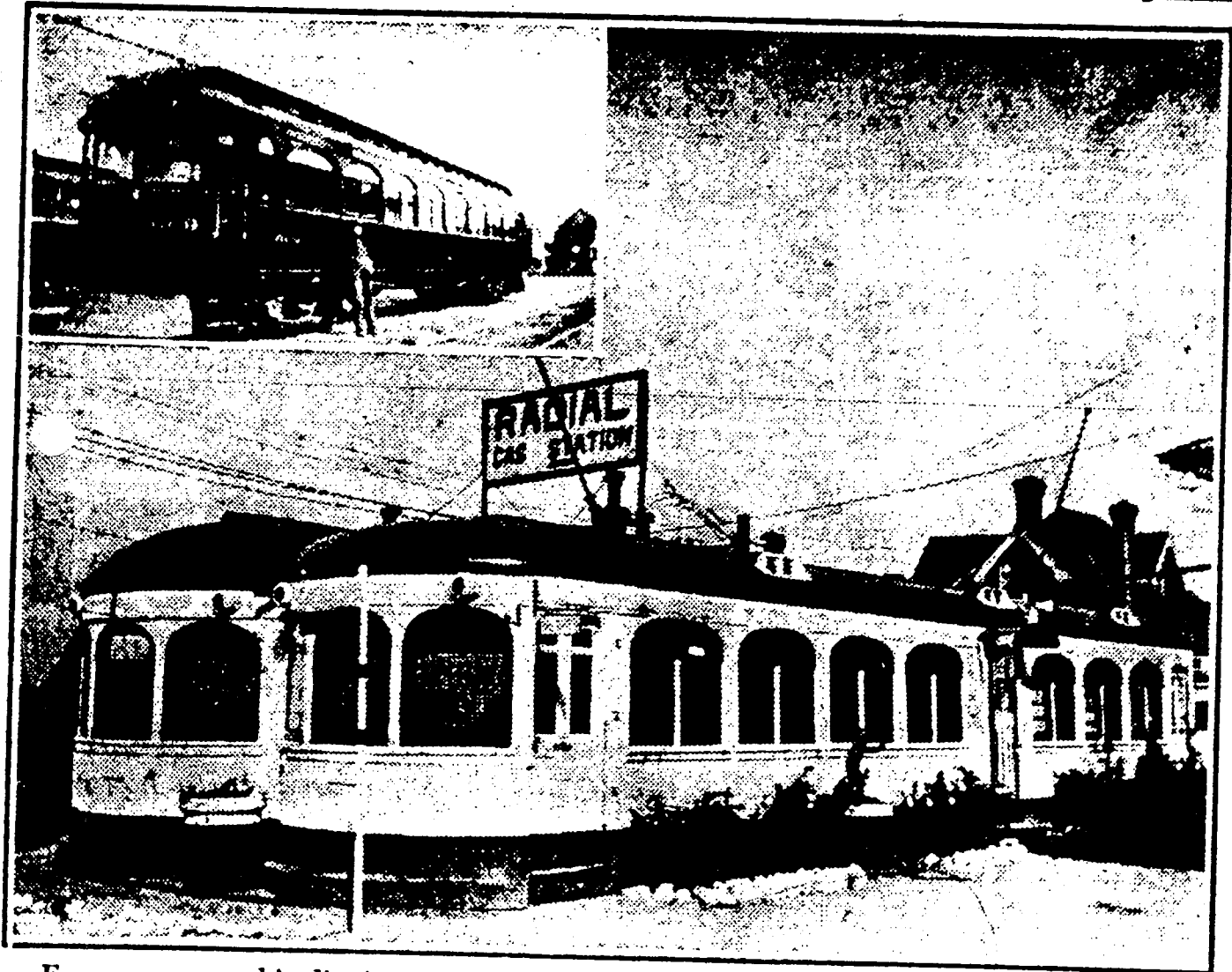
Cars Smashed.

H&D Car Crashed into a Freight Train

This morning there was a costly collision in the street railway at the south side of the T.H.B. railway crossing on Jones Street. A northbound car was held up by a freight train and a big H&D car got beyond control of the motorman the brakes failing to hold on account of the greasy rails. The cars slid down the grade and bumped into the street car. The vestibules of both cars were demolished. No one was seriously hurt. The company officials report
o o o

FATE OF ONCE PROUD PASSENGER LINES

July 15
1936



For many years this district was served by a network of radial electric lines, carrying freight and passengers. Now all have been abandoned and the old cars are to be seen around the country being used as summer cabins, playhouses and even sleeping cabins and gasolene stations, as in this photo taken on the Niagara highway. The insert at upper left shows a radial car in its heyday.

JULY 15, 1936

BAD COLLISION BETWEEN TWO RADIAL LINE CARS

~~They Met This Side of the Long Bridge Near the Waterworks
When Running at Full Speed~~

~~Motorman Choate, of Burlington, Lost Both His Legs, But It Is
Expected That He Will Recover~~

~~It Is Claimed That the Accident Was Due to Men on Hamil-
ton Car Neglecting Orders~~

An accident happened on the Radial railway this morning which resulted in Elgin Choate, one of the motormen, having his legs cut off just below the knees. The accident occurred this side of the long bridge over the black inlet near the waterworks. It was caused by the 7:10 cars, one from Hamilton and the other from Burlington, colliding with each other while traveling at a very high speed.

The 7:10 car, which left Hamilton in charge of Motorman Choate and Conductor Harrison, had received orders to stop at the switch near Ghent's crossing, and let the city-bound car come through. For some reason the order was not obeyed, and, consequently, instead of the track being clear for the Burlington car, the Hamilton car was beyond the switch, and before the motormen could stop their cars they had crashed into each other with terrific force. The fronts of the cars were demolished, and if they had not

been made of the very best material, and strongly constructed, it is probable they would have been totally wrecked and several lives lost.

As soon as the Hamilton office heard of the accident a special was sent to the scene, and in a few minutes the injured motorman and passengers were brought to the city.

Conductor Harrison states that he was fooling with some papers and did not notice that they had passed the switch until it was too late.

No blame can be attached to any member of the office staff; the issuing of the order and the dispatching of the car was done properly and on time.

As soon as the special car arrived in the city the injured motorman was taken to the hospital. His legs were cut off below the knee. At that institution this morning it was reported that he was getting along as well as could be expected, and that it is probable his life will be saved.

Mr. Choate is a married man, his home being in Burlington. He has three sons, but they do not live in this part of the country.

October 12, 1903

OCTOBER 12 1903

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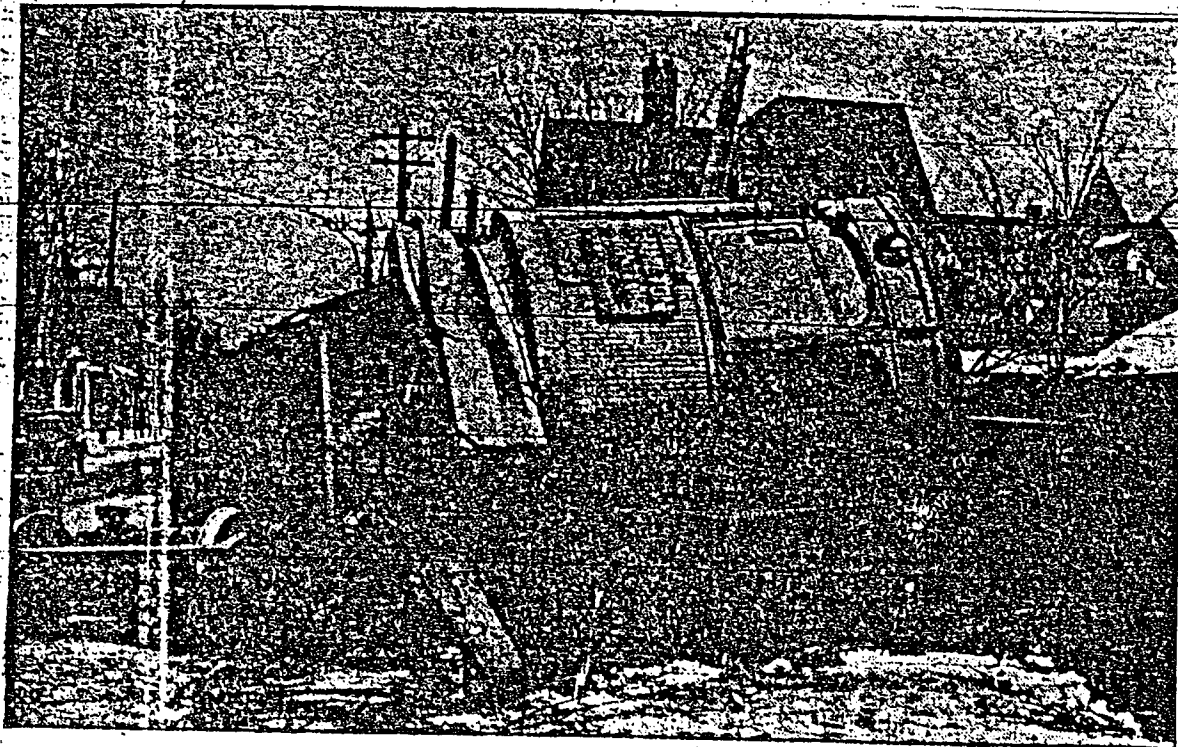
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October 3 1903

BRANTFORD & HAMILTON CAR THAT JUMPED TRACK ON SATURDAY, LANDING ON ITS SIDE

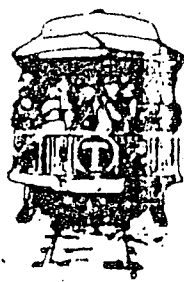


The Brantford & Hamilton Railway car which jumped the rails Saturday afternoon as it turned Hess street. There were 30 persons in the car when it was wrecked.

B. & H. CAR JUMPED RAILS ON HESS STREET

Got Beyond Control
and Crashed Into
Poles and Fence

Mrs. E. Bryson Lost an
Arm and Several
Others Were Hurt



THE second section of a Brantford and Hamilton line train, due here at 3.05 Saturday afternoon, left the rails when making the

turn onto Hess street.

CONDUCTOR KILLED

H., G. & B. Victim Jammed Tight
in His Vestibule.

THE CARS MET ON A CURVE

Collision at the Bottom of a Hill of Elec-
tric Cars of the Hamilton, Grimsby
and Beamsville Railway — Some
Others of the Crew Hurt—Pas-
sengers Were Badly
Shaken Up.

Hamilton, June 25.—As the result
of a head-on collision between two
cars on the Hamilton, Grimsby and
Beamsville Electric Railway yester-
day afternoon, one conductor was
killed and another so badly injured
that there is doubt of his recovery.
Two more railway employees were
rather seriously injured, several pas-
sengers received painful cuts and
bruises, and everybody on both cars
were more or less injured.

Dead and Injured.

The dead man is Conductor Robert
Braidwood of this city.

The injured are Conductor Harry
Branton, who got a terrible scalp
wound. His condition is regarded as
serious.

Peter Gibson, motorman, crushed
about the chest and ribs, and suffer-
ing, it is feared, from internal in-
juries.

Harry Patience, conductor, left
shoulder injured, and badly shaken
up.

J. A. Doucelte, 371 North Victoria
avenue, an electrician for Cataract
Power Co., sprained ankle.

Mrs. Ryckman, Grimsby Park,
ankle sprained.

All the passengers are nursing
bruises and cuts of a painful nature,
but will all be around again in a
few days.

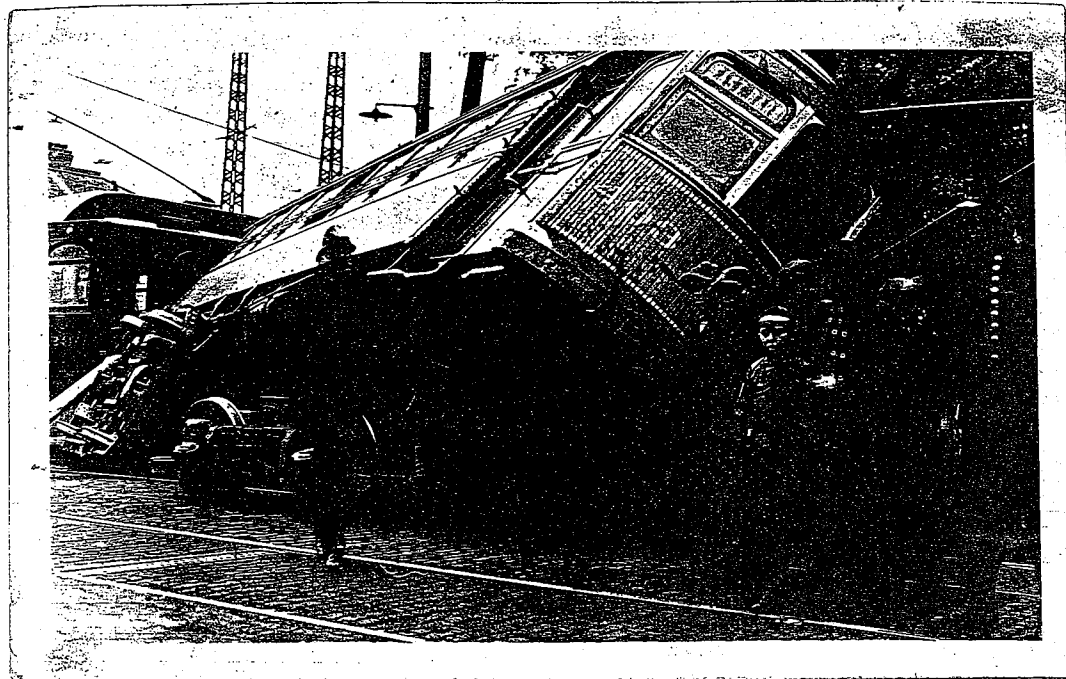
Cars Met on a Curve.

The cars plunged into each other
about 500 yards east of the Winona
crossing at 2 o'clock. It would be
difficult to imagine a worse place for
such a mishap. Both cars were rush-
ing down sharp inclines, and they
met at the bottom of the hill. To
make matters worse there is a curve
in the road.

The dead conductor, Braidwood,
was acting as motorman on it. The
cars came together with such force
that their front vestibules were jam-
med and wrecked. Poor Braidwood
was wedged in so that it took fully
ten minutes to release him. Both
legs from the knees down were
mangled, and one was broken above
the knee. He died before he reached
the city on a special car.

Braidwood had been with the com-
pany ever since it started to operate
cars in 1894, and was one of the
most popular men on the road. He
was 31 years of age, and leaves a
widow and a young son.

JUNE 26
1903

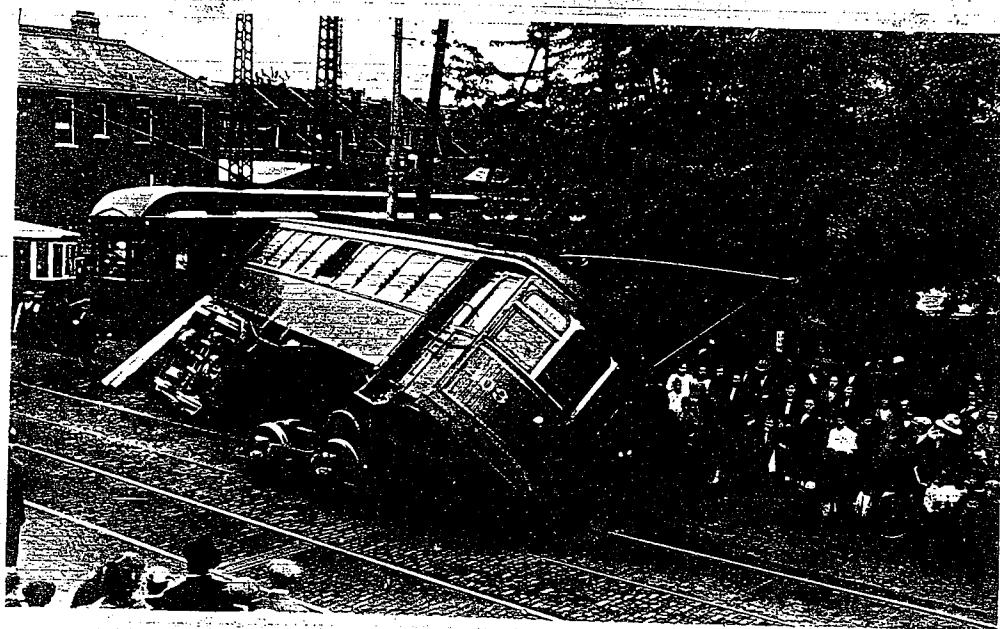
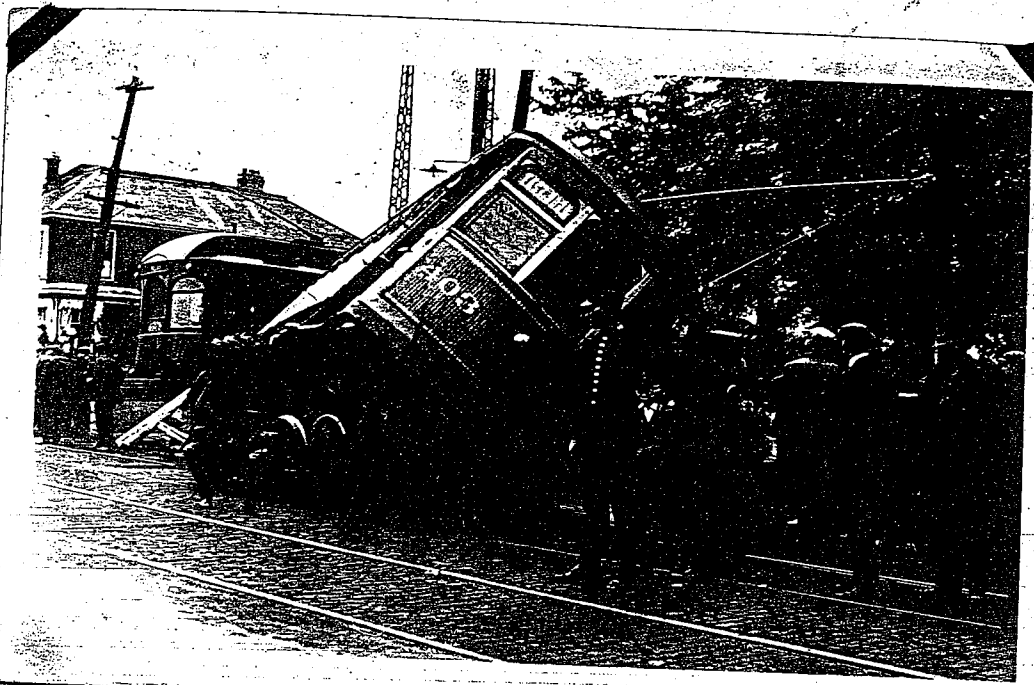


June 15, 1923



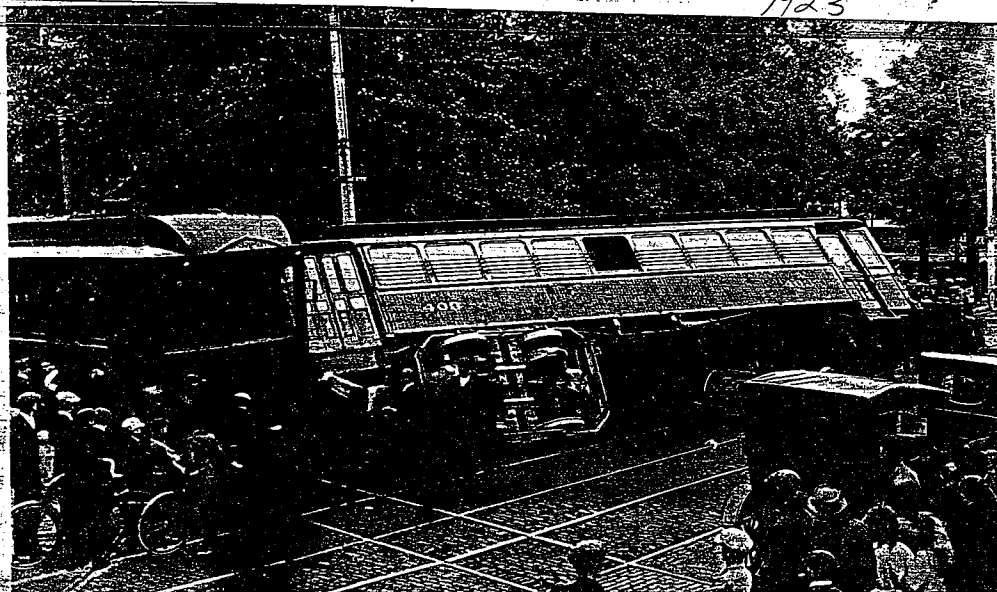
STREET CAR SMASH UP 1923.

Canfield Co.
H.P.L.



Cautel.
HPL

1923



FATAL COLLISION ON THE H. G. & B. RAILWAY

**Motorman Robert Braidwood Killed, and Several of
the Trainmen Badly Injured—Passengers
Luckily Escaped Serious Injury**

**The Accident Happened a Short Distance East of
Winona, Freight and Passenger Car Coming
Together With an Awful Crash**

**It Is Said Collision Was Due to Crossing of Tele-
phone Wires, Conductor of Passenger Car
Being Unable to Get His Orders**

KILLED—Motorman Robert Braidwood
INJURED—Conductor Henry Patience, left shoulder hurt; Motorman Peter
Gibson, internal injuries; Conductor Harry Branton, scalp wound; J. A. Dou-
cette, 371 Victoria Avenue North, ankle sprained; Mrs. Ryckman, Grimsby Park,
ankle hurt.

The most serious accident that has occurred on the H. G. and B. Electric railway since it began operations in 1894 happened yesterday afternoon at a place known as Fifty-Mile Creek, about a quarter of a mile east of the Winona shanty. It was a head-on collision between a west-bound passenger car and an east-bound freight car, both of which were traveling at a high rate of speed. Robert Braidwood, motorman on the freight, sustained injuries which resulted in his death about two hours later, while three others in the company's employ, and at least two passengers, were more or less seriously injured. The other passengers suffered from shock and a bad shaking up. The upper works of both cars were wrecked, but the running gear was not damaged to any great extent. While neither President C. J. Myles nor Manager George Waller can say definitely who or what was responsible for the accident they are of the impression that it was caused by something going wrong with the telephone wires, which prevented the operator in the local office from advising the conductor on the passenger car of the whereabouts of the freight. The company's officials will, however, lose no time in probing the matter to the bottom, while a coroner's jury will also endeavor to place the responsibility for motorman Braidwood's death.

Wires Were Crossed

The freight car left Hamilton in charge of Conductor Harry Patience and Motorman Robert Braidwood about 1:15 yesterday afternoon, but owing to the large amount of freight to be handled did not make very fast time. Conductor Patience reported by telephone to the head office from Stony Creek at 2:10, and from the station opposite E. D. Smith's fruit house at 2:20. When he was heard from at Smith's Chief Clerk Albert Orr, of the local office, gave him orders to go on to Patterson's siding, which is about a mile east of where the accident occurred. Mr. Orr says that at that time the passenger car, which left Beamsville at 2 o'clock, in charge of Conductor Harry Branton and Motorman Peter Gibson, was not reported at Grimsby, and bar-
delays the freight would have had plenty of time to reach the siding before the passenger car arrived. The next Mr. Orr heard of either cars was when a report came over the wires from Winona that they had collided in the
in a place just east of the village

a few car-lengths ahead in either direction and prevented the crews of each car from knowing of the approach of the other.

Collided With Great Force

Believing that all was clear ahead Motorman Gibson, of the passenger car, had his motor wide open until he reached the top of the east bank, when he shut off the power. Motorman

hospital, A. H. Dodsworth was one of the passengers on the car which followed the freight down the line, and he superintended the work of getting the injured into the passenger car, in which they were brought to the city.

Nature of Their Injuries

When Motorman Braidwood was released from between the cars he was still conscious, although both of his legs, from the knees down, were literally crushed into a pulp. There were lacerations on his face and hands, but no other serious injuries, and it was hoped that his system would be strong enough to withstand the severe shock and that he would recover, although from the first it was apparent that his condition was critical, and that even if he lived both legs would probably have to be amputated. He did not appear to realize what had happened, and more than once asked Mr. Dodsworth, who was a personal friend of his, how the accident occurred. Every attention was given to him, and he remained conscious until the improvised hospital car passed through Dartmouthville, when he breathed his last.

Conductor Harry Patience suffered considerably from shock, the result of the bad shaking up he received. At first he appeared to be hurt internally, but before the car got to Hamilton he was able to sit up, and it was found that a lame shoulder was the extent of his injuries.

When Motorman Gibson, of the passenger car, jumped, he struck against the fence and his head and chest were injured. He, too, suffered from the shaking up he received, and at first appeared to be seriously injured, but the doctors now say that he will be about again in a few days.

of clearing away the wreck. Neither trucks having left the trucks, it was an easy matter to pull the broken cars back to the Winona siding, and by five o'clock, two hours after the accident occurred, everything was in working order again. Manager Waller did not come to the city until late in the evening, however, being busy looking after the fruit shipments. When seen last night he seemed to be badly broken up over the death of such a valued employee as Braidwood was. He said he was not then in a position to make any statement concerning the accident. He had not heard Clerk Orr's explanation, nor had he had time to see the injured men or find out anything about how the accident occurred.

President Myles made a similar statement. All he knew about the accident was hearsay, and until such time as he knew more about it from an official source he did not care to venture an opinion or explanation.

Who Motorman Braidwood Was

Motorman Robert Braidwood was a son of Wm. Braidwood, 141 Hunter street east and resided with his father. He was a married man and is survived by a widow and one young son. He was 31 years of age and had been in the employ of the H. G. and B. company ever since it began operations in 1894. He served the company in many capacities, and was always a faithful and valued employee. With the patrons of the road he was exceptionally popular, being genial and courteous at all times, and all who knew him will deeply regret his sad death. Deceased was a member of Victoria lodge, I. O. O. F., and will be buried by the members of that lodge Sunday afternoon.

Are All Married Men

Conductors Patience and Branton and Motorman Gibson are all married men. The first named resides in Hamilton, but the other two run out of Beamsville and have their homes at that end of the line. Motorman Gibson has also been in the H. G. and B. company's employ since 1894, and like Motorman Braidwood was looked upon as a painstaking and careful employee. All three of the injured men, as well as the company's other employees, feel very keenly the death of their esteemed comrade.

Cause of the Accident

The uncertainty as to who was to blame for the accident will not definitely be removed until Conductor Patience gives his evidence at the inquest. The officials of the road place the responsibility on the motorman, Robert Braidwood, and Conductor Patience, who were on the freight car. The explanation given this morning indicates that on them rested the whole matter, entirely apart from the failure of Conductor Branton, of the passenger car, getting telephonic communication with the dispatcher, A. Orr, at the Main street station.

The freight was a special, and was supposed to give way to a passenger car at any time. It left Stony Creek at 2:20, and the conductor had orders to call at Smith's siding. This was reached at 2:34, and, all going well, the freight had ample time to reach the Patterson's siding before the passenger car was due to leave Grimsby on its way to the city.

As has already been stated, Conductor Branton, of the passenger, failed to get telephonic connection with Hamilton when he reached Grimsby, and knowing that he, with a passenger car, was on the line and had the right of way to the next siding, came on with the terrible result.

The officials cannot understand what the freight men were doing after 2:34, for they say the men had ample time to get to Patterson's. At any rate, they say the freight men should have called up from Winona and ascertained how matters were. They are inclined to believe that something went wrong with the freight car, and the men stopped to fix it.

The passenger car in the collision was the Grimsby.

The injured are all doing well to-day. They are still at the hospital.

Inquest Opened

The inquest was opened by Coroner Griffin at Dodsworth's morgue at noon to-day. F. A. Carpenter was elected foreman of the jury. After viewing the remains the jury adjourned until next Thursday night, the coroner advising a week's adjournment, so that the injured men would be able to attend and give their evidence. The jurymen are: Thomas Hill, George Jones, William Powell, George Hayes, James Robb, Daniel Allen, John Turner, Joseph Kennedy, John McMahon, Charles Dodman, Fred Armstrong, John Almas, Robert Proctor, Fred A. Carpenter.



opposite the farm of Egbert W.

Later in the afternoon - the cable with the wires was located. At the Geddes farm, east of Winona. The cable had got crossed, thus breaking the line. It did not take many minutes to get them in working order again.

There were other circumstances
which had a direct bearing on the ac-

as it is commonly known, always been looked upon as a dangerous spot and extra precautions have been taken to prevent just such occurrences as that of yesterday afternoon. It is a dip or ravine a few hundred feet east of the Illinois building and

[illegible]

ten cars were wrecked. The passengers in the west-bound car, about a dozen in number, were thrown violently from their seats to the floor and the conductors were thrown with much force against the backs of their cars. Yet, strange to say, the trucks of neither car left the track, which made the work of clearing away the wreck comparatively easy.

At the time of the accident, another passenger was, which left Hamilton at 1 o'clock, was standing on the Winona siding waiting for the passenger car from the east to cross it. Word of the accident soon reached the village, and the car was run out to the scene. An engine of Winona, was also summoned without delay and everything possible was done to relieve the suffering of the injured.

...and Manager Waller, who was at the time in command, took with by telephone. A view of the ship, the Board was with the ship and a... were made to have the injured brought back to the city and taken to the City

J. A. Doucette, electrician for the Canadian Power company, was one of the passengers who fared badly. He was badly shaken up and one of his ankles was sprained. He was brought to the city on the car with the other injured men. Mr. Doucette's home is at 371 Victoria avenue north.

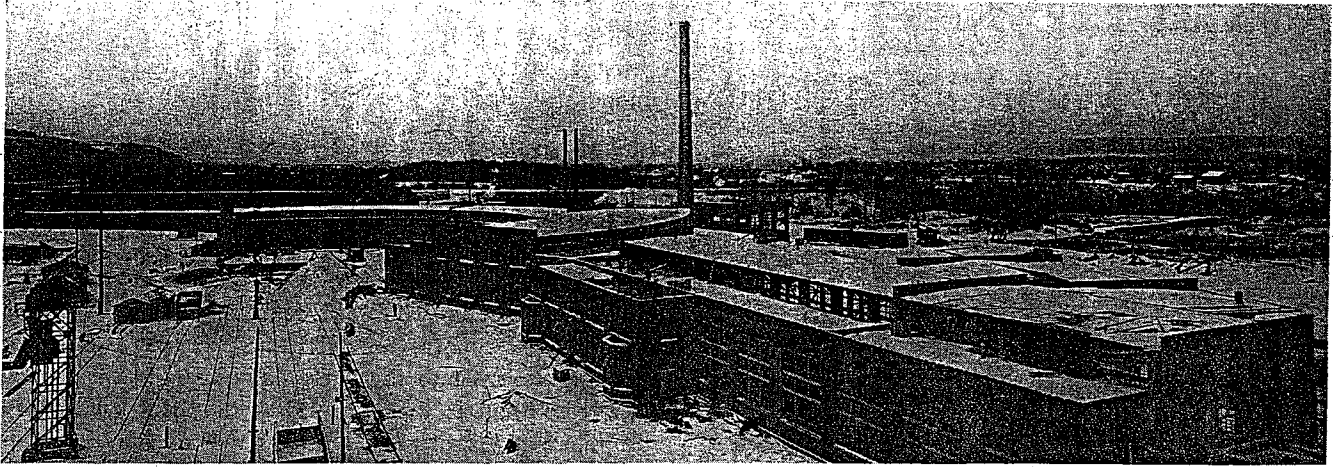
When the car with the injured on board arrived at the corner of Victoria avenue and Main streets the ambulance, patrol wagon, and a couple of hacks were in waiting to convey the injured to the hospital. Dr. Rennie came up from Winona on the hospital car, and at Victoria avenue he was joined by Doctors Edgar and Peters. The four injured

Coroner Griffen was communicated with and he ordered an inquest.

Rescue those who were brought to the city there was only one other person injured beyond a few bruises, or scratches. That one was Mrs. Ryckman, of Grimsby park. She suffered from a sprained ankle, but was looked after at a near-by house until the road was cleared, when she was taken back to the park.

WALKER Walker came up from the scene of the accident on the first car leaving after he was notified of what had occurred, and he personally supervised the work.

TH&B HAMILTON
ENGINE
TERMINAL



The Hamilton Engine Terminal During Construction

T.H.&B. Builds Fireless Enginehouse

*Complete terminal and shop facilities opened on
new site at Hamilton, Ont.*

ON April 16 the Toronto, Hamilton & Buffalo placed in operation a new terminal at Hamilton, Ont., for handling its locomotives and those of the Canadian Pacific. It includes a 27-stall enginehouse and repair shop, with mechanical coal- and ash-handling plants, a modern stationary boiler plant, a storehouse and a motive-power department office building. The enginehouse is equipped with direct-steaming facilities and is designed for fireless operation. Smokejacks are omitted from all except five stalls. This terminal, which represents an investment of approximately \$1,250,000, including land and grading, replaces an old terminal on another site which was too restricted to permit the development of longer engine-

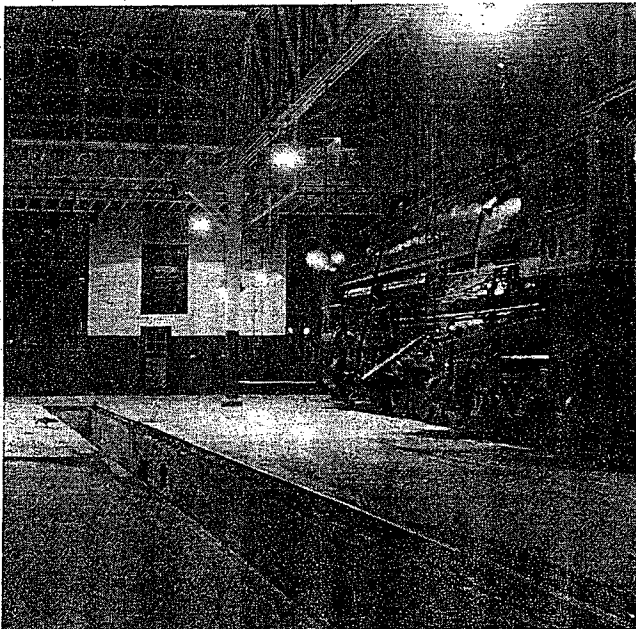
house stalls and turntable and adequate repair-shop facilities.

The old terminal is located in the Dundurn street wye and is completely hemmed in by tracks which made expansion impossible. Accordingly, after a careful study, it was decided to abandon this site, and a new site of 21 acres was purchased. This property, formerly occupied by brickyards, is located between Robinson street and Aberdeen avenue in the western part of the city and lies between the old shops and Aberdeen yard, adjacent to the tracks of the Waterford subdivision. In several respects the site is particularly favorable. It is relatively remote from real estate development, is conveniently accessible, and the hard, dry clay subsoil simplified the construction of foundations.

About 240,000 cu. yd. of grading was necessary to obtain the required track and building levels. Grading operations were started in the fall of 1928 and were completed in the summer of 1929. Building operations were commenced in June and the buildings were practically all enclosed before the winter.

The Enginehouse

The enginehouse is of brick and concrete construction, with an inner wall radius of 138.53 ft. The first seven stalls, which form the drop-pit and heavy-repair section of the house, are 155 ft. long in five bays. The center bay is 72 ft. across, from center to center of columns, and the roof is supported on wood trusses between monitor windows. The clear height under the trusses is 23 ft. 6 in. From the inside circle wall the two inside bays are 25 ft. and 19 ft. in width, respectively, the roof over each sloping toward the intermediate column line and draining through 5-in. galvanized wrought-iron leaders to openings in the sides of the track pits 8 in. from the bottom. The outside bays, from the monitor toward the outside, are 19 ft. and 20 ft. in width, respectively, and the roof of the



roof remains unbroken toward the outside circle wall. This section of the house is occupied with stripping and erecting operations and heavy running-repair work. Under tracks 2 and 3 is a Whiting electric drop table for driving and engine-truck wheels. Under track 4 is a similar table for trailer and tender wheels. A telfer track, equipped with a Northern 10-ton electric traveling hoist, leads from between tracks 2 and 3 to the wheel press and wheel lathes in the adjoining shop building.

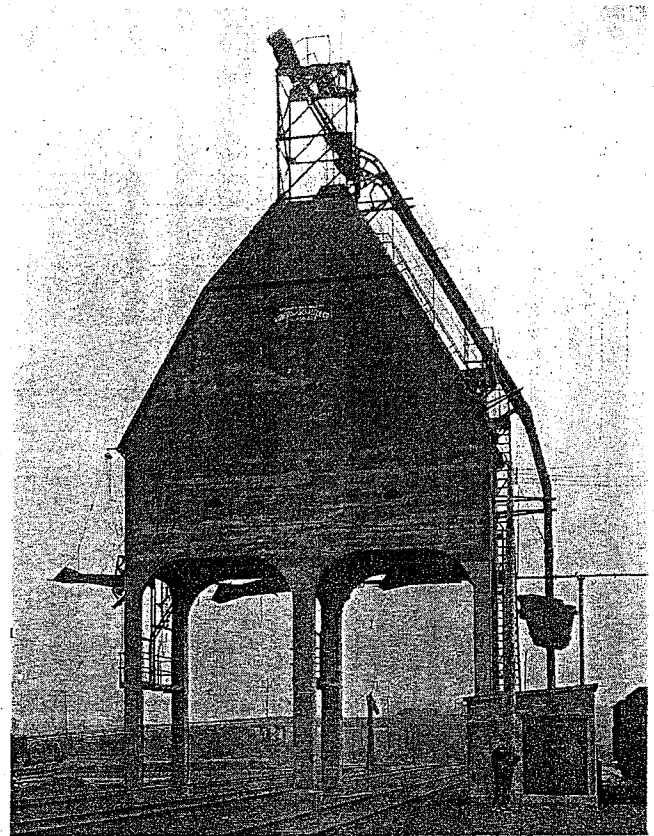
The 20 stalls of the enginehouse proper are 110 ft. long, in three bays. In this section of the house the trusses which support the roof over the center bay are 60 ft. long and the clear height under them is 18 ft. 6 in. The arrangement of the roof is shown in the section drawing. The floors are of concrete, laid on a gravel base, the whole of the enginehouse area having been excavated and backfilled with gravel and consolidated with water. The windows of the enginehouse are fitted with wood sash throughout.

This portion of the house is separated from the drop-pit section and is divided into two 10-stall sections by brick firewalls. Smokejacks for blowing flues on engines are provided over tracks 8 to 12, inclusive, adjoining the drop-pit section of the house. All stalls throughout the house have concrete pits, with drains at each end.

The turntable is 100 ft. long. It is of the continuous three-point type, supported on a concrete center pier and a concrete ring. The ends of the table are carried on a 127-lb. circular rail secured to plates supported directly on the concrete. It is operated by two electric driving motors and is provided with one auxiliary air motor, controlled from one operator's cabin. It was built by the Canadian Bridge Company, Ltd.

The Repair Shop

The shop building, which extends back from the outside circle at the end of the drop-pit section of the enginehouse, is 80 ft. wide by 220 ft. long. It is of brick and concrete construction, with pivoted steel

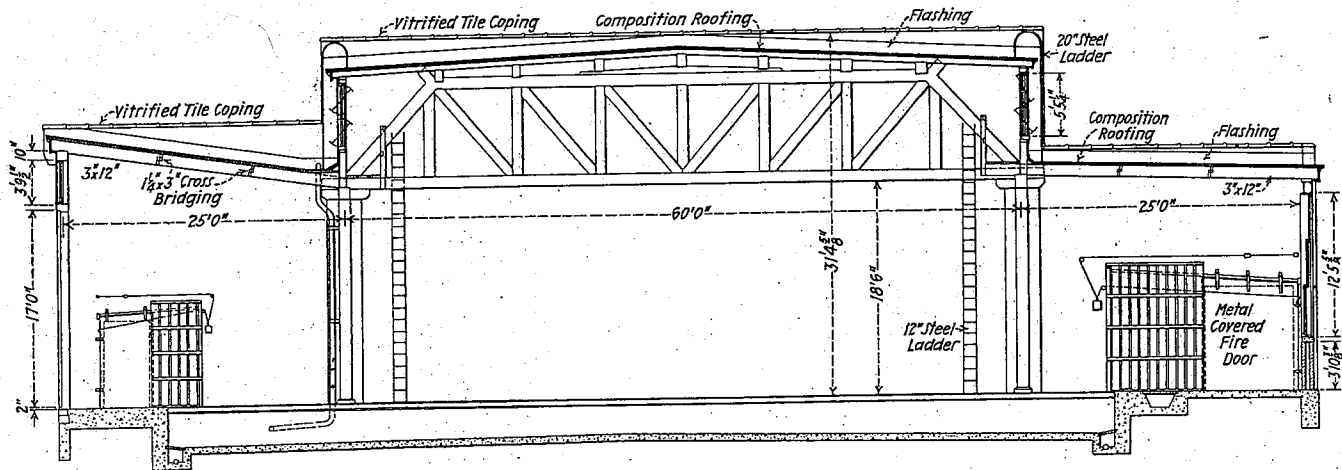


The 300-Ton Coaling Plant

window sash, and the monitor-type roof is supported on steel trusses. The floor has a concrete base surfaced with Kreolite wood blocks, with concrete foundations for the heavy machines. Adjoining the enginehouse the first 160 ft. of this structure is occupied by the machine shop and, separated by a fire wall, the remaining 60 ft. is occupied by the blacksmith and



A Night View of the Hamilton, Ontario, Engine Terminal of the Toronto, Hamilton & Buffalo



Section Through an Enginehouse Stall

flue shops. The flue rattler is housed in a small brick structure at the end of the shop building.

Space is provided in the shop section of the enginehouse for the boiler and sheet-metal shop facilities.

Extending along the side of the shop building 103 ft. is a two-story brick and concrete addition, 18 ft. 6 in. wide. This building, which faces the ash-pit tracks, contains the offices of the general foreman and engine despatcher, the register room, shop men's locker and toilet rooms, and a first-aid room on the first floor, and shop men's and enginemen's rooms, toilet and supply rooms on the second floor. A bay window in the general foreman's office affords a complete view of the service tracks from the turntable to the coaling plant.

The Storehouse and Office Buildings

The storehouse is a one-story structure, 185 ft. long by 77 ft. wide. Approximately 100 ft. of the building is of brick and concrete construction, with the floor at car-floor level. This portion of the building contains the storekeeper's office, the oil and waste storage and the stocks of finished materials. The remainder of the building is of frame and galvanized corrugated sheet metal construction and is unheated. The floor is at yard level. Platforms and ramps are provided for both car and truck deliveries.

A two-story office building, 40 ft. by 50 ft., has been provided for the superintendent of motive power and

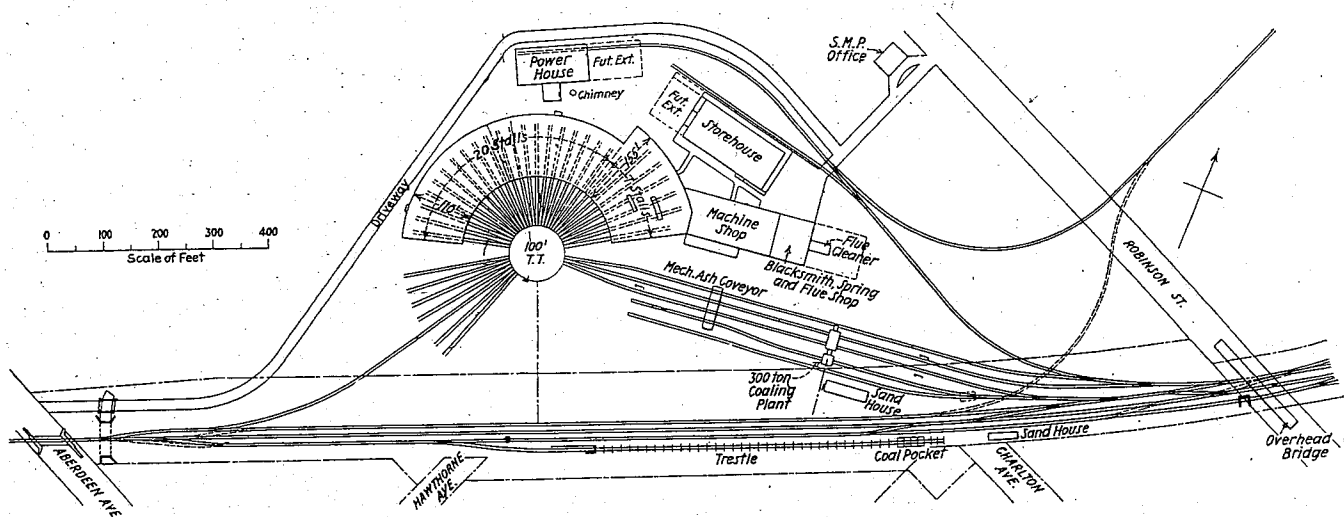
his staff. This building is fitted with steel sash and is heated from power house. Floors are laid with battleship linoleum.

The Power House and Direct Steaming Facilities

As the enginehouse is equipped with the direct-steaming system, stationary boiler capacity must be provided to carry the load formerly carried by the locomotives themselves. The power house at the Hamilton terminal is equipped with three Connolly 260-hp. watertube boilers operating at 200-lb. pressure, and with all necessary auxiliaries to insure efficient and economical operation.

The power-house building is 65 ft. by 130 ft., of brick and concrete construction, with steel-trussed roof and steel sash. The boiler-room is 70 ft. long and provides space for the installation of another boiler. The floor is approximately 9 ft. below the yard level and the coal cars enter the building at yard level and dump to the floor under the track. From a hopper in the floor the coal is elevated by a Nicholson coal-handling plant to a hopper above the boilers and piped by gravity to the stoker hoppers. Ashes are handled by a Hahn steam-jet system from the boiler room to a 41-ton cast iron ash hopper located over the coal track outside the building.

The boilers are fired by Detroit multiple-unit rear-dump stokers. In addition to the induced draft from the 175-ft. chimney, the boilers are equipped with



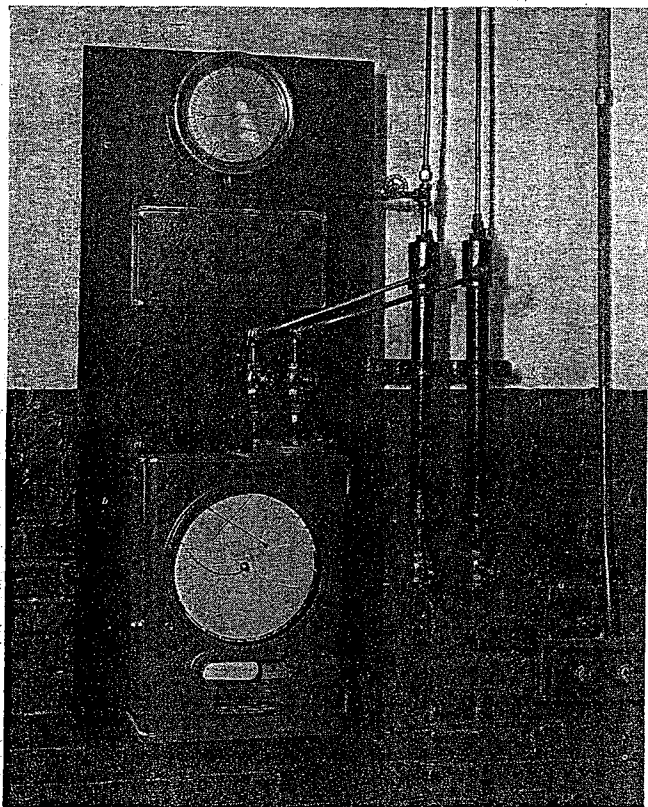
Plan of the New T. H. & B. Engine Terminal—The Enginehouse Stalls are Numbered from Right to Left

auxiliary steam-turbine-driven fans. A Hagan combustion controller automatically regulates the dampers and the speed of the stoker engines and draft fans to meet variations in the load. The boilers, stokers and settings were installed by E. Leonard & Sons and the piping and pumps by the Robert Fitzsimons Co., Ltd.

In the engine room is a 1,400-cu. ft. steam-driven air compressor and the boiler-washing and filling system tank and pump.

Electric Power Supply

In one corner of the engine room, within a brick and concrete fireproof, enclosure, is located the switch-board. The electric power for the terminal is brought into the power house on a specially constructed high-tension line of the Dominion Power & Transmission Company, which leads directly from the main service lines and is, therefore, expected to have practically no voltage fluctuation. From the Westinghouse switch-

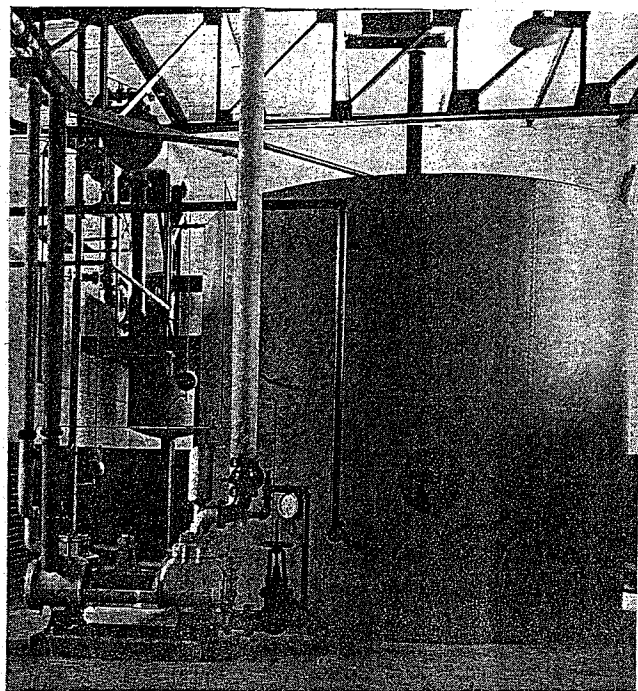


The Enginehouse Steam-Flow Meter

boards in the power house the power is distributed through two outdoor transformer banks, one located near the power house and one about 500 ft. south of it. All low- and high-tension feeders are laid in underground ducts throughout.

The hot-water boiler-washing and filling system and the direct-steaming equipment were installed by the Railway Engineering Equipment Company. Owing to the fact that the railroad owns but thirty-three locomotives and that these require boiler washing once a month, or an average of about one boiler wash daily, it was not considered necessary to install the double-tank system. Accordingly, a 20,000-gal. tank for filling water supplies both washout and filling water and the water from the steam separator in the blow-down line, passes through a water seal to the sewer.

Steam is conveyed to the enginehouse from the power

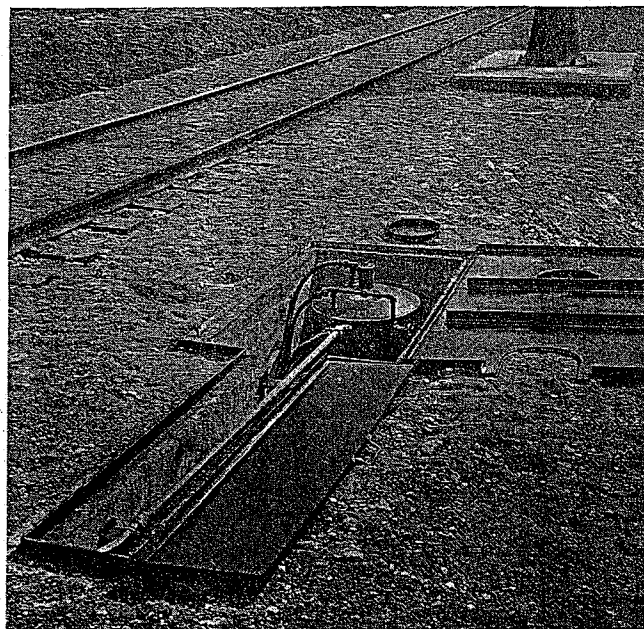


The Boiler-Washing and Filling Equipment

house through an 8-in. main. This leads to an overhead line which extends around the entire circle of the 110-ft section, thence around the drop-pit section and through the shop, from which branches lead to the storehouse and office building and to the sand house.

Steam Consumption Checked

A complete system has been provided by which the consumption in the various parts of the plant may be readily checked. The output of each boiler is measured by a Republic recording and integrating steam-flow meter. Where the 8-in. main enters the enginehouse a Bailey steam flow meter has been installed. This meter will record the entire output of the plant not consumed in the power plant itself. Other Bailey meters have been installed at points in the line such



Equipment at One of the Locomotive Firing Stations

that the consumption of the various parts of the load may be obtained directly or measured by the difference in the readings of meters in successive locations. The overhead mains for steam, hot and cold water and the blow-off line are of welded construction.

Steaming Drops at Each Pit

Drops for the direct steaming system are provided at each pit in the enginehouse proper and an extension drop has been carried into the back-shop section for steaming locomotives after the completion of repairs. Overhead valves in the drop lines from the mains, controlled by chain handles from the floor, connect the single flexible drop line with either the blow-off line, the hot-water filling and high-pressure steam lines, or with the hot- and cold-water lines, the latter when washing out.

It is the practice at Hamilton to keep all locomotives which are ready for service under steam. With the absence of smoke jacks the radiation from these locomotives serves to heat the house. To provide additional radiation in severe weather, two unit hot-air heaters are installed, one for each 10-stall section of the house. Each heater, which is housed in a 10-ft. by 12-ft. room built outside the outside circle wall, delivers either fresh or recirculated air through underground ducts to four pits, outlets being provided along the sides of these pits. One heater is located opposite tracks 12 and 13 or at the center of this section of the house. The other is located opposite tracks 25 and 26, near the end of the house. The drop-pit section of the enginehouse and the shop building are provided with unit hot-air heaters installed on the walls.

Coaling Station

The terminal is provided with a 300-ton reinforced concrete coaling station. This is the Roberts & Schaefer shallow-pit, roller-skip type, with a hoisting capacity of 75 tons per hour, the bucket having a capacity of two tons. Once started, the operation is automatic.

The cinder-handling plant is a Roberts & Schaefer N & W type, electrically operated, serving three tracks. The bucket has a capacity of 80 cu. ft. Its movement is selectively controlled from a push-button station at each track, so that the bucket may be returned to the dumping position under any track as desired. The ash-pit hoppers and control gates are of cast iron and the gates are equipped with an interlocking device to prevent the hoppers from being opened except when the bucket is in the filling position underneath.

Firing Stations

Three firing stations are provided for igniting the fuel on the grates of locomotives after leaving the enginehouse under steam from the direct-steaming system. Two of these are located adjacent to the outgoing tracks near the ash pits. A third is located near the single incoming and outgoing track which connects with the main tracks near Aberdeen avenue. These stations each consist of a small housing, the top of which is at the yard level, which provides protection for the oil and compressed-air service connections and for the firing-up torch when not in use.

The sand-handling facilities are housed in a 20-ft. by 80-ft. concrete and frame building containing one Beamer steam sand drier and Roberts & Schaefer compressed air sand-elevating equipment. This building is located adjacent to the coaling plant, and provides

a wet storage capacity of 500 tons, with a drying capacity of eight tons a day.

Lighting

Six 100-watt Benjamin angle reflectors mounted back to back in pairs nine feet above the floor, are used between stall tracks in the enginehouse. The units in the first pair are mounted on opposite sides of a roof supporting column and the second and third pair are suspended from the roof truss by conduit from a self-aligning fitting. They are located respectively 21, 35 and 51 feet from the outer circle wall. Angle reflectors are also used on the section walls.

In addition to the angle reflectors there are four Benjamin RLM reflectors between stalls, one over the outer circle runway, one over the inner circle runway, and two spaced equally between. They are respectively 150-, 200-, 100- and 100-watt units and are mounted 16 feet above the floor.

There are two portable extension outlets per stall. Their positions are staggered so that there is a pair on the outer column between one pair of tracks and on the inner column between the next pair.

The interior of the house is painted with white oil paint, with the exception of a six-foot strip along the walls which is dark green. The intensity and distribution of the lighting compares favorably with that in any well-lighted shop.

The terminal yard is illuminated with eight 1,000-watt, 24-in. floodlight projectors and fourteen 500-watt lighting fixtures. One of the photographs, taken from the top of the coaling plant, illustrates the effectiveness of the night illumination.

Water Supply, Sewerage and Drainage

Water is secured from the city mains through a 6-in. and 8-in. connection, forming a loop through the engine terminal cycle and feeding the necessary hydrants for fire protection. Water storage is provided in one 100,000-gal. tank and one 50,000-gal. tank, with 6-in. supply lines and 14-in. discharges into 12-in. mains, which furnish water for four 12-in. Sheffield water columns.

A complete system for drainage of surface, roof and waste water is provided separate from the sanitary sewer. This consists of vitrified pipe encased in concrete where necessary, and concrete and iron pipe ranging from 6 in. to 24 in. in diameter, with manholes, catch basins and gratings through which the surface water is carried to its natural outlet. The sanitary sewer is connected with the city sewer system.

Operation

In the operation of the terminal all fires are dumped at the ash pits before the locomotives are moved into the enginehouse. It is the duty of the hostler and his helper to connect the direct-steaming system drop to the blow-off cock before leaving the locomotive. It is then ready to be blown down, washed out and refilled, or to be kept under steam until ready to leave the house for despatchment. One attendant lays the fire and tends to the blowing-down, refilling and steaming operations. On leaving the house it is the duty of the hostler to disconnect the direct-steaming drop before moving the locomotive.

With the relatively high temperature of the coal in the firebox, the fuel is completely ignited over the entire grate area by the use of the oil-fired torch at the firing station in an average of about 3 min. This operation is performed by the hostler or his helper.

From the direct-steaming system the railroad company anticipates the benefits of reduced fuel consumption, reduced boiler maintenance, a reduction in fire hazard, a saving in enginehouse labor, quicker despatching of locomotive and better working conditions. Abatement of the smoke nuisance which is always a source of annoyance to the surrounding territory is also assured.

Although the road owns but 33 locomotives, a large proportion of these locomotives, as well as a number of Canadian Pacific locomotives, are dispatched from Hamilton daily. The road distances are relatively short and the locomotive make turn-around runs. Belt line service in Hamilton requires the use of a number of switch and transfer engines. Altogether, the daily dispatchments vary from a minimum of 25 to as many as 35 or 40. The repair shop is equipped to turn out two locomotives a month with class repairs. It also takes care of all heavy running repairs.

The contractor for the grading, foundations, sewers and water mains was the Dominion Construction Company, Ltd. The buildings were erected by this company and W. H. Cooper. The radial brick chimney was built by the Custodis Canadian Chimney Co., Ltd. The contractor for the electrical work was The Culley Electric. The construction of the terminal was carried out under the direction of R. L. Latham, chief engineer of the railroad, and E. M. Brennan, resident engineer, in direct charge.

Railway Age
June 7, 1930

GRAND TRUNK
RAILWAY
1911 OTTAWA
TERMINAL

Remodelling of the Grand Trunk Railway Ottawa Terminal Yards.

By Alexander Gray, A.M. Can. Soc. C.E.

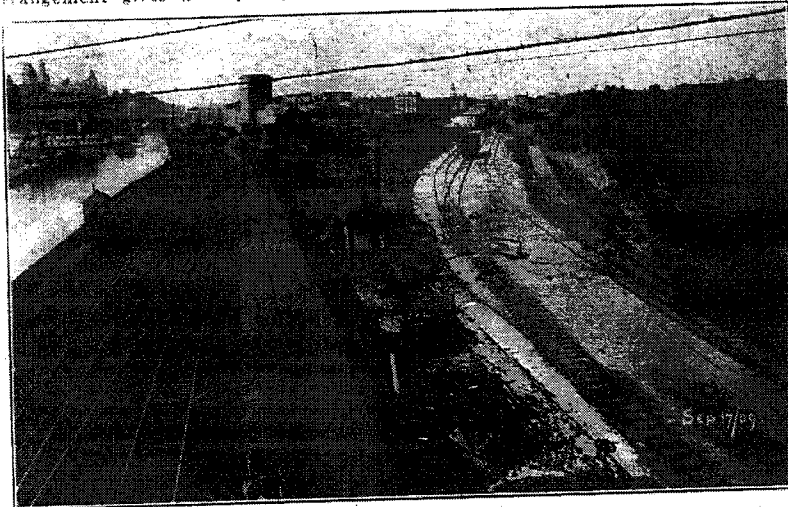
In giving a brief account of the work in remodelling the G.T.R. central station yard in Ottawa it would be superfluous to review the reasons which led to such work, further than to say that when the Canada Atlantic Ry. was fortunate enough to secure this route to the heart of the city, the terminal was designed with any consideration of future requirements. Tracks and other way facilities were built by degrees as demands arose and property was acquired. Under such conditions it was not a question of time until all the available land north of Laurier Ave. was taken up with a jumble of tracks which were very difficult to operate and in an exceedingly poor state of repair, the rails being 56 lb. steel and the switches 9 ft. When we came to consider the remodelling of this yard, the problem which confronted us was not to design a yard by using up the old one, but to design one without any regard for existing conditions, a yard giving the facilities for passenger and freight accommodation.

The passenger and freight yards are entirely separate from south of Laurier Ave., and as both the passenger and freight business enter from Besserer St. the grades of the tracks are governed by the grades of this street. From the station entrance towards the freight yard there is a drop of about 8 ft., which makes the passenger yard ascend from Laurier bridge towards the station and the freight yard descend from Laurier bridge towards Besserer St. While we were anxious to have the two yards on a uniform grade, it was impossible to gain this without very considerable expense both in land damages and in closing up the adjacent streets to such an extent. With the present arrangement there is excellent drainage for these two yards. The 20 ft. roadway between the two ladder tracks may be called the transfer shed. The passenger yard drainage runs toward the canal and Laurier bridge and the freight yard drainage goes towards Besserer St., where it

put to work and excavated the freight yard for its entire width and right through to Besserer St. to a uniform grade of 1-10% and to a depth of 2 ft. below the base of rail. At the side of the tracks under the transfer platform the excavation was made about 18 ins. deeper, in order to have the sub grade of the tracks thoroughly drained. This arrangement gives a very dry yard in

be given to each move made, so that freight business would not be tied up during the construction of any of the new works.

The rail in the freight tracks is 80 lbs. and the switches are split with no. 9 frogs, thus having leads which will admit of a safe operation by the ordinary class of engines, although there is a special yard engine to do all the



G.T.R. Central Station Yards, Ottawa, from Laurier Avenue Bridge, Sept. 17, 1909 before Improvements.

all weather. Part of the excavation from this point was dumped into the old canal basin where the freight shed stood on piles, this part having never been piled in. With this work all surface traces of the old canal basin have now been obliterated.

In the carrying out of this work the chief point we had to keep in sight was the safe and speedy operation of present business. The freight facilities were so congested that we could not cut out one track without making provision for its business at some other point. It so

switching work in this yard. The maximum curvature is $9\frac{1}{2}$ degrees, which is the turnout for no. 9 frog. Up to the time of writing there have not been any derailments in this yard since its completion, whereas previously there was an engine off the track on an average every 24 hours.

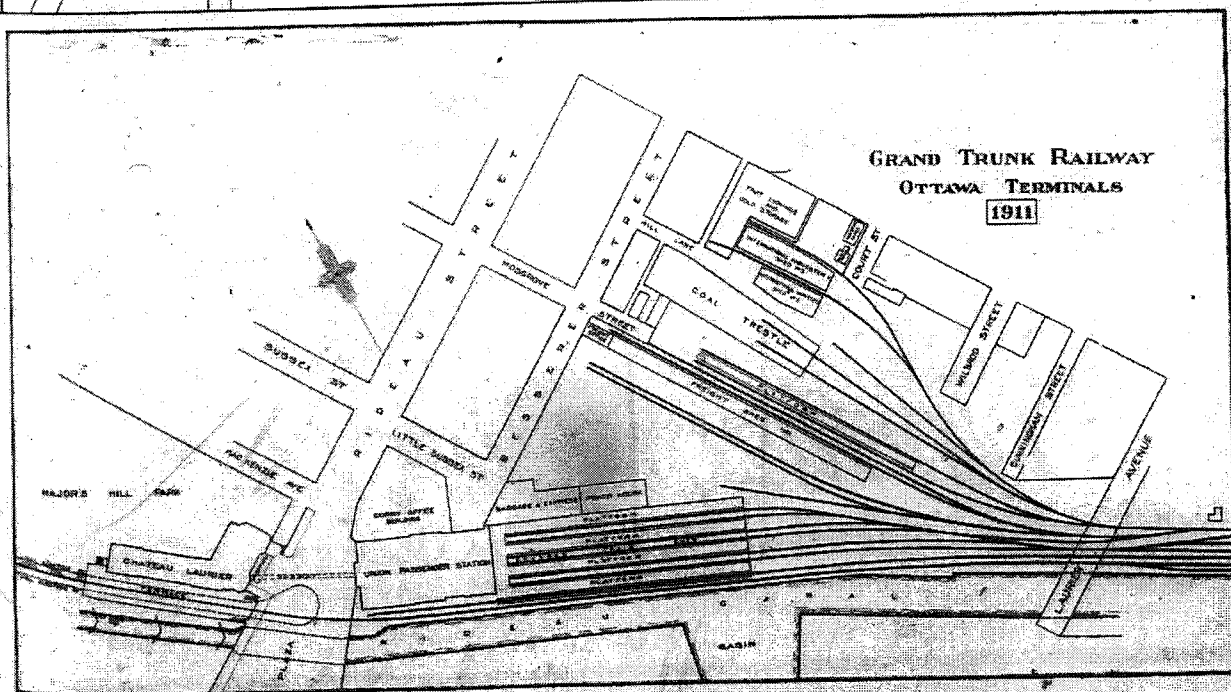
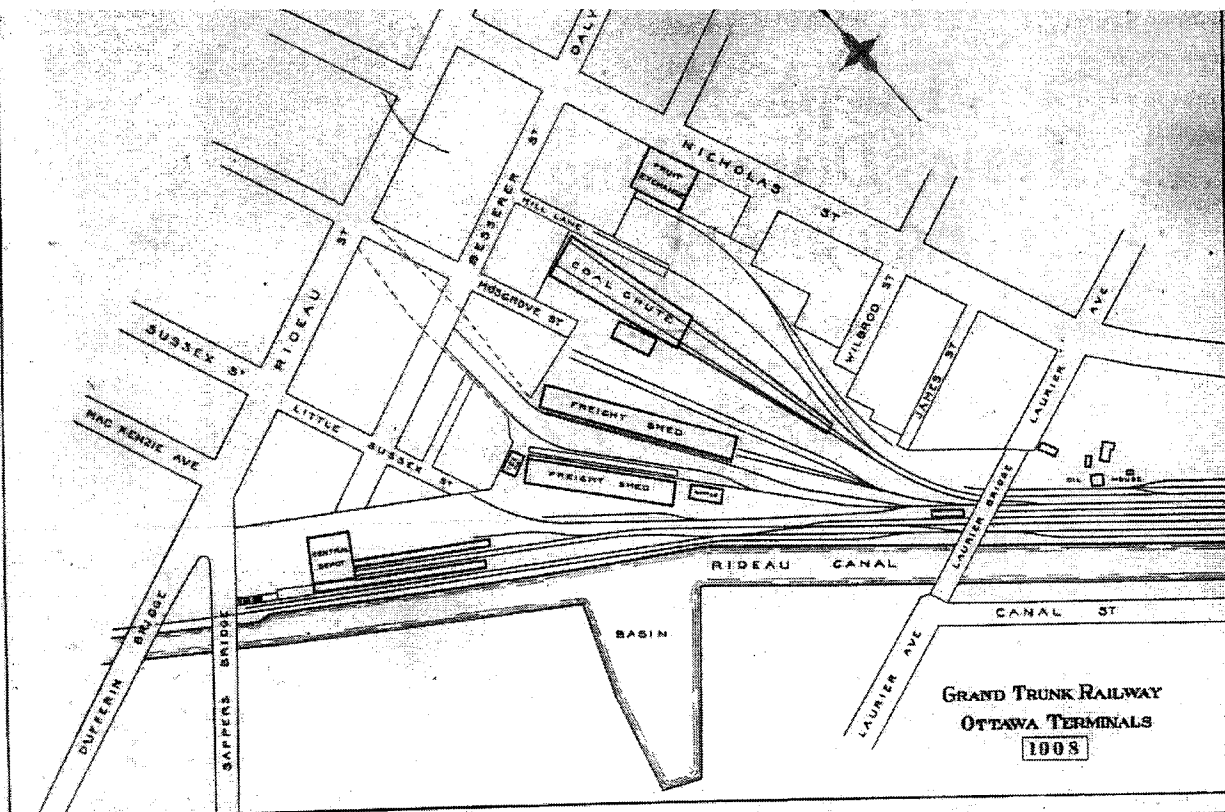
The freight yard consists of a freight shed and office 563 by 39 ft., with four parallel tracks the full length of the shed. A transfer platform 560 by 16 ft. and three pairs of unloading team tracks with macadamized roadways 30 ft. wide are also parallel with the freight shed. The floor of the freight shed is level with the floor of cars standing alongside. Freight can thus be loaded or unloaded into the cars through the shed. Opposite every alternate door in the shed is a set of weigh scales set in the floor, which saves a considerable amount of trucking.

The passenger yard tracks are in pairs 13 ft. centres, with room between each pair of tracks for a platform 19 ft. wide. The shortest pair of tracks have a train capacity of eight cars each (engaging average length of car over all at 70 ft.) and the longest can hold 17 cars. The total train capacity of this yard is 100 passenger cars, which figures out of a little more than double the train capacity of the old passenger yard. The passenger yard tracks are built of 100 lb. rail with no. 9 frogs. All the switches are on the one ladder, which gives the engine driver approaching the yard a clear view of the condition of all the switches. Ultimately it is the intention to have all these switches interlocked, the tower to be located either on or near Laurier bridge. A train shed, of the Bush type, 500 ft. long, covers all the trucks from the baggage annex to the canal. The tracks are ballasted with crushed stone which will keep down the dust in the



G.T.R. Central Station Yards, Ottawa, from Laurier Avenue Bridge, Jan. 17, 1910, showing Improvements made.

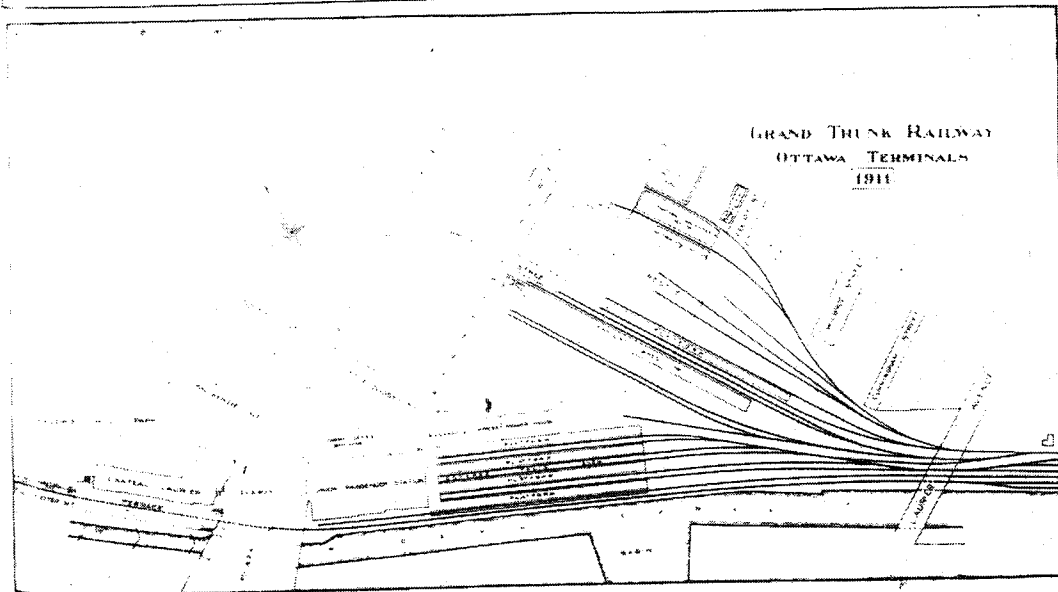
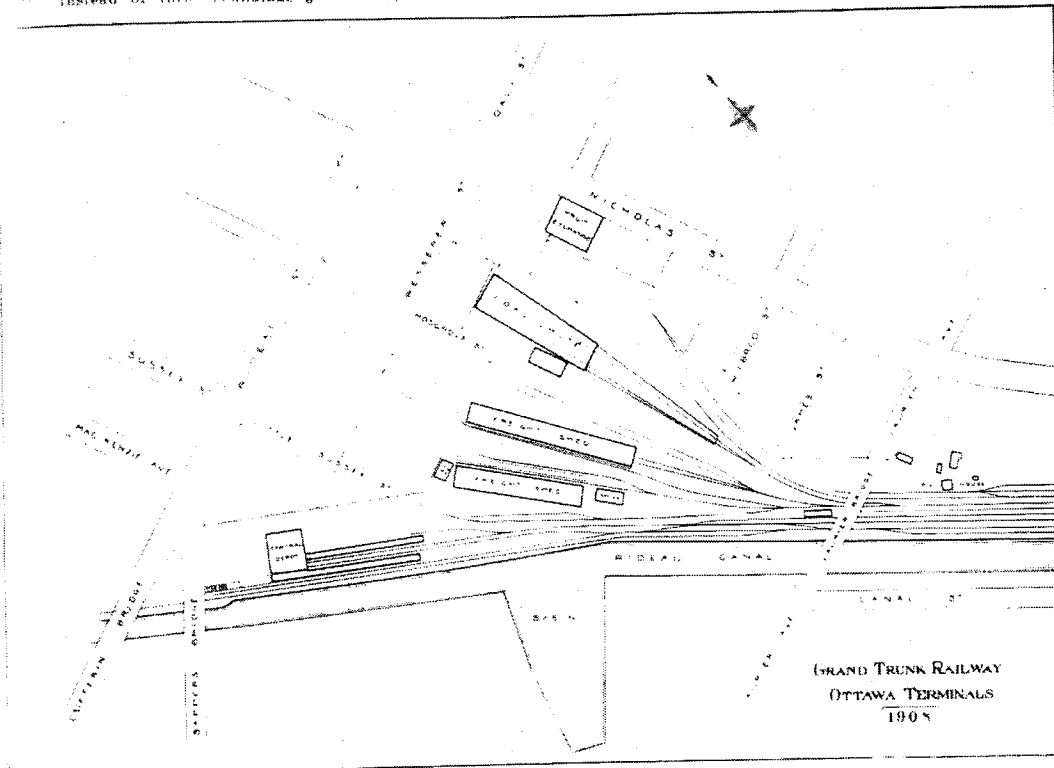
into a sewer at Musgrove St. happened that part of the new freight shed was located on vacant property, thus enabling us to build the freight of-



king its lines across the Alexandra
we had to build a retaining wall
it long of an average height of
Before commencing work sound-
were taken with an iron rod along
side of the wall at intervals of about
Instead of these soundings go-

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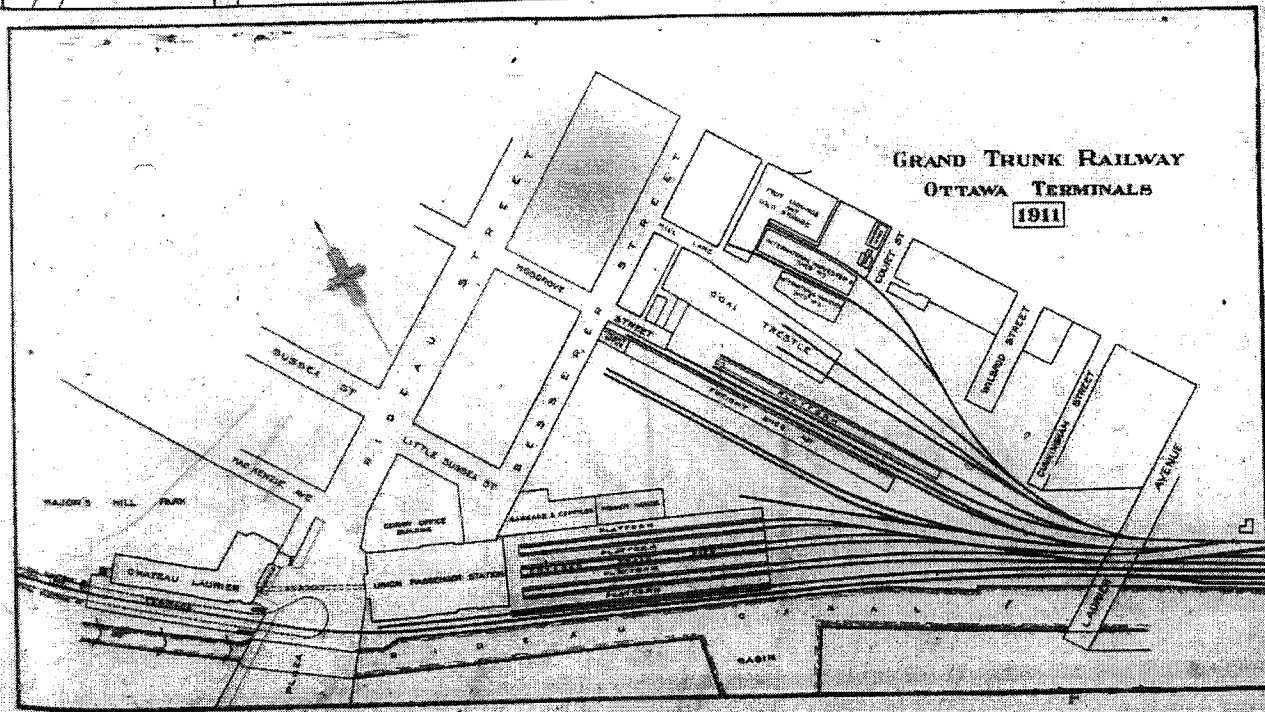
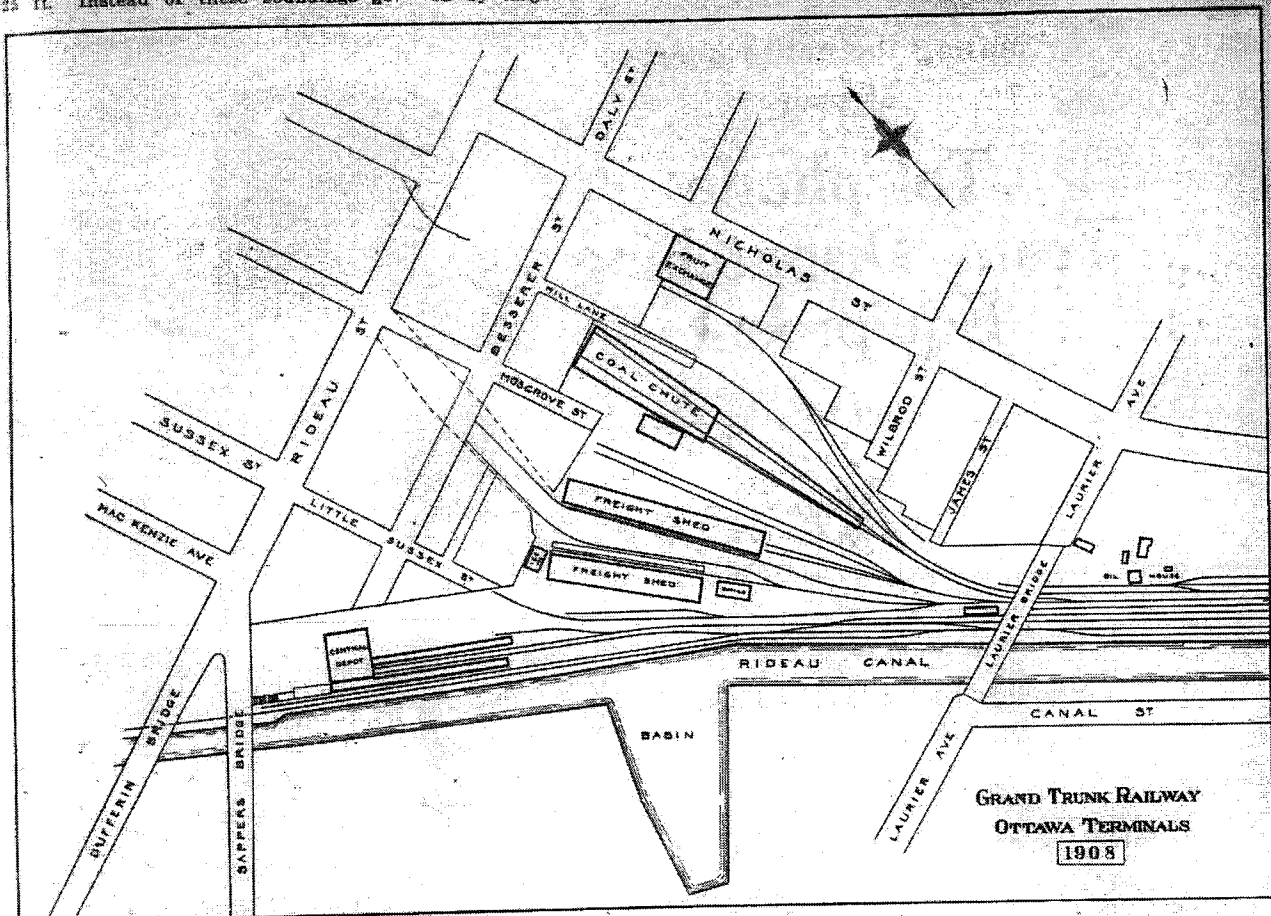
profile showing these soundings was so
uniform that there were no grounds to
question the results. This shows that
no reliance can be placed on this meth-
od of sounding. The only safe way,
in my opinion, is to put down test pits.
Designing the wall on this profile we



tracking its lines across the Alexandra bridge, we had to build a retaining wall 1,075 ft. long of an average height of 17 ft. Before commencing work soundings were taken with an iron rod along the side of the wall at intervals of about 25 ft. Instead of these soundings go-

ing to rock (as the man who took them reported) they only went to rock for about half the length; the rock extended from Sappers bridge end of the work for about 550 ft. and then suddenly disappeared; its place being taken by large boulders and gravel. The

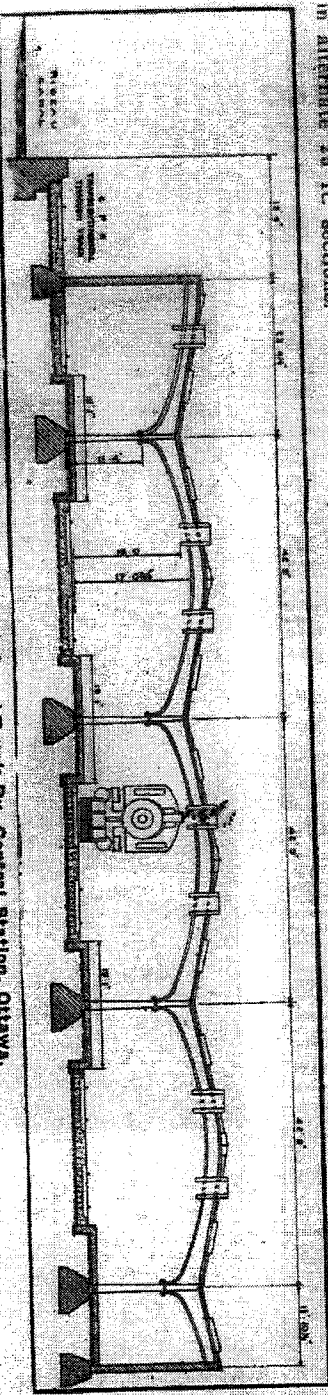
profile showing these soundings was so uniform that there were no grounds to question the results. This shows that no reliance can be placed on this method of sounding. The only safe way, in my opinion, is to put down test pits. Designing the wall on this profile we



ally intended, in the event of the Rideau canal being deepened to a 10 ft draught. The outside face of this wall is 13 ft. from the centre line of the first passenger track. In the design we had therefore to take care of the train load as well as the ordinary surcharge of earth pressure. Expansion joints were placed every 25 ft. and the concrete was laid in alternate 25 ft. sections.

operation of our terminals in Ottawa 88% of the derailments and trouble were at switches. Another point in re-modelling yards is that special study must be given as to how the work is to be carried out during the continuance of traffic. This is sometimes a very difficult problem, especially in congested yards.

The lower part of the exterior walls, to a height of about 60 ft. from the ground, is of Stanstead granite, the remainder above this line being of buff Indiana limestone. The G.T.R. divisional offices are located in this building, and the Board of Railway Commissioners has its offices as well as its public court room on the up-



Cross Section of Train Shed Grand Trunk Ry. Central Station, Ottawa.

The cost of excavation work was pretty high. On account of the through C.P.R. main lines being 26 ft. from the face of the wall and having to keep the track clear at all times we had to dump the excavations into the bed of the canal and after the wall was completed handle the excavations again, part of it with a derrick and the remainder by shovelling on to platforms and from there to cars. There was 4,800 cubic yards earth excavation which cost \$1.44 a yard, and 450 cubic yards of rock which cost \$2.10 a yard. The total cost of excavation, including back fill and disposing of waste material, was \$7,862.15. The sheet piling for piers cost about 3c. per cubic yard of the total concrete in the wall. There were 2,380 cubic yards of concrete. The total cost per cubic yard, including excavation, sheet piling, walling, and everything in connection with the work was \$3.45. The cost of concrete may be divided up as follows: Forms, 94c. per cubic yard; sand, \$1.08 1/2; crushed stone, \$1.85 1/2; cement, \$1.17; mixing, 3.2c.; pipe for weep-poles, 1.8c.; walling, 13c.; walchman, 4.5c.; and excavation, 2.73c. per cubic yard of concrete. This comes to, labor \$3,879.77; materials \$4.35, and tools 15c. The cost of concrete, not including excavation and sheet piling for piers was \$6.87 per cubic yard. All this work was done by our own forces. Work was commenced on Feb. 20, 1910, and finished for the opening of navigation, May 1, 1910.

dent Engineer, G.T.R., at Ottawa, when the work described were carried out. He is now Assistant Engineer in Charge Upper Ottawa River Storage, Public Works Department, Ottawa.—Editor.]

Grand Trunk Railway Terminal Buildings at Ottawa.

The buildings which the G.T.R. is completing at Ottawa include the Chalmers Laurier hotel, the central union passenger station, the baggage and express annex and the power plant building. A preliminary description of these was published in our issue of Nov. 1907, a complete illustrated description of the hotel and station was published in our issue of July, 1908, and in our issue of June, 1911, we gave a panoramic view showing a portion of the station, the hotel, the plaza formed by the junction of the Rideau canal and Sappers bridges, the Rideau canal and a portion of the Government buildings. Some fuller particulars of the station, train shed, etc., are now available. The passenger station is built on the southerly side of Rideau St. between the Corry office building and the Rideau canal. It is entered from Rideau St. on the second floor, through a large main corridor in the centre, leading by a marble stairway down to the general waiting room which has an area of over 8,000 ft. and extends the whole width of the building on the lower or ground

per floors of the Rideau St. portion of the building. The station has been planned to meet all practical and general requirements. Regular and difficult conditions with regard to track, street and bridge levels have been successfully overcome, and the result provides not only a railway terminal adequate to meet the needs of the travelling public, but an architectural adornment to the capital city. The TRAIN SHED is of the Bush type. It is 533 1/2 ft. by 164 ft. and contains seven covered tracks. The train platforms are each 533 1/2 ft. long. The area of the shed roof is 78,600 sq. ft. The width of the train platforms is 19 ft. 1 in. and the train shed columns are on the centre lines of these platforms. The columns and platforms are 42 1/2 ft. apart centre to centre, and the columns are spaced longitudinally on the platforms at a distance of 27 ft. centre to centre, the first row being 15 ft. from the station building. The distance from the top of track rail to the clearance line of smoke duct at the centre of each track is 16 ft. There are two skylights, each 4 ft. 10 in. wide by 21 ft. long over each 19 ft. 1 in. platform, and one continuous skylight 3 1/2 ft. wide, with a ventilator in the centre of each bay over the space between the tracks, the total area of all skylights being 26,150 sq. ft. The skylights over the platforms will furnish excellent light on the platforms, as well as to the side of the cars standing next to the platforms, and the skylights over

CANADIAN PACIFIC

RAILWAY

FORT

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1911

GRAVITY

YARD

The Canadian Pacific Railway's Gravity Yard at Fort William.

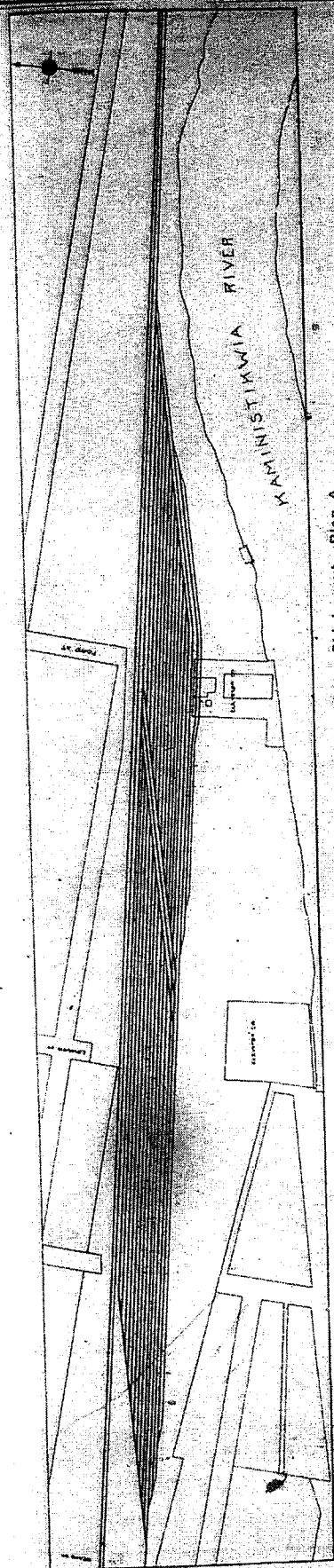
On account of the great satisfaction given by the C.P.R. hump yards at Winnipeg, the management decided to do away with the polling yard at Westfort, Fort William, and substitute for it a gravity yard.

To bring this change about it was necessary to raise the east end of the old receiving yard approximately 6 ft., and alter the eastern ladder track so that there will be two ladders running from the centre track of the old yard. The ladder at the west end of this yard is also changed so that the maximum length of the tracks is developed. The tracks in the old classification yard are lengthened and altered so that the ladders from the hump develop the longest track possible under existing conditions.

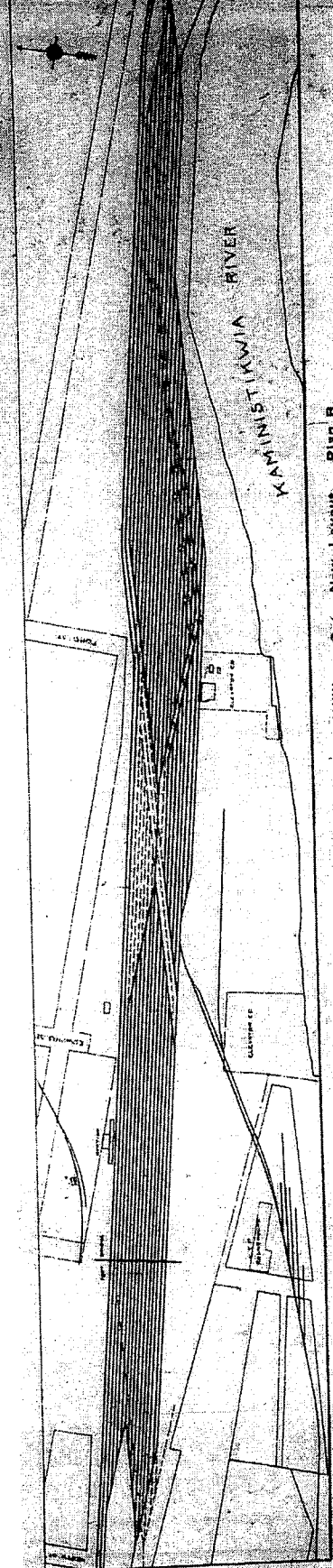
About 100 ft. of the east ladder of the classification yard is on pile trestle with planked top. The grade of the approach to the hump is approximately 1% and the decline to the east 3% for 150 ft. from the summit and gradually eased off.

The accompanying plan A. shows the old arrangement of tracks; plan B shows the arrangements of tracks in the new hump yard. The dotted lines in the latter plan show tracks which have been eliminated in the new layout.

The work is in charge of Frank Lee, Division Engineer, Winnipeg.



C.P.R. Polling Yard, Westfort, Fort William, Ont. Old Layout. Plan A.



C.P.R. Gravity Switching Yard, Westfort, Fort William, Ont. New Layout. Plan B.

November 1911

THE
TORONTO
SUBURBAN
RAILWAY

Electric Railway Department

The Toronto Suburban Railway's Guelph Extension and Other Lines.

Previous to 1914 the Toronto Suburban Ry. had in operation in the City of Toronto and York Tp. 9.92 miles of single track, comprising three distinct lines and a short branch line. The three principal lines were respectively, from the corner of Keele and Dundas Sts., in West Toronto, along Dundas St. to Lambton Mills, from Keele and Dundas Sts. to Church St., Weston, and from Keele St., along St. Clair Ave. and Daveport Rd. to the subway under the C.P.R. on Bathurst St. The branch line leaves the Dundas St.-Lambton line at Gilmour Ave. and runs south to Evelyn Crescent. In 1912, contracts were let to the Suburban Construction Co. for the extension of the Weston line to Woodbridge, 7.9 miles, and from Lambton Mills to Guelph, 46.3 miles. Ewen Mackenzie was given subcontracts for all work, except buildings and overhead line, on the Weston-Woodbridge extension, and for the grading, bridging, fencing, etc., of about 41 miles of the Lambton-Guelph line, and the tracklaying

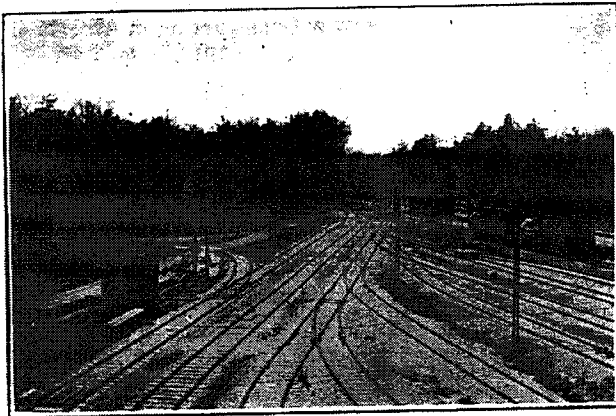
St., where it runs through the G.T.R. subway. Where the line is on private right of way, the sharpest curve, with two exceptions, is 10 degrees, and the steepest grade 2%. The exceptions are at the point where the line leaves the road allowance for a private right of way, where there is a 12 degree curve, and at a sharp bend in the Humber River, at mileage 7.1, where a 15 degree curve had to be used to avoid the necessity of diverting the river. For the first three miles the grade is undulating, following the valley of the Humber River until, after crossing the west branch of the river, it rises 80 ft. in a little over a mile to a summit near the Albion Road. Thence the grade falls for another mile to the Humber River, which it follows to Woodbridge village.

Cuttings were made 20 ft. wide and embankments 14 ft. Culverts, where small openings were required, are of concrete or corrugated galvanized iron pipe. Larger culverts and cattle passes are of

used as a passing siding.

The overhead line is of trolley construction, 2/0 copper trolley wire, on poles spaced 100 ft. apart, and 8 ft. clear of centre line. The feed wire is of aluminum, equivalent to 4/0 copper wire. There is one substation on this line, at Thistle-town, built of brick with stone trimmings and tar and gravel roof.

The Guelph extension, generally known as the Lambton-Guelph line, leaves the Dundas St. line at the top of the hill on the east side of the Humber River, where it enters on private right of way and continues thereon throughout. After passing through Lambton Park, the Humber River is crossed at an elevation of 82 ft. above the water level; thence paralleling the C.P.R. for 0.8 mile to near Mimico Creek, the line curves sharply to the left, and reversing, crosses Mimico Creek and runs under the C.P.R. at the latter's bridge over Mimico Creek. The line then rises on a short stretch of 2% grade to and through Islington village,



Toronto Suburban Railway, Lambton yard, showing the switches and Y.



Toronto Suburban Railway, Lambton yard and car barn.

and ballasting of all of this line, excepting the part lying east of the west bank of the Humber River, 0.6 mile. The grading and bridging of this 0.6 mile were done by the Lewis Construction Co., and the tracklaying and ballasting by the Suburban Construction Co. The grading on the westerly five miles was done by Chas. Cook & Co., and the tracklaying and ballasting, as above stated, by Ewen Mackenzie. At the same time that the work was going on, the Suburban Construction Co. did considerable work on the improvement of the city lines, particularly the Dundas St.-Lambton line.

The Weston-Woodbridge line, commencing on Main St., Weston, at its intersection with Church St., runs northerly on Main St. half a mile to beyond the under crossing of the G.T.R.; thence for another half mile the track is on the road allowance, but on the west side next to the fence, so that it does not interfere with the roadway. The balance of the line is on private right of way. The line, where it is on the street or road allowance, has necessarily to conform to the roadway, grades and alignment. The maximum grade of this part is 3% and the sharpest curve is 20 degrees, which is rendered necessary at the turn in Main

cedar box construction. The principal bridges are of steel, on concrete abutments and piers, as follows: Mileage 1.6, Humber River, 1-24 ft., 1-60 ft., 1-90 ft. deck plate girders. Mileage 2.7, West branch of Humber River, 2-45 ft. through plate girders. Mileage 3.1, creek, 24 ft. I beams. There is also one frame-trestle on this line. All bridges are designed for Class 2 loading, Department of Railways & Canals specification.

The track is laid with 60 lb. A.S.C.E. rail, rolled by the Algoma Steel Co., with 4 bolt angle bar splices, on ties spaced 17 to 33 ft. rail length. Surfacing was done with material from shoulders and side ditches. The right of way is 66 ft. wide, fenced throughout with no. 7 wire woven fence on posts spaced 25 ft. centres. Gates are of iron frame construction, covered with woven wire. There are two small shelter stations at Thistle-town and Albion Road respectively, and one larger frame station at Woodbridge. Passing sidings are provided at the north end of Weston and at Thistle-town and Albion Road, in addition to which there is a siding at Woodbridge. There is also a spur about three-quarters of a mile long, leading to a material yard on the C.P.R., a mile north of Weston, which is sometimes

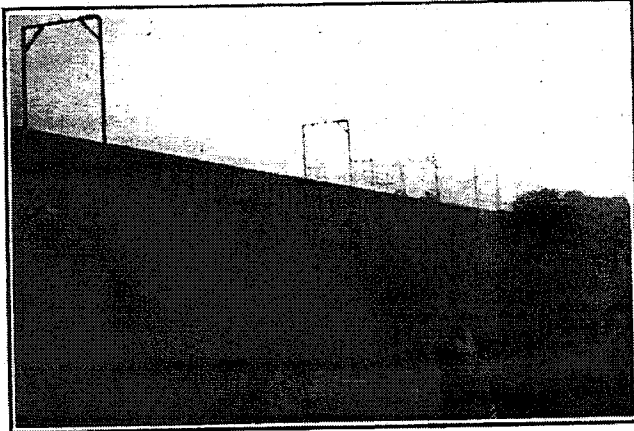
after which it parallels Dundas St. for 4 miles, excepting for a mile at Summer-ville, where it swings to the north, in order to get an easier grade down to the Etobicoke River valley, and, swinging back, a crossing under Dundas St. is obtained. Leaving Dundas St. at mileage 6, the line then runs for three-quarters of a mile through level fields and then parallels the C.P.R. for about a mile and a half to beyond Cooksville. There it strikes northwesterly on a rising grade and 4 1/2 miles further on passes over a summit 200 ft. higher than Cooksville and thence descends to the valley of the Credit River, which is crossed at Meadow-vale, mileage 15.3. The C.P.R. is crossed underneath, at mileage 15.9. The Credit valley is then followed through Church-ville and Huttonville villages, at which latter point the line again rises out of the valley until it reaches the meadow land on the higher ground, which it follows, passing Norval village on the top of the hill at mileage 22.4. The west branch of the Credit River is crossed, at mileage 23.4, on a timber trestle, 70 ft. high, west of which there is located the longest tangent on the line, which extends to George-town, mileage 26.0. The West Credit River is again crossed at that point, on a

timber trestle, and Water St. is crossed overhead on a steel span. The only level highway crossing in Georgetown is Main St., on which the station is located. West of Georgetown the line rises along the slopes of the Credit River valley, and at mileage 26.7 crosses under the G.T.R.'s Hamilton and North Western Branch. Thence the line rises almost continuously, passing through the limestone quarries at Limehouse and Dolly Varden to a summit immediately west of the latter point and reaches Acton at mileage 32.7. At that point the line runs through the Beardmore tanneries yards and crosses a G.T.R.

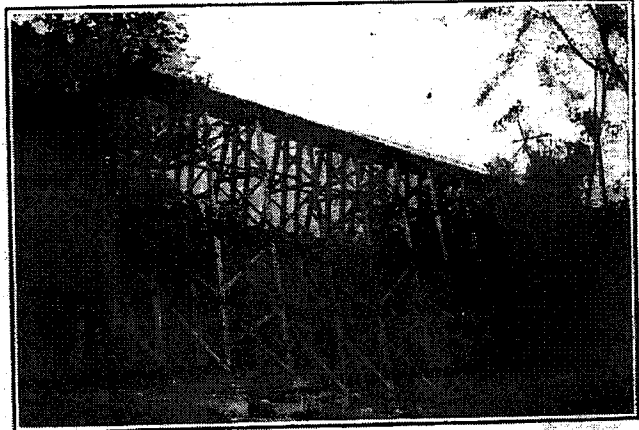
standard, there being very much less curvature and it was altogether a more expensive line to build. The principal bridges, which, with the exception of the Humber River bridge, were designed for class 2 loading of the Department of Railways & Canals specifications, are generally of steel and concrete, with a number of frame and pile trestle bridge at the less important streams. The principal bridges are as follows:

Humber River bridge, mileage 0.6. Total length, 711 ft.; maximum height above bed of stream, 86 ft. Commencing at the east end there is 209 ft. of frame trestle

footing. They are battered out 1 in 4, giving them a thickness or projection beyond the neat work of 4 ft. 8 in. at the top of footing. The land tower is supported on 4 pedestals of ordinary construction 6 ft. square on top, with side batters of 1 in 6. The river towers each rest on two piers, which are carried full size, 39½ ft. x 6 ft., to above high water, from whence they are carried up an additional 4 ft. in the form of pedestals at each end of the pier. There is a 90-degree cut water on each end of each pier. The west abutment is on the slope of the hill, immediately west of the river, and



Toronto Suburban Railway, Humber River Bridge.



Toronto Suburban Railway, typical trestle construction, west fork of Credit River.

spur in the yard at grade. The station is on Main St. West of Acton, the line passes through a somewhat swampy country and reaches its highest summit one mile west, where the track elevation is 755 ft. higher than at Lambton Jct. It then descends into the country tributary to Speed River's Eramosa branch, following Blue Springs Creek to the junction of

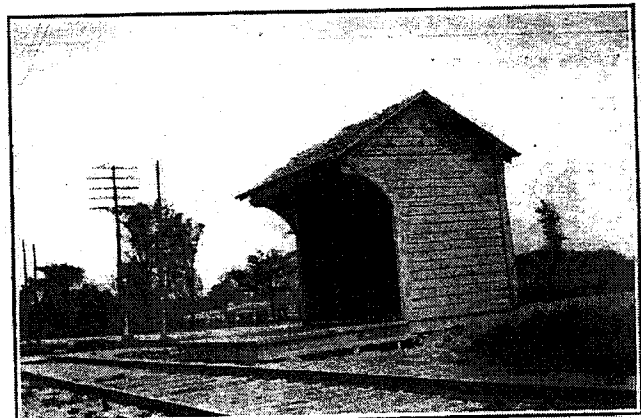
on mud sills, with a maximum height of 55 ft. This trestle ends on a high pier, which also supports the end of the first steel span. The balance of the bridge is of deck plate girder construction on steel trestle towers. The spans, commencing at the east end, are: 95 ft. 2 in., 40 ft. 4 in. tower; 95 ft. 4 in., 40 ft. 4 in. tower; 95 ft. 4 in., 40 ft. 4 in. tower; 85½ ft.

is of ordinary wing construction. All piers and pedestals are founded on solid rock. The west abutment is on stiff clay foundation, in which no piling was necessary. The steel work of this bridge was designed for class heavy loading of the Department of Railways and Canals specification.

Mimico Creek bridge, mileage 1.8, 80 ft.



Toronto Suburban Railway, Georgetown substation, interior.



Toronto Suburban Railway, standard shelter.

the latter with the Speed, and then for the most westerly five miles close to the Speed itself. The grade on the last 12 miles is generally slightly undulating, with a total drop of 130 ft. between the summit, west of Acton and Guelph. This western part of the line is generally through a limestone country and although there are good farms but a short distance away, the land immediately adjoining the railway is generally barren or covered with scrub brush.

The construction standards of this line are similar to those of the Weston-Woodbridge line, but the location is to a higher

The easterly pier is of somewhat unique construction. It is 55 ft. from the ground to the bridge seat and the bridge seat is 14 ft. x 7½ ft. in plan. End batters are 1 in 24 and side batters 1 in 18. In order to lessen the concrete quantities, an opening 30 ft. high and 5 ft. wide, was left in the pier from front to back, and commencing 7 ft. above the footing. As the slope of the embankment comes against the back of the pier, 35 ft. above the footing, a counterfort was built on each side of this opening. These counterforts are each 3 ft. wide, and commence at the face of the pier, 24 ft. above the

through plate girder, on concrete piers and abutments, 14 ft. from bed of stream to base of rail. This bridge is in a bad location, owing to the angle at which it crosses the stream, and to the sharp curvature of the track. In order to ease the flow of the stream, the river was widened on the east side, and protected with a sheet pile bulk head for 180 ft. up stream from the bridge. A short bulk head was also built on the down stream side of the east abutment and the banks on both sides were further protected with heavy rip rap. Both abutments are founded on gravel, in which no piling was necessary.

Etobicoke River bridge, mileage 5.0. Two 50 ft. through plate girders on 2 concrete abutments and 1 pier. Bed of stream to base of rail 12 ft. Both abutments and pier are on solid rock foundation.

Dundas St. overhead bridge, mileage 5.4. Reinforced concrete construction. Two abutments supporting slab on which the road is carried. Clear span 16 ft., at right angles to centre line of railway. Bridge on 47 degrees skew. Clear height, top of rail to trolley wire, 16 ft.

Dixie Creek, mileage 6.1. Timber trestle on mud sills 165 ft. long. Maximum height 23 ft.

Creek, mileage 10.3. Timber trestle on mud sills 35 ft. long. Maximum height 7 ft.

Creek, mileage 14.2. Timber trestle on crib piers. 90 ft. long. Maximum height, 20 ft.

Credit River, mileage 15.3. Three spans through plate girders, one 40 ft. and two 80 ft. The 40 ft. span is over an old tail race, and is supported on 2 concrete abutments. The two 80 ft. spans are over the main river and are supported on 2 concrete abutments and 1 pier. Bed of stream to base of rail 12 ft.

C.P.R. crossing, mileage 15.8. The

Limehouse Creek, mileage 29.3. Pile trestle 180 ft. long. Height above bed of creek 8 ft.

Mileage 30.8. Frame trestle, 180 ft. long, on mud sills, over Toronto Lime Co.'s at Dolly Varden Mine. Total height, 13 ft.

Creek, mileage 31.3. Pile trestle 60 ft. long. Maximum height, 17 ft.

Creek, mileage 32.8. Frame trestle on piles 75 ft. long. Maximum height 18 ft.

Fairy Lake, mileage 33.3. Pile trestle 180 ft. long. Maximum height, 14 ft.

Blue Springs Creek, mileage 35.4. Pile trestle 75 ft. long. Maximum height 8 ft.

Blue Springs Creek, mileage 40.3. Pile trestle 75 ft. long. Maximum height, 8 ft.

Speed River, mileage 41.3. 80 ft. through plate girder on concrete abutments. Bed of stream to base of rail 10 ft. Abutments are founded on coarse gravel, in which no piling was necessary.

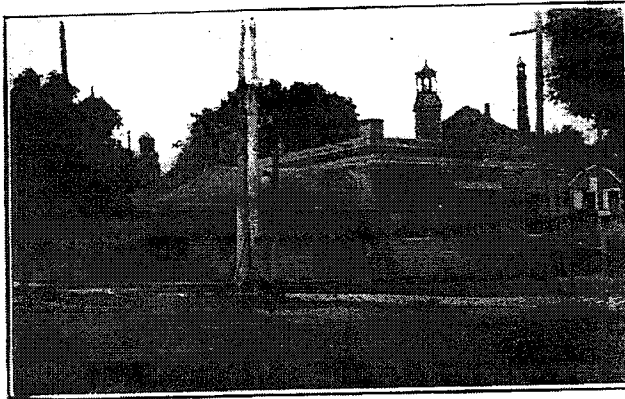
Speed River, mileage 43.4. 80 ft. through plate girder on concrete abutments. Bed of stream to base of rail 10 ft. Abutments founded on coarse gravel and boulders.

The track is laid with 60 lb. A.S.C.E. section rail rolled by the Algoma Steel Co. and laid on jack pine and hemlock

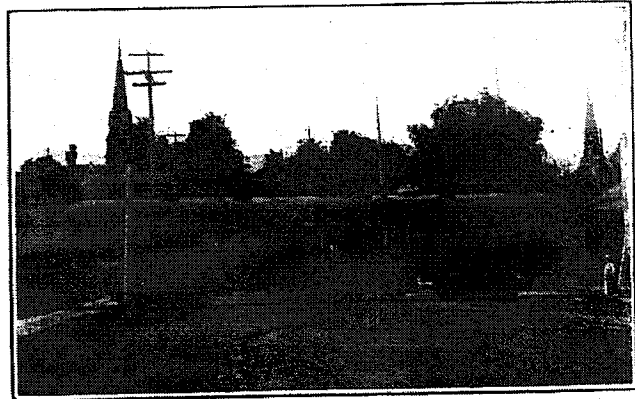
mosa. At Georgetown a brick station of neat design, with waiting room, office and baggage room, was built adjoining the substation. At Acton there is a 2 story frame station 18 x 24 in plan, with waiting room, office and baggage room downstairs, and living rooms upstairs. At Guelph, pending the construction of a better station, there is a platform adjoining the track, and across the street from this platform, a stone building is being used for station purposes. This building has a large waiting room, an office and an express room downstairs and 4 good sized living rooms upstairs.

There is a large car barn at Lambton, which was fully described and illustrated in Canadian Railway and Marine World for May, 1916, in which there are in addition to the car storage space, inspection, repair, machine, paint, and blacksmith shops, boiler room, coal store, offices and lavatories. It is the intention to put up a 2-car barn at Guelph, construction of which will commence immediately.

There are three sub-stations, at Islington, Georgetown and Guelph respectively. The Islington one is a frame building, covered with galvanized, corrugated iron; the Georgetown one is of brick, attached to the passenger station, and the Guelph



Toronto Suburban Railway. Georgetown station and substation.



Toronto Suburban Railway. combination passenger and baggage car at Georgetown.

C.P.R. is crossed underneath, and an I beam bridge, on concrete abutments, was built to carry the C.P.R. track. The width at right angles to the Toronto Suburban Ry. track is 16 ft. in the clear, and the clear height 15 ft.

West Credit river, mileage 23.3. Timber trestle, partly on mud sills, and where in the stream on crib work piers; 315 ft. long, with a maximum height of 64 ft.

West Credit River, mileage 25.8. 410 ft. timber trestle on piles. Maximum height above bed of stream 32 ft. This trestle is extended on the west, with a 3 span I beam bridge on 2 abutments and 2 pairs of pedestals, to carry the railway over Water St., Georgetown. This bridge consists of 2-16 and 1-24 ft. spans, giving a clearance above the roadway of 14½ ft.

G.T.R., mileage 26.7. The G.T.R. Hamilton & Northwestern branch is crossed underneath and a bridge of I beams, on concrete piers, with a clear span at right angles to the Toronto Suburban Ry. of 16 ft., was built to carry the G.T.R. track. Clearance from rail to trolley wire under the bridge 16 ft.

West fork of west branch of Credit River, mileage 28.1. Timber trestle 270 ft. long, on mud sills, and where in the river on timber cribs. Maximum height, 45 ft.

ties, 17 to the rail length. Generally, continuous joints were used, but there are a few miles also of ordinary 4 bolt angle bars. There is throughout 6 in. of good gravel ballast. Main line switches are laid with no. 7 frogs, with the exception of Lambton and Guelph Y tracks, in which no. 5 frogs were used. Yard switches and tails of Y have no. 5 frogs.

At Lambton there is a yard in connection with the car barn, and at the same point there is room for considerable additional trackage. Passing sidings are provided at Eaton farm, Summerville, Dixie, Cooksville, Huronbrow St., Streetsville, Meadowvale, Churchville, Huttonville, Norval, Georgetown, Dolly Varden, Acton, Blue Springs, Eden Mills and Eramosa. There are Y's at Lambton, Cooksville, Georgetown and Guelph. The Y's are all laid with curves of 100 ft. radius, with the exception of the east leg of the Georgetown Y, which is 130 ft. radius. Guard rails are used on all of these sharp curves. There is a yard at Guelph, with room to handle a considerable amount of freight.

Shelter stations have been built at Islington, Eaton Farm, Summerville, Cooksville, Huronview St., Streetsville, Meadowvale, Churchville, Norval, Limehouse and Eden Mills, and platforms at Lambton, Dolly Varden, Blue Springs, and Era-

one is also of brick. The high tension supply is from the Toronto Power Co., 12,000 volts, 3-phase, 25-cycle, although all the high tension wiring is installed to meet 35,000 volt standards, as the voltage of the supply will later on be raised to 25,000 volts. The Islington and Guelph substations each have one 500 kw. rotary installed, and the Georgetown substation has two of these rotaries. Each rotary converter receives its energy supply from 3 H.P. 25-165 kva.-12,500/25,000 volts to 965 volt oil-cooled, single-phase transformers. These transformers have four 2½% reduced capacity taps in the primary, and 50% starting taps in the secondary. The rotary converters are rated T.C.C. 4-500 k.w.-750 r.p.m.-1,500 volt, compound-wound commutating pole. The converters receive 3-phase energy, at 965 volts, from the transformers, and deliver 1,500 volt direct current to the trolley. The converters are equipped with brush raising mechanism for starting. Each substation is protected against lightning by an aluminum cell lightning arrester, and is provided with the standard arrangement of choke coils, disconnecting switches and oil switches on the high tension side. The switchboard panels are of natural black slate, the instruments having a dull black finish. The K-21-25,000 volt automatic oil switches are provided

AUGUST, 1917.]

CANADIAN RAILWAY AND MARINE WORLD.

with series relays. The rotary starting panels are located near the rotary converters, and are separate from the main switchboard. In addition to the main lightning arresters, aluminum surge protectors are installed directly across the armatures of each of the rotaries. The operation of the substations is proving very satisfactory, the design of the rotary converters permitting very heavy momentary overloads without injurious sparking. The complete electrical equipment was built by Canadian General Electric Co., at its Peterborough works.

The contact system.—In general the side bracket type of catenary construction is employed; 25,000 volt high tension transmission is carried on the same poles; also the feed wire, the telephone and signalling system. The standard pole spacing on tangents is 150 ft. More than 30% of the main line mileage is curved track, and on account of this the pole spacing varies according to the curvature. The standard pole length for construction is 35 ft.; for transmission and catenary 40 ft. Local conditions, such as crossing of railways, telephone and telegraph and public highway, increase these lengths.

The details of the material used in supporting the contact system are along standard lines, some modifications having been made to meet local conditions. All pole line hardware is either galvanized or sherardized. The messenger cable consists of 7/16 in. high standard steel strand, 90,000 lb. per sq. in., supporting a 4/0 standard grooved trolley wire. Five-point catenary construction is used with 23 in. deflection. A 4/0 feed wire is run all along the line and tapped into the trolley every half mile. The contact system is anchored every half mile, on tangents, and against a curve at both ends. The line is sectionalized at all substations, and where the voltage changes from 1,500 to 600 volt. The high tension transmission consists of 3-phase, 25 cycle, 115,000 C/M copper cable and is supported on a buerrow bracket construction. All along the line is a 5/16 in. ground wire, protecting the line from lightning and grounded every half mile. Three types of bonds have been used, one brass welded, one gas welded and one electric welded bond. The track is cross bonded with a 4/0 copper cable every half mile; also cross bonded on the intersections and switches. The entire electrical installation was designed and constructed by the company's own engineering staff.

This line between Lambton and Guelph was opened for operation on April 14 of this year. The passenger cars were described in Canadian Railway & Marine World in March, 1916, and May, 1917.

The present daily passenger service consists of 2 cars each way between Toronto and Guelph, 1 additional car between Toronto and Georgetown, and 5 additional cars each way between Toronto and Cooksville. The Sunday service consists of 2 cars each way between Toronto and Guelph, 2 cars each way between Toronto and Georgetown, and 1 each way between Toronto and Cooksville.

On the lines in Toronto last year, the track on Dundas St., from Keele St. to Gilmour Ave., and on Keele St. for 500 ft. north of Dundas St., making a total distance of 4,500 ft., was relaid with a 93 lb. grooved girder rail 7 in. high. This year the switches have been renewed with heavier steel, on Dundas St. at Gilmour Ave., near Mavety St., and on the Davenport line at the Y. At the junction with the Weston line at the corner of St. Clair Ave., and Keele St. This is preparatory

to running the interurban cars into the city.

For the foregoing information, photographs, etc., we are indebted to H. T. Hazen, M.Can.Soc.C.E., Chief Engineer, and T. Malm, Electrical and Mechanical Engineer.

NIAGARA
ST CATHARINES
AND
TORONTO

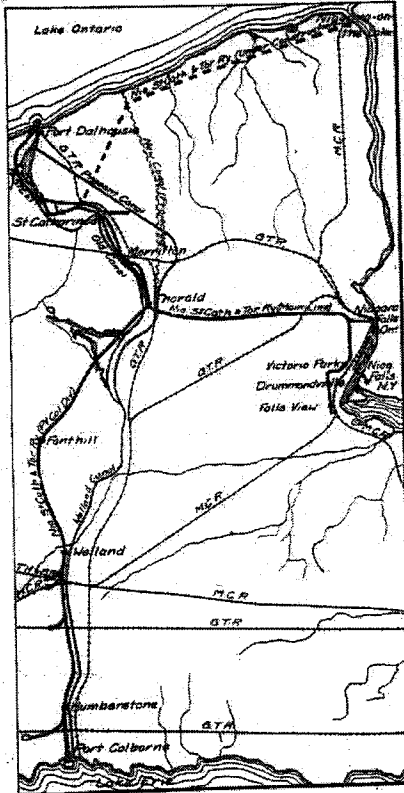
Electric Railway Department.

The Niagara, St. Catharines and Toronto Railway System.

The Niagara, St. Catharines and Toronto Ry. operates a system of electric lines covering a considerable portion of the central Niagara peninsula in Ontario, following principally the portion of the country traversed by the Welland Canal, and covering throughout its length a rich manufacturing district that is increasing in value yearly through the influx of new industries attracted by the close proximity of the cheap Niagara power, the abundance of the labor market and the excellent shipping facilities. At the different towns served, there has been a marked influx of branches of U. S. industries coming into the Canadian field, the establishment of such branches having been rendered necessary on account of the Canadian protective tariff.

The Niagara, St. Catharines and Toronto Ry.'s present system consisted originally of three separate lines. The early history of these lines is typical of that of most organizations that have been formed from the amalgamation of several minor lines that to a certain degree have a community of central interests. The main line was the St. Catharines and Niagara Central Ry., a line chartered by the Ontario Legislature in 1881, to build a steam line from St. Catharines to the Niagara River, this privilege being extended by another Act in 1882, authorizing the company to extend the line to Toronto via Hamilton. No action was taken at that time, but application was made to the Dominion Parliament to have the work declared to be for the general advantage of Canada, which was granted in 1887. Construction was pushed forward, and a line was completed from St. Catharines to Niagara Falls and opened for traffic, Dec. 20, 1888. In 1890, the Dominion Parliament reserved the right to extend the line to Hamilton and Burlington, and in 1891 increased financial power was granted, with authority to make physical connection with

given to extend the line to several points westerly as far as Woodstock and Port Dover. Shortly after, the line fell into a receiver's hands, but was eventually re-

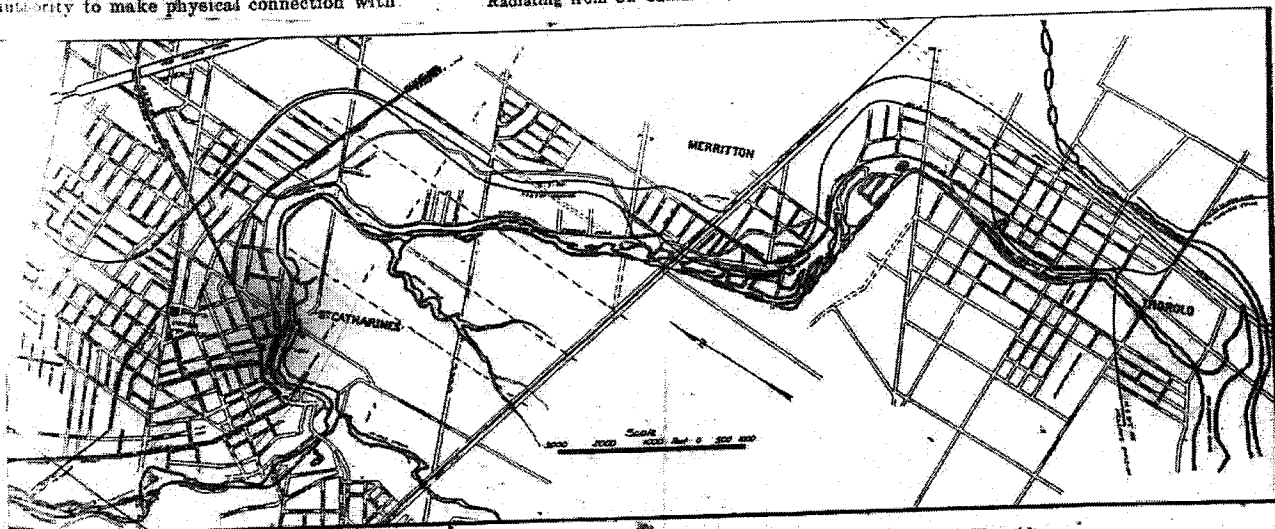


Niagara, St. Catharines and Toronto Ry. Lines, Radiating from St. Catharines, Ont.

to acquire, by absorption or control of stock, the older company. The new company was given power to extend its lines in several directions, including to Toronto, via Hamilton, to Port Dalhousie, and to Fort Erie. Wide powers of operation were granted, including the acquisition of vessels for operation on the Niagara River and Lake Ontario to Toronto and points west. Further Dominion legislation within the next three years, to be mentioned later, permitted the acquisition of the other two lines now comprised in the system.

The smallest unit of the system is the Niagara Falls, Wesley Park and Clifton Tramway Co., Ltd., incorporated by Ontario letters patent, Aug. 7, 1886, to construct a tramway through certain streets of Niagara Falls and Stamford township, to be operated by any power desired. This line was built shortly after, operated at first as a horse car line, and then electrified, being sold under permission of Ontario legislation of 1901, to the Niagara, St. Catharines and Toronto Ry. Co., the latter company being permitted to acquire this line under Dominion legislation of 1901.

The earliest line of the system was the St. Catharines Street Ry. Co., incorporated by Ontario legislation in 1874, to operate a horse car line, with the option of sleighs in winter, in St. Catharines, Port Dalhousie, Merriton, Thorold, and Grantham township. No immediate action being taken under this charter, the time for construction was extended by the Legislature in 1877, following which the line was built from St. Catharines through Merriton to Thorold, and operated as a horse car line. In 1882 the Ontario Legislature changed the name of the company to the St. Catharines, Merriton and Thorold Street Ry. Co., and the operation continued as before, until in 1893 the name of the company was changed by letters patent to the Port Dalhousie, St. Catharines and Thorold Electric St. Ry.



Niagara, St. Catharines and Toronto Ry. Local Lines in St. Catharines, Merriton and Thorold.

any railway other than the G. T. R., for transfer to and from New York State. Operation was continued under these conditions until, by Dominion legislation in 1895, the name was changed to the Niagara, Hamilton and Pacific Ry. Co., and authority

organized, and electrification was authorized by the Dominion Parliament in 1899. By this Act, the company was reorganized and the name changed to that which it at present holds—The Niagara, St. Catharines and Toronto Ry. Co. Power was given it

Co., but under this renewed charter, which granted the privilege of extending the line to Port Dalhousie from St. Catharines, no action was taken, the line operating as before. In 1902 the Ontario Legislature authorized the company to transfer its hold-

ings to the Niagara, St. Catharines and Toronto Ry. Co., the latter being permitted to take over the property by Dominion legislation of 1901, and the main company was given authority to absorb the two smaller companies.

From 1901, the history of the main company is the history of the subsidiary companies, on account of the complete absorp-

Wesley Park and Clifton Tramway had been operated as an electric line. The original line of this unit operated from Bridge St., Niagara Falls, Ont., through the town streets and out beyond Lundy's Lane, paralleling the Niagara River, some distance back from the river road. Immediately after absorption, the new interests had the line extended a short distance be-

City, had been purchased by that company the same year the line was extended. The boat line was changed in 1910 by the replacing of the Lakeside by the new steamboat Dalhousie City.

The Port Dalhousie, St. Catharines and Thorold Electric Street Ry. line through St. Catharines, Merriton and Thorold, is the same at present under the N. St. C. & T. R. Co. as before the absorption.

The company's lines were extended in 1907 from the main line at Thorold to Welland, and in 1908 from the latter point to Port Colborne, both lines being built under authority of Dominion legislation passed in 1906, which authorized several extensions, including one now under construction from St. Catharines to Niagara on the Lake.

The company's main line leaves the radial station on St. Paul St., opposite Mary St., in St. Catharines, following James and Raymond Sts. and Welland Ave. to the G.T.R. Port Dalhousie branch tracks, from which point it turns easterly over its own right of way, paralleling the G.T.R. very closely all the way to Merriton, and thence to Thorold, the general direction and location of the line being that of the original canal on the high land to the east. Merriton is situated on a low area, and as the line has passed up a steady grade coming out of St. Catharines, a drop into



St. Catharines Yards of the N. St. C. & T. Ry., with Shops in Background.

tion on this date of the amalgamation of interests. Shortly after the absorption, the Niagara, St. Catharines and Toronto Navigation Co. was formed, and the Dominion Parliament in 1902 granted the Niagara, St. Catharines and Toronto Ry. Co. authority to acquire the navigation company's stocks and bonds, which it immediately proceeded to exercise.

As mentioned, the main line of the company from St. Catharines to Niagara Falls was originally steam operated, and in the nineties fell into evil days and was placed in the hands of a receiver, who operated it for a number of years. In 1899, the insolvent line was taken over by a New York syndicate, associated with which were four Canadians, Z. A. Lash, J. H. Plummer, J. W. Flavell and Aemilius Jarvis, of Toronto. F. A. Cheney was appointed General Manager by the new interests, and the electrification of the line was proceeded with at once. In 1900, E. F. Seixas was appointed General Manager, which position he still holds. In the same year the line was first operated by electricity. In 1905, the U. S. interests of the company were bought out by F. Nicholls and E. R. Wood.

yond Lundy's Lane, into Falls View, the high land immediately above the Falls. This gave a total length of 4.35 miles, which has not been extended since.



Train of 37 Cars on Niagara, St. Catharines and Toronto Ry.

The main line from Niagara Falls, Ont., to St. Catharines was originally 11 miles long. Immediately after the absorption of

Merriton is avoided by constructing the line at higher elevation than the ground through that town, part of the way on an embankment, but the greater part on a timber trestle over half a mile long, the line through this portion following an ascending grade, negotiating the height of land which is reached beyond Thorold. This ridge is over 350 ft. above Lake Ontario, from which the line rises through St. Catharines, the principal portion of the rise being between St. Catharines and Thorold. From Thorold, the line runs almost due east, crossing the present Welland Canal on a swing bridge, following an almost straight route for Niagara Falls. From the outskirts of St. Catharines to the outskirts of Niagara Falls, the line is exclusively on its own right of way. Entering Niagara Falls at the north west corner of the city, the line follows the highway, going into the city over the tracks of the subsidiary company, the Niagara Falls, Wesley Park and Clifton Tramway Co., terminating at the foot of Bridge St. For the heavy summer tourist traffic, arrangements have been made with the International Ry. whereby the N. St. C. & T. Ry. cars run over its line from the foot of Bridge St., along the river bank to the upper steel bridge across the river near the Falls, crossing that bridge, and thence a short distance to the terminal station of the International Ry., in the heart of Niagara Falls, N.Y., landing through passenger without change.



Welland Station on Niagara, St. Catharines and Toronto Ry.

of Toronto, the former becoming President. In 1903, the Mackenzie Mann Co. interests acquired control. D. B. Hanna, Third Vice President, Canadian Northern Ry., becoming President.

Prior to its absorption, the Niagara Falls,

the subsidiary lines in 1901, this was increased by extending the line through St. Catharines to Port Dalhousie, in order to connect with the controlled Niagara, St. Catharines and Toronto Navigation Co., two boats for which, the Lakeside and Garden

July, 1913.]

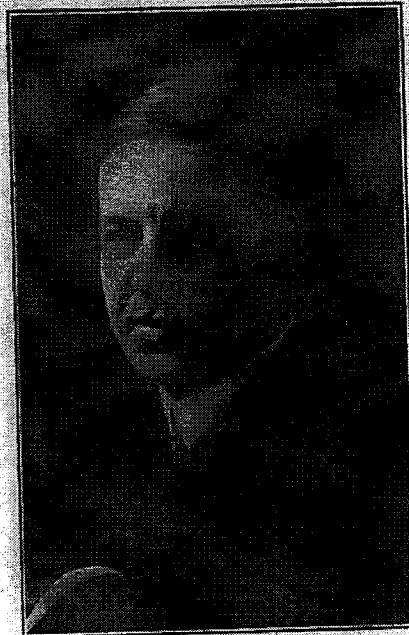
The company's Port Dalhousie branch leaves the St. Catharines station over the same lines as the main line, but instead of turning off at Raymond St., proceeds to Lake St. and Louise St., leaving the west end of the latter street for its own right of way along the sides of the steep east bank of the old Welland Canal. Crossing the canal on a swing bridge, the line goes through the centre of Port Dalhousie to the Navigation Co.'s wharf, where connection is made with the Port Dalhousie-Toronto boats. Between Toronto and Niagara Falls, by way of St. Catharines, there has developed a considerable traffic, particularly in the tourist season. To accommodate this, there is a through service over the company's lines from Port Dalhousie to Niagara Falls, N.Y. From the Port Dalhousie branch to the main line, in the outskirts of St. Catharines, there is a cut off along Louise St. for diverting this through traffic from the centre of the town, practically skirting the border of the city. The normal service over the Port Dalhousie branch is from the St. Catharines station to Port Dalhousie, this through service only being used to connect with the steamboats in the tourist season.

In St. Catharines, there is a purely local service, operating from the city park, at the south end of St. Paul St., the main thoroughfare of the city, through the business section, and out Queenston St. to the cemetery, located on the banks of the present Welland Canal, a total distance of about 2 miles, cars operating every 40 minutes.

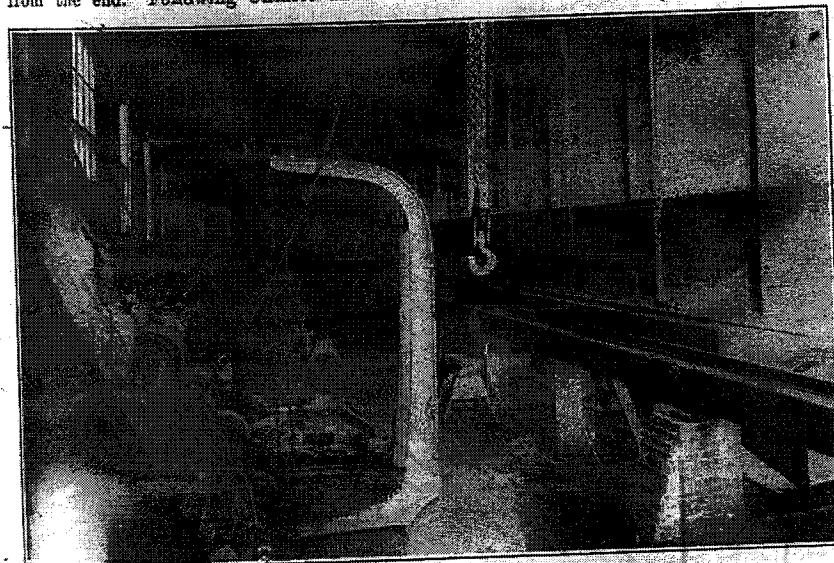
The Merrittton and Thorold division also operates a local service through a portion of St. Catharines, serving principally the manufacturing sections of these three places. The western terminus is at the McKinnon factory at the extreme west end of the city, near the point where the Port Dalhousie branch drops down the canal bank, crossing this line a few hundred feet from the end. Following Ontario and St.

canal bank closely, serving the numerous industries that are clustered along that old waterway. The local line thus acts as a feeder for the main line drawing from this rich district.

The company's new line southerly through Welland to Port Colborne leaves the main line a short distance south of Thorold station, branching off directly west, passing over the old Welland Canal on a swing bridge. All the way from the junction point to Port Colborne, the line runs on



E. F. Seiras,
General Manager, Niagara, St. Catharines and
Toronto Ry.



Interior of N. St. C. & T. Ry. Repair Shop at St. Catharines.

Paul Sts., it passes the terminal station, and then runs on Queenston St. to the Thorold Road, following the latter along the bank of the old canal through Merrittton into Thorold, terminating at the main line station near the centre of the town, the main line crossing this line at three points en route. Thus the company has a rapid transit line over its own right of way from St. Catharines to Thorold, with a local line between the same points, following the

its own right of way, with very light grades. All over the system the gradients are very light, with the exception of the maximum 2% grade on a portion of the main line ascending the mountain at Thorold. This new line passes through Fonthill, and then on to Welland, cutting through the westerly fringe of that town. South from there, the line passes through Humberstone, and thence to Port Colborne. The latest extension of the company is

to Niagara on the Lake, which is under construction, and is expected to be completed this year. This extension leaves the main line in St. Catharines at the corner of Geneva St. and Welland Ave., proceeding out Facer St. after crossing the present canal, striking across country on its own right of way after leaving the city, until it reaches the Lake Shore Road at the mouth of Ten Mile Creek, where the projected Welland Ship Canal is to be entered from Lake Ontario. For about half the remaining distance from this point to Niagara on the Lake, the line will run on the highway allowance, running across country the remaining distance on its own right of way south of the military reservation, going into Niagara on the Lake parallel to the M.C.R. tracks along King St., with the terminus at Queen St. The total length of this extension will be about 13 miles. The construction will be similar to that on the main line, using 80 lb. rails, 40 grooved trolley wire, and 35 ft. cedar poles. The maximum gradient will be 0.25%, with a minimum curvature of 500 ft. radius.

In general, the system is operated very much the same as a steam railway, with a train dispatcher located at Merrittton, the most central point of the system. Telephone train dispatching is employed. At the principal points there are well appointed stations for both freight and passenger service, in charge of each of which is an agent. These stations are St. Catharines, Port Dalhousie, Merrittton, Thorold, Niagara Falls, Fonthill, Welland, Humberstone and Port Colborne.

Freight is one of the principal items of revenue on this line, just as on a steam road. Along the company's lines are 80 industrial sidings, aggregating about 15 miles of track. All the freight is handled in trains, hauled by electric locomotives, and it is no uncommon sight to see trains of as many as 40 cars. In order not to interfere with the heavy passenger schedules, none of which are less than hourly each way during the daytime, the freight is handled as much as possible by night. In St. Catharines, where some of the sidings are from the local line, night handling of freight is required by law. In addition to the freight business the Dominion Express Co. operates over the company's lines. The freight business is so heavy that at St. Catharines there are 6 drays owned by the company in constant service. At other points on the system, the cartage is handled under contract. The St. Catharines freight terminals are quite extensive, and the traffic is so heavy that they are greatly overtaxed. In most particulars they resemble steam road freight terminals. Located where the Port Dalhousie cutoff strikes the main line near the outskirts of the city, the cutoff has been found a most useful adjunct for handling the through freight. On one side of the main line at these terminals is a platform shed, arranged in the conventional manner. On the other side of the main line are fairly extensive yards for an electric line, where trains are made up, and similar work performed.

The rolling stock equipment consists of the following:—50 interurban and local passenger cars, 7 electric locomotives, 3 snow ploughs (1 rotary and 2 push), 30 box cars, 30 gondolas, 18 flats, 1 derrick car, and 2 cabooses. The interurban passenger cars are of the double truck type, 60 ft. long, the majority closed, but several open for summer traffic. Each of these cars has a separate baggage compartment for handling passengers' luggage as expeditiously as a steam road. This is checked through to destination in the usual manner. The freight equipment is limited, but is all that

is required, all outgoing freight being handled in foreign cars.

The traffic has increased very rapidly within the last few years. From 1,322,000 passengers in 1901, there were 3,831,786 in 1912. The freight increase is even more marked, reaching 344,656 tons in 1912. The line is particularly well situated for the development of local freight. From Lake Ontario to Lake Erie, there is an increase in elevation of 326 ft., most of this rise occurring at or near Thorold, the centre of a heavy manufacturing district along the old canal. The extremely hilly nature of the local country, and the close proximity of the numerous factories to each other along the canal, makes it very difficult for steam lines to run in sidings, they being compelled to seek more favorable grades for their lines than are essential for electric operation.

Power for the operation of the line is received from the Electrical Development Co. of Ontario at the generated pressure of 12,000 volts, and is transmitted to trans-



Sub Station of the N., St. C. & T. Ry. at Welland.

former stations located at different points on the line. The location and capacity of the stations are as follows:—Niagara Falls 700 k.w., Thorold 1,000 k.w., St. Catharines 1,000 k.w., and Welland 500 kw. At all of these stations are rotary converters delivering power to the line at 600 volts d.c.

Over the whole system, the overhead work is of 4/0 copper wire. The main lines are laid throughout with 80 lb. rails, with 60 lb. on the local lines. The main and local line trackage is 55 miles, which with the additional 15 miles of sidings, makes a total of 70 miles of rail line. The steamboat line adds another 30 miles, making a total system of 100 miles.

The officials of the Niagara, St. Catharines and Toronto Ry. are:—President, D. B. Hanna; Vice President, J. D. Morton; Secretary and Treasurer, A. J. Mitchell; General Manager, E. F. Seixas; Auditor, D. J. McIntosh; General Passenger Agent, R. L. Fairbairn; District Freight Agent, F. A. Young; Chief Engineer, W. P. Chapman; Superintendent, W. R. Robertson; Master Mechanic, W. Pay; and Roadmaster, J. Carey.

NORTH
TORONTO
RAILWAYS

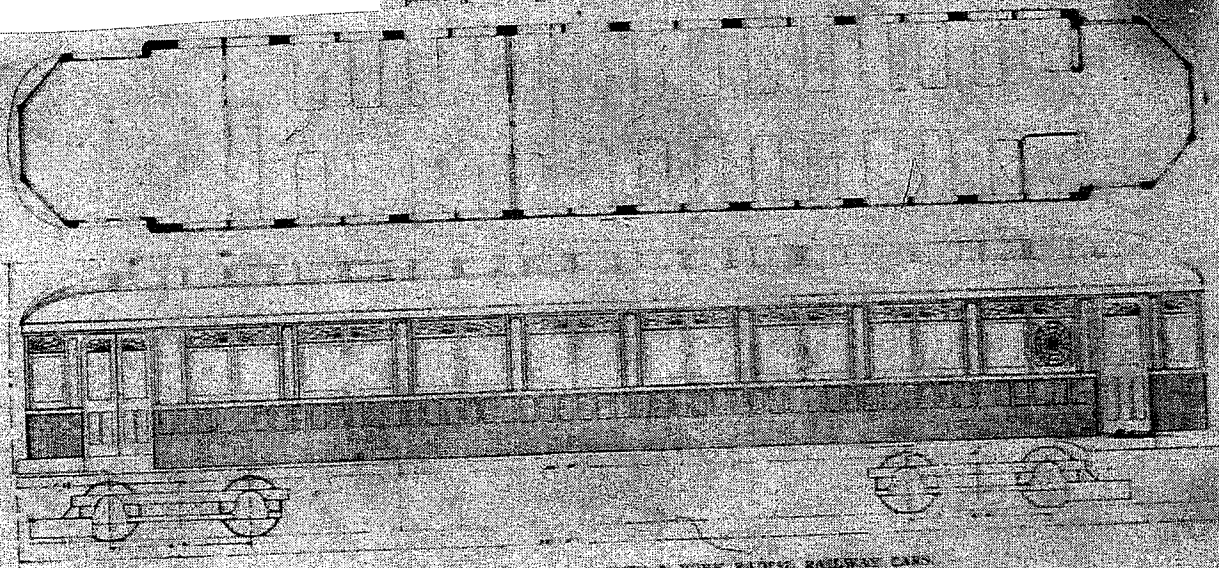
Toronto and York Radial Railway Cars.

By J. M. Gaultier, Superintendent of Construction and Purchasing Agent.

This company is building for the long through run between Toronto and Jackson's Point, the Lake Simcoe terminals of the Metropolitan Division, a number of about 55 miles, a number of excellent 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 sections the sound from beneath and add warmth to the car. The seats are high roll back, extra-covered "wells over," 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-divisioning. 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 con-

vey of men, 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 metropolitan 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 master controller, the latter being



ELEVATION 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 cases, 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 G. E. 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 lateral openings in each end into which the frame heads which carry the armature shaft bearings are bolted. Only wood 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 insulph, 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-

ity of mica, and has been proved to have long life and keep its shape well under hard service. It consists of a number of sections 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 on 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 100 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 23 tons. Car length over all 55 ft. 7 ins., and width 9 ft. 2 ins.

CANADIAN
PACIFIC
RAILWAYS

C.H. RIFF

GERMAN
LOCOMOTIVES
IMPORTED
INTO CANADA
THE CANADIAN
PACIFIC

500 CLASS 4-6-0'S

German Locomotives for the C.P.R.

In our issue of Oct., 1903, we published an illustration of one of the 20 Pittsburg system two cylinder compound 10-wheel (4-6-0) freight locomotives, built for the C.P.R. by the Saxon Engine Works, Chemnitz, Germany. Following are the general dimensions:

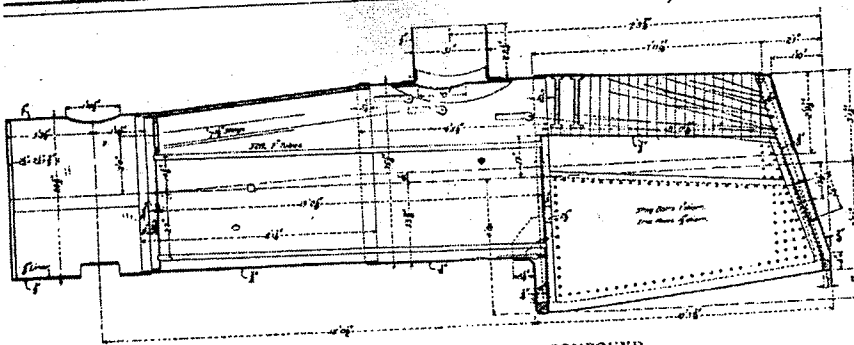
Total weight, lbs.	169,000
Weight on drivers, lbs.	128,000
Heating surface, sq. ft.	2421
Cylinders, in.	22 and 33 x 26
Diameter of drivers, in.	63
Working pressure, lbs.	210

The estimated maximum tractive effort of the locomotive is 24,900 lbs. All the drivers are flanged. The low-pressure cylinder has a balanced slide valve and the high-pressure cylinder has a piston valve. The valve motion bar is an I section and the valve rod receives its motion through a block-and-slot arrangement on the rocker arm, which arrangement avoids the springing motion of the valve rod such as occurs when no rear bearing is used for supporting the rod. The diaphragm in the front end of the locomotive terminates in a vertical plate in front of the blast pipe extending down to within 6 or 8 in. of the shell. Double petticoat pipes and a circular netting are used. The fire-box crown-sheet is sling

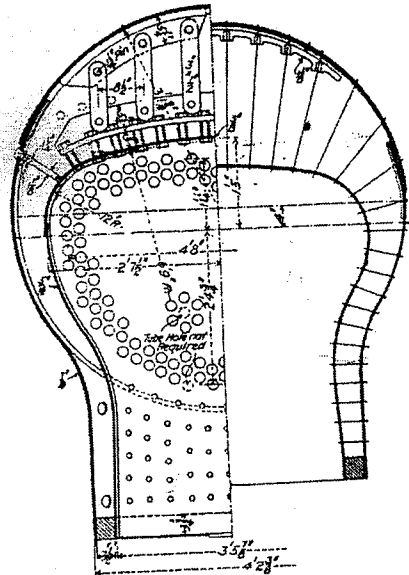
stayed, and the holes for the sling stay-bolts in the crown-sheet are reamed out so that the bolt will go up to within about $\frac{1}{8}$ in. from the head, after which it is driven up to the plate with a hammer. The six centre rows of stays are fitted with steel nuts $\frac{5}{8}$ in. thick and copper washers 1-32 in. thick under the crown-sheet. The boiler is the extended waggontop type, and is $75\frac{1}{8}$ ins. outside diameter at the dome course. The boiler contains 328 2 in. tubes 13 ft. $2\frac{1}{2}$ ins. long. The fire-box is steel, 9 ft. 6 ins. long and 3 ft. $5\frac{1}{8}$ ins. wide, and the grate area is 33.2 sq. ft. The fire-box contains 159 sq. ft. of heating surface. The tender has a capacity of 5,000 imperial gallons of water and 10 tons of coal. Following are some of the typical ratios given by the Railroad Gazette:

Weight on drivers divided by maximum tractive effort	5.74
Weight on drivers divided by heating surface	52.9
Heating surface divided by grate area	72.9
Heating surface divided by h. p. cylinder volume	425.3
Grate area divided by h. p. cylinder volume	5.9
Fire-box heating surface divided by total heating surface	6.57
Steaming capacity	20

The special equipment includes Simplex truck bolsters and brake-beams, and Westinghouse automatic brakes on engine and tender. Some additional illustrations are given on page 17.



BOILER OF C. P. R. TWO-CYLINDER COMPOUND.



SECTION THROUGH FIRE-BOX C. P. R. TWO-CYLINDER COMPOUND.

appointed chief clerk to the Assistant Freight Traffic Manager, Toronto, succeeding W. H. D. Miller, appointed Manager of Transportation Department, Canadian Manufacturers' Association.

L. A. W. Dougherty has been appointed chief clerk to the General Freight Agent, Ontario division, Toronto, succeeding J. R. Marlow, promoted.

J. Coughlin has been appointed Roadmaster of the Schreiber section, Lake Superior division, vice P. Jackson, resigned. Office, White River, Ont.

W. Guthrie has been appointed Roadmaster of the Chapleau section, Lake Superior division, vice J. Coughlin, transferred. Office, Chapleau, Ont.

G. S. MacKinnon, Master Mechanic, Central division, Winnipeg, has resigned, and until further notice all communications heretofore addressed to the Master Mechanic are to be sent to the Second Assistant of Rolling Stock, J. H. Manning, Winnipeg.

J. L. Audrain has been appointed station master at Winnipeg, succeeding H. O'Connor, transferred.

R. E. MacArthur has been appointed Resident Engineer, Western Division. Office, Calgary, Alta.

S. J. Hungerford resumed his duties as Master Mechanic, Western Division, at Calgary, Alta., Dec. 1. During his absence, on account of illness, R. A. Payne, locomotive foreman at Brandon, Man., was acting Master Mechanic. He has returned to Brandon and resumed his former duties.

T. Downie, heretofore Chief Train Dispatcher, district 1, Pacific division, has been appointed Trainmaster, same district, succeeding G. F. Risteen, resigned. Office, Revelstoke, B.C. G. F. Risteen has been

given a position as passenger conductor between Kamloops and Vancouver.

R. C. Baker, heretofore train dispatcher, Revelstoke, B.C., has been appointed Chief Train Dispatcher, district 1, Pacific Division, succeeding T. Downie, appointed Trainmaster. Office, Revelstoke.

R. A. Burford has been appointed City Passenger and Freight Agent at Buffalo, N. Y., succeeding A. J. Shulman, resigned.

F. P. McKee, who was appointed to act as freight and passenger agent at Washington, D.C., temporarily, has been appointed ticket agent at 1 Broadway, New York.

D. H. Morse has been appointed Freight and Passenger Agent at Washington, D.C.

Central Vermont Ry.—A. Buchanan, Jr., has been appointed Superintendent of Motive Power, succeeding T. A. Summerskill, resigned. Office, St. Albans, Vt.

E. Buck will, it is reported, be appointed Chief Dispatcher, Northern division, succeeding T. S. Beeler, resigned to accept service with another company. On Dec. 12 we were informed that no appointment had been made.

Chicago and Northwestern Rd.—D. Parker, successively with the C.P.R., Northern Pacific Ry. and Canadian Northern Ry., at Winnipeg, has been appointed resident agent for the C. and N.W. Rd. Office, 339 Main st., Winnipeg.

Delaware, Lackawanna and Western Rd.—A circular, dated Dec. 4, says, "After 18 years of faithful and efficient service with this Co., Geo. Bazzard announces his retirement Dec. 31, 1903."

A. Leadlay, heretofore Soliciting Agent at Toronto, has been appointed Canadian Agent, succeeding G. Bazzard, retired. Office, Toronto.

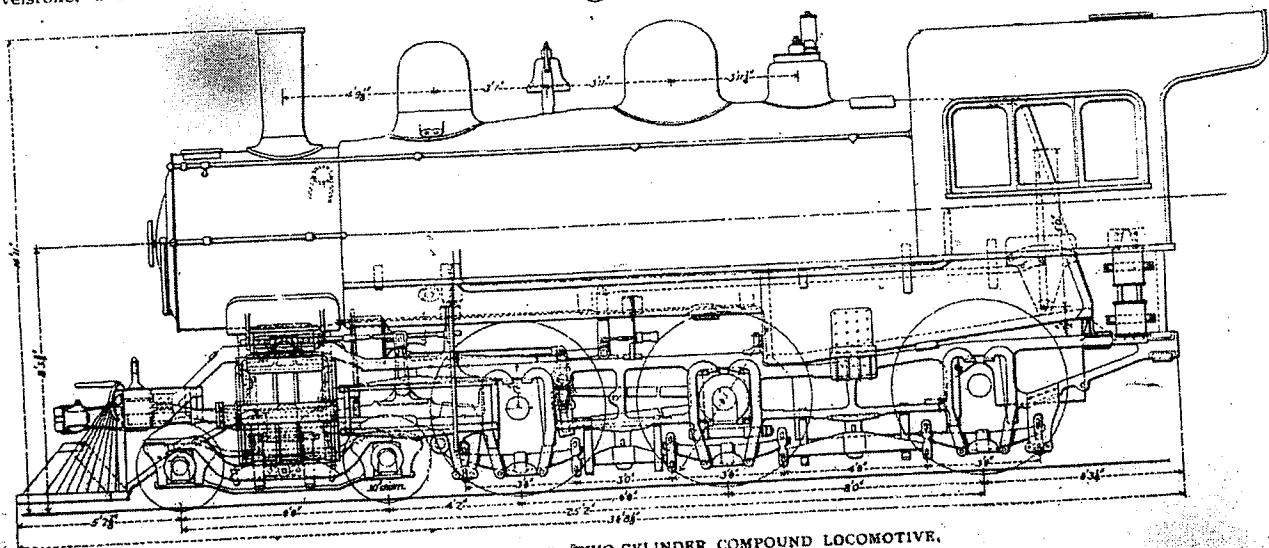
W. A. Grey, heretofore chief clerk, Yonge st. freight sheds, G.T.R., Toronto, has been appointed Contracting Freight Agent, succeeding A. Leadlay, appointed Canadian Agt.

Department of Marine.—J. F. Fraser, heretofore technical adviser to the Department, has been appointed Commissioner of Lights, with W. H. Noble as assistant. Lieut.-Col. W. P. Anderson remains as Chief Engineer of the Department. An enquiry of the Deputy Minister as to the respective duties of the officers named elicited the reply that "they are matters of departmental detail."

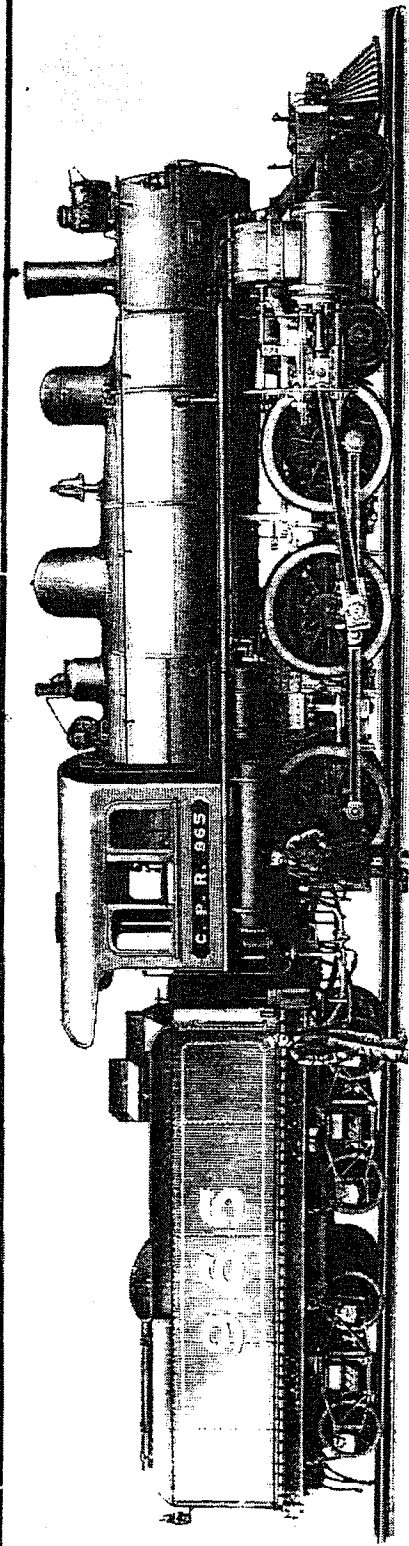
Erie Rd.—J. C. Stuart has been appointed General Manager of this company and its allied and controlled lines, vice D. Willard, resigned to accept service elsewhere.

E. A. Williams has been appointed Assistant General Manager of this company and its allied and controlled lines. Office, New York.

Grand Trunk Pacific Ry.—J. W. Kneeshaw, heretofore Assistant Stationery Agent G.T.R., at Detroit, has been temporarily delegated to go to Winnipeg for the purpose of looking after the purchase of supplies, etc., for the engineering parties on surveys. This work has hitherto been done by the division



ELEVATION OF C. P. R. TWO-CYLINDER COMPOUND LOCOMOTIVE.

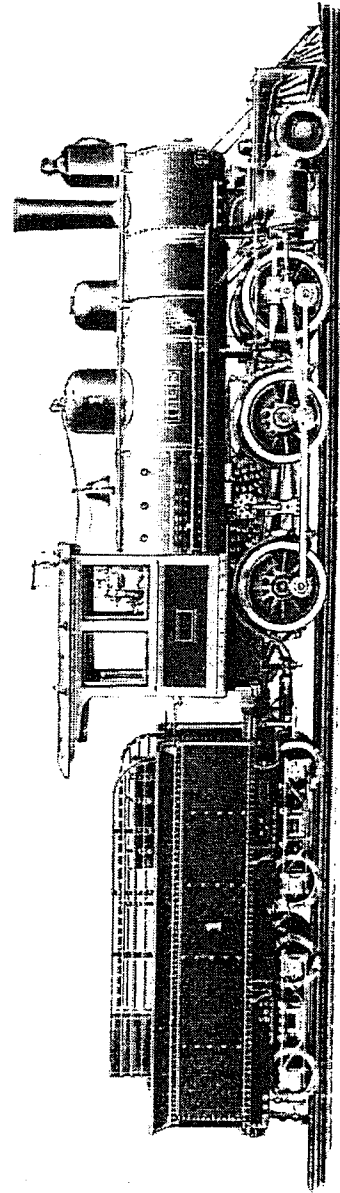


The Saxon Engine Works, late Rich. Hartmann, Limited

CHEMNITZ (Germany),

LOCOMOTIVES

Carry on the construction of of every description.



Number
of
Workmen,
5,200.

Capital,
\$3,000,000.

CANADIAN PACIFIC
RAILWAY CARS
IN
AUSTRIA

Canadian Pacific Railway Observation Cars on the Austrian State Railways.

On account of the increasing importance of Vienna, the Austrian capital, as a point of interest to tourists visiting Europe, the C.P.R. opened an important agency there for the convenience of its passengers and other Canadians visiting that city.

After the introduction of the observation cars on the C.P.R., which have proved such an attraction to tourists and other travellers between Montreal, Toronto and the west, and especially through the mountain scenery in the Rockies and Selkirks, representations were made to the Austrian government that in view of the great natural beauty of the Arlburg Pass route between Switzerland and Vienna, similar cars would be a great attraction to passengers. After considerable negotiation, a concession was granted to the C.P.R. for the operation of observation parlor cars between Buchs and

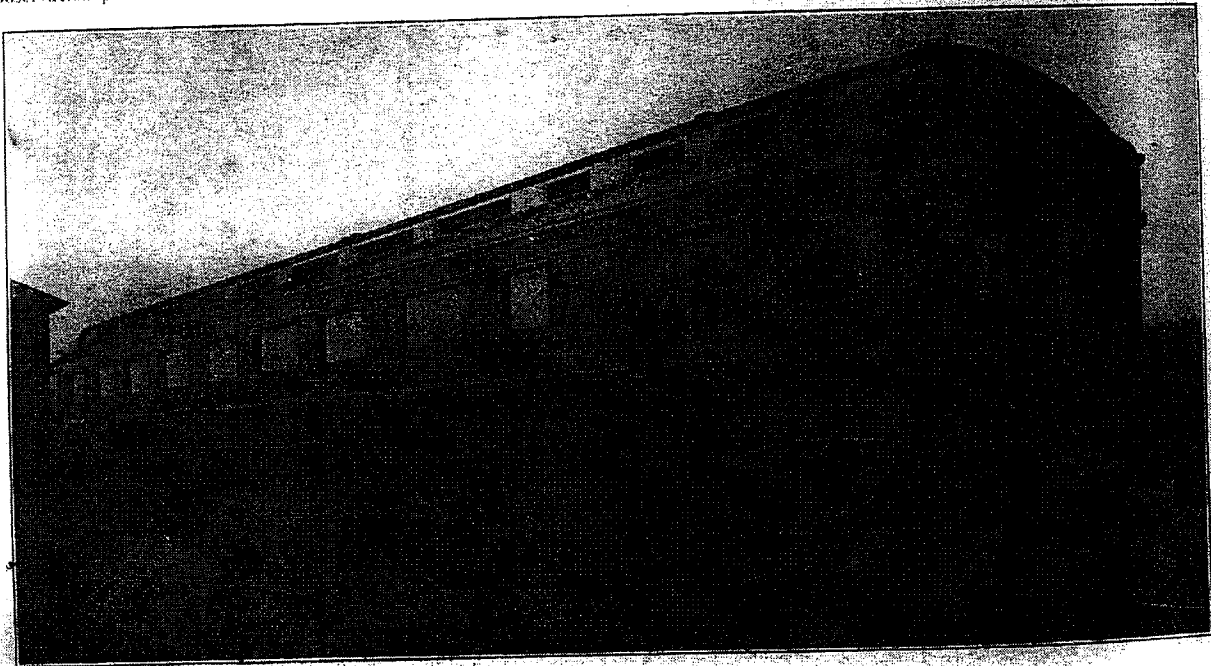
the cars were built at the Ringhoffer works, Smichow, Prague. These three were put into service during the past summer, and the balance of five will be delivered during this spring. The service has already become exceedingly popular, and officials of the Austrian State Railways are so pleased with the operation of the service that they are anxious to extend the use of the cars to other routes.

The accompanying illustrations show that the appearance of the Canadian car has been closely obtained. The bodies of the cars are 71½ ft. over buffer plates, and 9 ft. 5½ ins. wide over eave moulding, and an over all height of 13 ft. 8¾ ins. The underframe is of steel, that being standard on Austrian State Railway cars. The buffers, vestibules and underframe in general are all of standard Austrian State Ry. con-

ing it in glass, which have proved entirely successful. Unfortunately, it was found necessary to fit a vestibule to the observation end on account of there being no turntables of sufficient length to turn the cars at the ends of some of the runs, and as they had to be handled backwards for short distances the railway authorities insisted on the vestibules being applied.

The cars are sheathed outside in mahogany and lettered "Canadian Pacific," and the appearance throughout of a standard Canadian Pacific parlor car is maintained as closely as possible. The Burnett 4 wheel all steel truck, recently adopted as standard by the C.P.R., is used, it being considered by the Austrian State Railways as decidedly superior to their standard type.

In order that the cars built in Austria should be as closely similar in construction and finish as the C.P.R. cars from which they are modelled, sample sections of the C.P.R. cars were made up in the Angus shops in Montreal, and shipped bodily to Austria as a guide to the finish desired. The main thing sent was a full cross sec-



C.P.R. Observation Cars Built for the Austrian State Railways.

Vienna on the Arlburg Pass route, and between Vienna and Trieste on the line to Italy, the arrangements being very similar to those under which Pullman sleeping cars are operated on many lines in the United States and some in Canada.

It was thought that the cars should as closely as possible resemble those used in Canada, in order that they might reproduce the latest types of construction and provide the greatest degree of comfort to passengers. It was of course impossible to duplicate the actual C.P.R. equipment on account of the differences in the clearance, coupling and vestibule arrangements, etc. Negotiations were entered into with the Nesseldorfer Co., the largest car builders in Austria, and H. H. Vaughan, Assistant to the Vice President, C.P.R., visited Vienna and arranged for the construction of cars that while resembling as closely as possible C.P.R. equipment, would be suitable for operation on the Austrian State Railways. On account of labor trou-

struction. The body of the car is divided into two compartments—one for smoking and the other non smoking. The floor plan is very similar to that of an ordinary C. P.R. parlor car, the chief novelty being the use of two baggage compartments, which are required on account of the large amount of hand baggage usually carried by European travellers. In order to provide storage space for this, the porter of the car checks each piece of hand baggage from the passenger and thus avoids it being laid on the floor of the car or occupying seating capacity. The chairs are the C.P.R. parlor car chair of the "slumber" type. Ten are placed in the smoking compartment and 24 in the non smoking compartment. The equipment and finish are of the latest on C.P.R. parlor car style, and the lighting system is also similar, excepting that the system which is standard on the Austrian State Railways is used.

On account of the objections of the Austrian authorities to the open vestibule plat-

form of a standard C.P.R. observation car, including the desk and book case, showing the style of finish and marquetry. The other sample parts sent included a copper washstand, water cooler, towel racks, brush racks, soiled towel rack, drinking glass holder, centre and deck lights, deck sash, stencilling and lettering, sample of outside finish, section of car side, sample of doors, door locks and hand rails, deck sash screens, inlaid rubber flooring, roof canvas, inside and lavatory door locks, cork bolter and door checks, mosaic tiling, cork tiling, carpet strip, toilet room tiling, passage way marquetry, pantasote blinds, toilet room window glass, chairs, and inside lettering.

The photographs on this page and the next, show how successfully the Canadian Pacific type of parlor car has been followed, with the alterations imposed upon it by foreign railway practice, and the car as a whole exceed in comfort, beauty of finish, size and general appearance, any that have ever been operated on the European continent.

CANADIAN PACIFIC RAILWAY

1901

ROYAL
TRAIN

The C.P.R.'s Royal Train.

The train which has been built by the C.P.R. for the Duke and Duchess of Cornwall and York during their Canadian tour is 730 ft. long, and weighs 595 tons. It consists of the day coach Cornwall and the night coach York, for the especial use of their Royal Highnesses; the compartment car, Canada; the sleeping cars, Australia, India and South Africa; and the dining car, Sandringham—together with cars for the baggage and for the railway employees—nine coaches in all. The train will be hauled by locomotives of the Atlantic and Consolidation types of passenger engines of the C.P.R. These styles of engine weigh with their tenders, when loaded, about 132 tons, and the over-all length is between 61 and 62 ft.

The train is finished outside in natural mahogany. At either end of, and on both sides of each car are the armorial bearings of the Duke. The train is vested throughout, and lighted by electricity. Telephones of a

quiet, grey-green shade. The sofa, arm chairs, table, escritoire and other articles of furniture are upholstered in blue velvet to match the draperies. A piano is also provided. One feature of the car is its admirable light and airy appearance, this being due to the eight large plate glass windows of the side, together with the glass panels of the door and rear wall. The Duchess' boudoir is between the reception and dining rooms, half way along the corridor adjoining them. Its prevailing shade is a pearl grey. The panels are painted à la Watteau. The lattice work of the ceiling, by which ventilation is secured, as well as the ornaments of the panels are touched lightly with gold. The draperies are of light blue moire silk, and divans, chairs and table are gilt to match the panels. The dainty table, the reading lamp and chairs are all heavily gilt, and adjacent to it is a most complete toilet room, containing a long mirror, reaching almost to the floor, practically a cheval glass. The front of the car has been devoted to a dining

A corridor extends throughout the length of the car. The central portion of the York is occupied by two bedrooms with servants' sleeping rooms adjacent. These Royal bedrooms are finished in pearl grey enamel, being panelled in silk to match the draperies. Each contains its own wardrobe, dressing table and large mirror. The brass bedsteads are heavily gilt. In addition to the ceiling lights, each room has a special fixture for the dressing table, which sheds a mellow light upon the person sitting before it. The draperies of the Duke's room are of crimson silk armure, and those of the Duchess' of pale blue moire. The furniture is of satinwood. Each of the Royal bedrooms has its own bathroom attached. These are draped in a soft, tasselled waterproof cloth of a pearl grey hue. The baths are full sized, upholstered round the borders with this same waterproof cloth, and have heavy curtains of a similar material. The remainder of the car is devoted to two state rooms finished in mahogany; the one for the lady-

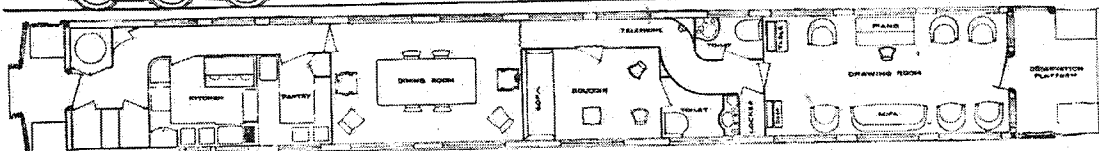
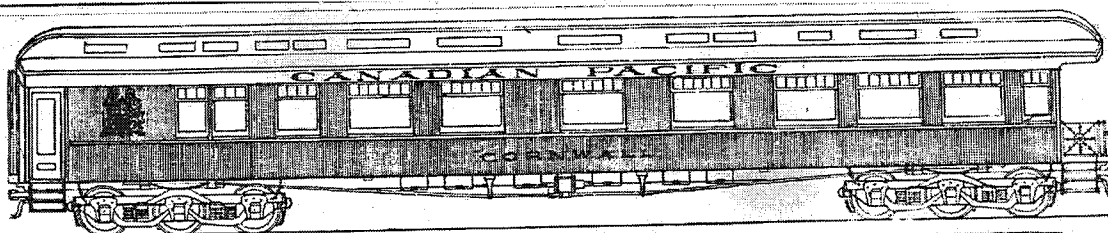
new pattern have been installed in every coach—one novelty being an arrangement by which all the instruments may be in use at the same moment, without any one of them interfering with any other.

The Cornwall will be the rear coach of the train, so that their Royal Highnesses may have an uninterrupted view of the scenery from the sheltered observation platform. The Cornwall is 78 ft. 6½ in. long, with a width of 10 ft. 3 in., an extreme height of 14 ft., and

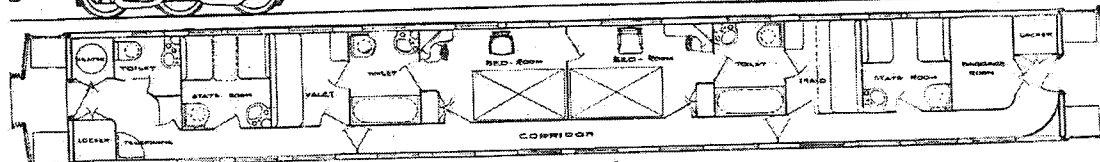
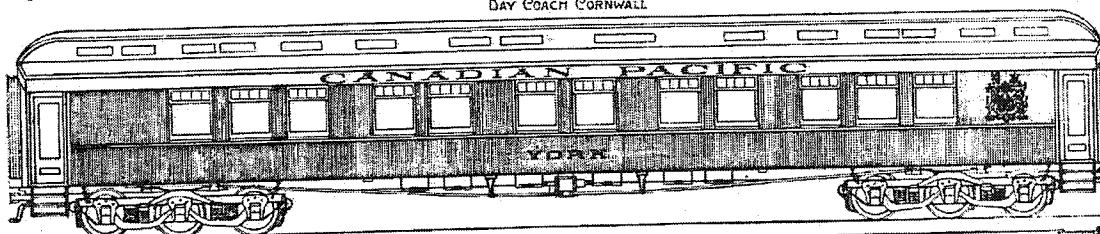
room which is finished in African coromandel, ornamental cartouches in bas relief displaying at one end the armorial bearings of the King, and at the other the blended coats-of-arms of the Duke and Duchess, while the arms of the Dominion, and the family badge of the Duke embellish the remaining walls of the room. The draperies are of green velvet, and the decorations of the panels are in shades of gold and green to match. The upholstery is, however, of a warm, brown tone. The dining table is large enough to accommo-

in-waiting, the other for the gentleman-in-waiting, together with a general toilet, and a baggage room.

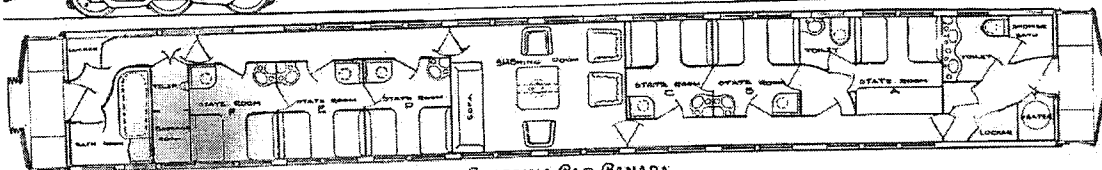
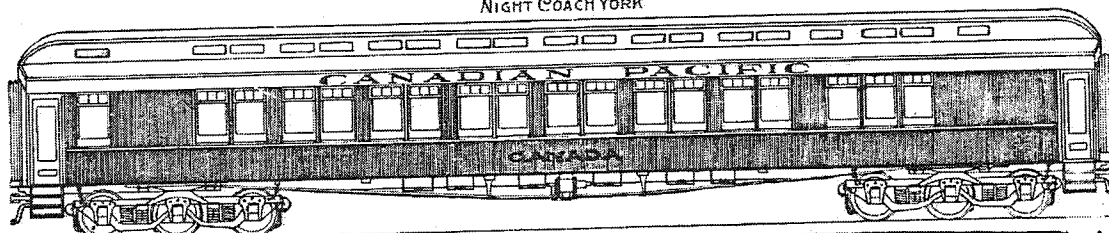
The Canada, which is the third coach from the rear of the train, is a compartment car, finished in prima vera or white mahogany, and upholstered in terra cotta and olive green plush. It contains six state rooms fitted with every convenience; in the centre of the car is a commodious smoking-room, with a large writing table, lounge and luxurious easy chairs. There is also a bath at one end of



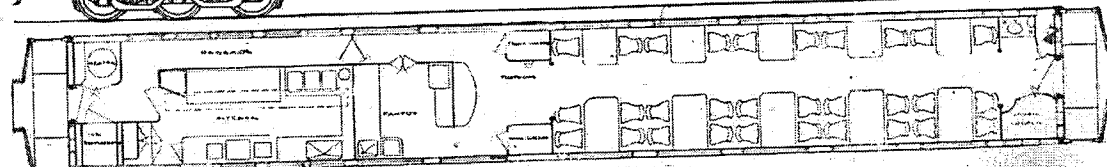
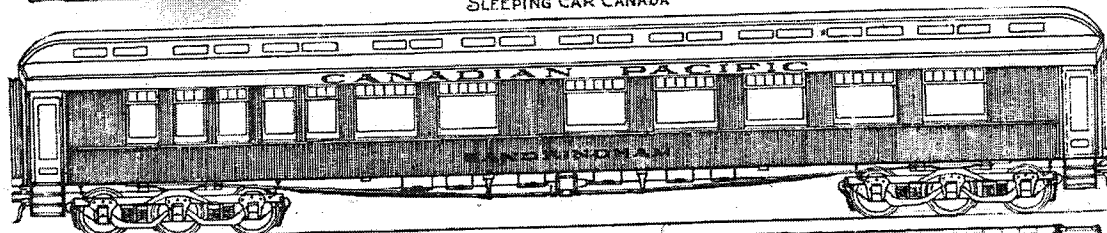
DAY COACH CORNWALL



NIGHT COACH YORK



SLEEPING CAR CANADA



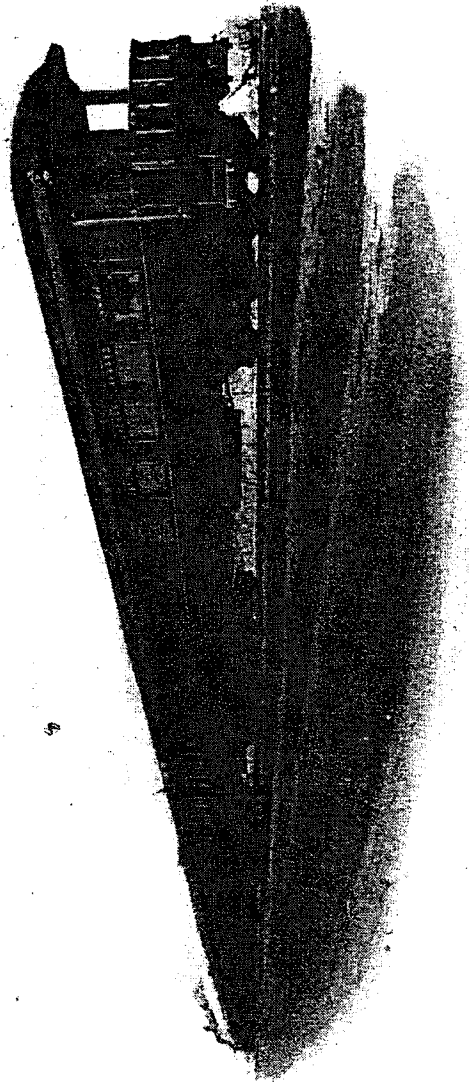
DINING CAR SANDRINGHAM

THE C.P.R.'S SPECIAL TRAIN FOR THE DUKE AND DUCHESS OF CORNWALL AND YORK.

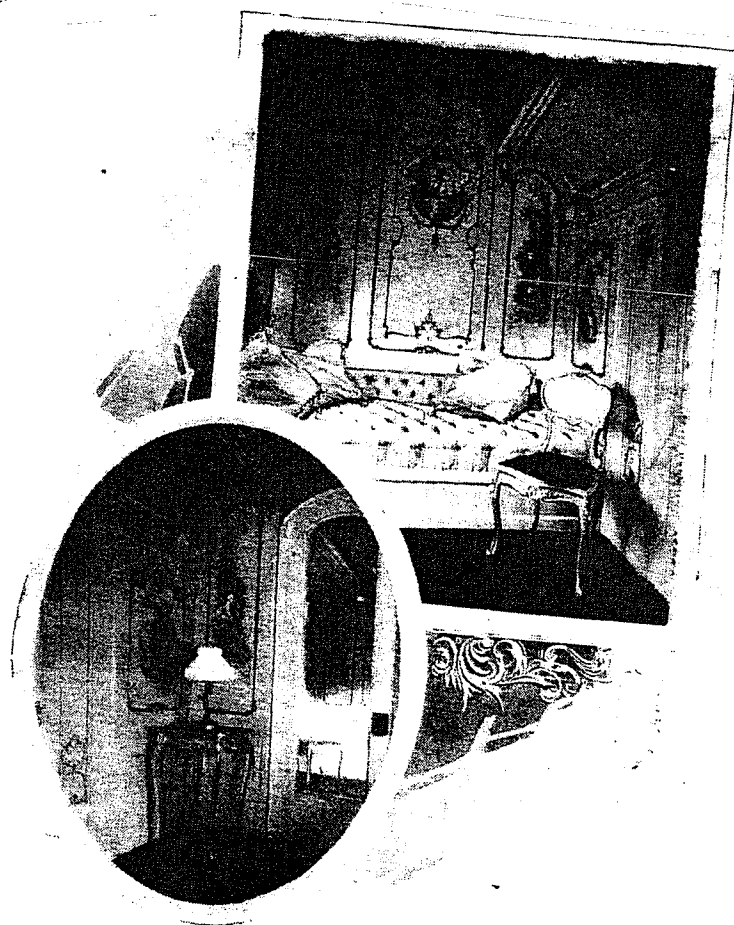
Nov., 1901.]

THE RAILWAY AND SHIPPING WORLD.

327



THE CANADIAN PACIFIC RAILWAY'S ROYAL TRAIN.



THE DUCHESS OF CORNWALL AND YORK'S BOUDOIR,
CAR CORNWALL, C.P.R. TRAIN.

CANADIAN
PACIFIC
RAILWAYS
FORT
WILLIAM
COAL PLANT

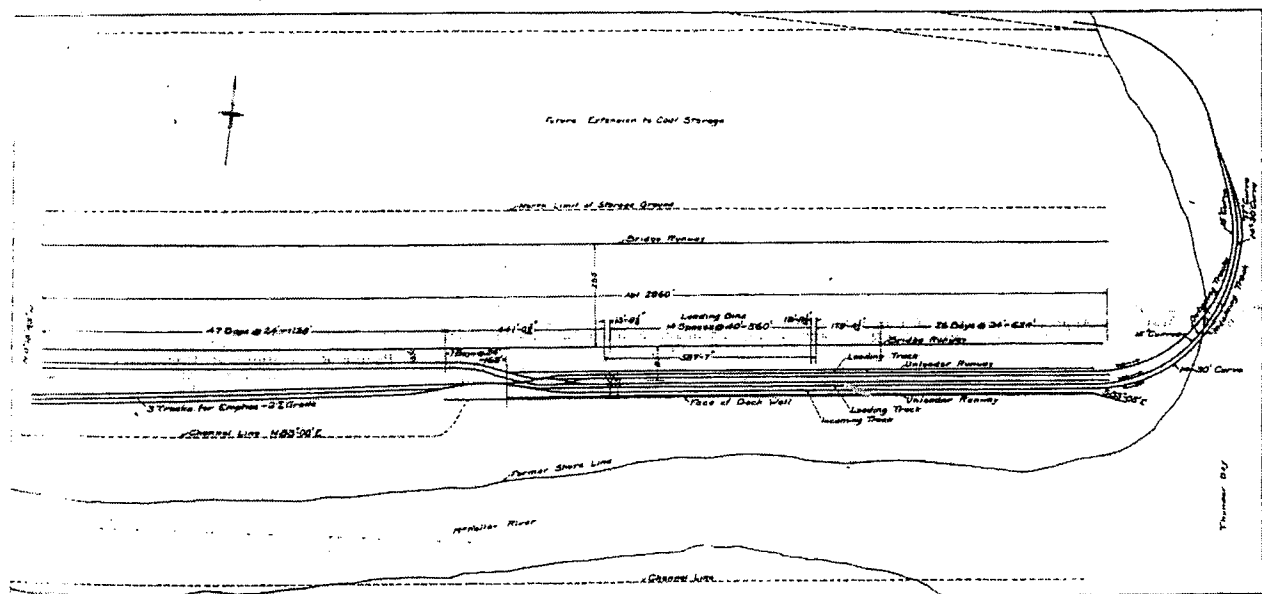
C.H. RIFF

The Canadian Pacific Railway's Coal Handling Plant at Fort William.

A complete description of the coal handling plant that the C.P.R. is having constructed for its own coal at Fort William, was given in the Canadian Railway and Marine World for Feb., 1912. That article covered the construction and operating details of the machine itself. The layout of the plant, with a view to continuous operation without pauses while waiting for the shunting in of cars, is rather ingenious, as an examination of the accompanying plan will show.

The plant consists of two unloaders, which lift the coal in 8 ton buckets from the vessel's hold, and carry it back either to a temporary storage pile beyond the north rail of the runway, or to 35 ton scale cars on double tracks between the unloader tracks. From a temporary storage pile, the coal is picked up by a 9 ton bucket, on a 320 ft. cantilever bridge, which bridges the main storage pile to the north of the temporary storage.

In operation, a switcher brings in a string of empties from the yard, running along the incoming tracks under the unloader, leaving the string on one of the three temporary storage tracks. From these tracks, the string can be run down into the plant, as required, by gravity, this being the object of the 2% ramp. Thus, 15 cars can be run in on either of the loading tracks. The box car loaders proceed along one string of cars, filling them up, then back along the other string. While one is being filled up, the other set of loaded cars is drawn further along through the plant by a car haulage system at the east end, and a set of empties run down by gravity to take their place. The loaded cars are drawn off from the east end of the plant by the switcher, which is kept busy bringing empties, and drawing away the loaded cars. By the use of this third incoming track, and the graded empty yard, the movement of the cars through the



Plan of C.P.R. Coal Handling Plant at Fort William, Showing Arrangement of Tracks for Continuous Movement of Cars Being Loaded.

There are 30 car loading bins located in a row, as indicated on the plan, and under the scale cars, by which they are filled. The scale cars drop the exact amount of coal, corresponding to the capacity of the freight car, to be loaded into the bins, and from the latter the coals pass into box car loaders, which fill the box cars on the two loading tracks.

An ingenious feature of the layout is the running of these loading and entering tracks. From the east, along the edge of the dock wall, runs the incoming track, which enters from the east, where the traffic comes from the adjacent yards, all the tracks coming in on a sharp curve from the rear of the storage pile. Proceeding west along the dock wall, to the south of the loading bins, the three tracks through the plant converge—that is, the two loading tracks and the incoming track. Beyond this converging track are three parallel tracks, rising on a 2% gradient, the tracks terminating at the west end of the plant. These three tracks are for the temporary storage of the empties on their passage through the plant.

plant is continuous.

It is of interest to note that the dock was sunk in the solid ground, and after completion, the ground outside was dredged out. At this section of Island no. 1, on which the plant stands, the ground was very low, so that the discharge from the hydraulic dredges working on improvements to the McKellar River channel were usefully employed in bringing the level of the ground to the proper height.

Canadian Ticket Agents' Association.—At a meeting of the executive committee at London, Ont., June 13, J. P. Hanley, C.P. & T.A., Grand Trunk Ry., Kingston, Ont., and W. Fulton, C.P.A., Canadian Pacific Ry., London, were appointed on the committee, vice C. E. Horning, now D.P.A., Grand Trunk Ry., and J. F. Dolan, who has been appointed D.P.A., Richelieu and Ontario Navigation Co., at Boston, Mass. J. A. McKenzie, C.P.A., Grand Trunk Ry., Woodstock, Ont., and 3rd Vice President of the Association, was appointed in place of Mr. Horning, as representative to the G.P. & T.A. convention to be held at Philadelphia, Oct. 14 and 15.