

THE GREAT TRANSFORMATION OF SARNIA RAILWAY TUNNEL

Story of Gigantic Work of Construction and Electrification of the
Grand Trunk Bore Beneath the
St. Clair River.

The electrification of the St. Clair tunnel covers about 20,000 feet or nearly four miles. There is about 4,000 feet of approximately level track at each end of the approaches. There is a grade of 2 per cent for 5,000 feet on each side and a stretch of 1,700 feet in the middle which has just sufficient grade to drain itself.

The work of electrifying the tunnel has been going on for many months and the electric locomotives have quietly eliminated the steam locomotives and taken up the work without any disturbance to traffic, the formal inauguration of which occurred Thursday.

The Power Station.

The power station is situated on the Port Huron bank of the St. Clair River, at a point directly over the tunnel. The building construction is of concrete to the dynamo room floor. The walls above this point are lined with paving block and are corniced and coped with concrete. The roof is of cinder concrete. The dynamo room is lofty and well lighted. The walls are lined with enamel brick to the height of the switchboard, the remaining portion is lined with sand-lime brick. The offices and switchboard room occupy the street front. The basement has plenty of head room and contains the condenser pump groups and other fan groups. The dynamo room floor is so recessed that the auxiliary apparatus in the basement is in view from the dynamo room floor. The boiler room floor is on the same level as the dynamo room basement floor. The striking feature of the power station is the inforced concrete coal bunker. This extends the entire length of the boiler room, and has a capacity of 500 tons. The power station equipment is in duplicate.

Just outside the power station there is a vertical shaft which extends to the tunnel. A reinforced concrete duct chimney has been built in this shaft as a continuation of the power station duct lines. All the feeders pass from this chimney through holes in the tunnel shell into the tunnel. The locomotive feeders tap the trolley and rail at this point, which is the only distributing point for the entire trolley system. There are section breaks and switches for isolating particular sections of the trolley wires in case of accidents, but normally the trolley wires are continuous from the limits of the Port Huron yards through the tunnel to the limits of the Sarnia yards, a distance of 3.7 miles.

In addition to the locomotive feeders there are two feeders for the tunnel lights, two feeders for the Port Huron portal pump groups, two for the Sarnia portal pump groups, a three-phase power feeder and an arc light feeder for the Port Huron yards and similar feeders for the Sarnia yards. These cables are run through the tunnel in ducts which are supported by reinforced concrete beams and secured to the lining of the tunnel shell. There are two of these beams, one on each side of the tunnel. The ducts are covered with a three-inch layer of concrete. The feeders are paper-insulated, lead-covered cables and terminate at the pumphouse switchboards, from which point the arc circuit and the three-phase power circuit continue as bare overhead wires.

In the yards a single catenary trolley construction is used. The spacing of the supporting bridges is 250 feet. There are no obstructions in the nature of intermediate supports, consequently where a number of parallel tracks are electrified, the spans are long, as at the Port Huron passenger station, where one of the spans is a little in excess of one hundred and forty-three feet. The bridges are tied together with guy cables. This enables a lighter structure to be used than if each bridge were sufficiently rigid, without the use of guy cables, to withstand the unbalanced strain resulting from the breaking of several messenger cables and trolley wires.

The trolley wires are 22 feet above the tracks except in the tunnel and short distance outside each portal. The overhead trolley leaves the yards clear of all electrical impediments while the catenary construction with its frequent trolley hangers practically eliminates the dangers arising from the presence of bare circuits.

The Engines.

The electric locomotives weigh 66

To Awaken the Liver

Coated tongue, aching head, biliousness, constipation alternating with looseness of the bowels, feelings of depression and ill-temper.

These arise from sluggish, torpid action of the liver.

Relief comes after the use of one of Dr. A. W. Chase's Kidney-Liver Pills and cure within a few weeks after the use of this great regulator of the liver.

With the liver right there is usually no disturbance of the digestive system or bowels. Therefore get at the cause of trouble by awakening the liver to action by use of Dr. A. W. Chase's Kidney-Liver Pills.

Mrs. L. Phillips, Virgil, Ont., writes: "I have used a number of boxes of Dr. Chase's Kidney-Liver Pills and consider them excellent for torpid liver."

25 cents a box, at all dealers, or Edman, Bates & Co., Toronto.

Dr. A. W. Chase's

Kidney-

Liver Pills

tons each, and are generally used in pairs. Each locomotive or unit is of 750-horsepower, and one or more can be coupled together, and used as one engine with one engineer.

Protected by Signals.

The tunnel division is protected by a block signal system which extends from summit to summit. The dispatcher's cabin is located at the Sarnia summit, and the other signal cabin at the Port Huron summit. Telegraph orders are used. In addition to the written order the conductor receives a staff when the train enters the block. The switches and signals are locked until this staff is placed in the instrument at the other end of the block. The protection is so complete that not a single accident chargeable to dispatching has occurred during the eighteen years of tunnel service. There is a yard telephone system and a tunnel special telephone line connecting the power station, the two signal cabins at the two portals, the middle of the tunnel and the roundhouse. The dispatcher is the master of the situation. He not only controls the train movements, but the power as well. Any failure of power is immediately reported to him. In case it is trouble with a locomotive he has the engine replaced. In case it is trouble with the distributing system he orders the power cut off, then communicates with the electrical superintendent who takes charge of the repairs. As soon as the repairs have been effected the dispatcher is advised and orders the power turned on again. He is also advised as to any power station trouble that will interfere with train movements. There is no division of responsibility. This arrangement is the logical one since it is the dispatcher's business to get the trains through the tunnel. He must accordingly be supplied with the necessary motive power and be kept advised as to its availability. Likewise in case of trouble on the line he must protect the repairmen by keeping the power off until the proper authority has advised him that power can be turned on again.

Building the Tunnel.

The first preliminary engineering work connected with the construction of the tunnel was boring in the bed of the river to ascertain the nature of the deposit and strata. These borings showed a tough blue clay at all points along the line.

Work on the preliminary drift was begun in October, 1886. A shaft 14 by 6 feet was sunk on each bank of the river to a depth of about 35 feet, or 70 feet below the surface of the river. The drift was pushed out 20 feet on the American side and 186 feet on the Canadian side. These drifts were finally abandoned in July, 1887, after about nine months had been spent upon the work.

The unsuccessful attempt to start the full size tunnel by means of shafts was begun April 20, 1888. These were 23 feet in diameter, lined with brick masonry. These were abandoned when the Canadian shaft was down within 20 feet of the tunnel level.

After the experimental work mentioned above and much careful study of the subject by Chief Engineer Hobson, the shield system was finally decided upon. The shield consisted of cylindrical steel shells, 15 feet 8 inches in length and 21 feet 6 inches in external diameter, made of steel plates one inch in thickness. Each shield was divided into twelve compartments by means of two horizontal and three vertical stays, which were built up to a thickness of two inches. These stays had a knife edge in front and extended back eleven feet, leaving four feet of clear cylinder, into which the end of the tunnel extended. Ten of the compartments were permanently closed and braced of angle iron placed across them. The other two were placed with heavy iron doors, which could be closed at once in case of accident or danger. These doors were situated at the bottom in the centre and through them was passed all the excavated matter. Flush with this heading were 24 hydraulic rams at equal distances around the shield. The rams were eight inches in diameter and had a stroke of 26 inches. By their use the shields were forced forward enough to admit of another section of castings, 18 inches. The power was supplied by Worthington pumps, which were capable of producing a pressure of 5,000 pounds per square inch, which amounted to 125 tons per ram, or 3,000 tons on the 24 rams. These shields weighed 80 tons each.

The engineering work in laying out the line of the tunnel was of the simplest possible description, yet it was carried out with the greatest care, for an error in alignment would not have merely increased the cost of the work, as in an ordinary tunnel, but would have possibly caused the failure of the whole enterprise.

The length of the tunnel from portal to portal is 6,925 feet. The length from portal on the Canadian side to the river bank is 1,729 feet. The length from portal on the American side to the river bank is 2,000 feet. Length under the river bed is 2,290 feet.

The tunnel is a perfect circle with an internal diameter of 19 feet 10 inches.

The grade on the American side is 1 in 50 or 105.60 feet per mile. The grade on the American side is 1 in 50 or 105.60 feet per mile. The total cost of the work was \$2,700,000, as expended on preliminary

work \$ 250,000
Machinery and plant used in construction 250,000
Labor, all classes 900,000
Cast iron for lining 800,000
Other materials 100,000
Real estate, land, damage, legal expenses 110,000
Permanent equipment (tracks

locomotives, etc.)	500,000
Approaches	200,000
Engineering, superintendence, etc.	40,000
	\$2,700,000

So accurate was the engineering work that the two shields from the Canadian and American side came together at 11:30 p.m. on Aug. 30, 1890. It was not until Saturday, Sept. 19, 1901, that the tracks were laid and the formal opening took place. There were present in Port Huron on that day all of the Grand Trunk officials, including Sir Henry Tyler, president, General Manager Sargeant, Chief Engineer Hobson and other heads of departments. From that time until a few months ago all trains were hauled through the tunnel by special locomotives built by the Baldwin works at Philadelphia. They are of the "Decapod Tank Freight" pattern and had a guaranteed carrying capacity of 760 tons up a two per cent grade.

Since the tunnel was completed a number of men have lost their lives while taking trains through the bore, among them Superintendent of Terminals Beggs, who entered the tunnel about three years ago to help the train crew whose engine was stalled.

Notes.

The cost of the electrification of the tunnel has been 1,000,000. The Grand Trunk officials will give the visiting newspapermen a banquet at the Harrington between 6 and 7 o'clock this evening. They are of the "Decapod Tank Freight" pattern and had a guaranteed carrying capacity of 760 tons up a two per cent grade.

The electrification of the tunnel has been in charge of H. L. Kirker, the special representative of the Westinghouse Company. Three of the leading officials of the Grand Trunk Railway, who are in attendance at the reception, formerly resided in Port Huron. They are W. E. Davis, general passenger traffic manager; J. E. Quick, general baggage agent, and James Coleman, master car builder, of the Grand Trunk system. The latter once represented the fifth ward in the common council.

HENEY'S ATTACKER TAKES HIS LIFE

Despite the Close Watch Kept on
Him Haas Suicided in
His Cell.

San Francisco, Nov. 15. — Maurice Haas, who on Friday attempted to assassinate Francis J. Heney, committed suicide last night by shooting himself in the head with a pistol he had concealed about his person. Haas went to bed at 8 o'clock at the county jail, and covered his face with a blanket. At 8:40 a shot was heard from his cell, and when the guard entered it was found that he was lying dead on the floor with a bullet-hole in his forehead. A derring-doe was grasped in his hand. His left trouser leg was pulled up, and examination showed a mark on his leg where the weapon rested in his shoe. Haas wore slippers with elastic sides which made this possible.

After he shot Heney, Haas was searched twice, first at the police station and later at the county jail. He went to bed last night with his shoes on, and again last night when asked why he did this, he said that he would rather sleep with them on. District Attorney Langdon, Detective Burns and Rudolph Spreckles on their arrival at the county jail, after being notified of the suicide of Haas, searched his clothing, and in one of his trouser pockets found a cartridge of the same calibre of the derring-doe with which he shot himself, a .41.

The weapon that Haas used in his attempt to kill Heney was a 38-calibre, and the cartridge found in his pocket could not have been used in that. The opinion was expressed that the pistol was passed to Haas after he was taken into custody. While at the county jail, Haas was in the charge of the police, and a policeman was standing within two feet of his cell when he shot himself. Haas' wife called at the jail yesterday to see him, and two stories are told as to where the interview took place. One says that Haas talked to his wife through his cell door, and the other that they were allowed to go into another room. The conflicting stories could not be reconciled last night. A rigid investigation is being made by the authorities.

The trial of Abraham Ruef, which was interrupted by yesterday's dramatic shooting, will be resumed Monday, it having been decided that the events in the courtroom did not prejudice the rights of the defendant, the jury not being present.

There was some intimation today that the defence would ask for a change of venue, alleging the plea of the inflamed condition of the public mind, but it is thought that such request would not be considered by Judge Lawlor.

At conferences today between Judge Lawlor, Chief of Police Biggy and Sheriff Haggerty, preliminary steps were taken to secure the court from further disorder or violence, and to safeguard the rights of the defendant Ruef.

The vicinity of the courtroom will be patrolled, and a large force of police will be held in reserve. The plans further provide that in the event of any disturbance the defendants will be quickly and quietly taken from the courtroom.

It is also intimated that Judge Lawlor will exercise his prerogative and continue to keep Ruef in custody during the trial. Precautions have been taken to protect Ruef while confined in the county jail.

Mr. Heney and his family were the recipients of many messages of sympathy and cheer during the day. The messages came from all sections of the United States and some from Europe. One telegram that brought a smile from the pain-drawn face of the prosecutor was a message from President Roosevelt to Mrs. Heney.

The five surgeons attending Heney after their consultations tonight stated that Mr. Heney was resting easily, and that his pulse, temperature and respiration were practically normal. The bullet was located in the muscles of the lower maxillary. The bone was not shattered, and the doctors say they

A WOMAN'S BACK WAS NOT MADE TO ACHE.

Thousands of Women Suffer Untold Misery Every Day With Aching Backs That Really Have No Business To Ache.

Under ordinary conditions it ought to be strong and ready to bear the burdens of life.

It is hard to do housework with an aching back. Backaches come from sick kidneys, and what a lot of trouble sick kidneys cause.

But they can't help it. If more work is put on them than they can stand it is not to be wondered that they get out of order.

Backache is simply a warning from the kidneys and should be attended to immediately so as to avoid years of terrible suffering from kidney troubles.

Doan's Kidney Pills will cure you in the same way as they have cured thousands of others.

Mrs. O. Warren, Radisson, Sask., writes: "I was troubled with very severe pains in my back for years. I tried everything I could think of but they did me no good. A friend told me about Doan's Kidney Pills and after taking two boxes, I have not been troubled since."

Price 50 cents per box, or 3 for \$1.35, all dealers or mailed direct on receipt of price by The T. Milburn Co., Limited, Toronto, Ont.

When ordering specify "Doan's."

will perform an operation to remove the piece of lead tomorrow.

NEWS FROM

WESTERN ONTARIO

Strathroy will have a Y. M. C. A. shortly.

The Y. W. C. Guild realized \$6,753 out of "tag day" in Toronto Saturday.

Brantford will vote on a bylaw to rowing for a new College Institute today.

Mr. Benson Sterling, a young man living near Enderby, got caught on a circular saw while cutting wood, and was cut to pieces.

Charles Mason, of Woodstock, was acquitted Saturday on a charge of stealing from the home of James Cottle, near Princeton.

Th Brantford Old Boys' Reunion will be held in 1910, not 1909, as first intended. Conditions will be more favorable then, it is thought.

Miss Nellie Mae Bartindale, of Banner, was married on Wednesday last to Benjamin Crawford, a well-known cheesemaker, of Oxford County.

Several boys were given a severe lecture by P. M. Ball, of Woodstock, Saturday, for riotous conduct election night. They were allowed to go on suspended sentence.

A three-squad cavalry regiment will be organized in Ontario, with headquarters at Woodstock, and will be known as the Twenty-Fourth Cavalry Regiment. Lieut.-Col. W. M. Davis, of Berlin, will command, with Capt. A. Lapierre, Paris, as adjutant.

The charge against J. W. McLaren, of Chatham, for selling liquor on Sunday, was dismissed, and the accused honorably acquitted.

The whisky-informers did not tell a straight story, and the drug clerk swore positively that no liquor was sold.

Two horses were burned and Engineer Marks, of Stratford, had his arm burnt and R. C. Hodgins, of Bolton, was badly burned by the explosion of a lantern in a freight car near St. Petersburg on Saturday. Hodgins was travelling with the horses when the lantern exploded, setting fire to the car. He escaped, although he was badly burned. The car and horses were destroyed. Engineer Marks was thrown from his cab by the sudden application of the airbrakes, breaking his arm.

AUSTRIA'S NEW CABINET.

Vienna, Nov. 14.—Baron Richard von Bismarck, minister of the interior, in accordance with instructions from the Emperor, has formed a new cabinet, himself taking the office of premier.

The Austrian cabinet resigned on Nov. 7 on account of dissensions between the German and Czech ministers, following the attitude of Austria in the Prague and other Bohemian towns.

In the new cabinet Baron von Hoerdtle had been appointed minister of interior, and Herr F. von Georgi, minister for national defence. The other ministerial offices have been entrusted to the present departmental chiefs.

Killed by Blood Poisoning.

Used an old razor for paring his corns. Foolish, because a 25c bottle of Putnam's Corn Extractor will cure all the corns in the family for a year. Safe, because purely vegetable. Use only Putnam's.

The ancient schoolmaster, Jacob Trebonius, was accustomed, when he entered his school, to take off his hat to the boys, alleging as his reason for so doing that he did not know what learned doctors and great men he might be training; and it proved that Martin Luther was amongst his scholars.

TO CURE A COLD IN ONE DAY

Take LAXATIVE BROMO Quinine Tablets. Druggists refund money if it fails to cure. E. W. GROVES' signature is on each box. 25c.

Venezuela has thirteen railroads, the longest 111 miles long, and no other as much as 50. They are for the most part lines which climb the hills from the sea toward the interior, and have steep gradients. On one line for 24 miles there is a grade of 49 feet a mile, worked by a cogwheel system, and there are other grades of 23 feet, 18 feet and 15 feet. Few of the lines connect with others, and there are a number of different gauges.

BOILS, CARBUNCLES, ABSCESSES, ULCERS.

Druggists refund money if Dr. POB-TER'S ANTISEPTIC HEALING OIL fails to cure any case, no matter of how long standing. The only Household Surgical Dressing, 25c.

WEATHER
PROBS:
Milder.

Smallman & Ingram
Limited

MONDAY,
NOV. 16

Tomorrow--Ladies' Tailored Suit Sale

\$20.00 to \$25.00 Suits for \$15.00
\$32.00 to \$38.00 Suits for \$21.00

We have in this lot Suits for 52 ladies, but just one for each, as there are just 52 to be sold at these prices. Some you will notice show a saving of \$17.00 on a single suit.

This is the opportunity of the season, if you have put off buying. Possibly you have admired one of these very suits but did not care to pay \$38.00 for a ready-to-wear, but never dreaming you would have the opportunity of buying it at \$17.00 less, so soon.

You may recognize some by the few descriptions given below, but be on hand at 8:00 tomorrow for your pick. You won't be disappointed. Some are displayed in Richmond street window today.

Twenty-one Ladies' Tailored Black Suits, \$22.00 to \$25.00, for, each \$15.00

Twenty-four Ladies' Tailored Colored Suits, \$20.00 to \$25.00, for, each \$15.00

These are in Broadcloth, Venetian, Fancy Stripes and plain colors, in brown, green, navy, wine. All broken lines. Only one of each in most cases. Some great bargains in this collection, at, a suit \$15.00

Seven only Ladies' Colored Broadcloth and Fancy Stripe Suits, beautiful styles. Were \$32.00 to \$38.00. Your choice tomorrow, for, each \$21.00

We Will Give Just Three Descriptions Here:

Ladies' \$25.00 Tailored Suits for \$15.00

One only grey and black stripe, and one only dark red invisible stripe Worsteds. Three-quarter length coat; satin lined; velvet collar; trimmed with braid and strapings of material. Gored skirt strapped. \$25.00 suits for \$15.00

Three only grey and green stripe Broadcloth Suits. Coat trimmed with buttons and strapings of cloth; mercerized lining; gored skirt trimmed with strapings; excellent styles and values. \$25.00 Suits for \$15.00

Ladies' \$36.50 Tailored Suits for \$21.00

Just a description of one of these high-class Suits, a Green Broadcloth Suit, in handsome stripe effect. Three-quarter coat lined with satin braid, and satin trimmed; gored skirt trimmed with strapings. Only two of these \$36.50 suits for, each \$21.00

We have dozens of other styles, all equally good, new and fashionable man-tailored suits, and the prices at this season should bring more ladies tomorrow than we have suits for. Therefore we would advise coming as soon after 8:00 as possible to make sure of getting your size in the style you like best. See Richmond street window.

SUIT DEPARTMENT, THIRD FLOOR—TAKE ELEVATOR.

Store closes
6 p.m. daily.
Saturday
included.

Smallman & Ingram
Limited

Dundas and
Richmond
Streets.

Chamberlain's Cough Remedy

WILL CURE

Your Cold. Try It

The uniform success that has attended the use of this remedy in the cure of bad colds has made it one of the most popular medicines in use. It can always be depended upon to effect a quick cure and is pleasant to take.

It contains no opium or other narcotic, and may be given as confidently to a child as to an adult. Price 25 cents. Large size 50 cents.

UNCLE SAM WANTS TO KNOW

What Japan Proposes To Do as to Manchurian Trade.

Washington, Nov. 14.—Exchanges have been in progress between the American and the Japanese Governments for some months looking to a more definite statement touching the latter's attitude towards Manchuria than now exists. To other nations having considerable interests in Manchuria, Japan has made clear her position in the Asiatic country with much more definiteness than she has to the United States. Officials are careful to state that no treaty between the two countries along these lines is contemplated; simply a clearer understanding with Japan is desired as to what her intentions in Manchuria are. Japan assented to the American propositions made years ago by Secretary Hay regarding the territorial integrity and administrative entity of China, and has indicated her intention of withdrawing all her troops in Manchuria whose presence dates back to the Russian-Japanese war. Baron Takahira, the Japanese ambassador, is conferring with Secretary Root on the subject and today was twice at the state department presumably in connection with the matter.

American businessmen have complained grievously that their trade with Manchuria has not revived since the far to the extent it should have, and this it is believed is a share of the situation which has animated the state department in taking up the

question with the Japanese Government. It is alleged that while nominally the country is open to the trade of all nations, the Japanese have their own special restrictions over business operations that practically only merchants from that country can successfully and profitably carry on trade in Manchuria. The Japanese declare that the country is open and free to all nations, and that trade is unrestricted. That conditions are far from satisfactory to the United States is evident from the action of Secretary Root.

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(BEAVER BRAND)

Is the Modern
KINDLING

No blowing away at a smokey wood kindled fire—just light the paper and place on a little charcoal. It kindles instantly.

Your grocer will sell you a Large Sack for Ten Cents or we will deliver it to your home.

25 BUSHELS FOR \$3.50

The Standard Chemical Co. of Toronto, Limited
Corr. Bathurst and Burwell
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Scott's Emulsion

is pure cod liver oil combined with hypophosphites of lime and soda. It forms fat, gives strength, enriches the blood, invigorates the nerves, and repairs tissues.

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