

1906-11

"HEAVEN SO SPEED ME IN MY TIME TO COME!"
—SHAKESPEARE.

A MODEL STREET RAILWAY SYSTEM

...A HISTORY OF THE...

CHICAGO CITY RAILWAY COMPANY

FROM ITS ORIGIN TO THE PRESENT TIME



ITS MAIN AND BRANCH LINES AND CONNECTIONS—CONSTRUCTION AND EQUIPMENT—
OFFICERS AND PROMOTERS.



ILLUSTRATED.



CHICAGO.
1900.

—PERSONNEL—

...OF THE...

CHICAGO CITY RAILWAY COMPANY.



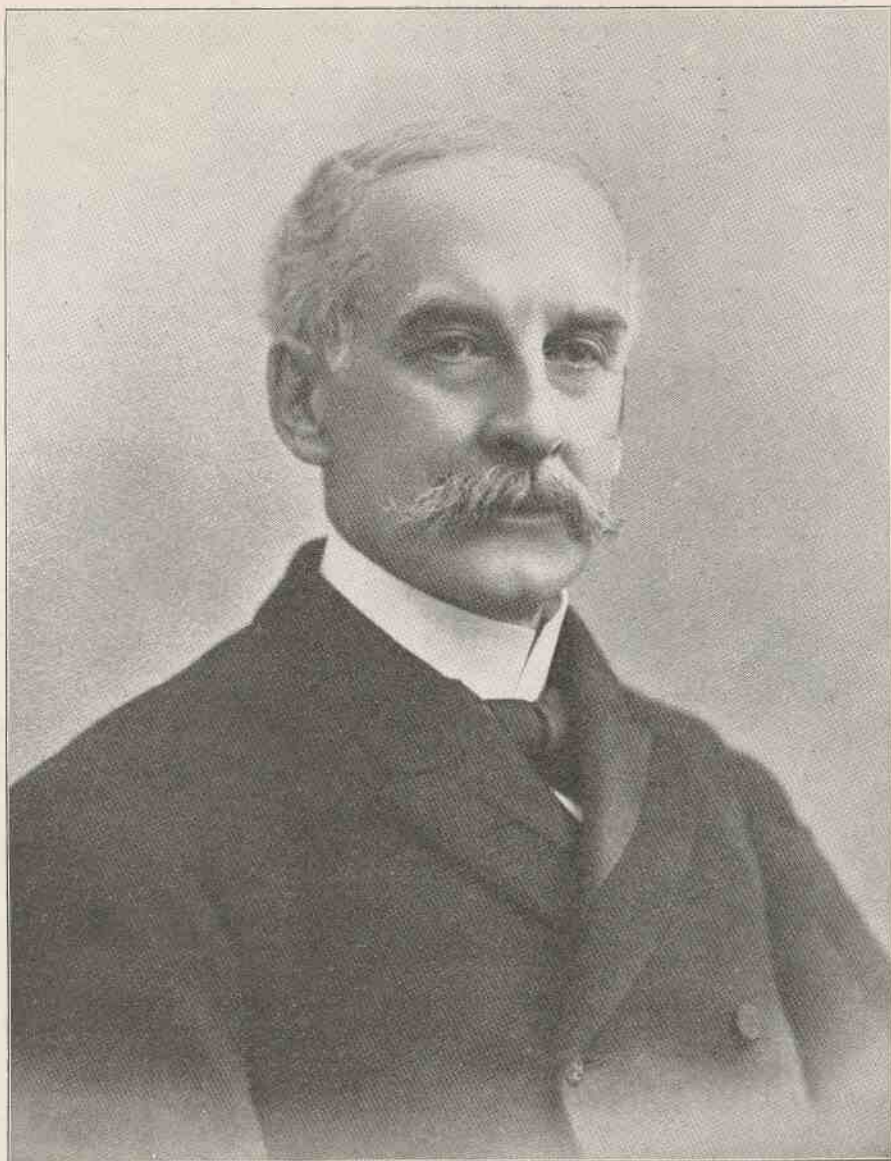
DIRECTORS :

SAMUEL W. ALLERTON,
ARTHUR ORR,
JOSEPH LEITER,
D. G. HAMILTON,
GEORGE T. SMITH,
WILLIAM B. WALKER,
GEORGE H. WHEELER.



OFFICERS :

President, D. G. HAMILTON ;
First Vice-President, JOSEPH LEITER ;
Second Vice-President, WILLIAM B. WALKER ;
Treasurer, T. C. PENNINGTON ;
Secretary, F. R. GREENE ;
Superintendent, GEORGE O. NAGLE.



D. G. Hamilton
President
CHICAGO CITY RAILWAY COMPANY.

HISTORY.

When Chicago was organized as a town, in 1833, it was about as remote from civilization as any town on the continent. There were possibly 150 persons in the settlement, this being the number required to effect a township organization. They lived in huts and houses of the rudest description. A row of these houses was strung along the south bank of the river, where South Water street now is; and on the west side of the south branch of the river, near its junction with the north branch, a tavern had been erected; on the north side there was but a single building, known as the Block House. Fort Dearborn stood on the south side of the river, near its mouth. The fort and the old light-house near it were standing as late as 1857. The settlers had clustered closely around the fort because they found its protection against the Indians necessary; but in the fall of 1833 the chiefs of the Sac and Fox tribes, in council assembled, ceded their lands to the Government and made way for the intruding tide of emigration. It was the final act in the drama of the Black Hawk war. Long-coveted peace returned, and gave the pioneers an opportunity to enjoy, without interruption, the fruits of their labor. They set up a local government, spread out from the fort in all directions, and as emigrants came in, began to increase in numbers rapidly.

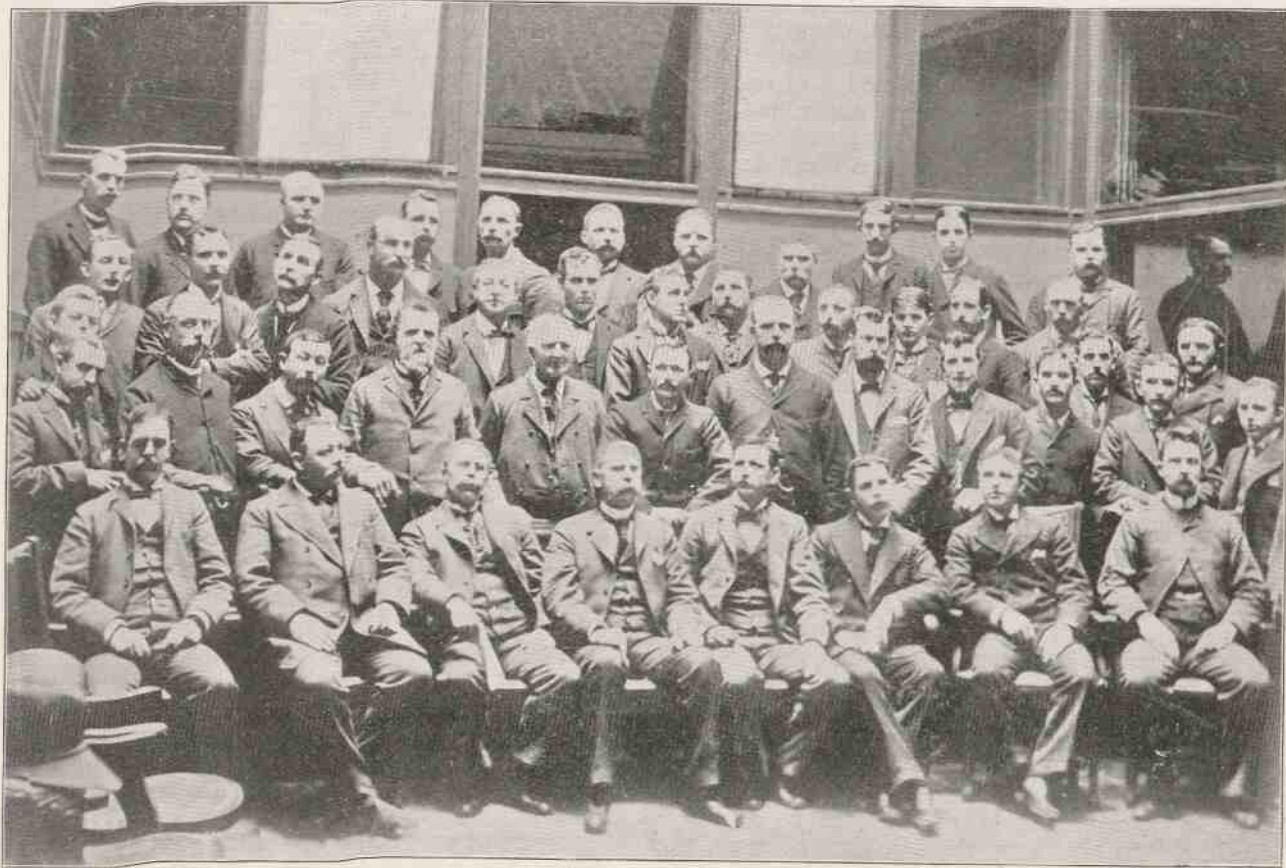
An idea of the general appearance of the country at that time is essential to a clear conception of the wonderful growth of the city during the ensuing twenty-five years, up to the period of the first street railway, where our story begins. The new Chicago was approached from the east by way of Detroit and Michigan City. Steamers plied regularly between Buffalo and Detroit. Thence to Chicago the route was by what was known as the Indian Trail, which traversed the then wilderness of southern Michigan in a southwesterly course from Detroit through Ypsilanti to White Pigeon Prairie, where it approached the northern boundary line of the State of Indiana and passed through South Bend and La Porte to Michigan City. Thence the trail led by way of the lake shore, along what is now Cottage Grove avenue, to Chicago. This was known to early Chicagoans as the East Trail. What is now Archer avenue was known as Hubbard's or the Danville

Trail. More recently Milwaukee avenue was known as the Northwestern Plank Road and Ogden avenue as the Southwestern Plank Road. All were convenient trails to their several points of the compass.

The approach to Chicago was usually on horseback. The rivers were crossed by fording or, where that was impracticable, on floats, or rude rafts. Indians were to be seen frequently, but there were no animals in sight and but few trees. The scene has been described by a traveler of that day as a beautiful panorama of nature. "On my left lay the prairie, bounded only by the distant horizon like a vast expanse of ocean; on my right, in the summer stillness, lay Lake Michigan. I had never seen anything more beautiful or captivating in nature. There was an entire absence of animal life, nothing visible in the way of human habitation or to indicate the presence of man, and yet it was a scene full of life; for there, spread out before me in every direction, as far as the eye could reach, were the germs of life in earth, air and water."

This word picture of boundless prairie, lake and sky is descriptive of about all that existed at that time of what is now the foremost inland city on this continent. Twenty-five years later a great change had been wrought. The wilderness had been transformed into the metropolis. In 1858 Chicago had become a recognized center of trade in certain lines, and it was evidently destined to be a great city. Far-seeing citizens believed that its growth had only begun. They thought the time had already come when the "mushroom town," as it was then called, might safely begin to put on metropolitan airs, and one of the first of these accomplishments of greatness was reckoned the street railway.

Bear in mind that the growth of the city had been so rapid that permanent improvement could not keep pace with it. The streets and buildings presented the appearance of having been laid out and constructed over night. The earliest settlers came in by covered wagons and usually lived on their "prairie schooners" until a better shelter could be provided for them. So rapid was this influx of newcomers that the population increased from 150 in 1833 to 1,800 in 1834,



CHICAGO CITY RAILWAY CO. OFFICIALS.

4,000 in 1840, 28,000 in 1850 and 95,000 in 1858. The first railroad was the Galena Union, which was completed from Chicago to Elgin early in 1850. The Michigan Southern was completed to Chicago in February, 1852, and was the first eastern trunk line to reach the city. Before that time a large and thriving business had been done in lake traffic between Chicago and Buffalo, and passengers and freight had been readily transported by this route, but the period of greatest activity and growth began with the introduction of railroads. In the first six years of eastern railroad communication, from 1852 to 1858, the population increased from 38,000 to 95,000; and since that time the growth of Chicago, and in fact of the entire West, has kept constant pace with its railway enterprise.

At the opening of the year 1858 Chicago was the largest city in the Northwest and the acknowledged metropolis of an area of country larger than that of the original thirteen States. The panic of 1857 had just passed, leaving financial wreck and ruin in its path and necessitating a general commercial reconstruction. The street grades had been ordered raised by city ordinance, and this had provoked a storm of protest, but the work was in progress and caused no end of confusion. Streets and sidewalks that were in process of being raised from three to ten feet did not present a very inviting prospect for street-railway enterprise. There were no pavements previous to 1857—at least none worthy of the name, the streets being merely thrown up like country roads, with open ditches to carry off the water. The low and marshy condition of the soil did not aid in this project. On the contrary, some of the most prominent streets were almost impassable after a heavy rain. But the spirit of improvement was abroad. There was a sentiment in the air that the citizens of Chicago deserved better things and were determined to secure them.

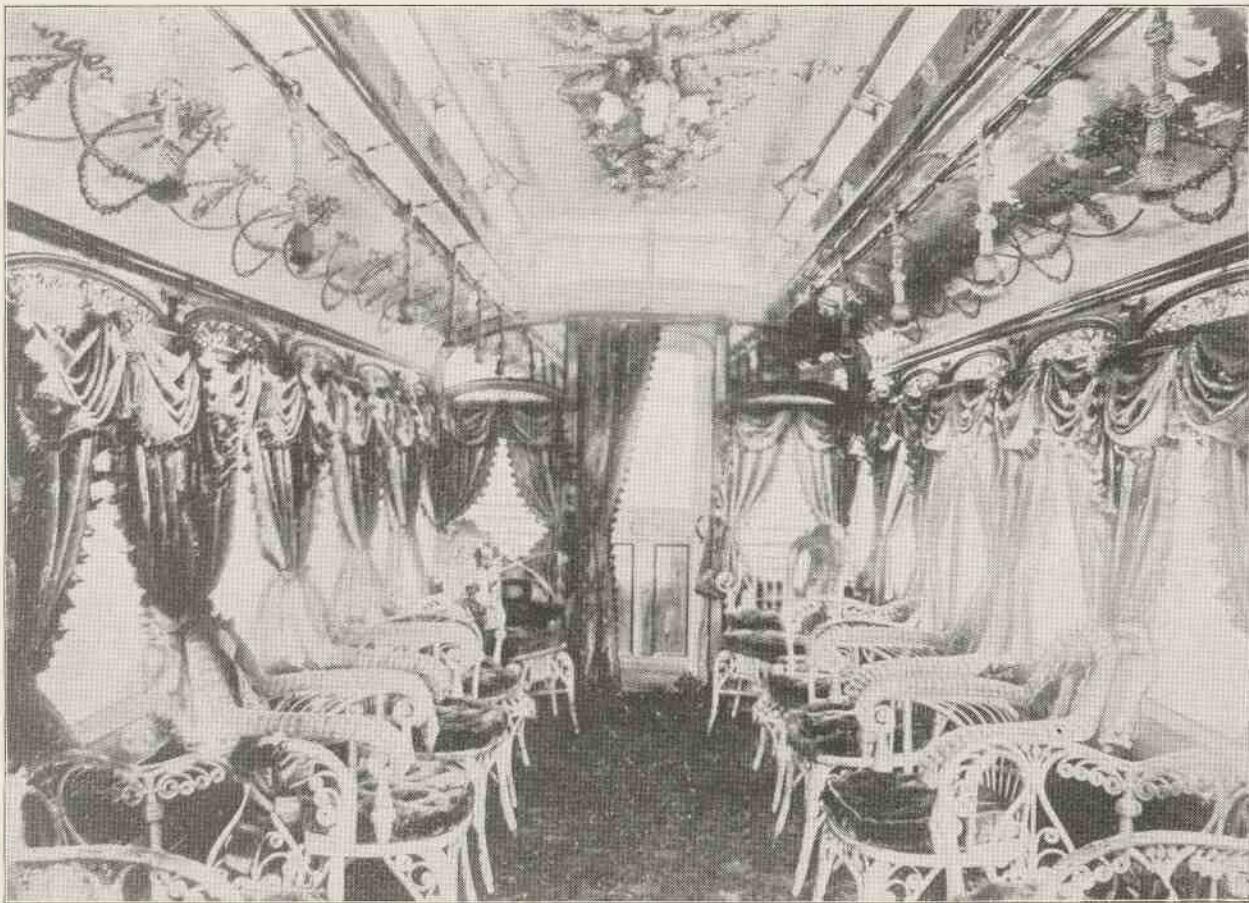
The period of which we write was one of great activity in railroad building. Just prior to 1858, and within the short time of six years, ten railroads tributary to Chicago had been projected and built. Beginning with the Chicago and Galena Union and the Illinois and Wisconsin, which afterwards became merged into the Northwestern system, there followed, in chronological order, the Chicago, Burlington and Quincy, the Michigan Southern, the Michigan Central, the Chicago, Rock Island and Pacific, the Illinois Central, the Chicago and Alton, the Chicago and Milwaukee, afterward made a portion of the Milwaukee and St. Paul system, and the Pittsburg, Fort Wayne and Chicago. Thus even at this comparatively early period Chicago was a great railroad center. The roads above mentioned were all

destined to be, as they now are, great trunk lines, radiating in every direction from this natural trade center.

Roads entering the city from the south, north and west found it impracticable to secure a common terminal; the Illinois Central entered by the lake front; the Rock Island bisected the South Side, as it does now, and the northwestern roads had their terminal on the West Side, near the forks of the river. Passengers were transferred from one station to another in omnibuses, and the 'bus lines were the first attempts at passenger traffic on the streets of the new city. They soon became established on the north and south thoroughfares very similar to the 'bus lines of eastern cities, and apparently they were all-sufficient for the needs of that day. In 1856 eighteen omnibuses were in operation on the South Side, making four hundred and eight trips daily. To these other lines were added, until in 1859, when the first street railway was constructed, the use of these vehicles had become quite general, and they were a very formidable competitor for public favor as against the "new-fangled" and untried horse-car system. Many amusing stories are told of the fierce competition between 'bus lines and the first street railways. The rivalry continued for several years, but ceased in 1865, when the omnibus owners were compelled to concede the superiority of the street-car system and withdrew practically all of their vehicles from the streets.

In this connection it may be of interest to note that the transfer business in Chicago has been entirely in the hands of one man, Frank Parmalee, for more than forty-six years. Mr. Parmalee started the first regular omnibus line in Chicago, on May 9, 1853. The original outfit consisted of six omnibuses and thirty horses, and required the services of about a dozen men. The control of the transfer business of Chicago was secured by buying out the omnibuses of all the leading hotels. At that early day the service was in great demand, on account of the primitive condition of the roads and the distance between depots. A line of covered Concord wagons, specially constructed for service on the sandy and miry roads of that day, were used in transferring passengers and baggage from the Michigan Central depot, which was located at first on the lake shore at Sixteenth street, to the depots of western roads on the west side of the river. It was an important service, and it naturally gravitated into the control of one man.

On March 4, 1856, the Chicago City Council passed the first ordinance granting street-railway privileges. This ordinance gave to Roswell B. Mason and Charles B. Phillips the right to lay tracks from



INTERIOR OF CAR, CHICAGO CITY RAILWAY CO.

the corner of State and Randolph streets, on State street to the southern city limits, and from the corner of Dearborn and Kinzie streets and the corner of Kinzie and Franklin streets to the northern city limits, with various connecting stations, the principal one being the line extending from the corner of State street and Archer avenue, on the latter thoroughfare to the southern city limits. These lines, however, were never built under this ordinance. In the next year came the panic of 1857 and the street-railway project, so well begun, was temporarily lost sight of. The original promoters dropped out, and on August 16, 1858, the Common Council passed another ordinance, granting to Henry Fuller, Franklin Parmelee and Liberty Bigelow the privilege of laying tracks on State street and Cottage Grove avenue, on Archer avenue and on Madison street, to the city limits. It was under this ordinance that the first street railway in Chicago, the nucleus of the lines of the Chicago City Railway Company, was constructed.

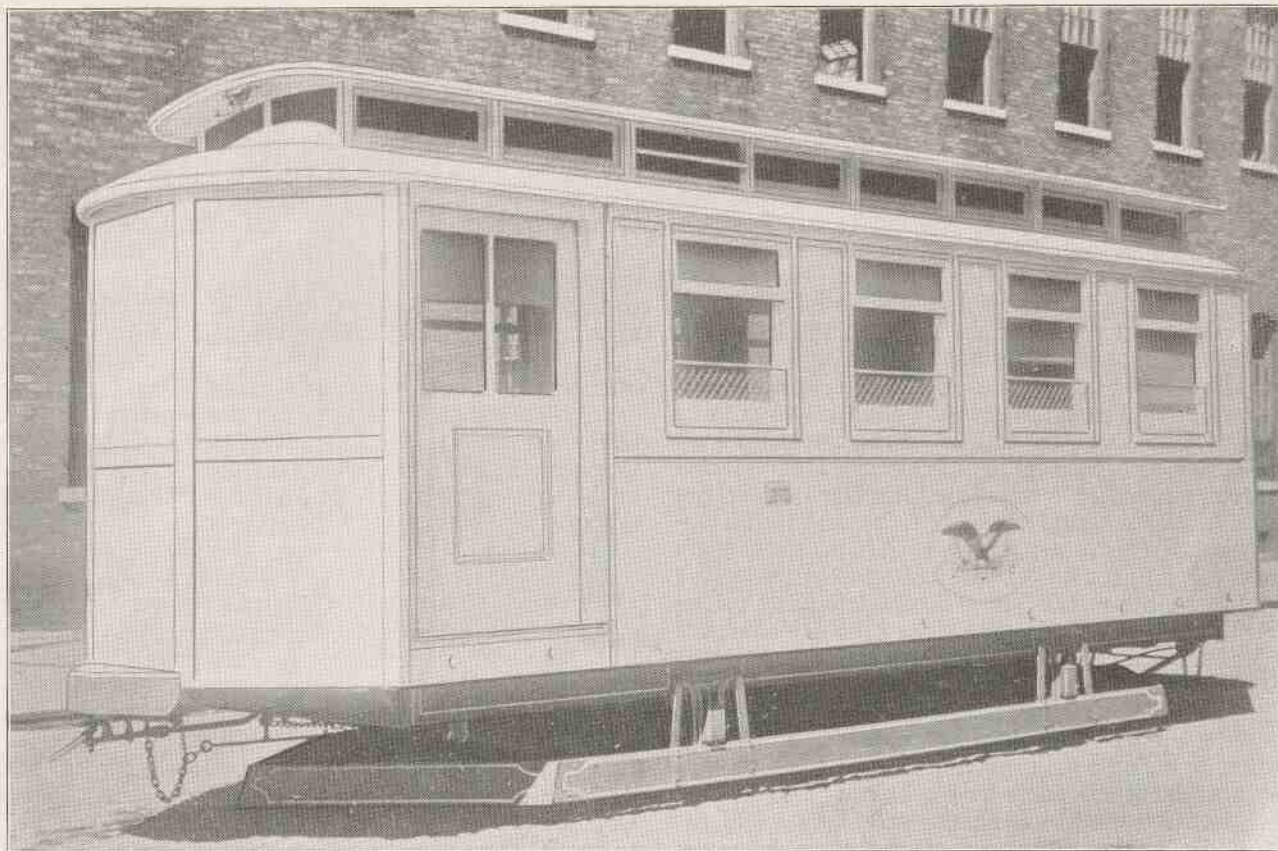
The State street line was opened to Twelfth street on April 25, 1859. It was a great day for early Chicago; yet even this first mile of street railway extension had not been accomplished without the most active and energetic work, against serious opposition. State street was even then the busiest thoroughfare in the city and was being changed from a residence to a business street, and many of its property owners were bitterly opposed to the innovation of a horse-car line. These malcontents fought the project, and in many instances their consent had to be bought. So harmony was at last restored and the line opened for business. State street about this time was paved with cobblestones to Twelfth, and beyond was a plank road to the Cottage Grove suburb, since better known as Camp Douglas. The ordinance had expressly specified that "nothing herein contained shall authorize the construction of more than a single track with the necessary turnouts, which shall only be at street crossings upon State street between Madison and Twelfth streets." Accordingly, the entire line, from Randolph street south, as first laid, was a single track, with turnouts at street crossings.

The work of extension was pushed rapidly forward, and by June of that year the cars were running as far south as Twenty-second street at intervals of twelve minutes. During the summer the track was extended on Twenty-second street and Cottage Grove avenue to Thirty-first street, and in the fall of the same year (1859) cars were running every six minutes as far as Twenty-second street. It is recorded that the line was finished to Cottage Grove in time for the

State fair which was held that fall.

To the same company had been granted the right to lay tracks on Madison street, in the West Division. On May 23, 1859, another ordinance was passed by the City Council specifying additional streets on which tracks might be laid in the West and South Divisions—namely, Lake, Randolph and Van Buren streets and Milwaukee and Blue Island avenues. The Madison street line was opened to Halsted street on May 20, 1859, and to Robey street on August 8 of the same year. The Randolph street line was opened on July 15, 1859.

In the early '60s came the troubled times of civil war, when the very stability of the nation was threatened. An interesting incident is told in this connection by Andreas, in his History of Chicago. He says: "In 1861 the financial medium was first vitiated. The daily varying quotations of 'stump tail' made its possessors often glad to be rid of it on any terms. The City Railway Company was of necessity made the recipient of much of this poor paper. Up to this time the company had not issued 'punch tickets' for fares, and so long as silver change held out it had not thought of doing so. When, however, silver disappeared, and recourse was had to postage stamps as the readiest expedient, the Chicago City Railway Company may be said to have come to the rescue of the people. Their earliest issue of tickets, hastily flung from a job press and as hastily stamped, was hailed as a public boon. An uncanceled ten-ride ticket was good in the city or vicinity, and unquestioned for its face value of fifty cents. It would pass in almost any transaction; indeed, anywhere in preference to a greasy little envelope of postage stamps that were certain to be damaged, if they were not short in the count. It is even related that church contributions brought in no small store of them. Though redeemable only in rides, so much were they in demand as a circulating medium that they were counterfeited, and it is a tradition that known counterfeits have been unhesitatingly accepted in trade. This issue of what may be called 'the emergency tickets of 1861,' amounted to about \$150,000, and because of counterfeits they were, as soon as possible, called in for redemption in other tickets of more elaborate preparation. The second issue was readily divisible into denominations of twenty-five, fifteen and ten cents, to the greater convenience of the people; and until the postal currency of the United States came into circulation, in the summer of 1862, the issues of the Chicago City Railway were the most acceptable small change Chicago had or could furnish. Long after their use as currency had ceased Mr. Fuller, the treasurer, continued to receive these tickets by letter from



MAIL CAR, CHICAGO CITY RAILWAY CO.

distant points. Many have doubtless been retained as souvenirs of an eventful time."

On July 30, 1863, the Chicago City Railway Company sold the road and franchises held by them in the West Division to a new corporation, known as the Chicago West Division Railway Company, for \$200,000 cash. Their attention was then turned exclusively to the extension of their South Side lines. By 1865 the Archer avenue line, from State street to Bridgeport, was completed. In 1870 the company was operating over seventeen miles of track and was running cars at intervals of one minute on State street; on Cottage Grove avenue every four minutes, and on Archer avenue every eight minutes.

The lines of street railway existing at this time (1871) were not materially added to until 1875, when the Wabash avenue line was built and a line on Indiana avenue from Thirty-first to Thirty-ninth street; also one on Thirty-ninth from Cottage Grove avenue to State street. In 1877 cars were placed on Halsted street and run to the city limits. In 1882 the cable lines were completed and opened for traffic, as is fully detailed in a later paragraph. In 1881 the horse car line on State street had been extended from Thirty-ninth to Fifty-fifth street and the next year to Sixty-third street. In 1883 construction was completed on Halsted street, from the then city limits to Forty-seventh street, and the next year to Sixty-third street, and on Sixty-third street to Clark; also on Wentworth avenue from Thirty-third to Sixty-third street, on Archer avenue from the river to Brighton Park, on Hanover and Butler streets from Archer avenue to Thirty-first street, on Thirty-first street from the lake to Archer avenue, on Ashland avenue from Archer to the city limits, and on Stanton avenue from Thirty-fifth to Thirty-ninth street. In 1885 the company owned and operated eighty-seven miles of track, inclusive of the cable lines.

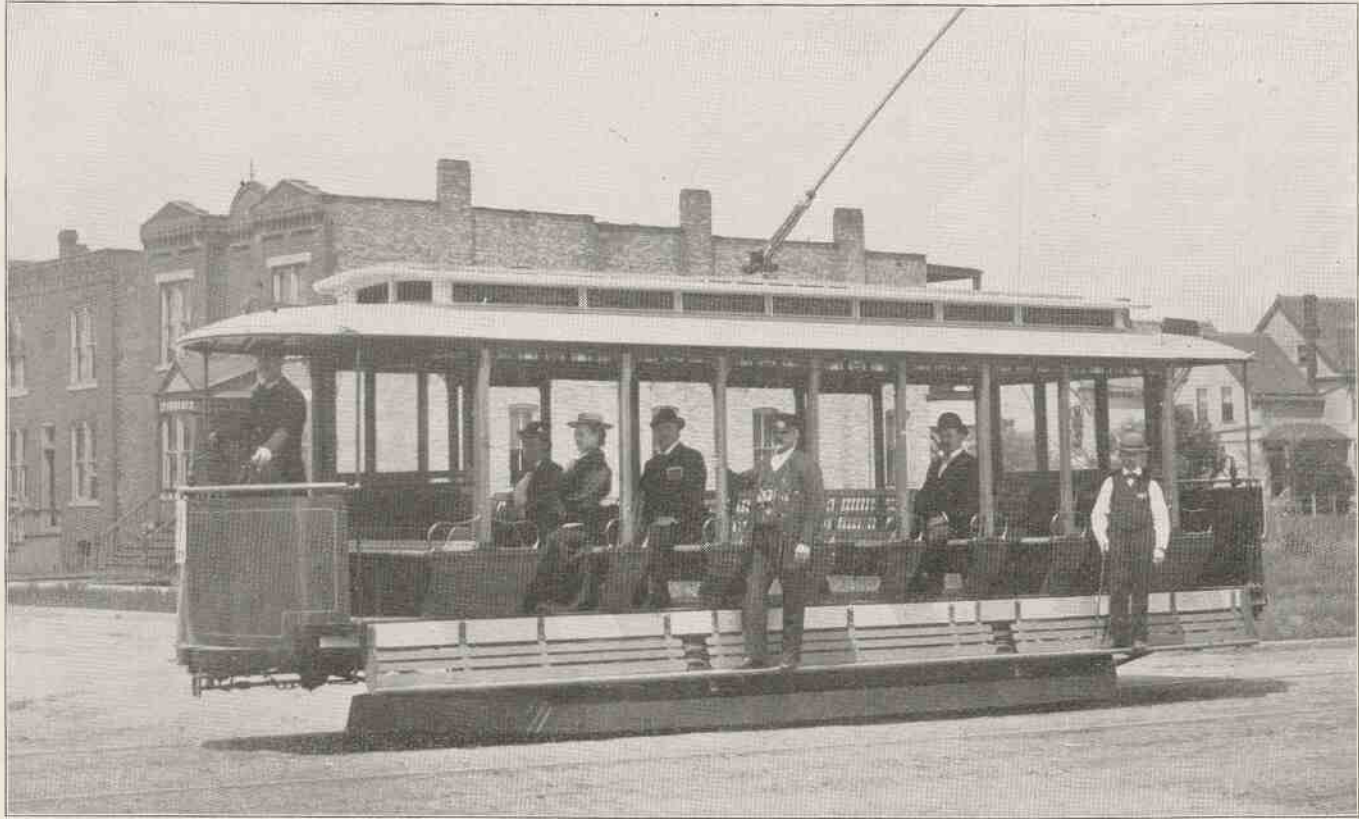
The first radical departure in street railway construction in Chicago was accomplished by the Chicago City Railway Company, when, in the latter part of the year 1881, the horse-car lines were changed to cable. In January, 1882, the first cable train was operated. It consisted of ten cars drawn by a single grip car, and carried 1,000 passengers, including many prominent engineers from all parts of the Union. The enterprise which had for months been the sole thought of the company, and which had provoked the criticism of every citizen, was at last proved to be a brilliant success. Thousands of people witnessed the trial trips and applauded the work. It was pronounced at the time the most gigantic undertaking ever attempted by any street railway company, and it was, and it marked an era of wonderful im-

provement in the construction and operation of street railways in Chicago.

The State street cable line, from Madison street to Thirty-ninth street, four miles of double track, was commenced August 12, 1881, and completed January 28, 1882. In 1887 the State street cable line was extended south to Sixty-third street, three miles from Thirty-ninth street, making a total of fourteen miles of single track, or seven miles of double track, on State street. In 1882 the cable line on Wabash and Cottage Grove avenues was constructed, from Lake street to Thirty-ninth street, a distance of six and one-eighth miles of double track. In 1887 this line was extended to Fifty-fifth street, and later to Seventy-first street, a total distance of about ten miles.

The cable lines thus constructed were not only the best examples of cable traction in the world, but also were the only lines of the kind on a large scale in this country. The cable had been introduced in a small way in street railroad construction in San Francisco, but the conditions were entirely different in Chicago. Here it was required to carry an enormous traffic over a long distance, with weather conditions varying from the snow and ice of winter to the heavy rainstorms of summer. The result proved entirely satisfactory, and demonstrated conclusively that great care had been exercised in the construction of the various lines. The cable system of the Chicago City Railway Company is well worthy a detailed description, but before proceeding to that part of the narrative we will mention some of the many difficulties over which it triumphed.

Not the least of these was the opposition of the newspapers and citizens of Chicago. For some unexplained reason the cable enterprise was an object of attack from the first, and by turns was ridiculed and misrepresented in the daily papers. The people distrusted it and feared the new power would be destructive of life and limb and not as a whole as satisfactory as horse power. To add to the difficulties of the situation, the weather during the most active period of construction was very unfavorable. Most of the work was done during the fall and early winter, when the rains and snows, combined with the wretched condition of the soil, presented almost insurmountable difficulties. Natural defects in the streets, which had never been brought to grade, had to be remedied. On State street north of Twelfth street filling to the depth of three feet was necessary; while south of that point a foot and a half had to be removed. Another difficulty was encountered in attempting to "find bottom." The original site of the city, as we have seen, was a swamp, and accordingly it was not strange



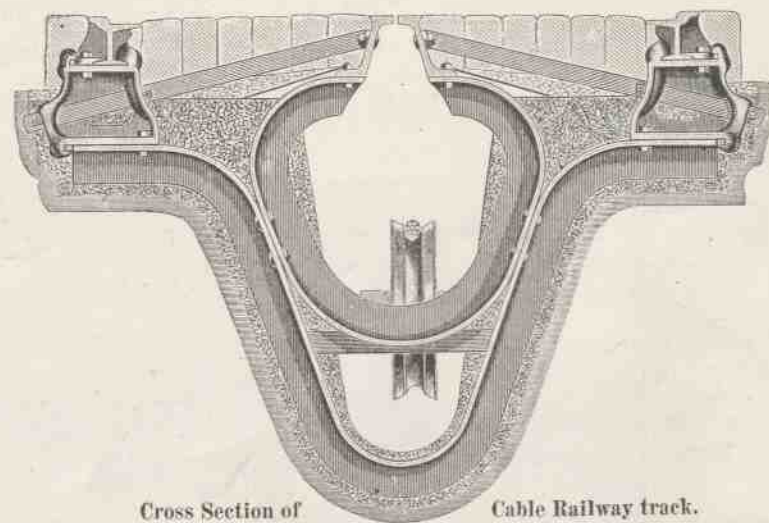
CHICAGO CITY RAILWAY CO.'S CAR.

that in the course of excavating for the cable line the workmen quickly reached the top of some of the bogs, which were found to be deeper than they supposed. Load after load of stone could be thrown into a slough of this kind, seemingly without filling it up in the least, and it required patience and skill to find a firm foothold in such soil.

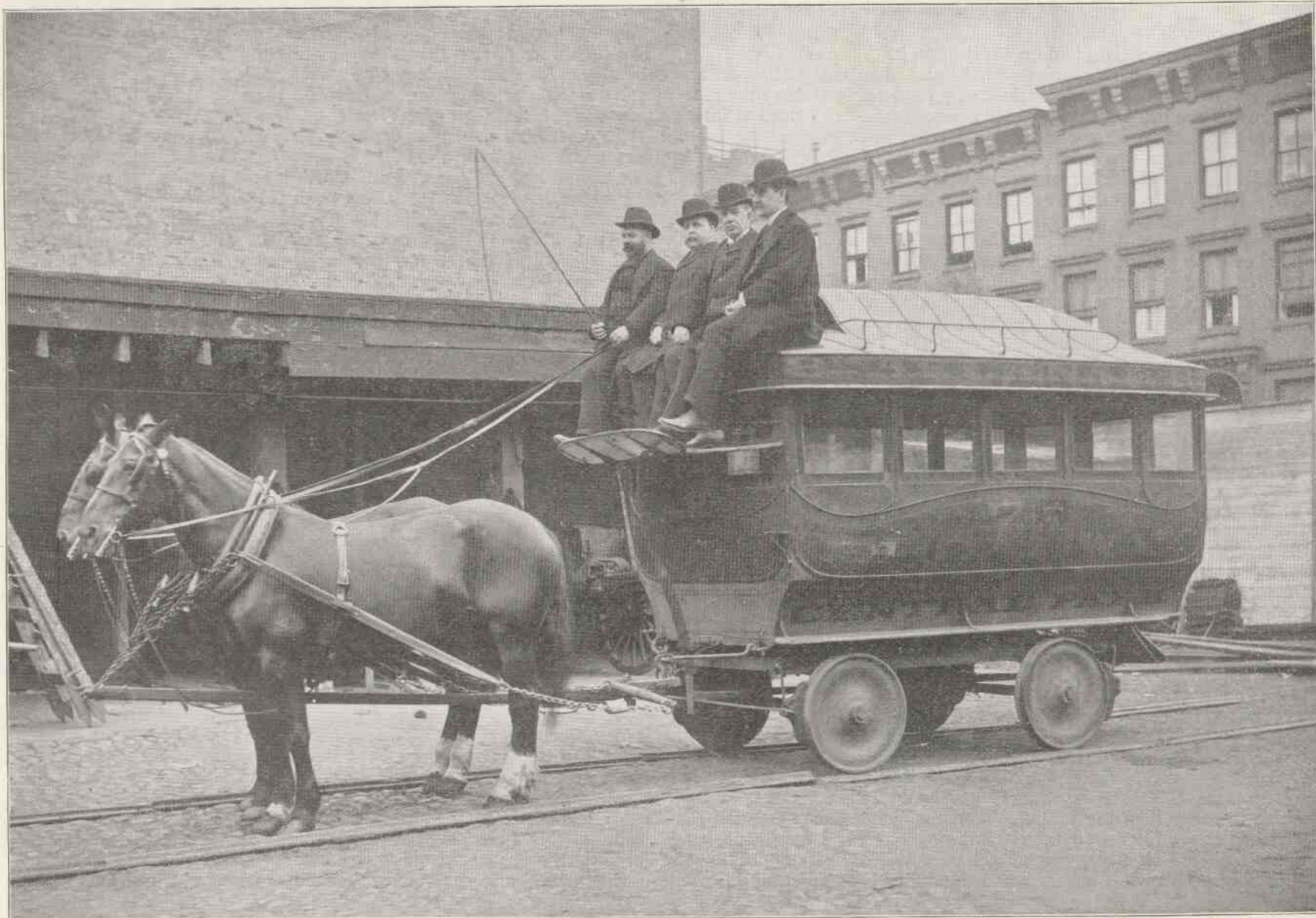
In the construction of the first eight miles of the State street cable line 1,500 men and 200 teams were employed for over four months; over 8,000,000 pounds of iron were used; 250,000 bolts; 50,000 wagon-loads of stone, sand and gravel for the concrete; 43,000 barrels of English and 1,200 barrels of American cement; 214,000 brick for sewer connections and pits to contain the underground machinery at terminal of lines; 900 tons of steel rails and 300,000 feet of timber. The cost of the first twenty miles of cable road built by this company was from \$60,000 to \$100,000 per mile of single track. This was in excess of the cost of the subsequent mileage because of the unusual street conditions.

The street as left by the company after the cable was installed was very different from the street as it existed before the work was undertaken. The center sixteen feet occupied by the tracks is paved and kept in repair. The best material to be had in this country is used for this purpose. Granite blocks quarried in Maine, Massachusetts, Virginia, Maryland and Wisconsin, averaging 4 by 9 inches by 6 inches deep, and weighing about thirty-five pounds each, are selected. They are laid in sand and gravel and the interstices filled with asphalt cement, which binds them together into a solid and very durable pavement of the most expensive but most desirable kind.

In this pavement the rails are laid, steel rails being used, weighing seventy-eight pounds to the yard, and placed according to the standard gauge, 4 feet 8 1/2 inches apart. The rails rest directly on iron chairs, which are a part of the wrought-iron framework forming the cable conduit. The first work in preparing for the cable is to excavate a V-shaped trench, 4 feet deep and 6 feet wide at the top, in which are placed at intervals of four feet the wrought-iron yokes which shape the conduit. These yokes are made of 4 by 4 inch T iron, bent and bolted as shown in the illustration. On the outer ends of the main yokes are the chairs supporting the rails; on the top of the center yoke are the parallel bars of sixty-pound Z or slot iron forming the 5-8 inch slot, which is directly over the center of the channel. Braces are shown running from the slot to the chairs. Between the center yoke, a little to one side of the center line of the channel, are placed the carrying pulleys on which the cable rests. The whole framework



is thoroughly bolted together. The rails and slot irons make a continuous connection between the several yokes, which are placed, as before stated, four feet apart. After the framework is placed in position wooden forms are set between the yokes to give shape to the channel, which is made of concrete. Between and around the yokes a filling of concrete is placed, forming a channel from one end of the line to the other, in which the cable runs. The concrete is mixed in a large trough with a 60-foot steel spiral conveyor turned by a portable steam engine. When thoroughly mixed it is carried to the excavation in wheelbarrows and dumped into the openings around the wooden forms. In a day or two it "sets" perfectly hard, forming a solid band of masonry around the yokes and forms, the latter being then removed. The concrete becomes harder with exposure to the elements, until it attains to the strength and durability of granite. Over it are placed the granite paving blocks, the whole making a street foundation that is as enduring as time itself. It is a construction that will resist the hardest usage and the heaviest weights. Even the severe strain of moving heavy buildings over this concrete vault has not crushed it. At Sixteenth street the conduit formerly passed under the tracks of the Illinois Central Railroad, but the enormous weight



ONE OF THE FIRST CARS OPERATED IN NEW YORK CITY. OPERATED IN 1860 FROM 14TH ST. AND 8TH AVE. TO 59TH ST. AND 8TH AVE. THE MAN DRIVING IT IS STILL IN THE EMPLOY OF THE COMPANY.

of trains and locomotives had no effect upon it.

Two other dangers, more to be dreaded than external force, are flood and frost. To prevent washouts by rain and to remove the rain-water from the cable conduit, sewer connections were placed at intervals of 420 feet. The ground being for the most part almost level, artificial drainage was necessary, and was provided by establishing artificial inclines at the bottom of the channel, with a fall of six inches in 160 feet. To keep out frost and snow, two-inch steam pipes were laid on the bottom of the channel, extending the entire length of the line, with traps and taps at suitable intervals where live steam could be taken from a boiler. When, after a continued storm of many days snow has drifted through the slot, and threatens to partly melt and freeze so as to choke up the conduit and interfere with the free movement of the carrying pulleys, the boiler is steamed up and drawn by horses to the point of difficulty. Connection is then made with the pipe at one of the taps, and steam is introduced for a hundred yards or so through the pipe which runs along the bottom of the conduit. This quickly thaws the snow and ice, which, in the form of water, runs off through the catch basin into the sewer. Work of this kind can be done at night when the traffic of the day is over, and one or two nights will suffice to remove the frost and snow from the entire line.

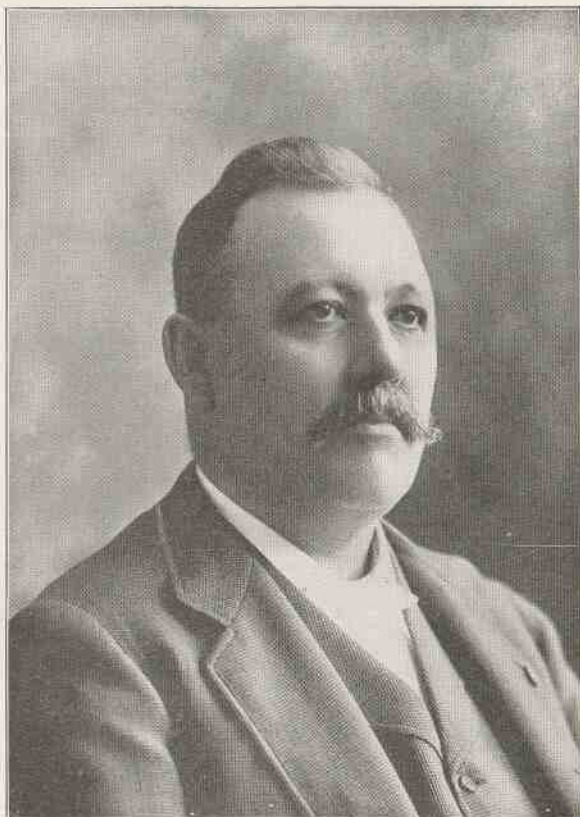
To support the cable in the channel carrying pulleys are placed at intervals of thirty-two feet all along the line, or at the rate of 170 to the mile. There are said to be 4,500 of these pulleys on the first twenty-six miles of cable line constructed. They are set in wooden frames and are thirteen inches in diameter, three and three-fourths inches wide at the rim, with a groove one and one-eighth inches deep, and are mounted on steel shafts seven-eighths of an inch in diameter and twelve inches long. Each pulley weighs thirty-three pounds, and by an ingenious device is made to withstand the constant wear and tear of many years. The cast-iron of which they are made would soon wear out and would have a very bad effect on the cable if unprotected by some other material. In order that the cable may not crystallize or the pulley casting suffer from the moving cable, the groove is filled with a cheap composite metal, which will last twelve months. The wear of the cable comes almost entirely on this composite filling, which is softer than the cable. When the lining becomes worn the wheel is easily lifted out, taken to the shop, and placed in an iron frame mold which closes around the pulley while the composition is poured in. This cools instantly and the pulley is again ready for use.

The reason for setting the pulleys slightly to one side of the center of the channel is that they may be clear of the line of the grip plate and that the cable be carried out of line with the slot, so that dirt or water from the street will not drop directly on it.

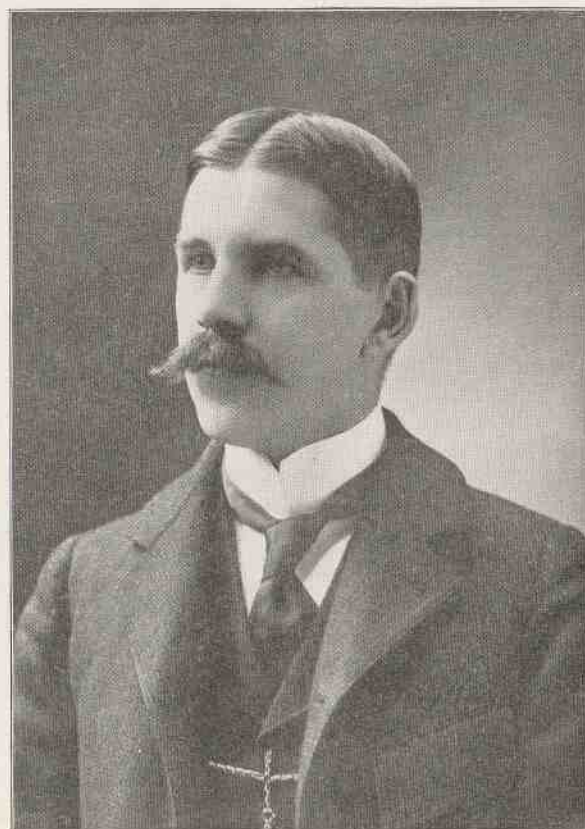
In describing the cables, grip and grip car, we are indebted to the very admirable work of H. H. Windsor on this subject, who says: The cables used are one and one-fourth inches in diameter, composed of six strands of sixteen wires each (with the large wires on the outside of each strand), and twisted around a heart of hemp rope to give greater elasticity and prevent crystallization. The cable is of Sweden steel, specially prepared for this purpose, has a breaking tension of thirty to eighty tons, and combines the greatest possible strength consistent with sufficient pliability. A cable will last indefinitely, according to the work demanded of it and the care given it; with this company the life of the cable is calculated at 40,000 miles. To prevent wear the cables are tarred and oiled as they enter the power station, and every night their entire length is carefully inspected while moving at a speed of four miles an hour, after the cars have stopped running.

When a new cable is required it is put in during the night. The old cable is cut and the end of the new one is spliced to it. The machinery is then started and the new cable drawn out into the channel, while the old one is drawn into the power house and wound on immense wooden spools. When the end of the new cable again reaches the starting point, the old one is cut off, the ends of the new one spliced, the cable put upon the drums, the tension carriage tightened, and the rope is endless and ready for service. This operation is always performed in the night, and without causing a moment's delay to the usual operation of the cars. The most important detail is the splicing of the "rope." The splice must be as strong as any other part of the cable, but must not increase its diameter. A complete set of cables for the Chicago City Railway Company weighs 180 tons.

A cable rarely if ever breaks, and then only through neglect but it may be cut by a careless driver failing to throw it from the grip at the point where it is depressed to enter the power station. The cutting of a cable, however, is as unpardonable as for the engineer of a passenger train, having reached a terminal station, stupidly sitting in his cab and allowing his train to plunge full speed through the depot walls, simply because he neglected to close the throttle. It was formerly the custom on this line to guard against such accidents by having a watchman stationed at the points of danger, whose duty it was



T. C. PENNINGTON, TREASURER.

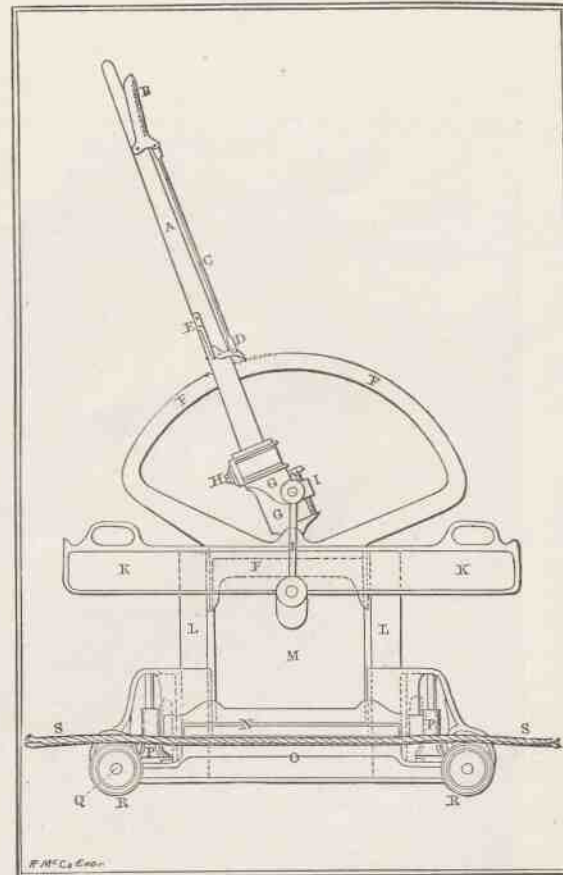


F. R. GREENE, SECRETARY.

to remove a small trap door by means of an iron hook as the train approached. This opening enabled him to see the cable; if it was thrown out of the grip it could be seen running on the pulleys; but if, as the train passed, the rope was seen to be several inches above the pulley, it indicated that the driver had not thrown the cable out of the jaws of the grip, and the watchman was thus enabled to signal the gripman in ample time to stop his train and prevent cutting the cable. By an improved mechanical device this inspection is now rendered no longer necessary, and accidents of this kind are effectually prevented.

Beneath the car is the mysterious mechanism by which the train is connected with the cable and set in motion, or disconnected at the will of the operator and brought to a stop. This device is known as the "grip," and to the average passenger on these cars it remains an unsolved riddle. We are again indebted to Mr. Windsor for the following description: The grip is hung in the center of the grip car; it extends through the slot in the track by means of the steel plates "L" (shown in the engraving) which support the lower portion or jaws through which the cable passes. When the car is at a standstill the cable (which always runs at a uniform rate of speed) slides through on the rollers or wheels "R," but when the lever "A" is drawn back the jaws "V" and "O" close on the moving cable with a pressure of 400 pounds for every pound applied. For a second or two the cable slips through, but quickly overcomes the inertia and draws the train at its own maximum speed. By loosening the pressure on the cable the speed of the train may be easily reduced to any rate desired, even to moving the car one mile in ten hours while the cable is running ten miles per hour. The train can be made to go as slow, and for any length of time, as the driver wills, but of course can never go faster than the speed of the cable. The wear on the cable from this continual starting, which occurs at almost every block, is much less than would be supposed, as the grip is lined with a metal which, after a few hours' use, becomes as smooth as glass. Once a month the grip is taken to the shop, quickly re-lined and repaired at small expense, when it is again ready for service. The grip beam is made of brass, the other parts of steel or malleable iron.

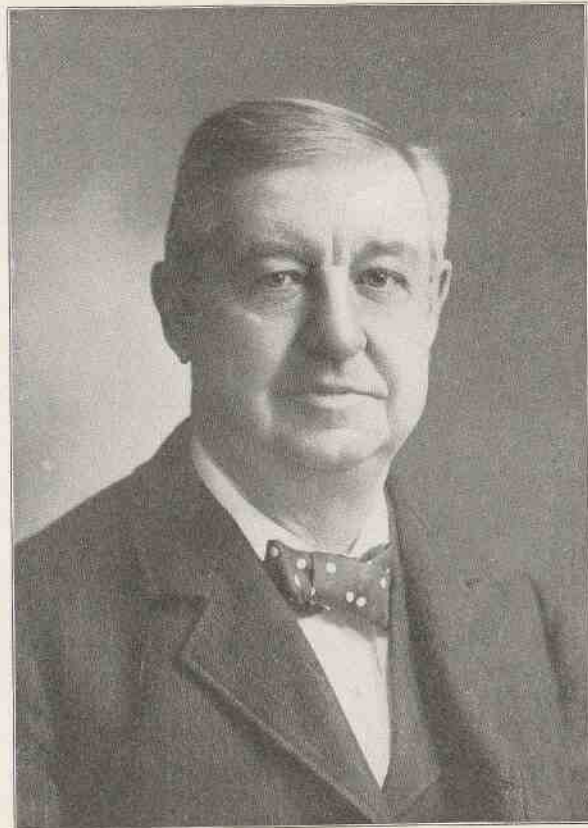
At the starting point the grip is lowered into position in the car through a trap in the track, that portion of the grip below the letter M running beneath the surface of the street. When the car goes into the house at night the grip is taken out in a similar manner and inspected. By a simple forward motion of the lever the spools P are



A. Grip Lever. B. Lever Handle. C. Lever Rod. D. Lever Dog. E. Lever Dog Spring. F. Quadrant. Upper G. Adjusting Head. Lower G. Adjusting Shoe. H. Lever Set Screw. I. Adjusting Screw. J. Grip Links. K. Grip Beam. L. Grip Shank. M. Grip Plate. N. Upper Jaw. O. Lower Jaw. P. Spools. Q. Roller Journals. R. Grip Rollers. S. Cable.

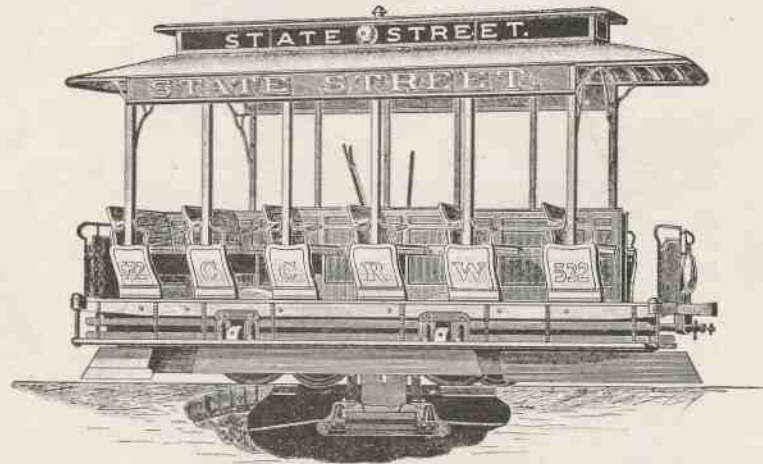


G. O. NAGLE, SUPT.



J. F. JOHNSON, ASST. AUDITOR.

raised, instantly throwing the cable entirely out of the grip. This must always be done in changing from one cable to another. Much ingenuity was displayed in the early days in arranging the cable and grip so that they would come together at starting points on the lines. The cable was brought into the grip at these points in the following manner: First, by being elevated on a four-foot sheave, which lifts the cable to a level with the open jaws of the grip; second, by a slight deflection to one side in the track which sufficed to throw the grip sufficiently to one side to bring the open jaws around the cable. The jaws were then closed and after moving forward a few feet the track jogged back, bringing the slot again in the center of the track line, when the cable would run through on the grip rollers. This arrangement has been very considerably improved upon by this road in more recent construction.



Grip Car, Showing Cable in Grip as When Drawing a Train.

The accompanying illustration, taken from Windsor's description, gives a lateral view of a grip car showing grip in the channel as when engaged in drawing a train. These grip cars are sixteen feet long, six feet wide and ten feet high, with reversible seats for twenty passengers. The wheels of this car (as of all cable cars operated by this company) are guarded with wooden fenders coming to a point at each

end of the car, the lower edge being lined with strips of rubber. These fenders are suspended from the running gear so as to barely clear the street surface, rendering it impossible for anyone to get beneath the wheels. Strong headlights thirteen inches in diameter are carried on the front platform of grip cars at night, and illuminate the track for a long distance. The car works equally well in either direction, the gripman standing in the center. Over his head and outside the car is a large gong, which he sounds by means of a rope hanging by his side. An additional lever stands near the grip lever, and by its use he operates a powerful brake.

Not the least puzzling of the many problems presented in the construction of the cable lines was the loop problem. In the down-town streets, where traffic is congested all day, it was a serious question whether cable traction would meet all the requirements of an enormous passenger service during the rush hours and at the same time avoid the crush of vehicles which would naturally result in this quarter of the city. At first a single loop was used, the State street cars turning east on Madison street, north on Wabash avenue, west on Randolph street and south on State street. The Wabash avenue cars made practically the same circuit, running north on Wabash, west on Randolph, south on State and east on Madison street to Wabash avenue, where they turned south again. Thus the State street and Wabash avenue cars, using the same track, performed the strange feat of turning the one to the north, the other to the south at Wabash avenue. This was explained from the fact that two cable loops were used, and a switchman stationed at the corner threw the proper switches for wheels and cable slot. More recently, however, the Wabash avenue cars have been run east on Madison street to Michigan avenue, north to Randolph street, west to Wabash avenue and then south. A separate cable is used on the loop lines, propelled by being passed around a horizontal sheave placed on the same shaft with a larger sheave, around which the main cable passes for its return to the power station; the size of the sheave propelling the loop cable is but one-half that of the main cable sheave, and consequently imparts to the loop cable but one-half the speed of the main line. The cable is conducted around the curves on vertical cone pulleys, placed at such intervals as to correspond with the periphery of an immense sheave, the radius of which would be that of the curve.

Silently the great cable does its work over miles of road, most of it far distant from the source of power. The Wabash avenue and State street lines are operated from the power station at Twenty-first



JNO. J. O'KEEFE.
Chief Inspector and Supervisor.



C. J. REILLY.
Superintendent Motive Power.

and State streets. The Cottage Grove avenue line receives its power from the station at the corner of Cottage Grove avenue and Fifty-fifth street. The line on State street south is supplied from a power station at State and Fifty-second streets. The equipment of these stations is so similar that a description of that at Twenty-first street will suffice for all. In general it may be said that the equipment is the best that scientific skill can provide, and is not surpassed by any similar plants in the world. The uniform reliability with which the machinery of the Chicago City Railway Company has always run, its freedom from break-downs and its wonderful record in handling immense crowds, is a part of the history of Chicago, and especially of the World's Fair year.

At the outset, four 250 horse-power Babcock & Wilcox "water tube" boilers were selected and installed at Twenty-first and State streets. These boilers have given excellent satisfaction. They are too well known to require detailed description, and they have fully maintained their former great reputation in this connection.

When the power station at the corner of Fifty-second and State streets was built a plant of three 350 horse-power Hazleton Tripod boilers was erected there, and these also have proved to be all that has been required of them. They have been in constant use ever since April, 1887, and have not only equaled but far surpassed the most sanguine expectations as to safety, economy of labor and fuel, large evaporative capacity and dryness of steam delivered to the engines. At an evaporative test one of these boilers developed 639 horse-power—an increase of 82.5 per cent over the rated horse-power—and evaporated 12.04 pounds of water from and at 212 degrees Fahrenheit per pound of combustible, burning Indiana soft coal screenings. In spite of this large increase over the rated capacity of the boiler, the steam remained uniformly "dry." Five more Hazleton boilers were subsequently erected by this company, three at the power station on the corner of Fifty-fifth street and Cottage Grove avenue and two for increase of boiler capacity at the original power station, corner Twenty-first and State streets. The three boilers at the Cottage Grove avenue station are among the largest single boilers in the world, each being 600 horse-power and having 6,000 square feet of heating surface. They are capable of developing 2,400 horse-power, if required, without in the least impairing their efficiency or economy. The two Hazleton boilers installed at Twenty-first and State streets are of 500 horse-power each, but together regularly develop 1,500 horse-power and occupy, with their mechanical stokers, a floor space of but thirty-

two feet wide by fifty-eight feet long. It is a model boiler room and is a credit to the company and a never-failing source of interest to visiting engineers.

The Roney mechanical stokers which are used by this company in connection with all their boilers are marvels of effectiveness and economy. The operation of the stoker is briefly described as follows: The fuel is fed in from the hopper by a gradual motion, which can be regulated to feed little or much, and the coal, as it enters, is coked under the short arch at the front of the grate, and the gases given off in this coking operation receive the necessary air for perfect combustion from a hot air chamber with perforated bottom, which is located at the head of the grate and immediately over the coal as it enters the furnace. The air is heated in passing through the air spaces in the side walls, and mingling with the gases given off in the coking of the fuel, produces practically perfect combustion, so much so that the fire is smokeless when the supply of fuel is regular and constant.

The grate bars, which extend laterally across the furnace, are constantly in motion, and form alternately a series of steps leading downward to the fire, and then by a forward rocking motion dip down until they overlap like shingles on a roof, forming a favorable surface for the forward movement of the coal but before it slides too far the grates return to the stepped position, thus checking the downward motion of the coal and breaking up the clinker thoroughly over the whole surface of the grate, and admitting additional air for the combustion of the fuel. This alternate sliding and checking motion, being constant, finally lands the cinder and ash on the lower dumping grate, when, by releasing the handles which project in front, the grate tilts forward, throwing the cinders into the ash pit, when it can again be closed, ready for further operation.

From this brief description it will be seen that the stoker can be operated continuously, and the fire can be forced whenever, and as rapidly as desired, without opening doors for the supply of fuel or cleaning grate. This is an important feature in its construction and one element of economy in the operation of the stoker. For as is well known the continual opening and closing of doors in the ordinary method of firing is not only a source of great loss in fuel, but is a severe strain upon the boiler shell, on account of the unequal contraction and expansion it causes.

In the practical application of the mechanical stokers to the boilers two or three are attached to each boiler, and the soft coal screenings, which are used for fuel, are elevated to the top of the building and



GEO. W. KNOX.
Electrical Engineer.



M. B. STARRING.
Acting General Counsel.

distributed to the several iron storage tanks which supply the stokers. These tanks hold about eighty tons each; from them the coal flows by gravity into the coal magazines on the stokers, whence it is supplied automatically to the furnaces, as previously described. It will be readily seen that by this method of handling the most rigid economy is secured, very few men being required, and at the same time the acme of cleanliness and efficiency is insured.

Proceeding now, in regular order, from boilers to engines, we find here a most wonderful mechanism indeed. With all the weight and power of leviathans they possess also the fineness of adjustment of the most delicate mechanical construction. Of the monster fly wheels it is said that though each is twenty-four feet in diameter and weighs 90,000 pounds, and is made in ten sections, yet so accurately are they fitted and bolted together that with the outer rim traveling at the rate of a mile a minute there is no perceptible variation from its true and even motion.

At the Twenty-first street station four of Robert Poole & Son Company's automatic cut-off engines challenge our attention. The four engines are placed in pairs, two at each end of the main line shaft. Ordinarily one pair only is used to operate the main line of cable, and the other pair is kept in readiness for use in case of accident. They are so arranged that the change can be made with but a few moments' delay, and should an unusually large amount of power be required in time of a great rush of travel, or during heavy snowstorms, both pair can be coupled to the main line shaft, so as to use the power of all four engines at the same time. If all are used together they will develop a total of 2,600 actual horse-power, but this extreme limit is seldom, if ever, required.

The Poole engines weigh about fifty tons each, or 100 tons to the pair. They have thirty-inch cylinders, five-foot stroke, and are set on solid concrete foundations thirteen feet deep. The crank shafts are eighteen inches in diameter. The main driving pinions, fastened to the crank shafts, are six feet in diameter and forty inches on face, and weigh 32,000 pounds each. The teeth are staggered, and mesh into those of the main driving gears, which are also staggered, the gears being ten feet in diameter and fastened to the main shaft. These gears weigh 42,000 pounds each. They are marvels of the molder's skill, running true and, considering the great power transmitted, comparatively noiseless, although there has been no machine work done on the teeth, they being left just as they came from the sand. The fly wheels on the engine crank shafts are twenty-four feet in diameter,

and each weighs 90,000 pounds. Each of these monster wheels is made in ten sections, but so accurately are the sections cast and fitted together that the entire wheel moves with perfect evenness. The main line shaft is steel, sixteen inches in diameter and sixty-eight feet long. It is in four sections and revolves in eight bearings. There are two pinions on this line shaft, one five and one six feet in diameter, twenty-four inches face, weighing respectively 12,000 and 13,000 pounds.

Each driving pinion meshes with a gear ten feet in diameter, weighing 26,000 pounds, and fastened to a shaft carrying a drum on each end. A second pair of drums is carried by a shaft having a similar gear, while between the two there is an idler shaft with a five-foot diameter pinion. The drums, driven by the six-foot pinion on the main line shaft, drive their cables one mile per hour faster than those driven by the five-foot pinion. These shafts are of steel, fourteen inches in diameter and seventeen feet long, resting in pillow blocks nineteen inches in length. The drum shafts are fourteen inches in diameter and seventeen feet long and run in three pillow blocks, which are bolted to a heavy cast-iron framework, which in turn is anchored to solid concrete foundations thirteen feet deep. In this instance, unlike the ordinary plan of placing the bearings for drum shafts on either side the drums, the shaft projects and the drums are hung outside the bearings, the outer ends of each pair of drum shafts being connected by a strut, which can be adjusted for wear, and which relieves the pillow blocks of the strain caused by the cable passing around the drums. The drums, being outside their bearings, permit the ready removal or replacement of the cable, if desired, and allow making an extra lap when the cable has stretched to such an extent that it would otherwise be necessary to cut a piece out. The drums are thirteen feet four inches in diameter, weigh 22,000 pounds each, and each has six one and one-quarter inch turned grooves.

There are 2,000 feet of grooving in these drums, and every inch of it must be true and even. Every tooth in each gear must be properly designed and accurately made, and the drums and gears must be so mounted on their shafts that they will revolve with perfect harmony. The utmost care is necessary in the casting of these immense drums and wheels; in the selection of the iron and in having the molten metal in just the proper condition when the castings are poured. One little defect in a single tooth, of the hundreds so rapidly turning in this multitude of wheels, might cause wreck and ruin to them all.

As the cable enters the power house it passes around its pair of



LEON JEWELL.
Superintendent Time Tables.



CHARLES E. MOORE.
Master Mechanic.

drums with two or three wraps, as the condition of slack or tautness may require, and it then leads from the bottom of the drum to the tension carriage, where it passes around the tension wheel from the under side, and leads out into the street. The tension carriage is an ingenious mechanism for taking up the slack in the cable. The cables must always be taut on the drums. To secure this automatically, yet effectively, the cable as it comes into the power station is passed around the drums, and thence before returning to the street around a vertical iron sheave, weighing 3,000 pounds, twelve feet in diameter, with a one and one-quarter inch groove in its rim. This wheel is set in a wrought-iron frame twelve feet long, carried by four flange wheels, on an ordinary steel T rail track of forty-four inch gauge. At the farther end of this carriage is attached a heavy chain, which may be shortened or let out at will by means of a sprocket wheel. This chain passes over a pulley, and to it is attached a weight of 4,000 pounds. As the moving cable comes in taut or slack the carriage moves forward or backward and the weight rises or falls.

The immediate effect of the tension carriage is to keep the cable taut on the drums and thus insure the necessary friction to make the rope move forward; but the device also serves another and an important purpose. The great weight of the cable causes a sag of one and one-half inches between each carrying pulley. When a heavily loaded train grasps the cable in starting this slack is all taken up for some distance ahead; but in a few seconds, when the train has secured its momentum, this slack is replaced. Were it not for the mobility of the tension carriage this sudden and constant tightening and loosening of the cable by many trains would prevent a steady and uniform motion of the cars. As the cable passes out of the power house it is elevated to its proper level in the channel. Each cable is independent of the others, but they are connected by a friction clutch of great power which can be operated instantly by one man, so that any one cable may be started or stopped at any time at will.

In the change from steam to electricity, which has been in progress on American street railways for several years, one of the most interesting phases of development was the substitution of electric motors for steam engines at cable stations. The idea was to save expense at the cable stations, and this has been actually accomplished. The Chicago City Railway Company has three cable stations. The one at Twenty-first and State streets runs all the cables north of Thirty-ninth street; that at Fifty-fifth street and Cottage Grove avenue runs the Cottage Grove avenue cables south of Thirty-ninth street and the

Fifty-fifth street branch. The State street line from Thirty-ninth street south is run by a plant at Fifty-second and State streets. On Wabash avenue, just across the alley from the Fifty-second street cable plant, is located one of the electric power stations of the company, from which the electric power for trolley lines is secured. The other electric station is located at Forty-second street and Oakley avenue. The close proximity of the Wabash avenue electric station to the cable house on State street suggested the feasibility of operating the cables with electric motors instead of steam engines. This change was made in 1894, and the motors were put into actual service in the year following. At present the cable at the Fifty-second street power house is operated by electricity during six months of the year—the summer time, when the load is lightest—and by steam during the other six months. The advantages of this change were well set forth at the time by the Street Railway Review, from which we take the following facts and figures:

The cable plant has two double engines, either one sufficient to carry the load, and belted one to each end of the cable driving shaft. This shaft has couplings at each end for disconnecting either engine. The rim and spokes of one of the engine fly wheels was removed and the motor placed behind the engine. The belt from motor to cable shaft was passed above and below the engine hub. The other engine is still on hand for emergencies, and the engine replaced by the motor can be put in running order inside of ten hours. No special foundation was required for the motor, the engine foundation being large enough. The motor, which is 600 horse-power, is identical in construction with the Westinghouse 700 horse-power No. 6 railway generator, except that it is shunt instead of compound wound. It is a six-pole machine and runs at 300 revolutions a minute. Its capacity is 1,044 amperes. It was started with the aid of an iron wire resistance kept cool by running water.

The average daily load of the cable plant is 250 horse-power. The maximum load (which occurs in the winter at the time of heavy snow-storms) is about 600 horse-power. To conduct the current across the alley, copper wires having a sectional area of 1,000,000 sectional mils were installed. This is about the equivalent of five No. .0000 wires.

This is one of the largest electric motors in the world, but it does its work excellently. It is shunt instead of compound wound, because shunt winding is the simpler and keeps the speed within a 2 per cent variation, which is as near as the steam engines can keep it. The use of this motor enables the engineer to study the variations of power



GEO. I. BERGEN,
Purchasing Agent.



A. C. HEIDELBERG.
Assistant Superintendent.

required by the cable. It also renders it possible to tell much more closely than ever before the per cent of power required to move the cable without cars.

The saving in labor alone due to the change amounts to about \$28 a day. The electric plant requires no additional force, while that in the cable plant is cut down enough to save the sum mentioned. To this saving must be added the repairs on the cable steam plant and the oil used, so that Chief Engineer Hill calculates \$35 a day as the total saving in station expenses. The fuel bill of the electric plant is increased somewhat. But in substituting the motor the friction of the cable engine is eliminated, and the saving on this item alone for several hours of the day is enough to counterbalance the double transformation of energy.

The loss in transforming the power into electrical energy and back again is estimated at about 17 per cent (10 per cent in the motor and 7 per cent in the generators), while it may be less. As the fuel bill of the cable plant running alone would average about \$45 a day, the increased cost of fuel is, say 17 per cent of this, or \$7.65 a day, to put against a saving of \$35 on the other items.

In the year 1892 the Chicago City Railway Company adopted electricity for its cross-town lines, and in so doing made perhaps the most radical change in its entire history—a change which is destined to revolutionize not only the horse-car system but the cable system as well. The first lines to be equipped were the two miles on Sixty-first street from State street to Jackson Park, with a branch on Cottage Grove avenue to Sixty-third street; thence on Sixty-third street to Jackson Park with a double loop extending north and south at the park; four miles on Forty-seventh street extending from Western avenue east to Cottage Grove avenue, and three miles on Thirty-fifth street from California avenue east to State street. The World's Fair traffic demanded that all these lines be equipped before the opening of the great exposition, and this was accomplished.

The Wabash avenue electric power station at Wabash avenue and Fifty-second street is described by the Street Railway Review as a model of neatness and good engineering. It is a station in which no extravagant expenditures have been made, but it has always been the policy of the City Railway management to omit nothing which will add to the economy and reliability of its plants. The station is a one-story building, thirty-five feet high and 130 by 147 feet in ground area. The boiler room is 57 by 130 feet, and has space for fourteen Mohr water tube boilers. The coal is delivered in the cable plant across the alley,

at which place it is loaded into dump cars and lifted to an elevated tramway which crosses the alley and runs above the boilers of the electric plant, where it is dumped into the bins or hoppers feeding the mechanical stokers. The engine room has space for five units, of which two are installed. Each unit consists of a pair of Wheelock, simple engines, connected by a Hoadley rope drive to a jack shaft. On each end of the shaft is a clutch for throwing in a 700 horse-power Westinghouse four-pole generator. The ultimate capacity of the station is thus 7,000 horse-power, which is ample to drive the whole system, cables and all, if it is decided to do so. The switchboard bus bars are calculated for 10,000 amperes. The switchboard is the Westinghouse standard, but ammeters have been put in the feeder circuits as more machinery was added.

The system of piping in this plant is modern in every detail. Over the entire battery of boilers thirty-inch drums, fifty-three feet in length, extend, and are connected by means of an eighteen-inch copper goose neck. From the thirty-inch drums steam is taken to each engine by means of a ten-inch heavy steam piping, having a ten-inch angle valve placed next to the drum. Copper joints and elbows are used throughout the entire plant.

The engine room is 90 by 128 feet and finished in white enameled brick. The generators are ten in number, each of the Westinghouse No. 6 type, rated at 700 horse-power when running at 300 revolutions per minute. The switchboard is placed on a balcony in front of the dynamo room. It is divided into two sections, each of the shape of a letter V on its side; these meet at a central door which allows access to the rear of the board. The outside of each division controls the station apparatus, while the inside of the board, formed by the other side of the V, controls the lines. Most of the apparatus is composed of marble or slate. A separate lighting plant illuminates the dynamo room by ten arc lamps and sixty incandescent lights.

The engines at the Wabash avenue plant are of the improved Wheelock type, equipped with E. K. Hill's valve system. They are ten in number, arranged in five pairs. They are designed to run 100 revolutions per minute with 100 pounds boiler pressure, and while so running will develop 1,400 horse-power per pair. The cylinders are twenty-four inches in diameter, with forty-eight inch stroke.

Each pair of these engines has an eighteen-foot built-up fly wheel weighing about 50,000 pounds. The hub is forced on the shaft and each arm recessed four inches into the hub; each sequent is bolted to arm and keyed with side keys, and each wheel is grooved for twenty-



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Attorney.

one wraps of one and one-quarter inch rope. The object of all this was to inaugurate the endless rope system of power transmission, known as the compound wind. The driver pulleys in this case are seventy-two inches in diameter and revolve 300 turns per minute, are grooved for thirty-two wraps of one and one-quarter inch rope, and drive two 700 horse-power generators. The compound multiple is seventy-two inches in diameter, grooved for eleven wraps of one and one-quarter inch rope. The stationary and carriage tighteners are eighty-four inches in diameter and suspended from the ceiling. By this system, with a fly wheel face only thirty-nine inches in width, 1,600 horse-power is transmitted.

In 1896 the company concluded to build a new power station at Forty-ninth street and Oakley avenue, on the extreme western end of its territory at that time, but near what is destined to be an important center of electric power distribution. This is said to be the largest railway power house building in the world and in horse-power capacity is the equal of any ever planned—having a rated output at the switch-board of 11,528 horse-power. Here, as in the Wabash avenue station, the rope drive is used, instead of the usual direct connection. The building is 209 by 266 1-2 feet; the boiler room is 99 by 266 and the engine room 110 by 266. It is a steel frame structure throughout. The general management of apparatus inside the station is nearly the same as that at the Wabash avenue station.

The boiler room is designed to accommodate forty-eight horizontal return flue boilers six and one-half by twenty feet. Half of these boilers deliver their smoke to a stack at one end of the building and the remainder to a stack at the other end, each stack being 200 feet high, with a fourteen-foot flue. The station is located near a railroad and coal is brought in on a side-track which passes between one of the stacks and the boiler room. There is another side-track for the removal of ashes. The coal is carried into the station by a conveyor and is distributed to the coal tanks running the length of the boiler room. The tanks are directly over the boiler front, and from them the coal is piped down to the smokeless furnaces. Under the furnaces run the tracks of the ash-conveying apparatus, which is a part of the same system as the coal conveyor.

The boilers are divided, with reference to piping, into eight banks of six boilers each. Each bank feeds into a header and each header is joined to the other by curved copper connections. Each division is separated by valves, so that the station is protected against breakdowns of any portion. The main header from which the engines draw

their supply is three and one-half feet in diameter. The exhaust piping is all under the floor in the engine room, and will rise in the boiler room through three four-foot exhaust pipes each 130 feet high. Three exhaust heaters of 2,000 horse-power and exhaust feed water injectors are used.

In the engine room there are six simple double engines running seventy-seven revolutions per minute, with two cylinders, each thirty-six by sixty inches. Each pair of cylinders drives a twenty-foot fly wheel. This fly wheel drives by rope drive a short jack shaft. On each end of each jack shaft is a clutch which connects with an 800 kilowatt generator. The plan embraces six pairs of generators and six double engines.

A TYPICAL CAR BARN.

In the summer of 1895 it became necessary for the Chicago City Railway Company to build an entirely new car barn on Cottage Grove avenue, between Thirty-eighth and Thirty-ninth streets. The old barns were destroyed by fire. The company owns land at that place, about three and one-half acres in extent, and this is now completely covered with a car barn and stable which is worthy of description in this connection. The barn is one-story in height and has a frontage of 242 feet on Cottage Grove avenue. It is of brick and very substantially built. When it is stated that the roof area of this building is about three and one-half acres some idea of its extent may be had.

The barn is divided by brick walls into three compartments. In the middle of the barn and extending entirely across it is the "transfer track," by which cars may be moved from one section to another. The object in dividing the barn in this manner is to guard against spread of fire. The openings in the dividing walls are each provided with two pairs of fire doors, which roll upon inclined ways, so that when released they will close of themselves. Cars are run into the barn by their own momentum and are taken out onto the tracks again by means of horses. They are moved from one track to another inside the barn on the transfer tables, which are of wood and are mounted on thirty-inch wheels. All the tracks inside the barn are on one level. No power other than horse power is used in making these transfers. The barn has a total floor space of 148,600 square feet, with tracks to accommodate 417 cars.

In the northeast corner of the barn is located the employes' club-room, which is 23 by 50 feet, and is furnished, lighted and heated by

the company. Next to this is a room 18 by 28 feet, in which are quartered the wreck wagon and its team of horses. The equipment of this room is all in the most approved fire department style. Adjoining is the office, and also the conductors' room, where lockers for the men are provided. There is also an oil and lamp room and a small coal room in the rear. Oil is delivered to the storage tanks, which are below the floor level, through a hatchway in the sidewalk. The train dispatcher's tower is located in the center of the incoming tracks. The dispatcher has a clear view of the tracks on Cottage Grove avenue in both directions, and also of the interior of the barn. Within his reach are levers controlling the semaphore signals and the track switches, and he is connected by telephone or speaking tube with the office and the transfer track.

Electricity is to be the ultimate power on all the lines of this company, including the present cable lines. At present writing there are about 160 miles of electric road and about 300 motor cars are required. The electric power has been extended to lighting and power supply at the barns. Besides the repair shop at State and Twenty-first streets there are six barns. At five of these there are from one to four car elevators. In all there are eleven elevators. Two fifty horse-power motors are installed for each elevator. These motors have in almost every instance displaced small steam plants, and have resulted in a considerable saving. The lighting and power load comes at a time when the other load is lightest and when it can be most conveniently taken care of.

The history of street railroad grants in Chicago is an important chapter in the history of this company. The first street railway ordinance was passed by the City Council on August 16, 1858, and granted to Henry Fuller, Frank Parmelee and Liberty Bigelow permission and authority to lay tracks and to operate for twenty-five years a horse-railway in certain thoroughfares of the city. The streets named were portions of State street, Ringgold place (now Twenty-second street), Cottage Grove avenue, Archer road and Madison street. The ordinance was accepted by the men named in it and construction of the road was begun.

At once a legal objection was raised which proved to be fatal to the validity of the ordinance. The Constitution of the State of Illinois in force at that time was what is now known as the Constitution of 1848. It contained absolutely no provision authorizing city councils to grant street railroad franchises. The legal experts soon discovered this fact, and declared that the ordinance granted by the Chicago City

Council on August 16 was worthless. The power, under the Constitution, to grant street railroad franchises, was vested in the State Legislature alone.

Messrs. Fuller, Parmalee and Bigelow lost no time in seeking special legislation to make good the deficiency. They asked the Legislature for an act of incorporation and authority to build and operate the road, and it was granted to them. On February 14, 1859, the Legislature passed an act entitled, "To promote the Construction of Horse Railways in the City of Chicago." This act created Henry Fuller, Frank Parmalee, Liberty Bigelow and David A. Gage into a corporation, with a life of twenty-five years, called the Chicago City Railway Company, and gave to it the right to install and operate for twenty-five years a street railroad in the streets already named in the ordinance of the City Council of the previous year. This act went farther. It named certain specified places along these streets where turnouts should be located and extra conditions fulfilled; and it also stated, as a condition of the grant, that the City Railway must operate a line from Lake street to the southern boundary of the city and on Madison street from the river to the western limits of the city, specifying the particular streets to be used in these extensions. The same act also authorized the construction of street railways on the North Side. Section 10 provided that William B. Ogden, John B. Turner, Charles V. Dyer, James H. Ross and Voluntine C. Turner be created a corporation, by name the North Chicago Railway Company, to lay down, maintain and operate a street railroad on North Clark street. The time limit of this charter and franchise was also put at twenty-five years from date of incorporation, or in 1883. This fact is stated in this connection to show the general and sweeping character of the legislation in question.

This direct State legislation was necessary, under the Constitution, then and for many years afterward in force, in order to give Chicago street railway companies the right to construct or operate lines of railway. There was no question on that point. The Legislature was admittedly supreme. On February 21, 1861, another act of the Legislature formed the Chicago West Division Railway Company. This act was entitled "An Act to Authorize the Extension of Horse Railways in the City of Chicago." It provided that Edward P. Ward, William K. McCallister, Samuel B. Walker, James L. Wilson, Charles B. Brown and Nathaniel P. Wilder should be a corporation named the Chicago West Division Railway Company, and should have possession of and power to operate the Madison street line formerly granted by

act of 1859 to the Chicago City Railway Company. From this time on there were three companies in existence, the North, South and West Side companies, which have practically the same legislative history, but in this article we shall follow, in detail, the history of the Chicago City Railway Company alone. Up to 1865 the only occurrences of note were a number of ordinances granted by the Chicago City Council to these street railroads. In some of these no time limit is given, and in others the time of expiration was 1883, or at the end of the companies' charters. In those where no period was stated, it was considered to mean beyond question that their life was the life of the companies' charters.

The first radical change in the status of street railway legislation was made by the act of February 6, 1865, entitled "An Act Concerning Horse Railways in the City of Chicago." This act amended by name the previous two acts of the Legislature regarding street railways in Chicago. In common with similar clauses for the other two Chicago companies the measure provided that the life of the corporation known as the Chicago City Railway Company be extended to ninety-nine years from its date of organization in 1859. It also extended all the rights and privileges belonging to the company for a similar length of time. Section 2 of this act provided, among other things, as follows:

"And any and all acts or deeds of rights, privileges or franchises, between the corporation in said several acts named, or any two of them, and any and all contracts, stipulations, licenses and undertakings made, entered into or given and as made or amended by and between the said Common Council and any one or more of the said corporations, respecting the creation, use or exclusion of railways in or upon the streets, or any of them, of said city, shall be deemed and held and continued in force during the life thereof, as valid and effectual, to all intents and purposes, as if made a part, and the same are hereby made a part, of the said several acts."

The State at that time was under the Constitution of 1848, which gave to city councils absolutely no power to legislate in street railway matters. The Legislature was therefore in supreme authority over street railways and was empowered to and did extend the charters of the companies, and all the franchises which had been given to them prior to 1865, to the limit of ninety-nine years from first incorporation or until 1958. This was the understanding for thirteen years, until 1878, when the first controversy involving the duration of the franchise arose. The question was brought up at that time on occasion of an attempt by the city to collect license fees on cars. It was de-

cided by a wise compromise. How this was done is well told by Mr. James Black, in his pamphlet on the Street Railroad Situation in Chicago, as follows:

Owing to the great fire of 1871, and other causes, the city of Chicago in 1878 found itself in a most embarrassed financial condition. It sought every means within its power to raise revenue, and finally turned to the street railroad companies as a possible means of obtaining income. An ordinance was passed March 18, 1878, requiring the companies to pay a license fee of \$50 a year on each car owned, whether the vehicle was used or not. Naturally, the street railways protested at this requirement, and took early steps to present the matter to the Supreme Court of the United States.

The case was still pending when Carter H. Harrison, Sr., became mayor, in 1879. The great thoroughness and ability of this man led him at once to study the street railway situation, and to seek a solution for the matter. He saw well that there were two sides to the license question, and that no man could tell what the outcome of the litigation would be. The city needed the revenue from car licenses badly. So Mayor Harrison shrewdly proposed a compromise. Then, as now, the street railway companies were only too anxious to get along without contention and trouble with the city, and so were induced to accept.

The compromise was to the effect that the litigation in the Supreme Court be withdrawn, that the companies pay a license of \$50 a year on a number of cars figured by daily trips, and that for twenty years from 1883 the city should offer no contest as to the companies' right to operate their cars for ninety-nine years under their State charters. This last disposed of any agitation which had been attempted regarding the expiration in 1883 of the rights granted by the city to the companies. The compromise was embodied in two ordinances enacted by the City Council. The ordinances were accepted by the companies, and have ever since been in force. They are known as the Extension Ordinances of 1883. But there is one important point about them which must not be overlooked. For fear the acceptance of these measures should be taken as an admission by the street railroad companies that their rights to operate cars on their original lines expired in 1883, the following clause was inserted in Section 5 of the second one:

"Nothing in this section contained, or the acceptance hereof, shall in any manner impair, change or alter the existing rights, duties and obligations of the city, or of the said companies, respectively, from and after the expiration of said term of years hereinbefore contained."

This was intended to mean, and does mean, as plain as words can say it, that neither the city nor the companies forfeited any of their rights by the ordinances and agreements of 1883. On the one hand, the city did not give up its supposed right to collect licenses, nor, on the other, did the companies admit, either, that the city had the right to collect licenses, or that their franchises in any way expired in 1883. In other words, the arrangement was a general armistice declared until 1903.

These facts are given to show the true situation in the matter of street railway franchises in Chicago. It is these ordinances of 1883 that are to expire in 1903, and about which so much talk has been made of extension. The street railway companies do not admit that their charters expire before 1958; but in 1903 the city's authority to charge a license fee will be again in dispute, and the charter rights of the street railway companies under the act of the State Legislature in 1865 will be again relied upon. If the whole question settled so skillfully for twenty years by Mayor Harrison in 1883 is reopened in 1903, it will mean, as before, trouble, expense and fight with the city. The street railroad companies would greatly prefer peace. That is the reason they are in favor of more "extension ordinances," only they do not regard these ordinances as extensions of their rights, but as merely an extension of the armistice of 1883.

There are some other factors mentioned by Mr. Black which sometimes cause confusion in the discussion and understanding of the street railway situation in Chicago. In 1870 the new Constitution of the State of Illinois was adopted. It provided that no grants of street railroad and like franchises should be made by the State without the consent of the local authorities, and that all such grants should be limited to twenty years. In 1872 the Horse and Dummy act followed, elaborating these points and providing other limitations and privileges. But both of these changes in the State laws came years after the ninety-nine year extension act of 1865 was accepted, complied with, and in force, so that they cannot in any way be held to affect the rights of the Chicago companies to operate for ninety-nine years under their charters. Another confusing thing about the matter is that under the Constitution of 1870, which gave the city power to grant street railway franchises, many ordinances were passed for twenty-year periods by the council and accepted by the companies, so that these are doubtless binding and are due to expire at varying periods for the next five to twenty years to come.

The interesting question now arises, What opinion do the legal ex-

perts hold regarding the significance of this sequence of events? As may well be believed, every step in the history of the street railway companies has been gone over many times and exhaustive opinions rendered, so as to show the exact standing of the corporations. Summed up, the opinion of the experts who have gone deeply into this matter, on both sides of the controversy, is overwhelmingly in favor of the contention that the street railroad companies of Chicago enjoy ninety-nine year rights of operation on the principal trunk lines, under their charters.

The late Judge Julius S. Grinnell made perhaps a more careful and able study of this subject than any other man has ever done. As City Attorney and afterwards as Chief Counsel for the Chicago City Railway Company, he had many occasions to delve thoroughly into the history and constitutionality of all the street railroad legislation. His studies led to the final conclusion—which was one of the fixed convictions of his positive life—that the charter rights of the companies under the act of 1865 are inviolate. Writing on the subject of what rights of the Chicago City Railway Company expired in 1883, he said:

"In this discussion I wish to confine my suggestions to what are usually called the 'trunk lines'—namely, State street north of Thirty-ninth street, Indiana avenue south of Eighteenth street, Archer avenue south of Nineteenth street, Cottage Grove avenue south of Twenty-second street, Clark street north of Twenty-second street, and Wabash avenue north of Twenty-second street, because as to these, in my opinion, there is no opportunity for difference of judgment or argument. All must agree that the tracks on these streets, respectively, can be operated by the Chicago Railway Company till 1958, being ninety-nine years from 1859, without hindrance by the city. No right of the company in any of these streets expired in 1883, and, therefore, no right will expire in 1903."

This was only one of the many similar opinions delivered by Judge Grinnell on this subject. From his long researches he reached the following conclusions:

"First—That the city can have the opportunity in 1903 of raising the question as to what, if any, rights of this company expire then; which question the city did not dare to raise in 1883, and has postponed to 1903. The contract limit of the city's silence will alone expire then.

"Second—That the act of 1865 is constitutional and valid, and within the powers and prerogatives of the Legislature.

"Third—The corporate life and franchises of the Chicago City Rail-

way Company have been extended to and will expire in 1958.

"Fourth—That the right of the Chicago City Railway Company to maintain and operate street car tracks on the above mentioned streets is a contract right, duly entered into between the company and the State and city, and cannot be abridged, lessened or modified by the State or city till ninety-nine years from 1859.

"The conclusions above were entertained and expressed by me while occupying the position of City Attorney, although such fact may add nothing to the weight of my opinion then or now. But it is exceedingly gratifying to a lawyer that his mature research, study and conclusions sustain the opinion of earlier years, and that the conclusions reached fifteen years ago are fortified by subsequent reason and decisions."

Mayor Harrison, Senior, who was more intimately familiar with the actual rights and limitations of the city in street car matters than any man who has ever occupied the city executive's chair, said, in 1883, of the ninety-nine year act:

"I have always entered upon the discussion of that act with all my prejudices arrayed against it, but I am forced to yield to the opinion of lawyers far better than myself, that the act of 1865 is valid."

Judge Francis Adams, now of the Appellate bench, admittedly one of the ablest corporation and constitutional lawyers of the State, when Corporation Counsel in 1883, made a long and careful study of the street railroad situation. Although strongly on the side of the city and the public, he came to the conclusion, after a thorough analysis of the subject, that the law of 1865 was perfectly valid. He said at that time, among other statements, on the subject:

"Was the act constitutional? I say it was, because the act was passed while the Constitution of 1848 was in force, and the question is, was it constitutional when passed? It was constitutional if the General Assembly had the power to pass it, and the General Assembly had the power, if not limited or prohibited in the premises by the State or Federal Constitution.

"I am of the opinion, therefore, that the act of February 6, 1865, was constitutional when passed, and, being accepted by the railway companies, became a contract between the State and the companies, and as such is not, so far as the rights of the companies are concerned, affected by any provision in the present Constitution."

It has been well stated by Mr. Black, in his summing up of the argument in this case, that fair play and justice dictate that street railroad companies should be put on the same footing as the elevated and

steam roads, with which they compete. The Chicago City Railway competes, in bringing passengers into the heart of the city, with one elevated and a dozen or more surface steam railroads doing a suburban business. The South Side Elevated Railroad has a fifty-year franchise practically without compensation to the city, although it occupies Sixty-third street for over a mile and has other valuable concessions, and although no portion of its structure is open to the use of general traffic. The Illinois Central has a permanent existence, pays no compensation to the city, and is protected by law in charging three cents a mile if it sees fit. All the steam railroads running through Hyde Park and the Town of Lake have franchises for fifty years, which, under the railroad act, are practically perpetual. Many of them occupy streets that have been given up to their exclusive use, damaging instead of improving the abutting property. None of them pave, repair, sprinkle or clean their rights of way. None of them pay to or do for the city anything which compares in amount with that done by the Chicago City Railway Company. None of them give transfers or are obliged to operate unprofitable outlying feeders to their trunk lines. Not one of them does one-hundredth part of the public good the street car company does.

The foregoing facts and legal opinions regarding franchises have been given in detail for the purpose of presenting to our readers the exact status of the Chicago City Railway Company's corporate rights in the matter, as opposed to the garbled and often perverted statements that have appeared from time to time in the public prints and have misinformed the people.

The rapidly growing importance of the South Side as a residence and business section and the wonderful growth of the street railway lines of the Chicago City Railway Company during a single decade are graphically illustrated by the corporative maps which we publish herewith. In 1887 the longest ride afforded on these lines for five cents was six miles; in 1897 passengers were carried fifteen miles for the same fare and transferred to any part of the South Side without extra charge. A still further extension since that time is noted. At the present time every square mile of this vast territory is intersected with many tracks of this company, all leading to the common downtown terminus, and bringing passengers from the remotest corner of the South Side to the business center for the single nickel fare.

The price of a ride has, by common consent, been placed at five cents, and this being the handy small coin of our country, it naturally remains as the standard. To reduce the fare by selling a quantity of tickets for a lump sum—say six or eight tickets for a quarter of a

dollar—has always proved a failure, so far as the object sought, viz., the advantage to the poor man, is concerned. The laboring man has but little money to spare, and experience warrants the statement that he seldom invests in tickets, even though such an investment would mean cheaper transportation for him. A critical examination has developed the fact that he fears the loss of his tickets, and also the unnecessary use of them. Those who benefit chiefly by the cheap ticket plan, therefore, are not the working people. But, aside from cheapening fares in such a manner, experience has taught that extending the length of the rides is by far the best and most satisfactory solution of the question, and at the same time is most helpful to the general public. As it would be inexpedient to make a charge per mile, the five-cent rate is made to cover all distances. And here a result is attained which can but be satisfactory. It is seldom the poorer classes reside near the heart of the city, owing to the value of real estate in such localities; generally they live near the outskirts, and thus it is that, as a length of ride is increased, the cost of the same to them is diminished. Besides this, the lengthening of the lines causes improvements to spring up, and great development in real estate.

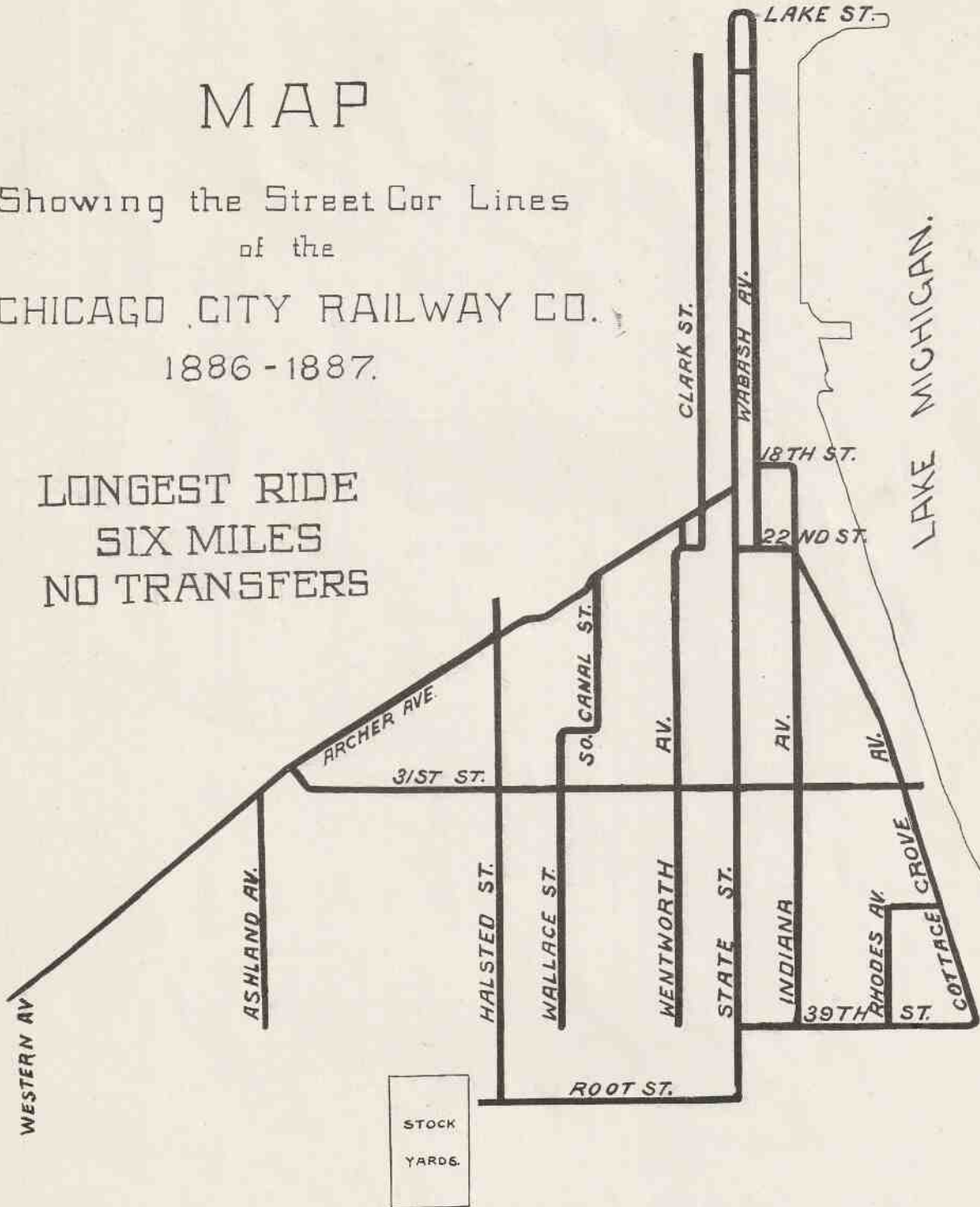
It has been said that while the cost of many articles has decreased during the past, the cost of a street car ride remains the same. This is erroneous, and the exact contrary is true. There is nothing for which we pay that has decreased in relative cost so much as travel on the street railways. The patrons of the street railways now receive from five to ten times as much for their money as they did thirteen years ago. A table prepared by the Street Railway Review, touching on this subject, tells the story by comparison, showing the appreciation of the purchasing power of money the past thirteen years as applied to street car fares and sundry commodities.

This phase of the subject will be found more fully illustrated, perhaps, by reference to the accompanying map (to be found in these pages), which has been produced to show in greater detail the development and extensions of the various street railway lines of this company since 1886 and 1887. The map shows all the main lines and extensions which existed twelve years ago, and the comparison is between then and now. The showing is certainly not unfavorable to the contention that while the fare has remained the same, the purchasing power of the "nickel" has multiplied many fold—to the great advantage of the people, and a corresponding expense to the street railway company. The diagram following is a brief elaboration of the idea:

MAP

Showing the Street Car Lines
of the
CHICAGO CITY RAILWAY CO.
1886-1887.

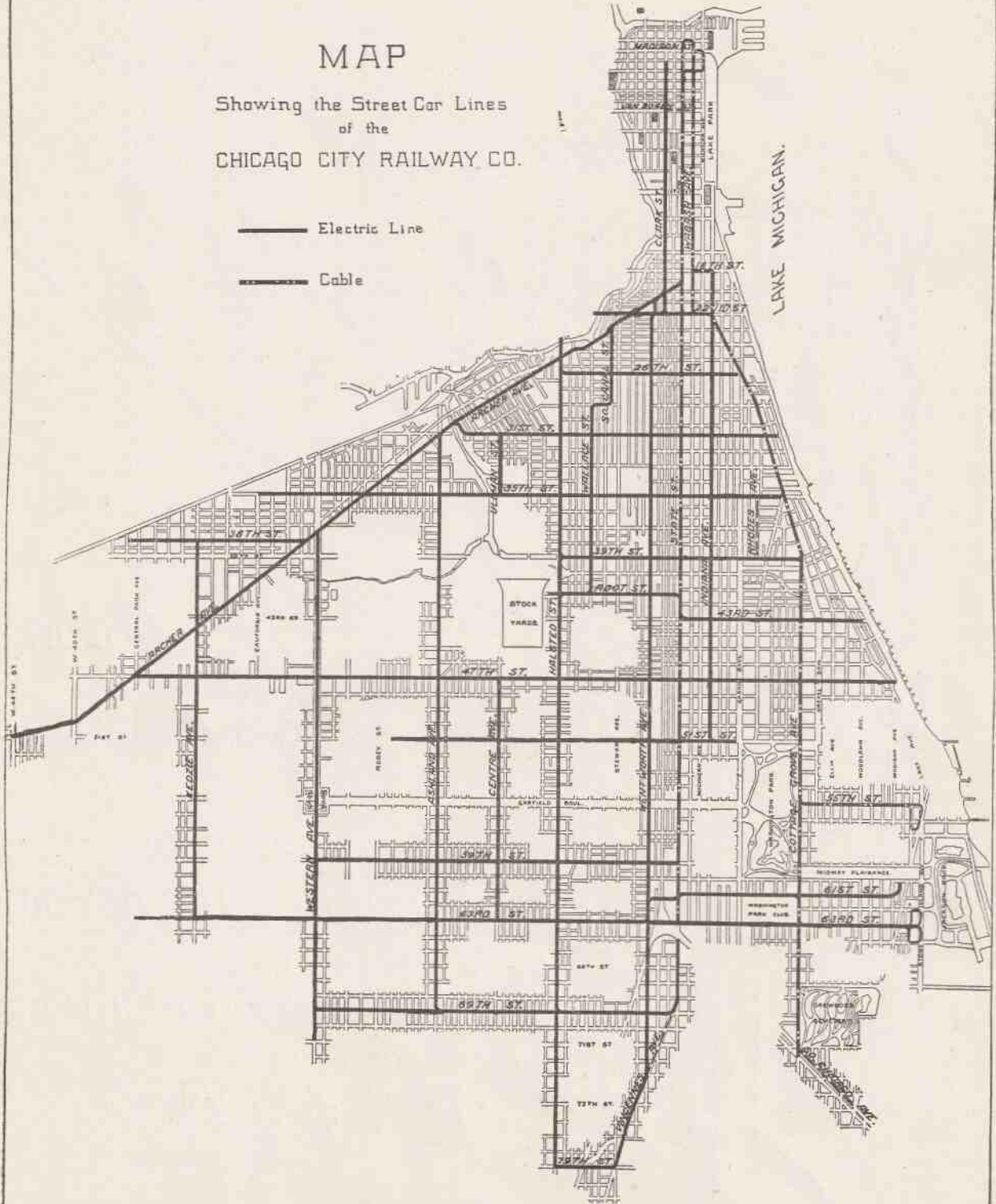
LONGEST RIDE
SIX MILES
NO TRANSFERS



MAP

Showing the Street Car Lines
of the
CHICAGO CITY RAILWAY CO.

- Electric Line
- Cable



1886	What a unit would buy	100%
1899	What the same unit would buy	
_____	Street Car Rides	337.5
_____	Bricks	178
_____	Steel Rails	174
_____	Silver	145
_____	Sugar	137
_____	Portland Cement	136
_____	Wheat	134
_____	Corn	131
_____	Cotton	122
_____	Coal	118
_____	Salt Pork	85

Notwithstanding the cheapening of the cost of a ride, the improvement in the physical condition of the railway has been marvelous. Instead of a light, rough running track, a girder rail is used, heavier than the steam railroads, which insures smoothness of running. The small cars, cold, with floors covered with straw, lighted by oil lamps, and slow-going, have been supplanted by large, roomy cars, well cleaned and heated, and lighted with gas or electricity, and propelled at much greater speed. The improvement has been so great that thousands ride on cars in good weather for the pleasure and recreation afforded. Surely the claim is not unfounded that, with much longer rides and better service, the rate of street car fare has been greatly reduced.

The Chicago City Railway Company is a corporation organized under special charter obtained from the State of Illinois in 1858. Its authorized capital stock is \$14,000,000; its stock actually outstanding is \$13,000,000. First mortgage bonds drawing 4 1-2 per cent interest and due July 1, 1901, have been issued to the amount of \$4,619,500. Dividends are paid quarterly at the rate of 12 per cent a year. An additional \$1,000,000 of capital stock was authorized by resolution of stockholders in January, 1899, to be offered to old holders at the discretion of the directors.

The first mortgage, dated December 21, 1887, was issued to secure an immediate issue of \$4,000,000 of bonds, and provided that additional bonds to the amount of \$2,000,000 might be issued from time to time for extensions and improvements, the additional bonds to bear such rate of interest as is fixed at time of issue. The trustee is Charles L. Hutchinson. Principal and interest are payable at the First National Bank, Chicago, and in case of death or inability of trustee, Erskine M. Phelps is named as his successor. Bonds may be redeemed at any time on giving sixty days' notice.

In 1890 this company took over the incomplete Chicago and South Side Rapid Transit project, furnishing money to build the elevated road in Sixty-third street and to complete construction north of that point. It thus secured a majority of the capital stock of the elevated road, and \$3,000,000 second-section bonds. The stock was held in trust by the Chicago Trading Company, and in September, 1893, the stock and bonds were distributed among City Railway stockholders as an extra dividend, each holder getting 50 per cent of the amount of his City Railway stock in Rapid Transit stock, and 33 1-3 per cent in extension bonds. In February, 1898, leading men in the company incorporated the Chicago City Railway Rapid Transit Company, with a capital of \$1,000,000, for the purpose of building an elevated road in

Chicago City Railroad Company :

1866	_____	4 miles.
1876	_____	5 miles.
1886	_____	6 miles.
1896	_____	15 miles

Dearborn street, from the heart of the city to Thirty-ninth street, to be used as a trunk line in bringing in the City Railway Company's trolley cars. At present writing, however, nothing further has been done in pursuance of this project. Although the stock of the South Side Elevated Railway is largely owned by stockholders of the Chicago City Railway Company, the two corporations are not otherwise affiliated. In June, 1898, the franchises of the General Electric Railway, which had threatened to invade the South Side territory, were acquired by interests friendly to the City Railway Company.

The tables given herewith show interesting details of operations running over a period of thirteen years. It will be noticed that the

Operations.

EARNINGS:	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
From passengers.....							\$4,400,942	\$6,029,813	\$4,239,749	\$ 4,440,323	\$ 4,761,945	\$ 4,781,055	\$ 4,799,606
From other sources.....								30,176	24,869	36,501	46,921	35,461	33,200
Gross.....	\$1,956,085	\$2,250,781	\$2,611,841	\$2,872,502	\$3,436,748	\$3,873,198	\$4,400,942	\$6,059,989	\$4,264,618	\$ 4,476,824	\$ 4,808,866	\$ 4,816,516	\$ 4,832,806
Operating expenses.....	1,336,781	1,564,521	1,928,503	2,027,162	2,297,651	2,534,316	2,809,431	3,422,040	2,838,684	2,807,726	2,977,208	2,908,982	2,926,490
Net earnings.....	\$ 619,254	\$ 686,260	\$ 683,338	\$ 845,340	\$1,139,097	\$1,338,882	\$1,591,511	\$2,637,949	\$1,425,934	\$ 1,669,098	\$ 1,831,638	\$ 1,907,534	\$ 1,906,316
Interest.....	104,242	155,443	212,356	239,308	220,271	216,585	230,873	190,237	207,877	207,877	207,877	207,877	207,877
Depreciation.....						43,091	29,500	155,989		92,510	181,568	50,000	90,000
Earnings on stock.....	\$ 515,012	\$ 530,817	\$ 470,982	\$ 606,032	\$ 918,826	\$1,079,206	\$1,330,138	\$2,282,743	\$1,218,057	\$ 1,368,711	\$ 1,442,212	\$ 1,649,656	\$ 1,608,438
Regular dividend.....	380,000	380,000	449,958	510,000	600,000	750,000	840,000	1,050,000	1,080,000	1,140,000	1,289,787	1,440,000	1,440,000
*Extra dividend.....								1,050,000					
Surplus.....	\$ 155,012	\$ 170,817	\$ 21,024	\$ 96,032	\$ 318,826	\$ 329,206	\$ 490,138	\$ 182,743	\$ 138,057	\$ 228,711	\$ 152,425	\$ 209,656	\$ 168,438
Outstanding capitalization.....													
Stock.....	\$3,000,000	\$3,000,000	\$4,000,000	\$5,000,000	\$5,000,000	\$7,000,000	\$7,000,000	\$9,000,000	\$9,000,000	\$10,000,000	\$12,000,000	\$12,000,000	\$12,000,000
Bonds.....	2,999,500	3,999,500	3,999,500	3,999,500	4,499,500	4,619,500	4,619,500	4,619,500	4,619,500	4,619,500	4,619,500	4,619,500	4,619,500

*In 1893 \$2,250,000 of stock and bonds of the Chicago & South Side Rapid Transit Company were distributed as an extra dividend.

DETAILS OF OPERATING EXPENSES:	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
Wages of trainmen.....	\$ 526,234	\$ 641,255	\$ 739,583	\$ 816,415	\$ 945,847	\$1,017,773	\$1,073,839	\$1,271,757	\$1,051,618	\$1,031,170	\$1,113,429	\$1,096,371	\$1,083,526
Transportation expenses.....	75,017	80,928	100,955	108,027	116,345	128,796	136,598	285,290	229,912	242,316	228,996	192,288	186,632
Motive power.....	311,534	268,752	542,994	588,561	728,672	732,259	782,542	708,768	587,039	479,376	316,550	283,388	264,892
Repairs and maintenance track and buildings.....	186,183	203,634	209,546	214,871	155,587	239,286	290,328	524,025	430,014	362,965	472,392	334,765	422,690
Repairs and maintenance rolling stock.....	73,356	102,976	121,428	91,962	113,439	114,056	180,321	283,549	196,276	288,592	339,753	269,829	358,975
General expenses.....	111,923	113,476	157,145	155,889	161,672	211,166	240,802	223,023	222,261	276,356	352,677	481,818	447,681
Taxes.....	40,927	40,267	42,606	56,287	59,667	85,307	86,985	93,940	102,345	106,138	131,086	128,997	139,140
Car licenses.....	11,548	13,232	14,244	15,149	16,421	17,673	18,016	22,687	20,219	20,792	22,025	21,525	22,654
Total as above.....	\$1,336,781	\$1,564,521	\$1,928,503	\$2,027,162	\$2,297,651	\$2,534,316	\$2,809,431	\$3,422,040	\$2,838,684	\$2,807,726	\$2,977,208	\$2,908,982	\$2,926,490

cost of operation per car mile is greatest when horses are used and least under the cable system. The cost of electric traction is apparently nearly 30 per cent more than cable, but this statement is subject to an important modification where trailers are used. It has been found that the addition of trailer cars does not increase the expense per car mile anything like the proportionate cost of operating motor cars alone, so that in general use, where trailers are carried on almost every train, the electric system is calculated to be the cheapest as well as the best.

The area covered by the transportation lines of the Chicago City Railway is the most important in point of population and desirability of residence in the city. It extends from Randolph street south, along a comparatively narrow strip of land between the river and the lake, to Twenty-second street, where the lines begin to widen out in both directions. Along Archer avenue to the southwest one electric line reaches away out to West Forty-fourth avenue and as far south as Fifty-first street. To the east the Cottage Grove avenue line reaches the western boundary of Washington Park and extends south to South Chicago avenue, on which street it runs southeast to Seventy-sixth

street. The State street line runs south to Sixty-ninth street and thence southwest on Vincennes avenue to Seventy-ninth street. The Halsted street line also reaches Seventy-ninth street. Other north and south lines are Rhodes avenue, Indiana avenue, Clark street and Wentworth avenue, Canal and Wallace streets, Center avenue, Ullman street, Ashland avenue, Western avenue and Kedzie avenue. Practically all of these lines are now operated by electricity—the trolley system being used throughout. The same is true of the cross-town lines, which are: Twenty-second, Twenty-sixth, Thirty-first, Thirty-fifth, Thirty-ninth, Root, Forty-third, Forty-seventh, Fifty-first, Fifty-fifth, Fifty-ninth, Sixty-first, Sixty-third, Sixty-ninth and Seventy-ninth streets. The territory actually covered by these lines is nine miles long by seven and one-half miles wide, and is populated, for the greater part, by the most intelligent and progressive of Chicago's citizens. It is doubtless destined to be the solid business section and also the most desirable residence portion of the city.

Among the many points of interest reached by the Chicago City Railway lines we may make special mention of the parks—Washington and Jackson—Oakwoods Cemetery and the Union Stock Yards. The

	1892.	1893.	1894.	1895.	1896.	1897.	1898.
Mileage:	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Cable.....	34.77	34.77	34.77	34.77	34.92	34.75	34.75
Electric.....	28.93	28.93	74.22	117.81	141.76	149.74	157.36
Horse.....	115.44	88.63	52.63	9.79	7.54	5.23	4.74
Total.....	150.21	152.33	161.62	162.37	184.22	189.72	196.85
Passengers carried:							
Cable.....			54,690,808	53,356,825	46,435,411	41,444,536	38,482,628
Horse.....			20,589,383	6,918,616	2,874,831	601,051	477,313
Electric.....			9,514,816	23,528,016	45,928,873	53,485,425	57,032,173
Total.....	88,018,861	120,596,270	84,794,967	88,806,461	95,238,915	95,821,112	95,992,114
Miles run:							
Cable.....		19,713,610	15,221,400	14,872,580	13,908,190	12,562,610	11,678,020
Horse.....		5,053,050	3,965,750	1,542,360	626,690	196,860	143,900
Electric.....		1,537,430	1,850,260	5,525,760	10,018,020	11,619,530	12,569,380
Total miles run.....	20,820,710	25,304,990	21,047,410	21,941,900	24,552,900	24,378,000	24,385,300
Cost per car mile:							
Cable.....		9.921	9.97	10.240	10.55	10.70	10.81
Horse.....		24.863	25.39	30.550	25.88	24.09	27.23
Electric.....		13.660	16.90	14.776	13.46	13.05	12.93
Average all.....	13.494	13.09	13.457	12.796	12.12	11.93	12.00
Percent exp. to income.....	63.84	56.75	66.56	62.72	61.91	60.40	60.97
Increase in traffic.....	13.62	37.01	*29.6	4.84	7.24
Earnings on stock.....	17.27	28.69	13.53	14.41	13.42	13.74	13.40

South Division has 1,306 acres in parks, which is more than the park acreage of both the North and West Sides combined. Exclusive of boulevards, the south park system possesses a park area of 975 acres, distributed as follows: Washington Park, 371 acres; Jackson Park, 524; Gage Park, 20, and Midway Plaisance, 80.

Washington Park lies six miles south of the City Hall and one mile west of Lake Michigan, and extends from Fifty-first street on the north to Sixtieth street on the south, and lies between Cottage Grove avenue on the east and South Park avenue on the west; it has an area of 371 acres. The park was originally very swampy and has been reclaimed almost entire from an impassable morass. This was a long, arduous and expensive undertaking, but the drawbacks were gradually overcome, and its transformation from a sandy waste to beautiful flower gardens, lawns, walks and shady retreats has been successfully accomplished. The transplanting and caring for the growth of trees was the most difficult task of all, but skill, labor and money have given to Washington Park groves of evergreen and deciduous trees second to none. The system pursued in transplanting has been to place them in groups, in such positions and of such size as to produce a pleasing effect of shade in bold contrast with intervening vistas of open lawn. By this means a better growth has been secured, through the protection the trees afford to each other, as well as an impressive effect of masses

of foliage obtained earlier than would otherwise have been possible. The trees are principally elms, maples and birches, selected because of their adaptability to the severe climate of this latitude.

No feature of the park attracts more attention or affords more pleasure than the floral display, which is as unique as it is beautiful. There are always shown new and striking figures, such as the "American flag," the "gates ajar," sun dial, calendars and other designs, presenting a remarkable exhibition of the landscape gardener's art, which has rendered this park especially noted. The conservatory is an elegant and spacious building and forms one of the principal attractions, because of the rare beauty of the plants and flowers with which it is filled. It contains a large collection of tropical and sub-tropical flowering plants and ferns, including date palms, magnolias, fan palms, century plants, laurestinus, rubber-trees, etc. There are a large number of propagating houses, from which 200,000 plants are annually transplanted, besides a cactus house.

Among the noticeable buildings in the park is that used for a stable and carriage house. It is a fine stone structure, 325 by 200 feet, built in the form of a Greek cross, and has accommodations for 100 horses and storage room for the various phaetons and other vehicles belonging to the park. This building is well worth a visit, the stable being one of the finest in the country.

Gage Park is a small park of twenty acres extent, located about four miles west of Washington Park, at the junction of Garfield boulevard and Western avenue. It was named in memory of George W. Gage, who was one of the first commissioners of the South Park system.

Washington and Jackson parks are connected by a strip of land one mile in length and lying between Fifty-ninth and Sixtieth streets, known as the Midway Plaisance. In preparation for the World's Fair this heretofore unimproved portion of the park system underwent a great change. It is now designed to serve its original purpose—that of a connecting parkway between the two parks. The plan of the landscape architect provided for a canal one hundred feet wide through the center of the tract to the lake in Washington Park, flanked on either side by a walk, a drive and a deep lawn, in the order named. One side of the lawn skirts Fifty-ninth street and the other Sixtieth. The walks and drives are shaded by trees; the canal is crossed by five bridges.

Jackson Park is about seven miles south of the City Hall and extends from Fifty-fifth street on the north to Sixty-seventh street on the south. It is bounded on the east by Lake Michigan. Its area is 523 acres, which includes 170 acres of lakes, connected with Lake

Michigan by an inlet. The lake frontage of 7,131 feet is protected from erosion of the waves by a great breakwater and a paved beach fifty feet wide, extending along the entire shore of the park. This work cost nearly half a million dollars, and has never been equaled in the history of park protection. It insures a permanent water line, as it is practically indestructible.

Jackson Park will always be associated in memory with the greatest event in the history of Chicago—the World's Fair. It was selected as the most available site only after a very spirited contest with the friends of other locations, each of which had its special advantages. A large part of Jackson Park was at that time not much better than a swamp, being composed for the most part of low sand ridges interspersed with bogs, the only considerable vegetation being meager growth of scrub oaks and other stunted trees. But, by a seemingly infinite expenditure of money and labor, the park was put in the condition of a garden, and proved to be exactly the location best suited to the wants of the Exposition. It was the admiration of the world during the six months of the Fair, and since that time it has been gradually improved, until it is now one of the most magnificent parks in this country. Some few of the old World's Fair buildings still remain, and the spot is a never-failing point of interest for the visitor to Chicago, who seeks to identify in the now changed and beautified landscape his former World's Fair associations.

South of Sixty-seventh street and east of Cottage Grove avenue is located Oakwoods Cemetery, which is reached by the cars of the Chicago City Railway. Interest attaches to this cemetery for the reason that it is one of the oldest burial grounds in the city and also because it is the burial place of a large number of soldiers. More than five thousand Confederate soldiers, who died while they were prisoners at Camp Douglas, were interred in Oakwoods. Many Union veterans sleep their last sleep there, and an interesting feature of the cemetery is the Union soldiers' monument, a statue representing a private soldier with his rifle on a marble pedestal. In the foreground are four cannon, guarding the graves of seventy veterans there grouped together.

Oakwoods comprises 180 acres. It was planned by the celebrated Adolph Strauch, of Cincinnati. The avenues are laid out in curves, on an established grade, and perfect drainage is secured by scientific engineering. The land is of a dry, sandy nature, but is covered with a sufficient depth of soil to insure the thrifty growth of trees, shrubs and flowers. Much attention has been given to the improvement and embellishment of the grounds, which present a park-like appearance, and are in every respect beautiful as a place for the long slumber of

the dead. The cemetery has its own system of water works, with five miles of pipe and five beautiful artificial lakes. A public vault capable of holding 500 caskets has been supplied with all modern improvements.

A never-failing magnet to draw the Chicago visitor is the Union Stock Yards. Located on Halsted street south of Thirty-ninth street, the yards are readily reached by the main line of the Chicago City Railway on State street, with transfer to Thirty-ninth and Root streets or Forty-seventh street. Over 640 acres are now occupied by the Union Stock Yards and the packing houses. This vast amount of land is all weeded for the purposes of housing, slaughtering, packing and shipping live stock, and not a single acre is wasted. In the early days of the city a yard capable of accommodating 5,000 cattle and 30,000 hogs was considered something wonderful. The present capacity of the Union Stock Yards is 75,000 cattle, 300,000 hogs, 50,000 sheep and 5,000 horses. The yards are divided into 4,475 pens, occupying a ground area of about 300 acres. The yards contain twenty miles of water troughs, fifty miles of feeding troughs, and seventy-five miles of drainage and water supply. The pens for the various kinds of stock, which hold from one to ten carloads each, are laid out in divisions distinct from each other, much after the manner of city wards, the intersecting streets running through them at right angles. The plant represents an outlay of \$5,000,000, and the company employs more than a thousand hands, while the 200 commission firms doing business there employ some 1,500 assistants. About one hundred firms of packers are located at the Stock Yards, some 20 per cent of whom are more or less prominent as curers of meat. The plants of these one hundred concerns are estimated to be worth about \$12,000,000, while the capital invested in their business falls little, if at all, below \$25,000,000. In and about the houses 25,000 men find employment, the annual wages paid reaching the sum of \$20,000,000, while the total value of the products for the year 1892 reached the enormous aggregate of \$150,000,000.

In the early history of the yards 1,200 cattle pens and 1,000 hog and sheep pens were found sufficient for accommodation of stock; at the present time more than 4,000 of the former and 2,000 of the latter are scarcely enough to meet the requirements of business. The amount annually expended for construction and repairs reaches from \$100,000 to \$300,000. The drainage of the yards is excellent, and has been provided at an enormous expense by the construction of a sewerage system embracing about fifty miles of sewers. The sanitary conditions of the yards are excellent.

One of the chief difficulties encountered by the company at the

outset of this enterprise was the obtaining of a sufficient supply of pure water. It is now secured from six artesian wells of an average depth of 1,200 feet, and an average capacity of 600,000 gallons a day. The first well was sunk in 1866, and water was found at a depth of 1,032 feet. The number of wells was increased from time to time, as it was found necessary. The water thus obtained can be used only for supplying the wants of the stock, not being available for mechanical purposes on account of its strong impregnation with minerals.

Every railroad entering Chicago is connected directly with the stock yards. Each company owns its own tracks, and the mileage is being constantly increased, more than 1,000 miles of steel rails being used for such connections at present. Inside the yards are about 150 miles of track, the locomotives running on which are owned and operated by the stock yards company, which receives and delivers the loaded cars, guaranteeing both the safety of the cargo and the payment of freight. Each road is assigned 1,000 feet of platform, and the facilities for loading and unloading stock are such that by an arrangement of chutes an entire train may be unloaded as rapidly as a single car. The company has also built a passenger station, with water tanks, coal bins, and all the requirements of a first-class railway station.

In the center of the yards stands the exchange building, in which are the officers of the company, as well as those of the commission firms. The building is a large one, having several wings which have been added to the original structure from time to time. It is connected by telegraph and telephone with all parts of the country. The stock yards supports a national bank, with a capital stock of \$200,000; also a printing house, in which a daily and weekly paper is printed. A postal station is located just outside the yards. In short, the stock yards is a city in itself, having all the features of city life except municipal government.

One feature of the yards which should not be overlooked by the visitor, and must not be omitted in this description, is the horse market. The horse stables are 850 by 165 feet, and are built chiefly of brick. A separate space is allotted to the different firms of horse dealers. This department of live-stock activity is a comparatively new growth at the stock yards. It has increased so rapidly within the past few years that it has been found necessary to construct, in addition to the stables, a sales pavilion, 525 by 162 feet, two stories in height, in which the regular auction sales of horses are held, and agricultural or live stock exhibits are made. The Chicago horse market sells an average of 300 horses daily. Daily auction sales are held in a commodious pavilion, and auctioneers who have had a life-long experience in

selling horses are able to dispose of as many as seventy-five head an hour at times, and have been known to keep up this average for a day's work. It is the world's greatest horse market.

The foregoing are a few only of the many places of general interest which are reached directly by the lines of the Chicago City Railway Company. They have been given a brief description in this connection to indicate, but faintly, the extent and importance of the territory covered by this system of street railways. The South Side is a mighty metropolis in itself, and the Chicago City Railway reaches to every nook and corner of it.

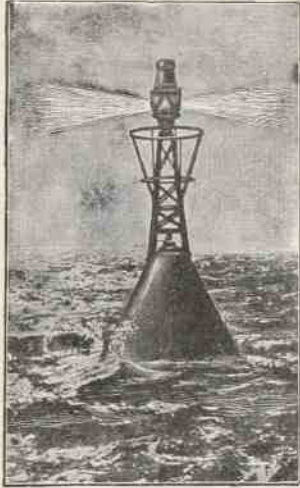
The officers of the Chicago City Railway Company from its incorporation to the present time have been as follows:

Presidents—Liberty Bigelow, March 28, 1859, to September 20, 1859; Benjamin F. Carver, September 20, 1859, to April 8, 1861; William H. Waite, April 8, 1861, to August 11, 1863; David A. Gage, August 11, 1863, to August 8, 1864; S. M. Nickerson, August 9, 1864, to January 11, 1872; M. D. Hennessy, January 11, 1872, to January 8, 1874; S. B. Cobb, January 8, 1874, to May 24, 1881; Daniel A. Jones (acting), May 24, 1881, to January 23, 1882; C. B. Holmes, January 23, 1882, to January 15, 1891; G. H. Wheeler, President and General Manager, January 15, 1891, to January 16, 1898; M. K. Bowen, January 16, 1898, to April 9, 1899; D. G. Hamilton, April 9, 1899, to the present time. *J. E. Milton, July 24, 1905*

Secretaries—George W. Fuller, March 28, 1859, to January 13, 1868; M. D. Hennessy, January 13, 1868, to January 11, 1872; J. F. Johnson, January 11, 1872, to January 9, 1873; W. N. Evans, January 9, 1873, to April 25, 1884; H. H. Windsor, April 25, 1884, to January 15, 1891; F. R. Greene, January 15, 1891, to the present time.

Treasurers—George W. Fuller, March 28, 1859, to January 13, 1868; M. D. Hennessy, January 13, 1868, to January 11, 1872; J. F. Johnson, January 11, 1872, to January 22, 1881; W. N. Evans, January 22, 1881, to January 29, 1883; T. C. Penington, January 29, 1883, to the present time.

Superintendents—D. A. Gage, May 11, 1860, to August 11, 1863; Franklin Parmalee, August 11, 1863, to August 8, 1864; Charles H. Walker, August 9, 1864, to December 1, 1866; Daniel Thompson, December 1, 1866, to January 13, 1870; R. T. Crane, January 13, 1870, to January 13, 1873; C. B. Holmes, January 13, 1873, to January 15, 1891; S. T. Pope, January 15, 1891, to April 9, 1892; M. K. Bowen, April 9, 1892, to January 15, 1897; General Manager, January 15, 1897, to January 16, 1898; George O. Nagle, January 18, 1898, to the present time.



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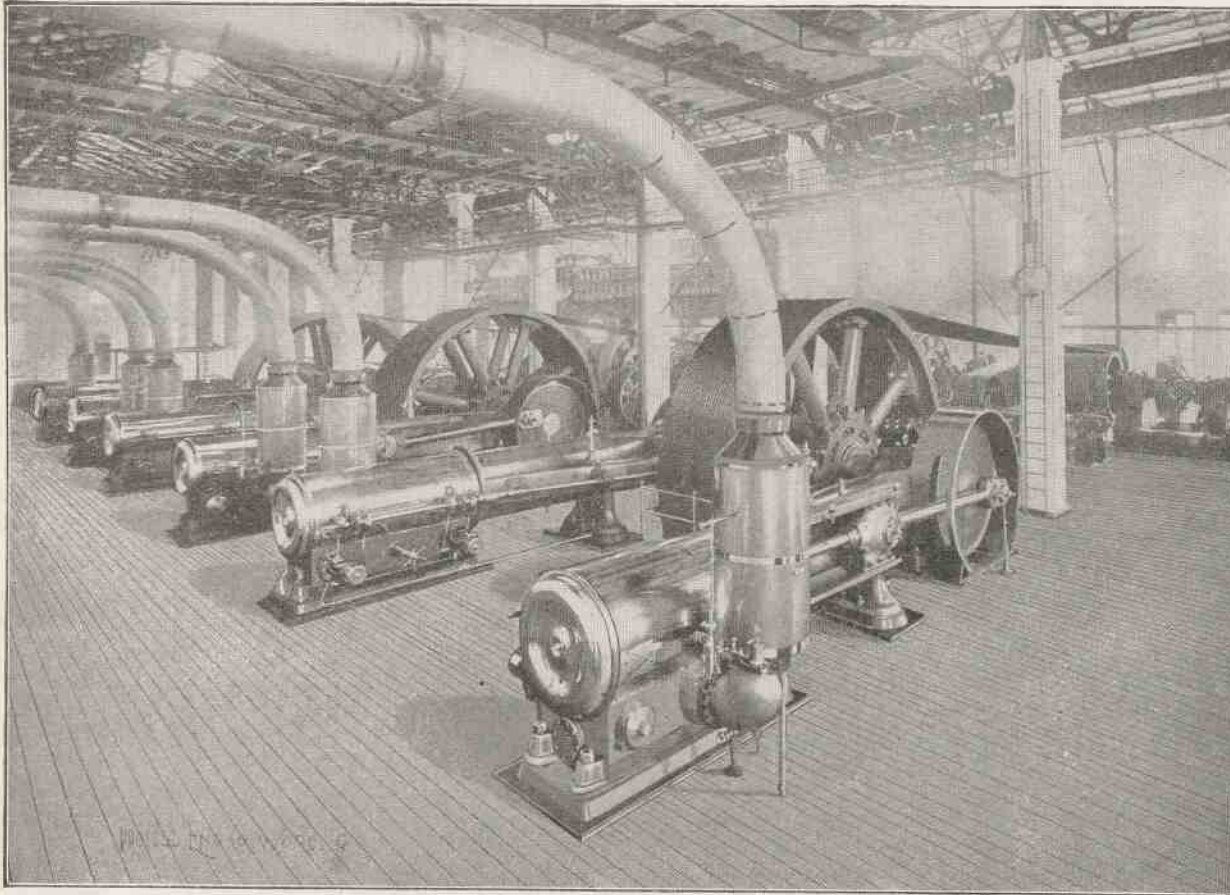
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