FROM HORSE CAR TO THE TROLLEY

Story of the Wonderful Development in Electric Traction During the Past Twenty Years.

PASSING OF STEAM TRAC

Gradual Elimination of Di Through the Development the Electric Locomotive— Chicago to New York in Ten Hours.

During the summer of 1887, the appeared in the New York Sun the following facetious news item:

"They tried an electric car on Fourth avenue yesterday. It created an amount of surprise and consternation from Third St. to One Hundred and Seventeenth St. that was something like that caused by the first steamboat on the Hudson. Small boys yelled "dynamite!" and "rats!" and made similar appreciative remarks until they were hoarse. Newly-appointed policemen debated arresting it, but went no further. The car horses which were met on the other track kicked without exception, as was

First Electric Railway of the World, Berlin Exposition, 1879.

natural, over an invention which threatens to relegate them to a sausage factory."

That was less than twenty years ago. Today the New York Central Railroad Company is expending $50,000,000 in the electrification of the first thirty-five miles of its system, and the car horses were long ago relegated to the boneyard, if not to the "sausage factory."

"They" have done marvelous things since the increasing knowledge of electricity opened up a new world of achievement, and we have scarcely crossed the threshold. In 1880 the electric car was a dream; in 1890, an experiment; in 1900, a great and wonderful fact which is revolutionizing passenger transportation and will enable human beings to move from place to place twice as fast as they do at present.

Born in Old Vermont.

When in 1834 Thomas Davenport, of Brandon, Vt., ran a toy motor mounted on wheels on a small circular railway, the modern electric railroad with its possible speed of over one hundred miles an hour was born.

In 1838 Robert Davidson, of Aberdeen, Scotland, built an electric locomotive which actually reached a speed of four miles an hour on the Edinburgh-Glasgow railway. Nine years later Professor Moses G. Farmer operated an experimental car which carried two passengers at Dover, New Hampshire.

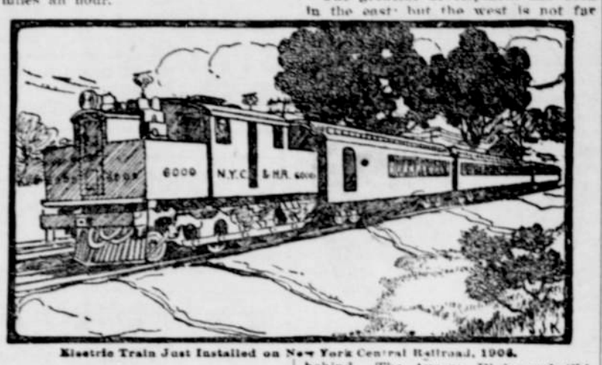
Then the United States congress became interested. By special grants Professor Page of Smithsonian institute was aided in the construction of several forms of motors. One of them was used as a locomotive and, driven by a battery of one hundred Grove elements, was tried April 29, 1851, on a railroad running from Washington to Bladensburg. A speed of nineteen miles an hour was developed, so great that it destroyed the batteries.

Numerous other experiments followed, all commercial failures because the motors were crude and the source of power a primary battery. The development of the wonderful modern dynamo was necessary before electric railroading could become a commercial success. The first great step was in 1800, when an Italian named Pacinotti invented a continuous current dynamo. Three years later the first practical commercial machine for continuous current operation was made by Gramme.

Still the modern electric car was impossible. The "reversibility of function" had yet to be discovered, involving electrical transmission of energy through two machines, one driven by power and generating electricity; the other reversing the operation, receiving electricity and developing mechanical power.

Like many other important discoveries, this is said to have been the result of accident. A workman coupled a machine to a live circuit by mistake and was greatly astonished to see it begin to rotate. This reversibility of function was publicly demonstrated for the first time at the Vienna exposition in 1873.

Not until 1879 was the first electric railway put in operation, taking the current from a dynamo, using a modern motor and carrying passengers. This novelty was in operation at the Berlin exposition and was a mile and two-thirds, in length. The train consisted of a small locomotive and three small cars, capable of carrying twenty people. It reached a speed of eight miles an hour.



Electric Train Just Installed on New York Central Railroad, 1906.

About this time Stephen D. Field and Thomas Edison in the United States began experimenting. In 1880 Edison was operating at Menlo Park an electric locomotive which pulled two cars.

The First Electric Railroad.

The first regular electric line to be established was at Lichterfelde, Germany, near Berlin. It was only a mile and a half in length and opened for traffic in May, 1881. The trains carried twenty-six passengers, at a maximum speed of thirty miles an hour.

The first electric car to be operated regularly in the United States was installed by Deft on the Hamden branch of the Baltimore Union Passenger Railway in August, 1886. That was barely twenty years ago. So great was the skepticism of the public and railway men generally that the contract under which the road was built withheld payment one year so that it might be determined whether the cars would run. "No one but a knave or a fool would undertake such a thing," said a well known scientist at the time. Scientists sometimes have trouble keeping up with the procession. About the same time small cars were operated by Van Derpoele at South Bend, Ind., followed by other small roads in

Edison Electric Locomotive Operated Experimentally at Menlo Park, 1880.

Windsor, Canada; Appleton, Wis.; Port Huron, Mich.; Scranton, Pa., and Montgomery, Ala. In the autumn of 1884 Frank L. Sprague, whose name is inseparably connected with electric traction, began to attract attention with his motors.

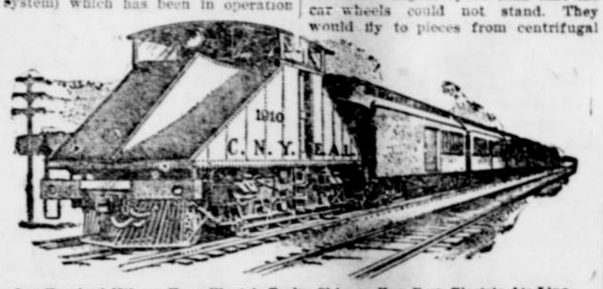
Twenty Years of Achievement.

At the beginning of 1887 there were in the whole world less than sixty miles of electric railroad track, and only about one hundred motors and motor cars. In 1905 there were nearly thirty thousand miles of electric track in the United States alone.

This change was not accomplished without opposition, discouragement and financial difficulties. Mr. Sprague himself, who was so potent a factor in working this change, has told the story of his first important contract. In the spring of 1887, the Union Passenger Railway company of Richmond, Va., engaged him to build an electric railway. The first car was run out one night while the skeptical people slept, to make sure it could climb the hills. It started out in a blaze of glory and ignominiously was towed back again by four big mules. But Sprague persisted until on Feb. 2, 1888, in a drizzling rain, the road opened for business.

From that time forward the future of electric railroading was assured and events moved rapidly. City after city adopted the new motive power; horse cars became things of the past; interurban roads began to gridiron the country everywhere, and in each instance a commercial success was scored. Electric interurban lines have been money makers from the start.

The greatest development has been in the east; but the west is not far behind. The Aurora, Elgin and Chicago Electric railway (the third-rail system) which has been in operation



One Hundred Mile an Hour Electric Train, Chicago-New York Electric Air Line.

several years, is famous. From one center power station over two hundred miles of road are operated, or will be as soon as the line to Belvidere is completed. Electricity at wholesale is sold to cities and villages along the route for lighting purposes; electricity for power is sold to farmers. Trains of elegant cars run into Chicago at a speed which would have seemed impossible a few years ago. Passengers wave good bye to steam trains on a paralleling railroad, which they pass easily. A parlor and dining car is one of the luxuries which the suburbanites enjoy going to and from the city, and the railroad seems a veritable gold mine for its owners.

The horse car has long since disappeared. Will the iron horse, the great steam locomotive, be supplanted also? This question occurs to all who can see the significance of passing events. Probably not for many years to come, as far as heavy freight traffic is concerned, because steam is especially applicable to the hauling of freight. But the action of the New York Central in electrifying thirty-five miles of its road leading out of New York, and the popular agitation for similar improvement in Chicago and elsewhere, would seem to point to a time not far distant when electric railroads will connect distant cities and greatly shorten the hours of travel.

In fact such a railway already is being built between Chicago and New York by the Chicago-New York Electric Air Line Railroad company, of Chicago. This company, headed by a group of practical railroad men, proposes to run limited trains, making not more than three stops, through to New York or Chicago, in ten hours. The thought fairly takes one's breath away at first, but the project considered soberly seems practical enough, and certainly is "a consummation devoutly to be wished." The work of grading began Sept. 1 near LaPorte, Ind.

As the new road will be an air line, with few curves, the route surveyed is 100 miles shorter than the Pennsylvania "Short Line," and 230 miles shorter than the Lake Shore and New York Central, each of which runs trains covering the distance in eighteen hours. Taking into consideration the shorter route of the Air Line, this is equivalent to a fourteen-hour service. With low grades, a straight track and no grade crossings, the seventy-five miles an hour average necessary to a ten-hour service ought easily to be maintained. Even on the first class steam roads of today ninety miles an hour is not uncommon for short distances.

The Scientific American of Feb. 18, 1905, speaking editorially of the New York Central experiment, says, "The success of this installation, of which there can be no doubt whatever, marks the first step in the gradual substitution of the electric for the steam locomotive in the operation of long distance express trains." The Chicago New York project may be regarded the second step.

Mr. Sprague himself says that speed is "a matter of finance." "What then will determine the future?" he asks. "Chiefly the financial factor, as it must the future of any other great industrial problem. When savings in operation and the increased return for traffic will more than pay a fair dividend on money invested for electrical equipment, will trunk lines be operated by electricity."

Professor Charles P. Steinmetz, one of the greatest authorities on electricity, is quoted as saying, "There is no limit to the speed that may be developed in electric traction—that is, there is no limit up to 150 or 200 miles an hour. Higher speed than that the car wheels could not stand. They would fly to pieces from centrifugal force. Not only can a speed of 120 miles an hour be maintained on a train equipped with electricity, but in

First Regular Electric Railway in United States, Baltimore, 1886.

my opinion it is an entirely feasible scheme from the commercial point of view."

At any rate, the world seems on the eve of great things, and no scientist dares say today as was said twenty years ago, "a man is a knave or a fool." The attitude of the American public is one of faith and expectancy, best expressed by a recent remark of an old lady in her last sickness:

"I don't want to die," she said, "I want to see what they are going to do."

The PILLAR OF LIGHT

By LOUIS TRACY,

Author of "The Wings of the Morning"

Pyne swung himself to the steamer's deck before the gangway was made fast, thereby provoking a loud outcry from the deserted children.

Grasping his uncle's hand, he said:

"Wait until you read Brand's letter. No one else knows."

So Mr. Traill, with fine self control, greeted Mrs. Vansittart affectionately and handed her over to a stewardess, who took her to a cabin specially prepared for her. Her low spoken words were not quite what he expected.

"Don't kiss me," she murmured, "and please don't look at me. In my present condition I cannot bear it."

Relatives of the shipwrecked passengers and crew, many of whom were waiting in Penzance, were not allowed on board. This arrangement was made by Mr. Traill after consulting a local committee organized to help the unfortunates who needed help so greatly. The unanimous opinion was expressed that a few lady members of the committee, supplied with an abundance of clothing, etc., would afford prompt relief to the sufferers, while the painful scenes which must follow the meeting of survivors with their friends would cause confusion and delay on the vessel.

Pyne, watching all things, saw that Mrs. Vansittart did not meet his uncle with the eagerness of a woman restored to the arms of the man she was about to marry.

She was distraught, aloof in her manner, apparently interested only in his eager assurance that she would find an assortment of new garments in the cabin.

The millionaire himself was too flustered to draw nice distinctions between the few words she spoke and what he expected her to say. When she quitted him he walked toward the group of young people. They were laughingly exchanging news and banter as if all that had gone before were the events of a lively picnic. At last he met Enid.

Pyne introduced his uncle, and it was a trying experience for him to stand face to face with his daughter. In each quick flash of her delighted eyes, in every tone of her sweet voice, in every winsome smile and graceful gesture, he caught and vivified long dormant memories of his greatly loved wife of nineteen years ago.

Somehow he was glad Mrs. Vansittart had not lingered by his side. The discovery of Enid's identity involved considerations so complex and utterly unforeseen that he needed time and anxious thought to arrange his plans for the future.

The animated bustle on deck prevented anything in the nature of sustained conversation. Luckily Mr. Traill himself, whose open handed generosity had made matters easy for the reception committee, was in constant demand.

Mrs. Sheppard had sent a portmanteau for Constance and Enid, so they, too, soon scurried below with the others.

The lifeboat returned to the rock, where the four lighthouse men sent to relieve Brand were now helping the sailors to carry the injured men downstairs and assisting the sick to reach the entrance.

As soon as this second batch was transferred to the tug the vessel started for Penzance. The Trinity tender would land the others.

There was a scene of intense enthusiasm when the steamer reached the dock. The vociferous cheering of the townspeople smothered the deep agony of some who waited there, knowing all too well they would search in vain for their loved ones among these whom death had spared.

The two girls modestly escaped at the earliest moment from the shed used as a reception room. All the inhabitants knew them personally or by sight. They attracted such attention that they gladly relinquished to other hands any further charge of the shipwrecked people. So after a few words of farewell for the hour Stanhope piloted them to a waiting carriage and drove away with them.

Mrs. Vansittart did not emerge from her cabin until the deck was deserted. She found Mr. Traill looking for her. In a neat black dress and feather hat she was rehabilitated.

"Why didn't you show up earlier?" he asked in good humored surprise. "The breeze on deck was first rate. It brought the color into many a pale cheek. And the way in which the crowd let itself go was splendid. Look at these waiting thousands, quivering yet with excitement!"

"I am worn out," she said quietly. "Take me to your hotel. You have engaged rooms there, I suppose?"

"Of course."

"When do you purpose leaving Penzance?"

"Well—er—that is part of the explanation I promised you."

"We can talk matters over in the hotel. Where is your nephew?"

For the first time he marked her air of constraint.

"Believe me, Etta," he said hurriedly, "that what I have to tell you will come as a great surprise, but it should be a very pleasant one."

"Anything that gratifies you will be welcomed by me," she said simply. "You have not said where Charlie is."

"Hiding in that shed. He refused Mr. Stanhope's offer of a rigout on board. In his present disguise he passes as a stoker, and everybody wants to see the man who saved all of you."

"Have you a closed carriage here?"

"Yes."

"Let us go. Charlie can come with us."

Again he was conscious of a barrier between them, but he attributed her mood to the strain she had undergone.

In the shed they found Pyne. With him were the orphaned children; there was none to meet them. Kind offers were made to care for them until their relatives should be forthcoming, but the man to whom they clung would not listen to any such proposal.

"I guess they're happy with me," he said. "I will see them through their present trouble."

Childlike, they had eyes and ears only for the prevalent excitement. At last Elsie asked him:

"Where's mamma? You said she was sick. But the men haven't carried her off the ship, an' she wasn't in the boat."

"Don't you worry, Elsie," he said. "I'm going to take you to a big house where you will find everything fixed just right."

His uncle and Mrs. Vansittart approached. The lady's face was no longer hidden.

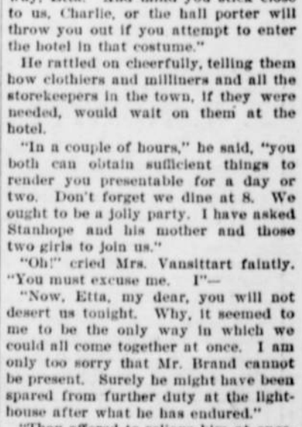
"What are you going to do with those children?" she inquired.

"There's none here to claim them," he said. "I can't let them leave me in that haphazard way."

"Let me help you. It is a woman's privilege."

She stooped toward the tiny mites.

"You dear little babes," she said softly. "I can take mother's place for a time."



"Don't be afraid."

They knew her quite well, of course, and she seemed to be so much kinder and nicer now in her smart clothes than she was in the crowded disorder of the bedroom.

Mamie looked at Elsie, and the self reliant Elsie said valiantly:

"Mamie an' me'll be glad if Mr. Pyne comes too."

Mr. Traill, who had never before seen tears in Mrs. Vansittart's eyes, found a ready excuse for her womanly sympathy.

"It seems to me," he said genially, "we are all of one mind. Come this way, Etta. And mind you stick close to us, Charlie, or the hall porter will throw you out if you attempt to enter the hotel in that costume."

He rattled on cheerfully, telling them how clothiers and milliners and all the storekeepers in the town, if they were needed, would wait on them at the hotel.

"In a couple of hours," he said, "you both can obtain sufficient things to render you presentable for a day or two. Don't forget we dine at 8. We ought to be a jolly party. I have asked Stanhope and his mother and those two girls to join us."

"Oh!" cried Mrs. Vansittart faintly. "You must excuse me. I"—

"Now, Etta, my dear, you will not desert us tonight. Why, it seemed to me to be the only way in which we could all come together at once. I am only too sorry that Mr. Brand cannot be present. Surely he might have been spared from further duty at the lighthouse after what he has endured."

"They offered to relieve him at once, but he declined," said Pyne.

He looked out of the window of the carriage in which they were driving to the hotel. Constance had told him of the dinner arrangement, but he wished to ascertain if the definite absence of the lighthouse keeper would tend to reassure Mrs. Vansittart.

He was not mistaken. She did not reply at once. When she spoke, it was with a sigh of relief.

"I will not be very entertaining, I fear, but the young people will have plenty to tell you."

"For goodness sake, Etta, don't class yourself among the old fogies!" cried Mr. Traill. "Look at me—fifty-five and lively as a grasshopper."

"Please, is Mamie an' me 'vited, too?" whispered Elsie to Pyne.

"You two chicks will be curled up among the feathers at 8 o'clock," he told her. "Don't you go and worry 'bout any dinner parties. The sooner

(Continued on page 8)