

The Principal Causes of Trouble

Any consideration of the present problem of crowded cars in our city streets must take into account the modern tendency of urban growth which doubles the population without materially increasing the area of the business section of the city. We refer to the steel skyscraper which increases enormously the density of population and makes almost impossible demands on all systems of street transportation. For example, there are many business blocks in both New York and Chicago consisting of single colossal buildings, in which no less than 4000 to 5000 persons earn their livelihood. Including dependents these single buildings alone bespeak each a city of 10,000 to 12,000 inhabitants, the workers of which have to be carried to and from their labors daily, an average distance of perhaps 5 miles, within a period covering, perhaps, an hour and a half morning and evening. And they are all hurrying through and to the same narrow streets, laid out when elevators were an unknown quantity. The business center of every large city is constituted of enormous and constantly increasing numbers of buildings of just this character. The difficulties of carrying all the people who present themselves for transportation are apparent.

But it is not only a question of the congestion produced by the cars themselves. Trucking has increased almost, if not quite, to the same extent as have the denizens per square mile of our over-built business and residential districts. Streets in our older cities, which were originally designed for lanes between adjoining farms, have in the evolution of the city been forced to perform the function of great arteries of trade. The result is that, blocked by each other at every principal cross street and by the vehicle traffic, the cars crawl along at 8 miles an hour when they should make 25 miles. The addition of more cars simply makes confusion ten times worse confounded, yet the tall buildings continue to grow while the facilities remain the same.

Some of the Remedies

It must not be assumed, however, that the situation is not capable of amelioration. The principal directions in which improvement can be secured may be summed up briefly as follows: More routes, higher speed and the redistricting of the modern city so as to secure a larger effective business area.

The latter can only be gained by prohibiting the height of buildings, as is done in many cities, especially abroad. This latter plan, however, will not afford any remedy for the existing situation, but will tend to prevent it becoming worse. It is doubtful, also, whether New Yorkers or Chicagoans, to whom the many advantages of the tall steel skyscrapers have become most familiar, are yet ready to accept this plan.

The hearing in New York on Jan. 5 developed the fact that the obstruction of the roadways by the vehicles constituted, undoubtedly, the chief obstacle to better service in New York with the existing street railway facilities. Instances without number were cited, and every visitor or resident in the city will have no difficulty in recalling as many cases, where an obstinate truck driver or a wagon unloading merchandise has held up a long line of cars to suit his convenience. The better surface given by the rails for traction attracts the trucks to the portion of the streets on which the cars run, and it often takes a good deal of prodding with the platform gong to make a driver turn off the track. This trouble is especially noticeable after a snow-storm, when all of the trucks use that part of the roadway devoted to the railway tracks, as it has been cleaned by the railway company, but the practice constitutes a serious evil all the

time. It is a very significant fact that although there is a municipal ordinance against the creation of an obstruction of this kind by truck drivers, and although the railway company has had a large number of arrests made, and has appeared as complainants, no convictions have occurred in over two years.

The suggestion made elsewhere in this issue of restricting the trucking business to non-rush hours, while very radical, and one which might possibly be incapable of execution, at least points the direction in which improvement can be secured. With the trucks out of the way or keeping to their proper portions of the street, it is not too much to say that the situation will be very radically relieved. We also believe that strict rules punishing the drivers of vehicles who obstruct the movement of cars, restrictions on vehicle traffic over certain busy streets and traffic regulations upon those streets on which it is permitted, would also greatly assist in the amelioration of the present conditions. The control possessed by the police over the vehicle traffic in London is much more efficient than that in New York, and the conditions in our streets could be made much better by a vigorous police supervision.

Other Proposed Remedies

Some of the demands made by the Merchants' Association, in New York, will, in our opinion, add to the congestion rather than relieve it, that, for instance, requiring the issue of transfers at all junction points. Such a proceeding is directly opposed to the effort which should be made to distribute the traffic from a congested line over parallel lines. An example will perhaps make this clearer. A person, for instance, arriving in New York at West Twenty-Third Street, over either the Erie or Pennsylvania ferries, can, by taking one of several lines which now terminate at that point, be transferred to any of the north and south lines crossing Twenty-Third Street, although the Twenty-Third Street line itself transfers to only a few of the north and south lines. If transfers were given by the Twenty-Third Street line to all of these longitudinal lines it would probably be taken by many persons, who could just as well travel by another crosstown line. This would not only crowd the cars but would also interfere with the north and south travel at every junction point of Twenty-Third Street and the busy avenues. In other words, the transfer situation should be very carefully reviewed, with the object of inducing the passengers, where possible, to take the lines of lighter traffic, and if any change is made it should, in our opinion, be toward reducing the present number of transfer points rather than toward increasing them.

The demand for vestibules, in our opinion, is another mistake made by the Merchants' Association. We have constantly advocated the use of vestibules for the protection of motormen on lines operated under interurban conditions, and for some city lines in Northern latitudes, but we believe that vestibules are not only unnecessary in New York, but, what is very serious, directly impair the ability to give quick service. The weather conditions in New York are not extreme, and the motormen are no more exposed to the weather than the Broadway policeman or others who have to work in the open air. On the other hand, the traffic situation is a critical one, and any screen which tends to cut off the view ahead, or otherwise interferes with the quick control of the cars, would be productive of accidents and very objectionable.

Some of the other demands made by the association, such as the use of two conductors on cars during the rush hours and on long cars at all times, also seem unnecessary; on the other hand, certain reforms urged by the association are of a practical

nature, and, if carried out, would assist in bettering the traffic conditions on the surface lines in New York city.

Manhattan Recommendations

The preliminary investigation of the traffic conditions on the Manhattan Elevated Railway by the Railroad Commissioners resulted last week in an order from the Commission to the Manhattan Company which contains three provisions, viz.: That between an early morning hour and midnight as many trains be run as during the rush hours; second, that during the next three months the company shall add 300 cars to its rolling stock, at the rate of 100 a month; and, third, that the company shall take immediate steps to lay a third track upon sections of its Third Avenue and Ninth Avenue lines, and for practically the entire length of its Second Avenue line. We do not believe that the Commission expected the first two provisions to be carried out literally by the company, as a rush-hour service during eighteen hours of the day is unnecessary, and in view of the condition of the car shops of the country the second demand could not be complied with if orders for these cars had not already been placed. These instructions were given, we assume, with the idea of impressing upon the Manhattan Company the necessity of prompt action in increasing its train service during the non-rush hours, and also the importance of having enough cars to carry out the schedules ultimately to be decided upon by the Commission. The installation of the additional third-track routes ought, however, to be of great assistance in caring for the rush-hour traffic.

The Chicago Situation

The summary of the Arnold report, which was presented last week, is supplemented in this issue by a discussion of Parts I and II, with two maps, showing the proposed rearrangement of lines; the remainder of this document will be considered in the same manner in subsequent issues. It requires only a casual glance over the general summary to understand that the problems in Chicago are entirely different from those in New York in many important points, including the physical conditions, the franchise situation and the divisional lines in ownership. In other respects there is a striking similarity, particularly with reference to the congestion of the downtown district and the obstructions caused by trucks and other vehicular traffic. At the present time all the important lines of the city lead to the retail shopping district, which is a comparatively small section, and none of them has ample terminal facilities.

In the two parts of the report discussed in this issue the general operating conditions are treated as well as the inadequacy of the present downtown terminals, the reasons for the present congested condition, and recommendations are made for immediate improvement of downtown terminals to relieve congestion. Unification of ownership or consolidation of management on some basis is advocated as a condition which must be precedent to any really satisfactory and lasting solution of the problem, although an equitable arrangement for the joint use of tracks, it is believed, would offer a temporary solution and probably result ultimately in unification. The surface lines serving the city are now operated by eight companies, and the elevated lines by four companies. At present during the hours of maximum traffic there are 1379 cars operated on the lines entering the business district, but experience has shown that this is wholly inadequate, and as a consequence many persons living within a couple of miles of their places of business prefer to walk rather than submit to the crush on these lines. Great delays are experienced in shifting cars at the downtown terminals, and with the present facilities it is impossible for the

companies to handle more cars than they do now. In order to afford immediate relief the report recommends the following changes:

First—All cable operation should be abandoned and the cable trackage converted to either overhead trolley or underground conduit for electric cars.

Second—The territory bounded on the north and west by the river, and by Twelfth Street on the south, should be used in common by all companies for the proper location of loop tracks or terminal facilities, all of these central tracks to be of the underground electric conduit type.

Third—Cars should be routed as far as practicable via trunk avenues and crosstown lines, combined in such manner as to serve the maximum amount of travel with the minimum use of transfers.

Fourth—Sufficient cars of the double-truck pattern, equipped with brakes operated by other than hand-power, adequately heated during cold weather and operated singly, should be provided for all through lines, although lighter cars could be used on crosstown service.

Fifth—On all well-paved streets all rails on new track, and all tracks when renewed should be of the grooved type, designed on such lines that the groove will be cleaned by the passage of the wheel flange. The groove should present the least obstacles to passing vehicles and the least inducement to vehicles to drive on the tracks. Where such rails are laid the pavements should be kept clean.

Mr. Arnold points out, however, that no matter what improvements may be proposed and what additional terminal facilities granted, the efficiency of the system as a whole will be contingent upon keeping the tracks clear of trucks, so as to enable the expeditious movement of cars and avoid the innumerable and exasperating delays now resulting from the obstruction caused by vehicular traffic. The picture drawn by the Chicago expert represents a very serious condition, and one which will be recognized at once by every one familiar with the situation in that city. A strict enforcement of the ordinances regulating trucking would greatly relieve the situation, and further restrictions should be enacted to improve the situation. Chicago has ample precedent for regulations of this kind in the rules governing boulevards where heavy drays and trucks are not permitted. It is certainly of far greater importance that the thousands of patrons of street railway lines should not be delayed than that the carriage drives of the city should be protected from the invasion of commercial vehicular traffic. Unless effective regulations are made and enforced for keeping the surface lines clear the advantages of the present movement for the improvement of Chicago's transportation facilities will be lost, and the investment required for this immense project will be wasted.

Free Transfers in Boston

A remarkable instance of the growth of the free transfer system is found in the annual report of the Boston Elevated directors, covering the year ending Sept. 30, 1902. The total revenue passengers carried by the company amounted to over 222,000,000, while the estimated free transfers reached the enormous total of 115,000,000, or over 50 per cent of the entire paying traffic. Compared with previous years this figure would seem little short of phenomenal, were it not for the fact that the vast bulk of the transfer traffic is between the elevated trains and surface cars, and of this a larger percentage is made without the use of checks. The year being the first which, for its entire twelve months, covered the operation of both main line and Atlantic circuit elevated trains in harmony with the surface car system, it is not to be wondered at that the transfer total reached a large figure, but it seems a remarkably high percentage of revenue traffic, none the less. Were Boston laid out on the rectangular block plan of cities like New York and Chicago, the figures would appear less striking,

THE PASSENGER TRAFFIC PROBLEM OF GREATER NEW YORK

BY W. W. WHEATLY

The passenger transportation problem of Greater New York is a fascinating but a complicated and perplexing one. Involving, as it does, the entire question of the present traffic conditions and the possibility of future rapid transit expansion to meet the enormous growth of population in a very large territory, with the lower end of Manhattan Island as its focus, it cannot be treated exhaustively in a limited space.

To show the existing traffic conditions, to state what the transportation problem is, to throw some side lights upon the measure of relief to be afforded by the additional facilities projected or under construction, to indicate wherein the additional facilities, as at present outlined, appear to fall short of a comprehensive rapid transit system, and to suggest how the proposed system may be rounded out and made more complete, is the purpose of this paper.

PRESENT TRAFFIC CONDITIONS

As will be seen from table No. 1 the population of the city of New York, according to the census of 1900, was 3,437,202. An estimate for Jan. 1, 1903, makes the population at this time 3,632,000. The counties of Bergen, Essex and Hudson, just across the river, in New Jersey, comprising the cities of Bayonne, Jersey City, Hoboken, Weehawken, Englewood, Hackensack, Newark and other smaller towns, are quite as closely allied to Manhattan Island by ties of business as are any of the boroughs of the city of New York, and in any broad view of the transportation problem their population should be considered as tributary to New York.

TABLE NO. I.—POPULATION OF TERRITORY NOW COMPRISING NEW YORK CITY

Borough	1860	1870	1880	1890	1900
Manhattan....	813,669	942,292	1,164,673	1,441,216	1,850,093
Bronx.....	23,593	37,393	51,980	88,908	200,507
Brooklyn.....	279,122	419,921	599,495	838,547	1,166,582
Richmond....	25,492	33,029	38,991	51,693	67,021
Queens.....	32,903	45,468	56,559	87,050	152,909
Totals.....	1,174,779	1,478,103	1,911,698	2,507,414	3,437,202

The rate of increase of population in the last decade of the cities and counties just across the Hudson, as shown in the table below (No. 2), is quite as remarkable as that of New York.

TABLE III. PASSENGERS CARRIED PER YEAR †

	SURFACE LINES					ELEVATED LINES			Grand Total
	Manhattan	Brooklyn	Bronx	Queens	Total	Manhattan	Brooklyn*	Total	
1860.....	38,455,242	12,374,931	.....	.....	50,830,173	.....	.....	.....	50,830,173
1870.....	111,007,498	36,537,175	1,038,014	.....	148,582,687	.....	.....	.....	148,582,687
1880.....	148,615,107	75,208,691	1,792,995	1,052,380	226,669,173	60,831,757	.....	60,831,757	287,500,930
1890.....	217,819,887	107,222,538	3,394,726	2,961,855	331,413,336	190,024,848	81,686,166	271,711,014	603,124,350
1891.....	226,248,245	115,261,992	3,560,370	3,346,196	348,416,803	201,202,518	89,862,350	291,064,868	639,481,671
1892.....	232,846,607	123,303,283	3,731,930	3,778,063	363,659,883	213,692,745	94,426,871	308,119,616	671,779,499
1893.....	233,300,301	137,715,699	6,510,126	4,024,673	381,550,799	221,407,197	100,181,372	321,588,569	703,139,368
1894.....	242,159,667	142,535,644	9,538,175	4,277,837	398,501,323	202,751,532	90,162,483	292,914,015	691,415,338
1895.....	285,926,558	153,420,479	8,774,252	4,768,808	452,890,097	187,614,985	97,378,890	284,993,875	737,883,972
1896.....	343,539,503	172,115,126	10,562,496	7,086,017	533,303,142	184,703,630	94,679,121	279,382,757	812,685,899
1897.....	385,097,830	200,185,819	12,049,137	8,373,496	605,706,282	182,964,851	90,240,073	273,204,924	878,911,206
1898.....	429,229,886	217,410,612	23,327,664	9,999,121	679,967,283	183,360,846	82,774,107	266,134,953	946,102,236
1899.....	504,298,052	216,704,139	22,010,420	10,727,440	753,740,052	174,324,575	57,650,084	231,974,659	985,714,711
1900.....	533,092,114	243,214,554	27,499,589	12,855,104	816,661,661	184,164,110	66,964,803	251,128,913	1,067,790,274
1901.....	550,610,435	271,588,153	36,514,321	13,086,649	871,799,558	190,045,741	62,587,361	252,633,102	1,124,432,660
1902.....	537,230,548	273,026,809	41,191,654	15,243,070	866,692,081	215,259,345	69,605,556	284,864,901	1,051,556,982

* Includes Brooklyn Bridge Elevated Line. † Includes Transfers ‡ The apparent decrease in passengers Manhattan surface lines in 1902 is caused by the change in transfer system by which one transfer carries the passenger through over two or more lines.

TABLE NO. II.—TRIBUTARY POPULATION IN NEW JERSEY—CENSUS OF 1900

City	Year 1890	Year 1900	Per Cent Increase
Jersey City.....	163,003	206,433	26.6
Hoboken.....	43,698	59,304	36.
Bayonne.....	10,033	32,722	71.9
Newark.....	181,830	246,070	35.3
<i>County</i>	407,564	544,589	33.6
Hudson.....	276,126	386,048	39.8
Essex.....	256,098	359,053	40.2
Bergen.....	47,226	78,441	66.
	579,450	823,542	42.1

In nearly all large cities it is the common experience that the percentage of passengers to population is forging ahead at the ratio of about three to one. The suggestiveness of these figures is in the tremendous probable increase of passenger traffic which the transportation lines of New York, and especially of Manhattan, will be called upon to handle within the next decade, and to prepare for which is the problem now before the municipal and State authorities.

The following table (No. 4), showing the rides per capita per year on Manhattan Island alone, indicates how rapidly the passenger traffic is growing:

TABLE NO. IV.—RIDES PER CAPITA PER YEAR ON MANHATTAN ISLAND

Year	Rides	Increase
1853.....	13	—
1855.....	30	17
1860.....	47	17
1865.....	113	66
1870.....	118	5
1875.....	150	32
1880.....	182	32
1885.....	220	38
1890.....	283	63
1900.....	388	105
1903.....	*415	27

*Estimated.

The local transportation lines of this entire territory are now handling daily over 4,000,000 people, of which number about 2,500,000 ride in the Boroughs of Manhattan and Bronx, 1,200,000 in Brooklyn and Queens, and 400,000 on the lines just across the river in New Jersey. The magnitude of the business on Manhattan Island alone is shown by the figures in table No. 5, giving the passengers carried each working day during the week ending Dec. 13, 1902:

TABLE NO. V.—PASSENGERS CARRIED ON SURFACE AND ELEVATED LINES WEEK ENDING DEC. 13

	Manhattan		Total
	Elevated	All surface lines	
Monday, Dec. 8.....	868,287	1,550,808	2,419,095
Tuesday, Dec. 9.....	774,647	1,464,031	2,238,678
Wednesday, Dec. 10....	753,811	1,511,278	2,265,089
Thursday, Dec. 11.....	706,682	1,605,378	2,312,060
Friday, Dec. 12.....	659,444	1,518,989	2,178,433
Saturday, Dec. 13.....	734,961	1,467,162	2,202,123
Average per day.	749,172	1,519,608	2 269,229

To the population of New York may therefore be added that just over the river in New Jersey, making, in 1900, 4,260,744 or at the present time (estimated) about 4,524,719. At the end of another five years this already enormous total will have been

tribution by directions and the estimated number handled in the maximum hour in each direction on Monday, Dec. 17, 1902.

TABLE NO. VI.—TRAFFIC—METROPOLITAN STREET RAILWAY SYSTEM—DEC. 17, 1902.

Date of Record, Dec. 17, 1902	
Total passengers, including transfers, on system.....	1,625,127
Passengers by lines—North and South	
East Side lines	579,092
West Side lines	644,079
Total	1,223,171
Passengers by crosstown lines, East and West.....	401,956
Estimated number of passengers North in maximum hour.	69,000
Estimated number of passengers South in maximum hour.	51,000
Estimated number of passengers East in maximum hour.	19,000
Estimated number of passengers West in maximum hour.	20,000
Maximum hour on the average day	5-6 p. m.
Estimated percentage of total twenty-four-hour traffic handled in 5 busy hours, 7 to 10 a. m. and 5 to 7 p. m...	35%



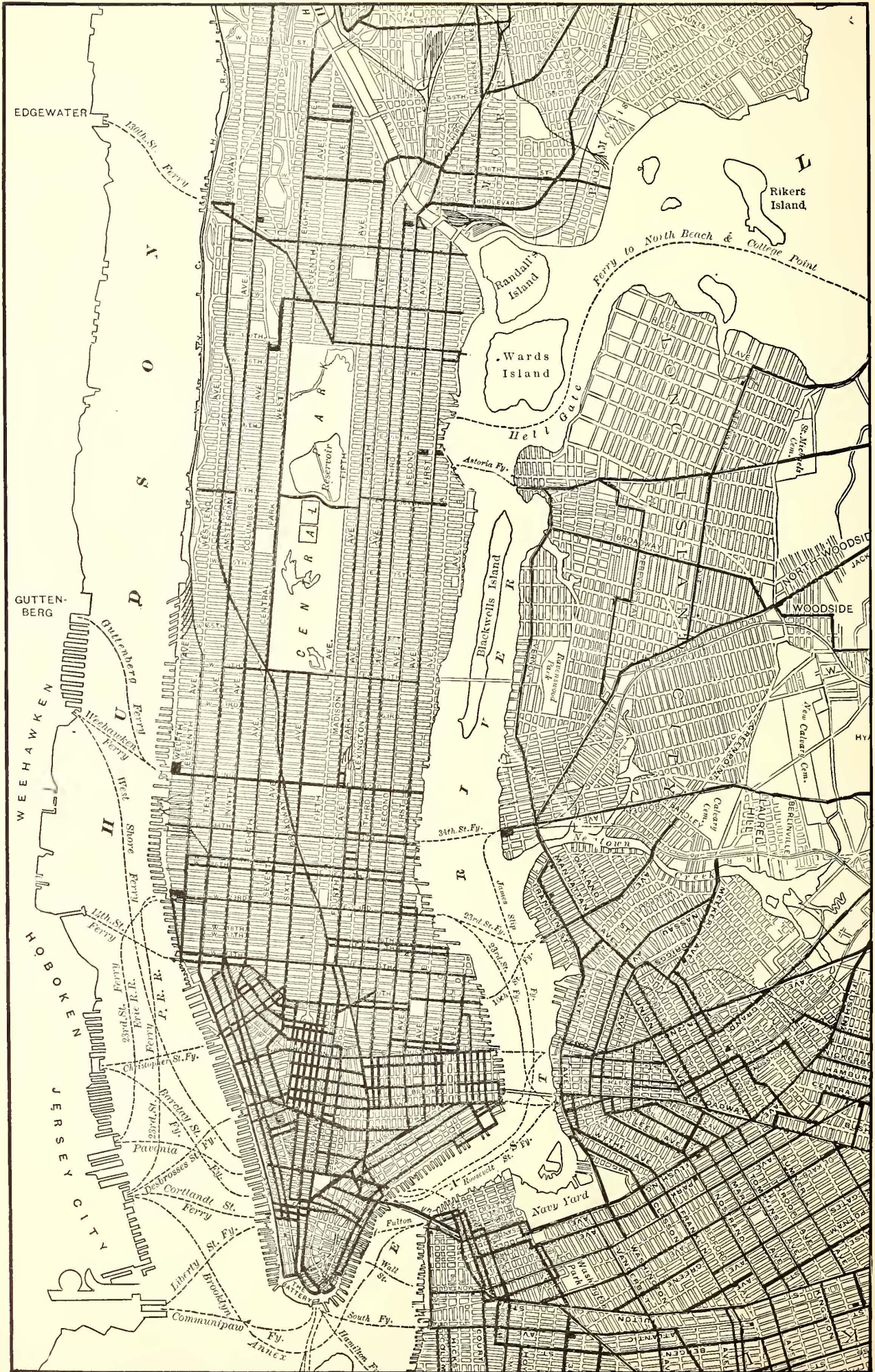
OBSTRUCTIONS ON CENTER STREET CAUSED BY SUBWAY EXCAVATIONS

increased to over 5,300,000 people to be served by the transportation lines leading to and from the business and shopping district of Manhattan Island. While the growth of population has been remarkable the growth of passenger traffic has been much more remarkable. Exact figures are not available for the local lines on Staten Island (Borough of Richmond), and in New Jersey, but the passengers carried in all the other Boroughs of New York city, as indicated by table No. 3, have shown an increase in each decade of almost 100 per cent.

The surface line traffic in Manhattan and Bronx is shown in an interesting manner by tables Nos. 6 and 7, giving the dis-

TABLE NO. VII.—TRAFFIC—UNION RAILWAY COMPANY AND SOUTHERN BOULEVARD COMPANY—DEC. 17, 1902

Date of Record, Dec. 17, 1902	
Total passengers, including transfers.....	103,592
Passengers by lines—North and South—	
North	34,982
South	30,461
Passengers by crosstown lines—East and West—	
East	19,880
West	18,269
Estimated number of passengers North in maximum hour.	3,099
Estimated number of passengers South in maximum hour.	1,465
Estimated number of passengers East in maximum hour..	1,672



MAP SHOWING SURFACE LINES IN MANHATTAN AND TRANSPORTATION CONNECTIONS WITH SUBURBAN POINTS.

Estimated number of passengers West in maximum hour. 1,158
 Maximum hour on the average day 5-6 p. m.
 Estimated percentage of total twenty-four-hour traffic
 handled in five busy hours, 7 to 10 a. m. and 5 to 7 p. m. 40%

Seventy-five per cent of the surface line traffic and all of the elevated railroad traffic is north and south traffic. Twenty-five per cent of the surface traffic is the lateral or east and west traffic. It will therefore be understood that the average daily north and south traffic on Manhattan Island, all lines included, is now 1,888,878, and the average east and west traffic about 379,902.

The above figures, it may be said, represent the number of people who are able to obtain transportation facilities, and not the number who would ride if they could. The greater part of the people who reach Manhattan Island from over the rivers come by the ferries, and the majority of them are compelled to walk, some of them considerable distances, because of the lack of crosstown lines. It is of considerable interest and importance to know what this lateral traffic amounts to and what its future development promises. The following figures, now

number of people who go to and from this district during an ordinary day or during the hour of maximum traffic is impossible, but a close estimate has been made from facts and figures at our disposal. The transportation problem is largely a rush-hour problem. The morning rush is concentrated in the period from 7:30 o'clock to 9 o'clock, and the heavy afternoon con-



SKYSCRAPERS IN NARROW STREETS IN THE CONGESTED DOWNTOWN DISTRICT

printed for the first time, show the volume of the east and west (bridge and ferry) traffic:

PASSENGERS CARRIED PER ANNUM

	1902
East River and Staten Island ferries, all lines.....	84,500,000
Brooklyn Bridge	109,000,000
Hudson River Ferries—all lines.....	108,500,000
Total	302,000,000

The average number of people from Long Island, Staten Island and New Jersey who cross the rivers daily and come to Manhattan is estimated as follows:

From Long Island and Staten Island by ferries.....	119,000
From Long Island by Bridge.....	150,000
From New Jersey by ferries.....	150,000
*Total	419,000

* It should be understood that the above figures represent one way traffic only.

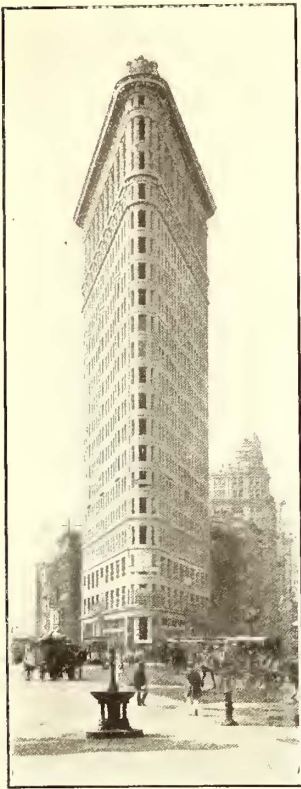
The business district of Manhattan, to which the stream of traffic flows in the morning and back again at night, may be located roughly as that part of the island between Twenty-Third Street and the Battery. To give exact figures of the

centration is in the one hour from 5 o'clock to 6 o'clock, but the peak of the load comes actually from 5:30 o'clock to 6 o'clock. The travel going to the business district in the morning hour and returning in the evening hour, assuming a fairly well balanced traffic, is estimated as follows:

Coming from north of Twenty-Third Street by all elevated lines	75,000	
Coming from north of Twenty-Third Street by all surface lines.....	67,000	
	142,000	
Coming from Long Island and Staten Island, all ferry lines	31,000	
Coming from Long Island by Brooklyn Bridge	33,000	
	64,000	
Coming from New Jersey by all Hudson River ferries	32,000	
	32,000	
Coming from the east and west surface car lines (not included above).....	12,000	
	12,000	

Total in maximum hour..... 250,000

The especial significance of these figures is that 56.8 per cent of the rush hour travel to the business district comes from the



FLAT-IRON BUILDING

," by W. L. Derr; STREET RAILWAY JOURNAL, Oct. 5, 1901, "Traffic Conditions of New York City," by F. R. Ford.

It does not require a deep study of existing conditions to convince the observer that the north and south lines in Manhattan, both elevated and surface, when worked to their utmost capacity, will be unable to afford any adequate lasting relief from the rush hour congestion. When the installation of the electrical equipment on the Manhattan Elevated Railway is fully completed, and advantage has been taken of the increased number of cars per train and the lengthening of the station platforms, not much more can be done until more tracks or more elevated lines are provided. The points on the elevated roads which now fix the limit to the number of trains that can be operated were described by Vice-President and General Manager Skitt in a letter to Mayor Low, under date of Dec. 24, 1902, from which the following is an extract:

As to the travel during the Dewey celebration, to which you refer, the Manhattan system carried on the first day 805,000, and on the second day 836,000 passengers, under conditions with which everyone in New York at the time is familiar. On Monday last the system transported, without undue delay or risk of accident, in the ordinary course of business, 931,000 passengers.

There is a limit, however, to the number of trains which can be run north of Fifty-Third Street and Ninth Avenue, where the Sixth Avenue trains, Ninth Avenue trains and Ninth Avenue express trains are massed on two tracks, one for local and the other for express travel. At 115th Street, in the afternoon, these two tracks merge into one when the expresses take local tracks to deliver their passengers from 116th Street north.

It is impossible to stop at any one station more than forty trains per hour at one and a half minutes apart with steam, or sixty trains per hour with electricity, without congesting the service above 104th Street and giving rise to serious complaint from the large number of passengers who disembark at 116th Street (the second most important station on the system), 125th Street and stations north to 155th Street. These passengers are certainly entitled to full consideration. The temporary mixed power of steam and electricity is the cause of gaps and irregularities, and also prevents the sixth car being added to all trains. Congestion is now only relieved by turning trains at intermediate terminal points above 125th Street.

The limiting feature of our capacity, above all, is the Fifty-Third Street and Ninth Avenue junction. During the rush hours eighty-one trains per hour pass this point, going north only, which number cannot with safety be exceeded, and they are

north, 25.6 per cent comes from Long Island and Staten Island, 12.8 per cent comes from New Jersey, and 4.8 per cent from the residence districts of Manhattan, adjoining the business districts.

To say that the rush hour problem on Manhattan Island relates primarily to the north and south traffic is to state a fact with which nearly all who do business here are familiar.

For the benefit of those who wish to make further study of the traffic development on Manhattan Island the following reference to articles on the subject are given:

"Railroad Gazette," Nov. 20, 1891, "Manhattan Elevated Railroad Traffic," by H. G. Prout; "Railroad Gazette," Sept. 11, 1896, "Analysis of One Day's Traffic Manhattan Elevated Railway," by Theo. Cooper; "Proceedings New York Railroad Club, March, 1897;" "Notes on Rapid Tran-

massed on one track at 115th Street. The only means of relief is the enlargement of all trains to six cars on the main lines, and to five cars on the Fifty-Eighth Street branch.

There are now running on Sixth Avenue twenty-six trains of five cars each, which will become six-car trains, being twenty-six cars additional, and ten trains of three cars each, which will become five-car trains, being twenty cars additional, making forty-six additional cars on the Sixth Avenue line, as soon as electrical equipment is fully installed.

On Ninth Avenue there will be changed thirty express trains from five to six cars, twenty-four local trains from five to six cars, an addition of fifty-four cars in all on that line.

There are running to-day on Sixth Avenue twenty-six six-car



VIEW IN DOWNTOWN NEW YORK

electric trains. Eight more will be ready for operation within two weeks. Every engine that is withdrawn tends to the regularity and better speed of the service.

On the East Side lines every train from all terminals now has six cars, and it is planned to run forty-two trains of 252 cars on Second and Third Avenues, now stopping at 129th Street, through to 161st Street, in rush hours, as soon as track material ordered months ago is received and put in place.

It is expected that, with the delivery of electrical apparatus and track material and new cars by outside builders, and with the remodeling of cars in our own shops, all the improvements outlined, which have been in hand for two years last past, will be completed by April next.

The number of trains now being operated on the Manhattan Elevated system in the two hours, 5 o'clock to 7 o'clock p. m., is shown herewith for each line:

SECOND AVENUE LINE

Twenty-five trains	4:59 p. m. to 6:01 p. m.
Twenty-one trains	6:03 p. m. to 7:05 p. m.

THIRD AVENUE LINE

Forty-one trains 5:00 p. m. to 6:01 p. m.
 Thirty-three trains 6:02 p. m. to 7:02 p. m.

SIXTH AVENUE LINE

Forty-seven trains 4:58 p. m. to 5:58 p. m.
 Thirty-five trains 6:00 p. m. to 7:00 p. m.

NINTH AVENUE LINE

Thirty-seven trains 5:00 p. m. to 6:00 p. m.
 Twenty-four trains 6:00 p. m. to 7:00 p. m.

In consideration of the conditions prevailing on the streets of Manhattan and Brooklyn the surface lines should not be expected to handle long-distance traffic. The especial function for which they are fitted is the handling of the local or short-haul traffic. But the inability of the elevated roads with the

transit routes they will be valuable aids, and it may be assumed that there will never come a time when they will not be crowded to their capacity with short riders. Much can be done by the city authorities toward the regulation of the vehicle traffic if they will take hold of it in the right way. Stringent regulations, strictly enforced by the police, would greatly relieve the slow movement of surface cars and add considerable to the traffic-carrying capacity of the lines. It is probable that in future years the people, in self-defense, will demand that all heavy trucking be confined to the non-business hours, and that the receiving and discharging of goods from shops, warehouses, freight stations and stores be done either before or after the hours of maximum passenger traffic. So little attention is



VIEW AT CORNER OF BROADWAY AND FULTON STREET, SHOWING BLOCKADING OF CARS BY TEAMS

existing limitations to carry all of the long-haul traffic has thrown a considerable portion of it upon the surface lines, and it is owing largely to this fact that the present outcry is being made. The managers of the railroads have not wanted the long-haul traffic on the surface lines, but they have been powerless to prevent it. The endless procession in the streets and on the Brooklyn Bridge and its approaches of cars and vehicles, getting in one another's way, and moving like a funeral cortege, is rather discouraging to the long-distance rider, and it may be set down as certain that he patronizes the surface lines from necessity and not from choice. As a natural consequence it appears that many short riders who would often use the surface lines are lost to the roads by being crowded out and being compelled to walk.

Hampered as they are by the confusion of vehicle and pedestrian traffic and the congestion of cars at crowded junction points and crossings, it is inevitable that the surface lines will play a minor part in the rapid transit development of the future. As collectors and distributors of traffic for the through rapid

paid to such matters at the present time that it is no uncommon occurrence to find the sidewalks as well as the streets barricaded with boxes, barrels and building materials, until some of the narrow cross streets in the lower end of the city are almost impassable. The crosstown cars on some of these streets are often held in a jam of vehicles from twenty minutes to thirty minutes, waiting for some obstinate driver to move out. Such a situation in the imperial city of New York would seem to be quite incredible if it were not such a common occurrence that it is witnessed every day.

WHAT THE PROBLEM IS

There is not merely one problem but a multiplicity of problems, all of them related to one another. Any consideration of them which eliminates the question of the growing congestion of all classes of traffic in the streets is short-sighted. The street traffic has maintained a steady increase until, on many of the avenues and cross streets, movement on foot is attended with the utmost danger to life and limb. In the business district of

Manhattan low buildings are being replaced by skyscrapers, where instead of 100 or 200 employees in one building there are several thousand.

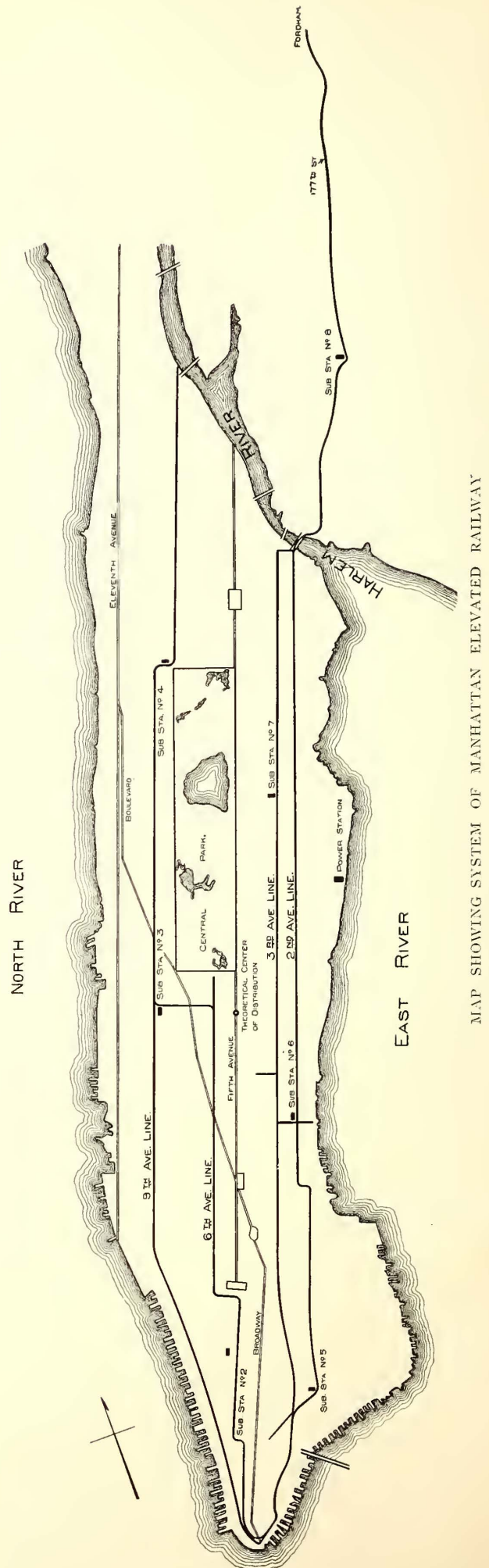
Several of the illustrations given herewith are intended to show the latest development in skyscrapers and the actual conditions of street congestion. Unfortunately, during the short days of the winter season, the photographer was compelled by darkness to withdraw at least one hour before the evening rush hour began, and the photographs show what might be termed the midday traffic conditions.

In one of the largest of the new skyscrapers, a twenty-nine-story structure, which took the place of a five-story building, there are 1125 offices, in which are employed nearly 6000 persons. The elevators in this building carry over 15,000 persons on every business day. If the employees of this one building lived near together in Harlem it would require to carry them home ten elevated trains of six cars each, with 100 persons crowded in each car, and to give all of them seats would require twenty trains of six cars each. Such buildings are increasing yearly. Already plans have been accepted for a thirty-story building and for one of thirty-five stories. The entire lower end of Manhattan Island in the course of time is bound to be covered with buildings each housing thousands of persons, because the only permissible direction for growth is upward. With the hundreds of skyscraper office buildings and huge department stores, each disgorging into the narrow streets their thousands of humanity homeward bound within the hour from 5 o'clock to 6 o'clock each working day, and with the thousands of surface cars, wagons, carriages, push carts, etc., brought together in inextricable confusion, is it any wonder that there is congestion on the streets of Manhattan or in its transportation facilities? This suggests the importance of having the transportation lines easily accessible to the people to be served. It is not sufficient to provide between two given termini a rapid transit route, the location of which requires its patrons to consume half as much time in walking to and from it as it requires for the trip between the terminal points. Accessibility is essential under present conditions.

Next, there is the question of where the people come from and go to. There is the east and west traffic and the north and south traffic, sub-divided again into the long haul and the short haul traffic. It is quite well understood that where one comes into conflict with the other both are retarded. They should, therefore, be handled separately, in so far as possible. The scope of the problem must embrace not only where the people come from and go to at the present time, but where they will likely come from and go to in future years. The topography of the territory hereabouts makes it almost certain that there will be a shifting of the center of population within the not distant future.

As the problem broadens out it will be seen that it relates not only to Manhattan Island but to all the adjoining territory tributary to Manhattan. One section cannot be considered without taking into account the others. Therefore, the means of getting to and from Manhattan by way of the existing and projected bridges, ferries, tunnels and subways, becomes a matter of the greatest importance.

But that portion of the problem which is of the most vital consequence and the most difficult of solution is the question of handling, within the narrow confines of Manhattan Island the diurnal movements of its own enormous population and the increasing throngs coming to it from the adjoining territory by way of the ferries, the bridges and the tunnels. As the barriers surrounding the island on all sides are gradually but surely overcome, it stands to reason that more people will live away from and still do business here. To bring these people to the outer edges of Manhattan and dump them out to seek their destination on foot or by way of the already overcrowded transit facilities would be little short of criminal negligence.



To provide means to distribute this tremendous traffic to its destination in the morning and to collect it and send it homeward to the four points of the compass at night without having the several traffic streams mingle with or cross one another—that is the colossal problem which is worthy of the most careful attention of the people and the municipal authorities.

It is quite within bounds to say that much of the criticism that is being levelled at the management of the existing transit facilities is ill-timed and unintelligent. Comparing the speed and comfort of travel to-day with several years ago, when the track mileage was the same as now, it will be seen how much the existing lines have accomplished within a comparatively short time. It is probably useless to remind the critics that the travel has been steadily increasing for many years without any increase in track mileage. The people who are making the most noise appear to be afflicted with inability to reason in a straight line, and the ones who appear to know the least about transportation matters are the loudest in their wholesale denunciations of the railroad managements. So far as known not one of the complainants has any feasible plan to ameliorate the unfortunate conditions that are admitted to exist, and in the end they must depend upon the wisdom and skill of these same railway managers to plan and execute the much needed improvements. Nagging criticism at this time can only annoy without accomplishing any good results. It is to be hoped that the prevailing agitation will result in such a thrashing out of the subject that fair-minded public men and intelligent citizens will arrive at a better understanding of it. The universal clamor will not have been in vain if it shall result in directing attention to the real underlying cause of the entire trouble.

It may fairly be charged that the municipal and State authorities have been for a long time lacking in foresight or in civic enterprise. It has been noted also that the spirit of the people has been against any and every transportation improvement that the railroads have undertaken to inaugurate, and the people themselves have been the greatest sufferers. Instead of making it possible for great transportation improvements to take place they have persistently thrown obstacles in the way. The companies have been made to fight hard for every little concession granted to them. If the transit facilities of New York have been outgrown by the enormous increase of population the people and their public servants must bear a large share of the responsibility. It must be borne in mind that the railroads have always been ready and willing to make such additions and extensions of their lines as will give added facilities.

Unless the people are now ready to grant the necessary privileges and assist rather than retard rapid transit development they must make up their minds to be content with the present accommodations. They should, however, be warned that the traffic congestion they are now forced to endure will be as nothing compared with what they will be called upon to endure in future unless they commence at once to expand their transportation resources. A clear understanding of the fact that the existing facilities are being worked almost to the utmost limit of their capacity should go far toward securing immediate action. It should be emphasized that the conditions existing now are the natural result of the marvelous growth of a prosperous community in a territory where the physical conditions render relief impossible without additional elevated roads, surface lines, subways, bridges and tunnels, with adequate terminal and station facilities; which cannot be secured without the co-operation of the municipality and the State.

Beyond the application of electricity to the horse car and cable lines and the development of the facilities of the surface roads, it will be recalled that there have been no really great additions to the transportation facilities during the past quarter of a century with the single exception of the building of the Brooklyn Bridge and the elevated roads. Nothing else of really

first-class importance was permitted until a short time ago, when the rapid transit subway, including its Brooklyn extension, and three additional bridges over the East River were authorized. It will be about one year from now when the first of these additional facilities will be opened to the public use, and probably four years to five years before all of them and the more recently authorized Hudson River tunnels will become available. In the meantime there will be ample opportunity for the exercise of the virtues of forbearance and patience. The fact is that the tendency towards increased concentration of population in the cities has been without precedent in the world's history, and the general public has been slow to awaken to a full conception of its significance. But the conditions existing in New York are seemingly due to causes that a wise foresight might have removed long ago.

It was foreshadowed that Manhattan Island would eventually be devoted to trade rather than to homes. After a few years of more rapid growth than ever before in its history it will probably reach almost the maximum of its permanent residents. The steady encroachments of business upon the residence districts and the insufficiency of the narrow area of the island to provide residences for all those who do business upon it is gradually driving the people across the river barriers in search of suburban homes. It will not be many years until private residences on Manhattan Island will be relatively few, and the time will come when not even the very rich can find room here for properly lighted and ventilated dwellings. The limited residence area now available is being rapidly covered with huge hotels, apartments and flat houses, in many of which rents are so high that only those with independent incomes can afford to live. The following figures, taken from the records of the Building Department, by Herbert Croley, show that the number of private dwellings now being erected is only one-sixth as large as ten years ago, and in the same time their average cost has increased fourfold:

	No. dwellings	Estimated cost	Average per dwelling
1902 (January to September)...	120	\$7,793,500	\$64,000
1901.....	99	5,927,000	59,800
1900.....	112	3,928,000	35,000
1899.....	338	8,329,700	24,600
1898.....	339	6,182,800	18,200
1897.....	492	7,492,100	15,200
1896.....	410	5,527,950	13,400
1895.....	515	8,799,750	17,000
1894.....	494	8,606,160	17,200
1893.....	511	9,516,750	19,000
1892.....	710	12,625,500	17,500
1891.....	661	11,225,500	16,900
1890.....	835	12,663,000	15,100
1889.....	759	12,733,000	16,700

The time is evidently not far off, if the present rate of growth continues, when to occupy a private residence on Manhattan Island will be a remarkable distinction. The masses of the people are gradually being driven to the alternative of a crowded city tenement or moving to the suburban districts, where modest incomes can find suitable homes. There are probably hundreds of thousands now awaiting the time when improved rapid transit facilities will enable them to leave their crowded city quarters, where they are denied the God-given privileges of sunlight and fresh air. Heretofore the principal exodus from the city has been toward the north. The direction of the greater exodus which is bound to come within the next few years may not, however, be to the northward for reasons which will be pointed out later. The direction of the city's future great expansion will be in the line of least resistance, and that line will depend almost entirely upon the improved transportation facilities which it is now our purpose to consider.

The subject of the proposed additional facilities and their probable effect upon the present situation will be taken up in the issue of next week.

SUCCESS OF MUNICIPAL OWNERSHIP IN GREAT BRITAIN
II. and conclusion

BY ROBERT DONALD

In the first instalment of this paper, published last week, the writer discussed the traction situation particularly, and in the following article other classes of municipal enterprises are considered:

GAS DISTRIBUTION

With regard to gas supply in England Mr. Porter makes the following statement:

The British Corporation plants are neither so well nor so economically managed as the private plants, nor do they serve the public so advantageously. * * *

While the reduction in the price of gas by private companies in England has been as great, if not greater (as we have seen in the only comparison practicable), the price charged by companies under similar conditions is less than the price charged by municipal corporations.

Mr. Porter could not have made that statement if he had read, as he says he did, the testimony of the municipal trading committee with care. The late Sir Courtenay Boyle, secretary of the Board of Trade, in that report laid down the principles upon which Parliament had acted in regard to the gas supply. He said:

The general policy of Parliament as regards bills for the compulsory acquisition of gas undertakings by local authorities appears to be:

- (1) To compel an unauthorized gas company to sell if past mismanagement or bad supply of gas is proved.
- (2) When such allegations cannot be substantiated, to refuse to give the local authority compulsory power to purchase, but in certain cases where very strong local feeling exists, committees have brought some pressure upon the company to induce them to agree to sell upon very favorable terms.
- (3) In the case of an unauthorized gas undertaking, to refuse compulsory purchase.
- (4) In no case, to allow a local authority to compete with an existing gas undertaking.

Mr. Porter mentions that in 1899 there were 439 private gas companies in England, and 222 municipal corporations. Strangely enough he stops his comparison between the two classes of undertakings at that point. Had he proceeded to the next sentence he would have found this statement—I quote from Sir Courtenay Boyle's testimony:

The average receipts per 1000 cu. ft. of gas sold was, in the case of local authorities, 3 s. 0.4 d., as compared with 3 s. 6.2 d. received by companies. This would indicate that generally the price charged to consumers was higher in the case of companies than local authorities.

Yet Mr. Porter says that the price charged by companies under similar conditions is less than the price charged by

and its suburbs, which are entirely served by companies. Then, instead of going to Mr. Field's incomplete analysis, Mr. Porter might have given the following summary of the complete returns, with percentages added, issued by the Board of Trade:

I would particularly draw attention to the last column, showing that the municipalities are paying off the loans on the municipal gas works rapidly, no less than one-third of the amount being invested in sinking funds. The loans are usually for a period of less than thirty years.

If these general official comparisons do not sufficiently dispose of Mr. Porter's statements I am ready to meet him with detailed comparisons. Mr. Porter could have found in the report, which he read "with care"—an interesting comparison between the gas works of Manchester and Liverpool—two large cities near each other—Manchester served by the municipality, Liverpool served by a company. Here are the figures, in shillings and pence, taken from the report:

	Manchester	Liverpool
Price per 1,000 cubic feet.....	2s. 3d.	2s. 9d.
Illuminating power.....	19.16	20.50
Comparative value of gas ..	2s. 3d.	2s. 4 90d.
Excess of price charged over value of gas when compared with Manchester.....	.....	4.10d.
Cost of coal and cannel, per ton.....	11s. 5.27d.	14s. 2.94d.
Net cost of gas	21.18d.	25.16d.
Gross profit.....	7.31d.	8.48d.
Amount required for interest, sinking fund, dividend, etc.....	3.12d.	8.46d.
Surplus.....	4.19d.	0.02d.

Mr. Porter might also have quoted the following interesting statement:

Although Liverpool charges meter rents and 6 d. per 1000 more for its gas, Manchester made a gross profit of 7.31 d. per 1000 as compared with 8.48 d. by Liverpool. If Liverpool charged no more for their gas than its worth in comparison with Manchester gas, their gross profit would only have been 4.38 d. per 1000, or less by about 4 d. per 1,000.

Finally, of the gross profit 8.48 d. per 1000 made by Liverpool, 8.46 d. went into the pockets of the shareholders and others; whilst in the case of Manchester 3.12 d. per 1000 was sufficient to meet the charges for interest and sinking fund, leaving a balance of 4.19 d. to be applied in aid of rates, etc.

The total additional sum which Manchester consumers would have to pay, supposing the Manchester Gas Works were owned by a company and worked at the same level of expenditure as Liverpool would, in the year under review, have been £152,349.

These figures, quoted from Field's Analysis, relate to the year 1897. Mr. Field does not now, for some reason, include the Liverpool company among the nine provincial gas companies in his returns, but I find from the Board of Trade Returns for 1901 that Manchester continues to set the pace to Liverpool in the price of gas by 8 d. (16 cents) per 1000 cu. ft. The Liver-

YEAR	Capital	Receipts	Expenditures	Rate Per Cent of Gross Profit	Sinking Fund	Rate Per Cent of Net Profit	Percentage of Gas Wasted	Loans Repaid
<i>Municipalities</i>								
1898-1899.....	£ 28,614,971	£ 7,177,670	£ 5,365,995	6.33	£ 1,219,771	2.18	8.75	£ 6,744,715
1899-1900.....	29,658,730	8,048,089	6,155,725	5.49	1,280,168	2.23	7.93	7,256,771
1900-1901.....	31,509,701	9,121,418	7,463,693	5.26	1,353,259	1.26	7.71	7,699,829
<i>Companies</i>								
1898.....	53,494,781	14,092,125	10,309,948	7.07	.....	.....	7.64	.....
1899.....	69,88,150	15,514,700	11,478,442	5.81	.....	.....	7.67	.....
1900.....	71,414,519	17,638,963	13,864,808	5.28	.....	.....	7.57	.....

municipalities. It should be added to Sir Courtenay Boyle's comparison that the municipalities invariably supply gas of a higher illuminating power, and rarely charge rent for meters. Sir Courtenay Boyle pointed out that local authorities have usually the most populous places to serve, exclusive of London

pool company still charges a meter rental. The gross profit for that year was, in the case of Manchester, £130,405, and in that of Liverpool, £109,872. I would also like to point out that in the same year—1901—besides paying £40,000 in interest, and over £37,000 to the sinking fund, Manchester Corporation dis-

tributed in relief of rates £51,900. Mr. Porter would also have got a little object lesson from these accounts with regard to local indebtedness, which he completely fails to understand. He would have seen, from column five of the Return, that the total capitalization of the Manchester gas works is £1,968,060. In column seven he would have seen that the amount already set aside towards the liquidation of this loan is no less than £890,261, reducing the net capital charge on the gas works to £1,077,799, on assets worth £2,500,000.

ELECTRICITY SUPPLY

I now turn to electric light. Just as England was slow to take up telephones, the typewriter, or almost any other new invention, it was also late in introducing electric lighting. The first act regulating electricity supply was passed in 1882, and limited the life of private undertakings to twenty-one years, following on the precedent with regard to tramways, but the conditions were not the same, and the limitation was a mistake. One of the chief reasons for this limited franchise was the wild speculations which had taken place by companies. Company promoters fastened on the new industry, and there were great booms in the city. The Brush Company became a center for the flotation of many schemes, and millions of dollars were lost through speculative companies. Even Mr. Garcke, managing director of the British Electric Traction Company, in a recent article on "The Industrial Development of Electricity Supply," says:

Electrical manufacturing firms and companies have labored under many difficulties. The undue inflation of enterprise in 1881 and 1882 increased the difficulties surrounding the industry and created a keen competition for contracts, while business was almost entirely confined to the erection of separate installations of the electric light in ships, mills, factories and residences. Prices of electrical machinery rapidly declined and frequent alteration in design rendered profitable production on a large scale practically impossible. The manufacturing branch of the industry has not on the whole been profitable to the investor. Without including the heavy losses suffered as a result of the speculations in "Brush" licenses (these were not losses in manufacturing), there have been several depreciations of capital, which probably more than neutralize all the dividends which manufacturing companies have paid.

Parliament, in order to put an end to the financial speculations which were killing the industry, passed the act of 1882, which checked progress in another way. During the six following years things were at a standstill, and it was not until after the act of 1888 was passed, when the conditions of supplying electricity were better known, that electric lighting really began in England. This act extended the franchise of companies to forty-two years, at the end of which period municipalities could compulsorily acquire their undertakings without paying anything for good-will but simply the bare value of the plant as it stood. If the undertakings were bought up before the end of that period sufficient compensation had to be paid. Nothing, of course, was paid by companies for the franchise. The conditions under this act were not unreasonable. In continental countries the franchises are most stringent, and in many German cities they are for shorter periods. German enterprise has, however, been more ready to develop electricity undertakings.

Both companies and municipalities in England were put under certain restrictions. The undertakings were both subject to the regulations and inspection of the Board of Trade. They were subject to a maximum price of 8 d. per kilowatt or Board of Trade unit. They had to supply the Board of Trade with annual reports. There was to be no competition. In London the powers of companies were allowed to overlap, but the companies arranged among themselves to avoid competition. Whether electricity, therefore, is supplied by a company or a municipality it is in each case a monopoly—an important feature of the system which Mr. Porter does not appreciate.

According to him, when a supply is in the hands of a municipality it is a dangerous monopoly, but when a company has the undertaking it is a beneficent enterprise.

The municipalities were seriously handicapped as compared with companies during the first years of the undertakings. Outside London they have to pay back the whole of the capital in twenty-five years. Not only the cost of the installation but also the cost of the building and the land, as if the buildings were useless at the end of that period and the land went out of existence. In the meantime they have, of course, to pay for all necessary renewals out of revenue. This short loan period has the effect of making municipalities build in the first instance on too small a scale. They have to pay interest and sinking fund charges as soon as they borrow their money, from one to two years before their undertakings are bringing in any revenue. In one or two instances the payments to sinking funds have been waived during the period of construction, but in all cases interest is paid on capital. Companies, of course, do not pay interest on capital during these initial years, unless they do so out of capital, as the "Tube" and other railway companies do.

It is easy to obtain comparative statistics of municipal and company supplies of electricity. The returns issued by the Board of Trade are not difficult to obtain. Mr. Porter found it convenient to overlook these returns. He repudiates a return from which Mr. Bemis seems to have quoted, and only accepts it after it has been digested by the committee of the London Chamber of Commerce, the constitution of which I have already referred to. The tables quoted by Mr. Porter in the STREET RAILWAY JOURNAL are for the year ending March, 1898. Mr. Porter's comment is as follows:

It will be observed that the average amount allowed for depreciation (\$18,735) is about one-eighth of 1 per cent per annum, and that the annual average margin of surplus, inclusive of this \$18,735, is only equal to one-third of 1 per cent per annum on the total capital expended. What have our municipal ownership friends to say to this statement of facts?

Taking the figures, after passing through prejudiced sources, I would say that they are by no means discouraging. Only Mr. Porter and his friends overlook entirely the payments which municipalities have to make to the sinking funds to pay off the whole of their capital in twenty-five years. The payments amount to more than 2 per cent per annum, and should properly come under the head of depreciation or reserve, as they would do in the case of companies. Some municipalities, which look after their renewals well out of revenue, make no provision for depreciation whatever, and I do not think that, with a sinking fund, it is absolutely necessary.

Mr. Porter's table is, of course, incomplete. He should have compared the results with the returns relating to companies. I take the round figures for the same year given in the "Manual of Electrical Undertakings," edited by Mr. Garcke, of the British Electric Traction Company. They are as follows:

	Per cent of profit on capital expended	Price obtained for current
Companies	6.54	5.62 d.
Municipalities	5.73	4.68 d.

These figures show that municipalities serve the public better by supplying current at 2 cents per unit less than companies, while the profit on the capital expended is not very much less, and would be more were the price of current the same.

Before showing more fully the relative position of municipal and company electricity undertakings I would like to refer to some other statements which Mr. Porter makes. In trying to depreciate the results of municipal working he says:

Of course such an item as the amounts of taxes relinquished by the municipalities by reason of becoming their own capitalists is

never included in the comparisons. If it was we should have an actual loss, instead of a tiny profit.

After reading this statement I am inclined to think that Mr. Porter has never seen the accounts of any municipal electricity undertaking. If he had he could not have missed the items for rates and taxes. Municipal undertakings pay their contributions to local taxation just as if they were private property. The following table shows the pence per unit paid by a number of representative municipalities and companies:

MUNICIPALITIES		COMPANIES	
Town.	Amount paid d.	Town.	Amount paid d.
Belfast .....	.19	Aberystwyth .....	.21
Blackburn .....	.21	Bournemouth .....	.33
Bristol .....	.20	Cambridge .....	.26
Burnley .....	.26	Chelmsford .....	.03
Canterbury .....	.21	Cork .....	.04
Cardiff .....	.23	Folkestone .....	.13
Coventry .....	.22	Hove .....	.30
Darlington .....	.26	Newcastle-on-Tyne .....	.08
Hull .....	.29	Northampton .....	.30
Middlesborough .....	.38	Oxford .....	.22
Plymouth .....	.25	Prescot .....	.11
Wolverhampton .....	.10	Preston .....	.24

The variations in the amount in both cases is due to the fact that sometimes the generating stations are in highly assessed central districts, and sometimes in suburban districts where the assessment is low.

In the "Manual of Electrical Undertakings," above referred to, the following figures appear as the comparative position of the whole of the municipal and company undertakings in the United Kingdom for the last two years:

YEAR	No. of Undertakings	Revenue From Sale of Current	Working Expenses	Profit	Per Cent of Profit on Capital Expended	Price of Current
<i>Municipalities</i>						
1900-1.....	75	£ 988,404	£ 555,682	£ 432,722	4.90	d. 4.06
1901-2.....	97	1,477,087	923,246	553,881	4.30	3.82
<i>Companies</i>						
1900-1.....	43	1,053,291	580,548	472,743	5.45	5.26
1901-2.....	45	1,180,354	702,121	478,233	5.00	4.94

The Board of Trade issues every year accounts of tramway and gas undertakings, but not until this year has it attempted to issue a summary of electricity accounts presented to it. The summary has not been well received by any of the technical papers, as it is incomplete and in some ways misleading. The capital expenditure is unnecessarily swollen by the inclusion of sums expended on works under construction. This more particularly applies to municipal undertakings. The following are the main figures:

	Companies	Municipalities
Capital expended.....	£ 10,954,188	£ 14,843,122
Receipts.....	1,383,779	1,661,760
Working expenses.....	962,146	1,057,728
Gross profit.....	421,633	604,032
Allocated for redemption or renewal purposes (i. e., reserve, depreciation, repayments and sinking fund; during the year)	183,008	322,525
Do. do. (total to end of 1900).....	746,067	1,080,030
Interest on loans (local authorities).....		397,579
Net profit (companies).....	321,880	.....

Going into the figures with a little more detail we find that the equivalent return on capital expended in the case of municipalities was 4 per cent, and in the case of companies 4½ per cent. On the other hand the price per unit charged by municipalities was 3.64 d., and the average price charged by companies 4.83 d.—more than 2 cents higher. Had the municipalities

charged as much for current as the companies did, and sold the same quantity, they would have increased their revenue by £420,000. A large number of the municipalities include in this return for the year ending March, 1901, were small concerns, which involved a loss after paying their heavy sinking fund charges. The number of losses of this kind was thirty-seven. The best proof, however, that such losses are temporary, and due to the initial stage when municipalities are heavily handicapped, is the fact that for the next year, ending March, 1902, Stepney has turned a loss of £2,743 into a profit of £2,035, West Ham a loss of £2,499 into a profit of £1,137, Southampton a loss of £2,793 into a profit of £718, Crewe a loss of £618 into a profit of £949, Darlington a loss of £926 into a profit of £90, Leigh a loss of £101 into a profit of £81, Motherwell a loss of £553 into a profit of £70, and so on. There are only one or two municipal undertakings throughout the country which have involved any loss necessitating support out of local rates. Salford and Bath are the most notable examples, and in these and other cases the causes would very likely have arisen had companies controlled them. In fact, examples of bad management and financial loss under companies are by no means rare. The number of companies which worked at a loss in the year 1901 was thirteen, a proportion just about the same as in the case of municipalities. For the year 1901 companies put aside by way of depreciation and reserve £182,162, equal to 1¾ per cent on the capital expended, or less than the municipalities had to allow for sinking fund payments, which, with £30,332 placed to reserve, was equal to 2¼ per cent on the capital laid out. The statistics also show that the municipalities had already repaid £628,312 of capital, and had £275,585 in sinking funds—two amounts which are equal to over 6 per cent on the total capital expenditure.

Another instructive comparison between company and municipal undertakings was recently supplied by the "Electrical Engineer," a perfectly independent trade journal. Taking the London undertakings the following were some of the comparisons:

	Companies	Local authorities
Average capital expenditure per kilowatt installed.....	£ 115	£ 96.5
Average price per unit sold.....	4.72d.	3.58d.
Average cost per unit sold.....	2.59d.	2.38d.
Gross profit as percentage of outlay.....	5.98	4.75
Units sold per kilowatt of plant installed.....	780	917

Companies spent 19.2 per cent more on plant, charged 32 per cent more per unit, and costs were 8.8 per cent more.

I should point out that all the central districts and the West End of London are supplied by companies, whose output is five times as much as that of the few municipal undertakings established. The following is the same journal's comparison between company and municipal undertakings in the provinces, where the municipalities produce nine times as much current as the companies:

	Companies	Local authorities
Average capital expenditure per kilowatt installed.....	£ 98.5	£ 78.5
Average price per unit sold.....	4.45d.	3.15d.
Average cost per unit sold.....	2.34d.	1.75d.
Gross profit as percentage of outlay.....	4.65	5.18
Units sold per kilowatt of plant installed.....	524	695

Companies spent 25.5 per cent more on plant, charged 41.4 per cent more per unit, and costs were 33.6 per cent more.

New undertakings are excluded from both these tables.

Mr. Porter says in his article that "Everyone who has studied the subject of electric light production knows that the great element is the extent to which the average utilization of the machinery can be brought up to the maximum reserve necessary to be kept in store—the load factor, that is to say." The

municipalities in England, in this respect, are far ahead of the companies. The paper from which I quote also states that had the municipalities charged the same average rates as the companies did in the provinces last year (1902) they would have received an additional income of about £650,000 for the same output. Anyone who has studied the subject of electricity supply to any extent in England knows that the company undertakings in many cases are overcapitalized. Whatever amount is spent in promotion and the value placed on provisional orders, is so much inflated capital, which is not represented by any asset and does not occur in the case of municipal undertakings, the capital of which represents absolute assets, except the cost of holding preliminary inquiries and Parliamentary expenses, which are light under provisional orders.

I have shown that municipalities are more enterprising than companies, and the statistics prove more efficient management and the supply of current at lower prices. Companies which are doing well in England are not enterprising. They rather draw a comfortable dividend from few customers than lower the price. That is the reason why the large cities of Liverpool, Sheffield, Birmingham, Leeds, Southampton and others have, within the last few years, bought out at heavy compensation companies which their shortsighted policy had allowed to come in. The table printed on page 34 last week is interesting in this connection, as showing the result of the transfer to municipal management. The figures are obtained from the accounts issued by the companies and municipalities.

In the cases of Leeds, Sheffield and Birmingham the undertakings only supplied current for power and light. In Liverpool the output has been greatly increased by electric tramways. In its last year the Liverpool company paid 6 per cent dividend. In its first years the municipality, without tramways, increased the kilowatts sold by over 1,000,000, and, although it at once reduced the price, the receipts increased from £35,414 to £51,722.

At the present time there are 302 municipal undertakings and 113 company undertakings. All the large cities outside the Metropolis have municipal supplies. Municipalities held 121 provisional orders, chiefly for small towns and of recent date, and companies twenty-seven orders. A number of electrical power bills have been passed, giving companies power to supply current over wide areas. At first these companies tried to encroach, without permission, on the province of the municipalities. From an industrial as well as a municipal point of view this policy was undesirable, as the general law provides for giving every undertaking, whether private or public, a monopoly in its own area. The bills were allowed to become law on condition that the rights of municipalities were respected. Two electrical power companies are now supplying current on a small scale, but there has been no experience yet in England of serving large areas from one center, and it is not known whether the system will be financially successful or not.

One important point in connection with municipal supplies should not be overlooked. In many cases dust destructors are attached to generating stations, and the town refuse and waste utilized as fuel. As the collection and disposal of fuel is a municipal service it is considered in the interests of administrative economy that the combined dust destructor and generating station should be under the same control.

TELEPHONES

With regard to telephones the British Government made the same mistake as it did with the telegraph service, by allowing private companies to get possession of the business. The post-office bought out the telegraph companies for such large amounts that the service has not been financially successful, as the object of the department has been to cheapen telegrams. The post-office held aloof with respect to telephones, with the they were all absorbed into one national monopoly, which had

a large inflated capital and imposed heavy charges for a bad service. The government acquired the trunk lines, and as no improvement took place it finally instituted municipal competition, although only one or two towns had asked for it. The result is that where municipal services are established the charges have been reduced 40 per cent to 50 per cent. In Glasgow, for instance, the telephone company used to charge £10 a year; the municipality now charges £5, 5 s. Another effect of the national telephone monopoly was to injure home industries, as it went to Norway for its instruments, etc. Municipalities are more patriotic and support home industries. I do not regard telephones as coming under the head of municipal industries in England, as the post-office has announced its intention of acquiring all the telephone system in 1913 or 1925, so that municipalities are seriously handicapped in establishing a business which will only have a temporary existence.

MUNICIPAL INDEBTEDNESS

"Compared with the United States, I find," says Mr. Porter, "in the aggregate the municipal debt is fully double." If Mr. Porter is right in this statement I can only say the more shame to the United States. If the cities in the United States do not spend more than a thousand million dollars on providing adequate services, making adequate provision for education, sanitation, hospitals, asylums, museums, street paving, street improvements, technical institutions, libraries, police, fire brigades, these services cannot be in a high state of efficiency. English cities certainly could not maintain their present standard of administrative efficiency in connection with the above services for the amount. The loans incurred for trading enterprises represent £104,000,000, out of a total of £293,864,000, or 35 per cent. The chief cause of the increased local indebtedness has been vast improvements in county and parish government during the last ten years. General sanitary and street improvement is represented in an increased indebtedness in ten years of 65.9 per cent. for education, 51.5 per cent for sewage purposes, 50.0 per cent for poor law purposes and infectious diseases hospitals, and 57.4 per cent for parks. If the American system of limiting debt in some States to 10 per cent of the assessed value were to be applied to British cities these services would be crippled and the present standard of sanitary control weakened.

The credit of British municipalities stands high, as a reference to any stock exchange list will show. During the South African war the consols and all government stocks were low. The city governments had naturally to pay more for their money, and had difficulty in getting it. But in normal times their issues are generally subscribed for several times over. Last week, for instance, the London County Council issued £2,000,000 worth of 3 per cent stock at 98, and the amount was offered four times over. The best municipal stock fell less than government stocks during the war.

MUNICIPAL OWNERSHIP AND LOCAL TAXATION

A statement is quoted by Mr. Porter to show that municipal trading enterprises only reported a dividend of one-half of 1 per cent per annum. The return upon which this statement is based is one known as Sir Henry Fowler's Return of Reproductive Undertakings. Under the head of "Reproductive Undertakings" are included piers, harbors and baths, which are not supposed to yield profits. But even including them the average annual profits were equal to a dividend of over 4 per cent on the whole capital. The half per cent referred to was the surplus—£486,397—which was left after paying all interest, sinking fund charges, etc. Were the baths and other undertakings which are not expected to yield a profit eliminated the return would, of course, be more.

A fiction sometimes brought forward by opponents of municipal government is that the extension of trading enterprises means an increase in rates. As a matter of fact local

taxation is lowest in those towns where municipal ownership is most highly developed, and highest where municipal ownership is least. During the last five years, for instance, the following amounts have been contributed from trading enterprises towards the relief of local taxation, after each department had made all its charges, paid the interests, set aside sums for reserve, depreciation and repayment of loans:

Town	Profits in aid of rates £	Town	Profits in aid of rates £
Darlington	70,406	Birmingham	183,723
Bolton	200,465	Walsall	25,000
Manchester	442,120	Leeds	174,403
Turnbridge Wells.....	12,950	Nottingham	144,000
Leicester	608,362	Hull	64,400
Sheffield	32,000	Burton-on-Trent	38,363
Salford	130,297	Belfast	52,511
York	8,944		

The case of the little town of Darlington, with a population of 44,500, is remarkable. From its water, gas and market undertakings it distributed in surplus profits last year \$4.50 per family. Its outstanding debt only amounts to \$1,297,965. Its annual surplus profits, which go to local taxation, are equal to 5 per cent of this debt. And Darlington has yet to develop two services which will pay it best—its electricity supply, which is just beginning to earn a profit, and the municipal tramways, which were established last year. But for its municipal trading enterprises the municipal taxes in Darlington would be 5 s. 9.125 d., instead of 4 s. 0.087 d. Darlington, I may mention, is a thoroughly business community, in the midst of large coal and iron industries.

The relief of local taxation is not the chief aim of municipal ownership, although it is an evidence of good business management. Mr. Porter quotes a statement of mine that it would be the chief cause of friction, the chief sources of temptation, favoritism and corruption. A highly developed system of municipal government calls for higher social service from the councillors. It means to them sacrifices of time, service and money. The model council is one comprising men whose sole object is to improve the educational, social and moral welfare of the community. Such a condition of things may be rarely attained. There are always opposing elements, but we are fortunate in finding in British cities a class of men ready to serve the public without getting anything out of it. Their award is only the honor which the public service may carry with it and the confidence of their fellow citizens. There are few social prizes in municipal life. Councillors may be made magistrates—purely honorary positions—a few mayors may get honors, but generally the service is as unostentatious as it is disinterested. Party organizations are used at election times, but politics play little part on the councils and still less in the selection of men for posts of honor. Politics have no bearing on municipal ownership. Some cities which are politically the most conservative are the most advanced in municipal trading.

I have dealt with all the points raised by Mr. Porter. I have not gone outside of them, but there is much else that could be said in support of the policy which has proved successful in England. Everyone must admit that there are dangers to be guarded against, and precautions to be taken in connection with existing institutions as well as in future developments. But as local government is conducted publicly it is always open to criticism. Any extravagances or reckless experiments on the part of a Council are soon checked at election times by the defeat of those responsible for them. Nothing wrong can remain hidden for any length of time.

The United Railways & Electric Company, of Baltimore, proposes to put a stop to the practice of teamsters in blocking cars by refusing to turn out of the tracks, and has requested the police department to assist in enforcing the law which prohibits reckless obstruction of street cars by wagons and trucks.

INSTITUTE MEETING IN CHICAGO

The Chicago members of the American Institute of Electrical Engineers met in Chicago on Tuesday evening, Dec. 30, to discuss the subject of "Braking and Traction Brakes." The paper by R. A. Parke on "Railroad Car Braking," was read by T. P. Gaylord in abstract. The paper by J. D. Kieley on "Some Brake Tests and Deductions Therefrom," was read in abstract by B. J. Arnold.

Mr. Gaylord at the close of his reading called attention to the necessity for larger motor equipments for electric brakes, using the motors where generators were to be employed, and said that complaints from electric brakes were likely to be due to having too small motor equipment, designed only to be used for accelerating and propelling the car.

B. J. Arnold, at the close of his reading, spoke of the tests which he made about a year ago on comparative steam and electric traction, in which a negative acceleration or braking at the rate of 3 miles per hour per second was obtained in a few instances.

J. R. Cravath called attention to the fact that it is only very recently that interurban roads have felt the necessity of increasing the rate of braking in ordinary service stops. Recently he had known at least one high-speed interurban road upon which the regular schedules would be so fast as to call for a rate of braking almost equal to an emergency stop. The question would come up how to accomplish, with an ordinary straight air brake, what a Westinghouse automatic high-speed brake does in applying the brakes with high brake-shoe pressure at first, and gradually reducing this pressure to compensate for the increase in brake-shoe friction at the lower speeds. In one case, he believed, it was proposed to accomplish this by teaching the motormen to apply the brakes with high pressure at first, and gradually decrease this pressure as the car lowered its speed. This would call for considerable skill on the part of the motorman, but much judgment is required by him anyway with a modern interurban straight air brake apparatus, because the storage reservoir pressure is usually much greater than could be let into the brake cylinder without sliding the wheels. Care is therefore required in every application of the brakes.

An informal discussion followed, which was taken part in by a number of members, on the recently exploited apparatus for increasing the coefficient of friction between the wheels and rails by means of magnetism, thereby increasing the possible rate of braking on a slippery track.

E. B. Clarke described briefly the braking precautions on an ore-carrying machine in the Illinois Steel Company's plant, of which he is electrical engineer. This machine had air, electric and hand brakes. There had been some trouble with broken axles, that he had suspected was due to the use of the electric brake, and inquired whether trouble from this source had been experienced in railway work. None of the members seemed to have heard of any unusual trouble of this kind on roads employing the electric brake.

The question of the rapidity of action of the Westinghouse quick-acting automatic air brakes on long trains came up. R. H. Pierce spoke of some apparatus which he knew of a number of years ago for applying the air brakes under all the cars of the train simultaneously by means of electricity. B. J. Arnold told of tests which he witnessed in 1887 on the quick-acting automatic air brake on long trains, and showed that the application of the brakes on the rear cars of a long train was more nearly simultaneous with the movement of the engineer's valve than if the rate of brake application had been transmitted through the train with the velocity of sound. While electrical apparatus for working the valves under each car was instantaneous it was evidently not enough better than air to justify the complications it would involve.

ENGINEERING AND OPERATING FEATURES OF THE CHICAGO TRANSPORTATION PROBLEM

In last week's issue was given a synopsis of the report, submitted by Bion J. Arnold, as consulting engineer to the committee on local transportation of the Chicago City Council. The full report went to the committee on Dec. 30, 1902, but as the text comprises a book of 300 pages, together with fourteen maps and fifteen plates, containing elaborate curves and drawings, space will forbid the publication of the complete report in these columns, and since some of it is of entirely local application an abstract will be given which will take up matters of general engineering interest and other facts and figures regarding Chicago conditions which are applicable to conditions likely to arise elsewhere.

The report is an exceedingly complete and valuable engineering work, and it is difficult without actually seeing it to appreciate the amount of thorough engineering investigation that has gone into it. The report is divided into six parts.

Part I is a general discussion of street railway systems and the conditions governing them; also a general discussion of Chicago conditions.

Part II deals with the inadequacy of the present downtown terminals, the reasons for the present congested condition, and recommendations for immediate improvement of downtown terminals to relieve congestion.

Part III is an analysis of the growth of population and the development of the transportation facilities, with a discussion of the probable increase and an analysis of the financial results heretofore obtained in operation.

Part IV takes up the question of through routes from one side of the city to the other, universal transfers and the one-city-one-fare idea.

Part V outlines a new, reorganized and consolidated system of street railways for Chicago.

Part VI is devoted to technical problems and estimates as to the value of the present street railway properties and the cost of bringing the street railway lines of Chicago up to the highest modern standards. In this part a system of subways for affording terminals in the downtown district is outlined and several plans are suggested. The practicability of the conduit system is discussed, and the changes necessary from present cable construction to make the system a success are indicated. A short chapter is devoted to electrolysis. The capacity of the present union elevated loop is considered, and the steps necessary to give immediate relief of the congestion on the loop are reviewed, with further provision for relieving the congestion as the traffic increases in the future. One chapter is devoted to track rails and track construction, and the four remaining chapters of this part of the volume are taken up with estimates and valuations.

Attached to the report are five appendices. Two give exact data on the present operating conditions of the Chicago surface lines, including the present routes, length of round trip, time schedules and maximum number of cars operated. One appendix is devoted to the recommended routes for the operation of cars under the unification of ownership of all the lines. Another contains the recommended routes in the business district for the operation of cars under divisional ownership, with the joint use of tracks. Two appendices give the points to which transfers are issued and received at present. Streets upon which tracks are laid and the distances have been compiled. The last appendix recommends streets upon which new tracks should be constructed, and outlines a complete surface transportation system for the entire city, giving the changes in present routes and terminals thought best.

GENERAL TRAFFIC CONDITIONS

Part I opens with the statement that nearly all of the large cities of the United States are laid out on one of three plans:

the peninsula plan, of which New York is the best known example; the valley plan adopted for Pittsburg, and the radiating plan, to which Chicago belongs. The first two plans call for comparatively small track mileage and great traffic density on that mileage. For example, the elevated and surface transportation systems of New York city, serving a population of 2,050,000, earn about \$13.00 per capita per year with a track mileage of 393 miles, and San Francisco \$14.00 per capita, with a mileage of 229 miles, serving a population of 350,000. The radiating plan calls for greater mileage for the population served with smaller gross receipts per capita. The Chicago surface and elevated lines earn less than \$10.00 per capita with a track mileage of 610 miles, serving 2,000,000 people, and the surface lines of St. Louis \$8.00 per capita, with a track mileage of 361, serving 750,000 people. Misuse of transfers and loss of revenue thereby is easier with radiating lines than in cities where traffic is confined to a peninsula or in a valley. Population and population density have an enormous influence on street railway profits. The knowledge of these differences in city plans and their bearing on the earnings of transportation companies is absolutely essential to the theory of properly conducting transportation.

EFFECT OF DIVISIONAL LINES

Chicago is divided into three parts by the river. Following up the division idea forty-four years ago, when the city had grown to such proportions that some method of transportation was deemed necessary, three street car companies were formed, chartered and granted franchises in three divisions, and to this mistake, made in the infancy of the Chicago transportation business, can be traced the primary cause of the present demand for a change in transportation facilities.

To this double fare in the business district can be charged all the present congested conditions not caused by the presence of the river. Naturally, each division's company, not being in any manner interested in the operation in any other division, guarded its territory jealously and laid out extensions and new lines with a view to perpetuating the travel in each division over that division's lines to a common center, thus tending to aid the crowding of business and traffic to a small area. As the area of the city grows new centers are created at different points in the several divisions, and there is a growing demand for transportation between these divisions, without reference to the general downtown center.

PROBLEMS TO BE SOLVED

Problems to be solved in relation to transportation facilities for Chicago and its suburbs are therefore:

First. To devise some method of operation which will relieve the congestion of the overcrowded thoroughfares in the central portion of the business district of the city and tend to render valuable an increased area in that district.

Second. To furnish a more ready means of intercourse between the three divisions of the city from the business district and outside that district.

Third. To furnish a means of distributing passengers brought in at the several railroad stations, transferring them from one station to another, and to facilitate intercourse between all portions of the business center.

It is obvious that the primary cause for the existing unsatisfactory conditions is found in a diversity of ownership of the transportation companies. Unification of ownership or consolidation of management on some basis is a condition which must be precedent to any really satisfactory and lasting solution of the problem, although an equitable arrangement for the joint use of tracks would offer a temporary solution and probably result ultimately in unification. The surface lines serving the city are now operated by eight companies, the elevated lines by four companies. The territory served by each of these companies is briefly outlined.

UNDERLYING IDEAS OF THE REPORT

It is considered that the adjustment of the transportation question should be made on the basis that Chicago is one city and not three, that there are no divisional lines, that the citizens have the right to expect that they be transported about the whole district in one general direction for one fare, with as little inconvenience from transfers as possible. The amount of cash compensation to be secured from the street railways should be a secondary consideration to the attainment of one fare within the city limits, with the very best transportation facilities known at the present time, and with the assurance that the service be kept up to the modern standard.

REASONS FOR INADEQUACY OF PRESENT TERMINALS

It is hard for the casual observer to see why good business practice would not prompt the owners and managers of the present street railway companies to operate a sufficient number of cars to accommodate the people, if it were possible to do so. It is very evident to the ordinary observer that large numbers of people living within a 2-mile limit of the business centers are walking morning and night. Some of these walk from choice, but most of them do not. An observation taken any morning between 7:00 o'clock and 8:00 o'clock, or any evening between 5:30 o'clock and 6:30 o'clock on any of the principal thoroughfares at a point 1 mile from Madison Street and State Street, will demonstrate the correctness of this statement. At the same time it will be observed that every car is so loaded that it would be impracticable to take on more passengers. The reasons for the present conditions in the business districts are that the present facilities, as arranged, are entirely inadequate. The operation of cars by cable power prohibits the use of the terminal facilities that are provided to their maximum capacity, and there is a lack of electric power in the business district. There are now in operation during the hours of maximum traffic on the lines that enter the business district 1379 cars, consisting of 772 cable cars, 97 electric motors trailed on cable trains, and 510 electric cars. The 869 cable cars and electric trailers are operated around five loops; the 510 electric cars are operated around one loop and on five stub-end terminals, thirty-four of them being hauled by horses eight blocks on every round trip. Letting go and picking up the cable and precautions incidental thereto, at cable crossings, tend to the interruption of traffic. The headway on the North Division cable loop consists of one grip and two trailers every forty seconds, or say one car every twenty seconds, and headway on the West Division loop is a train every fifty-three seconds, or one car every twenty-six and one-half seconds. With the difficulty of operation it is impracticable to operate more trains around these two loops. The maximum service that can be given on these two loops has been reached. The loop service of Blue Island and Halstead Street cable lines is congested by team traffic and trolley traffic on two of its sides, which reduces its capacity. There are fifty-four cable cars and eighty electric cars operating on Van Buren Street east of Fifth Avenue, giving a headway of less than one car every twenty seconds. The eighty electric cars stub-end at State Street and cross back to the West End track. Platform gates must be changed, trolleys turned, fenders put up on one end and let down at the other, and the motorman must change from one end of the car to the other. At this point the cars also distribute and take on the bulk of their passengers. It is impracticable to operate these stub-end terminals under much closer headway than twenty seconds. Adams Street overhead trolley wire stops at Fifth Avenue, and the thirty-four cars on the Harrison Street and Fulton Street lines have to be hauled four blocks and back by horses. This delays the cable loop on Adams Street, over which fifty-four cable cars are operated.

These are samples of a long list of conditions on downtown terminals explained in detail in the report. In nearly every case the paragraph ends with the inevitable conclusion that it

is impracticable to operate cars on closer headway under existing conditions. Clark Street terminal, of all the South Side lines, may be mentioned especially, since it is a stub-end terminal, serving electric cars only. The headway on Clark Street, north of Twenty-Second Street, is about twenty-six seconds, and 239 electric cars use this street as a terminal. The time occupied in changing ends, discharging passengers and crossing over to the southbound track is frequently more than twenty-six seconds, as shown by the fact that the incoming track for a mile is lined with cars, bumper to bumper, almost every evening during the rush hours. After reviewing the conditions, the report states that it must be apparent to anyone thoroughly understanding present conditions, that very little improvement can be made in the surface transportation situation unless a radical change is made.

CABLE SYSTEM MUST BE ABANDONED

Later developments in electrical operation have made it as much more desirable than cable operation as cable operation is to horse operation. Under all installations of cable systems prior to that on Broadway, New York, operation of cars in trains was considered the proper method. The single car operation of Broadway, as well as single car electrical operation everywhere, demonstrated the superiority of this method over the old. Two or more cars in a train decrease the frequency of cars on a street, but increase the number of stops in the ratio that the larger number of passengers bears to the capacity of a single car. The discomfort of jerking in cars coupled in a cable train is mentioned. Accidents are more numerous with train operation than with single cars. There is nothing to be said in favor of the train method even from an ownership standpoint. The money saved in wages is more than offset by increases in the accident account. Cable operation as a system is undesirable, because the movement of a large number of people is dependent on the care of the gripman. Carelessness on the part of one gripman in letting go the rope may stop the operation of the entire line.

LACK OF TROLLEYS IN THE DOWNTOWN DISTRICT

When ordinances were secured for the conversion of horse lines into electric tracks, the right to operate over the cable tracks by electric power was withheld, and the overhead trolley was prohibited in the downtown district, thus perpetuating the difficulties from which the people were already suffering. After several years of most unsatisfactory operation electric terminal facilities were granted over a few of the horse tracks in the business center, which relieved the situation to some extent at that time, but the travel has now outgrown those facilities.

RECOMMENDATIONS FOR IMMEDIATE RELIEF

The foregoing sets forth the conditions as they now exist, and the causes which led up to these conditions have been impartially and conservatively stated. Serious conditions require radical treatment, and the following recommendations are accordingly submitted, and the belief is expressed that their adoption will give to the city of Chicago as good transportation facilities as can be secured under the separate ownership and operation of territory at present existing:

First. All cable operation should be abandoned and the cable trackage converted to either overhead trolley or underground conduit for electric cars.

Second. The territory bounded on the north and west by the river, and by Twelfth Street on the south, should be used in common by all companies for the proper location of loop tracks or terminal facilities, all of these central tracks to be of the underground electric conduit type.

Third. Cars should be routed as far as practicable via trunk avenues and crosstown lines, combined in such manner as to serve the maximum amount of travel with the minimum use of transfers.

Fourth. Sufficient cars of the double-truck pattern, equipped

with brakes operated by other than hand-power, adequately heated during cold weather and operated singly, should be provided for all through lines, although lighter cars could be used on crosstown service.

Fifth. On all well-paved streets all rails on new track, and all tracks when renewed should be of the grooved type, designed on such lines that the groove will be cleaned by the passage of the wheel flange. The groove should present the least obstacle to passing vehicles, and, at the same time, offer the least inducement to vehicles to drive on the tracks. Where such rails are laid the pavements should be kept clean.

To accomplish these recommendations involves a large expenditure by the traction companies and an abandonment of extensive equipment from which little salvage can be obtained. The expensive part of cable installation is the track, curve and vault construction. The abandonment of the cable and the substitution of electricity means the entire rebuilding of most of the cable trackage, because the yokes used are not adapted to the heavy rails necessary for 25-ton double-truck electric cars. Cable power houses and other machinery cannot be utilized to advantage in electrical operation.

OVERHEAD TROLLEY VS. CONDUIT

Experience with the overhead trolley wire in Chicago, as well as in other large cities, has demonstrated that its advantages far exceed its disadvantages. There is practically no increased danger in its use in the average business or residential district, except that due to the increased speed of the cars. In this district, the buildings are not of such height as to require the hoisting of long ladders or stand pipes by the fire department in case of fire, and as modern trolley lines are provided with frequent cut-out points, very little, if any, danger is incurred from live wires in suppressing fires. There have been very few recorded instances of damages arising from broken or fallen wires, and such as have occurred have been more than offset by damages sustained by persons or property from the open cable slots in the street surface, by the catching of horses' hoofs or dropping in of light vehicle wheels. In congested districts like the business center of Chicago, where the buildings attain such heights, and where even a lamp-post on the sidewalk is an obstruction, overhead wires should be prohibited. Outside of these districts objections to the overhead trolley are mainly on account of its appearance. Under any circumstances overhead construction should not be permitted inside of the district bounded by the river on the north and Twelfth Street on the south.

PLANS FOR ROUTING OF CARS

Map No. 1, which accompanies the report, but is not reproduced here, shows the present tracks in the downtown district, a number of which are not in use and are known as dead tracks. Map No. 2, which is here reproduced, shows an arrangement of loops, eleven in number, three from the South Side, three from the North Side and five from the West Side. Each loop is independent, and grade crossings are eliminated, except where the traffic on each loop crosses itself to avoid running against vehicle traffic, which custom has decreed must keep to the right. It is impossible to devise loops where one street has to be used for tracks, which will observe the right-hand rule of team traffic, without crossing the car traffic at some point on the loop. It is plain that in making a choice between the two evils, of crossing car traffic or running against team traffic, the lesser has to be chosen. The crossing of car traffic on the loop cannot be considered as reducing its capacity much more than the crossing of the track at any point by a team.

This plan furnishes as much terminal capacity as can be obtained in the limited area available on the surface. In this plan the three tunnel entrances now in existence in the business district are incorporated. Whatever plan be adopted, either surface or subway, the present tunnels must be lowered to provide a deeper channel in the river to maintain marine traffic. If

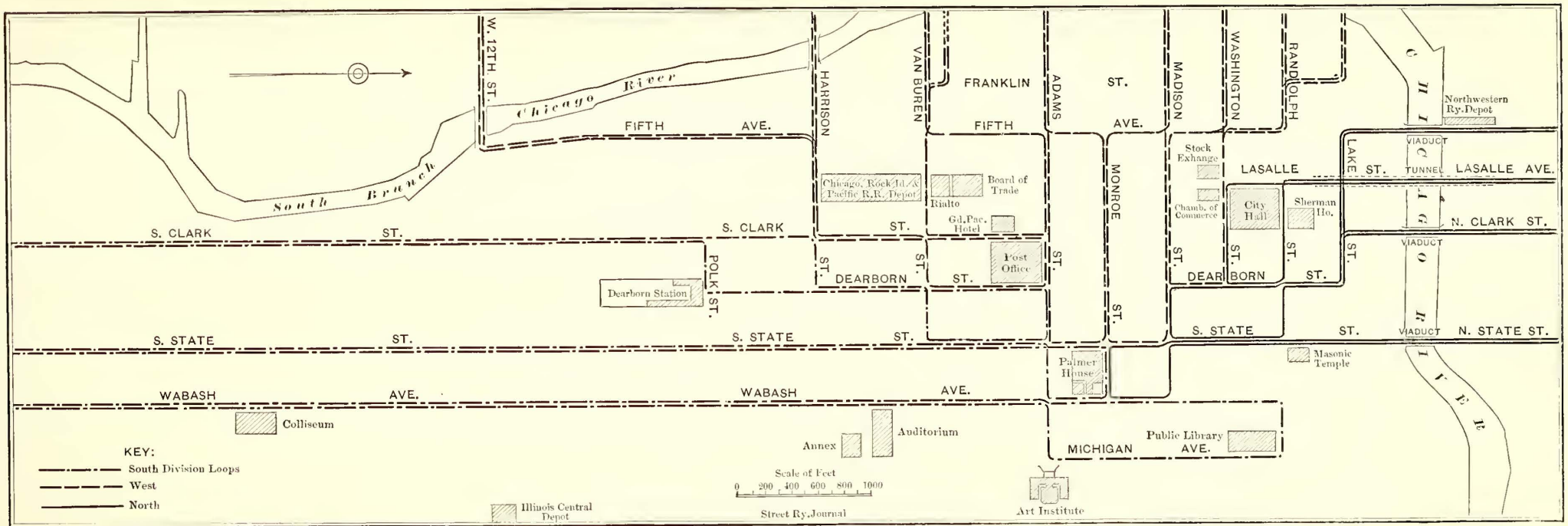
the tunnels are lowered sufficiently the present entrances must be extended in both directions at least one block, in order that the grades may not become prohibitive for the operation of electric cars. It, therefore, seems to be impracticable to lower the present tunnels and retain them for surface street car operation.

Map No. 3, herewith produced, is a modification of the plan shown in No. 2. It permits the use of the tunnels, provides for through traffic between divisions, and is based on the assumption that grade crossings will be permitted, and that the two companies could amicably arrange for the joint use of tracks in the business district. This arrangement serves the largest street mileage by all lines of cars and makes it possible to deliver almost all the passengers to State Street and all to Dearborn Street. By the adoption of this plan, which could be put into operation in a very short time when once agreed upon, the destruction of the present tunnels could at once take place, removing the present barriers to marine traffic, and, at the same time, making it possible to construct whatever system of subways might ultimately be decided upon, without adhering to the location of the present tunnels. The complete destruction of the present tunnels is not advocated. The tops could be immediately lowered and the remainder of the work preserved for future use in connection with the subways.

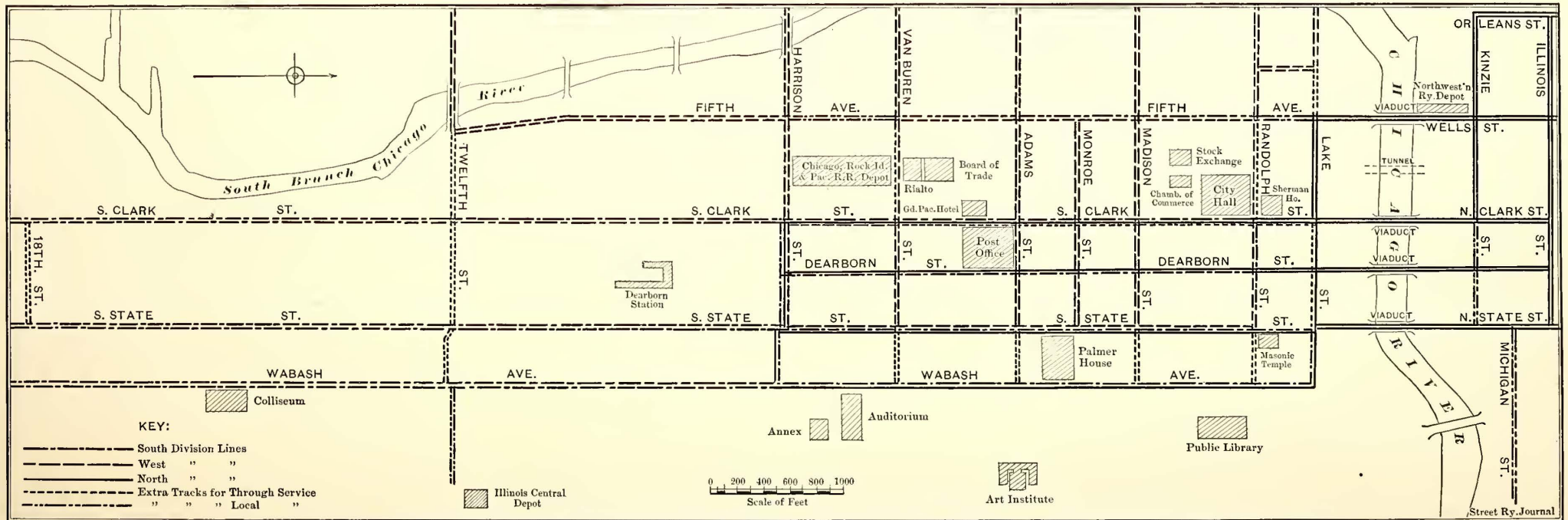
TRAFFIC CONDITIONS

As showing how near the eleven terminal loops given on either Map 2 or 3 would provide facilities for the traffic from the three divisions, an estimate is submitted. It was necessary to ascertain what proportion of the total passengers handled were carried into the business center during the entire day and during the morning and night rush. As there was no record of this it was necessary to make some assumptions. It was found that 20 per cent of the total passengers were carried on crosstown lines having no terminals in the business center. Deducting this 20 per cent left the passengers carried on trunk lines terminating downtown. From this number was deducted 25 per cent for passengers carried on trunk lines not coming to the business center. This left the number of passengers that were brought from and carried into the business center on trunk lines during the entire day. As the service given during the middle of the day was less than 50 per cent of the maximum service during the rush hours, and as the cars during the middle of the day were only moderately well filled, a deduction of 25 per cent was made to arrive at the number of passengers hauled during the rush hours. The rush hours extend over ninety minutes in the evening and a somewhat longer period in the morning, but for the purpose of this estimate it was assumed that the intervals were equal. By dividing the number thus obtained by two we have a number for which capacity must be provided in ninety minutes each morning and evening. By a further deduction of one-third the number handled in one hour is obtained. The following are the figures:

	One Year Ending			
	1901	June 30, 1902		1 Year
	South Div.	North Div.	West Div.	Total
Passengers carried.....	117,127,732	56,807,083	99,329,815	273,264,630
Crosstown, 20 per cent.....	23,425,546	11,361,416	19,865,963	54,652,925
Trunk lines	93,702,186	54,445,667	79,463,852	218,611,705
25 per cent short rides.....	23,425,546	11,361,416	19,865,963	54,652,925
75 per cent of trunk lines to downtown	70,276,640	34,084,251	59,597,889	163,958,780
25 per cent ride during day.....	17,569,160	8,521,062	14,899,472	40,989,695
Hauled during rush morning and night	52,707,480	25,563,189	44,698,417	122,969,085
Per day	144,404	70,036	122,461	336,901
One-half morning	72,202	35,018	61,230	168,450
One-half at night to be moved in ninety minutes.....	72,202	35,018	61,231	168,451
To be moved per hour, two-thirds	48,135	23,346	40,821	112,302



MAP NO. 2 OF ARNOLD REPORT, SHOWING SUGGESTED REARRANGEMENT OF TERMINAL LOOPS IN BUSINESS DISTRICT



MAP NO. 3 OF ARNOLD REPORT, SHOWING RECOMMENDED REARRANGEMENT OF SURFACE TRACKS IN BUSINESS DISTRICT

The hourly capacity of a loop under a given headway is the carrying capacity of the number of cars that pass a given point on the loop in one hour. Assuming sixty passengers to the car, which would be a comfortable load for a double-truck car, a

	Passengers
Thirty-second headway would give 120 cars, capacity one loop per hour...	7,200
Twenty-five second headway would give 144 cars, capacity one loop per hour	8,640
Twenty-second headway would give 180 cars, capacity one loop per hour.	10,800
Twelve-second headway would give 240 cars, capacity one loop per hour.	14,400
Ten-second headway would give 360 cars, capacity one loop per hour....	21,600

The three loops provided for the South Division would give,

	Per hour
Under a thirty-second headway, capacity for.....	21,600
Under a twenty-five-second headway, capacity for.....	25,920
Under a twenty-second headway, capacity for.....	32,400
Under a fifteen-second headway, capacity for.....	43,200
Under a ten-second headway, capacity for.....	64,800

The number of passengers to be handled per hour on these three loops from the South Division, as shown by the foregoing table, is 48,135, or it would be necessary to maintain a little closer headway than fifteen seconds, assuming an equal number of passengers carried in a given time night and morning. In case more passengers were carried at night, the headway would be slightly decreased during this time.

The five loops provided from the West Division would give:

	Per hour
Under a thirty-second headway, capacity for.....	36,000
Under a twenty-five-second headway, capacity for	43,200
Under a twenty-second headway, capacity for.....	54,000
Under a fifteen-second headway, capacity for.....	72,000
Under a ten-second headway, capacity for.....	108,000

In the case of the loops for the North Side and West Side cars considerable room would be left for an increase in business. A system of routing cars is suggested in the report, which has as its object the elimination of the necessity of so many transfers to crosstown cars from trunk lines. The idea is one very commonly used in other cities, of operating cars out over a trunk line and thence over some intersecting crosstown line, instead of depending entirely on transfers from the trunk line to crosstown lines.

TYPES OF CARS

The installation of double-truck closed cars is considered very desirable for a number of reasons. The seating capacity of a double-truck car with reversible back cross seats and center aisle, such as is being operated on South Clark Street, is fifty-two passengers, against thirty passengers for the ordinary closed single-truck car, an increase of twenty-two passengers to the car, or 73 per cent. The change to double-truck closed cars now being operated would add a seating capacity equivalent to 1122 more cars of the single-truck type to the present service, without increasing the number of cars on the streets. A car equipped with cross seats and reversible backs permits all passengers to face forward, and it can, consequently, be used with open windows and doors as a summer car. In Milwaukee such cars were adopted for use the entire year, recognizing the fact that there are more days in the so-called summer season in this climate, calling for closed cars than when open cars are more desirable. The riding qualities of double-truck cars are superior to the oscillating single-truck cars. While the double-truck car is much heavier than the single-truck car, it can be operated at a higher average speed, with greater safety to the public than can the lighter single-truck car, owing to the use of power braking mechanism, without which no heavy double-truck car should be permitted to operate. It would be advisable to continue the operation of the small single-truck cars on short crosstown lines, and also in the business center, provided a local business center distributing system is installed. In the event of the installation of a subway system, cars for operation in subways should be constructed of non-combustible material. The subject is receiving attention in this country as well as abroad, and non-combustible cars will undoubtedly be demanded eventually for all underground roads.

GREAT OBSTRUCTION BY TEAM TRAFFIC

Should the foregoing recommendations be adopted the traveling public will not receive the measure of efficient service intended to be rendered unless the municipal authorities stringently enforce better regulation of team traffic on the streets of the city. While one of the city ordinances provides that teams shall leave the track on the approach of a car, it is qualified by the provision "as soon as possible," and the teamster, in the absence of a police officer, is the sole judge of when it is possible. In the judgment of the average teamster the possibility of leaving the track decreases in the ratio of the weight of the load; generally, if he has a heavy load, lasting until he reaches an intersecting street. As there is no limit to the weight of a load, heavy loads are the rule, which prohibit any degree of speed, in consequence of which street cars, in the principal thoroughfares of the city, are seriously retarded. In many cases wagons are loaded to their full level-road or street-car-track capacity. When they reach the slight grades approaching the bridges the horses cannot pull the loads. It has, therefore, become customary for the drivers of such wagons to count on being pushed up these grades by the electric cars, and they wait at these approaches until a car comes to their assistance. As the wagons must be removed from the track before the car can proceed the car is compelled to assist the wagons, thus enforcing upon the public and companies the expense of the delay in traffic. This practice has become so common that push-bars are kept at the principal bridge approaches to enable wagons to be pushed up the grades by the cars. A number of streets are so narrow that a wagon cannot back up against the curb without blocking the car track. Wagons do this daily throughout the city, occupying from five minutes to ten minutes unloading, while the cars are lining up. The unloading is facilitated for the one teamster, but hundreds of street car passengers are discommoded. Provision should be made for the unrestricted operation of cars, and ordinances should be enacted compelling wagons to leave tracks immediately upon signal from the car, and prohibiting wagons from standing anywhere on the streets where they will block the street car tracks. The average schedule time for all electric cars operated in the city is 8.22 miles per hour. This is only 2¼ miles per hour greater than the former horse car schedules. It is thus seen how small are the benefits now received in rapid transit from the adoption of electricity as a motive power, because of these drawbacks, over which the operating companies have no control. In establishing schedules the necessary time for stops, gathered from experience, is calculated, and allowance is made for delays incidental to ordinary team traffic. Every effort on the part of the city to curtail the present speed of cars by ordinances will result in the lengthening of schedules, which will materially decrease the already very small benefits in rapid transit derived from electric operation. All efforts should be directed toward removing the causes of delay by regulating team traffic so that it would not be necessary to attain a higher maximum speed than 11 miles an hour, in order to maintain the present schedules.

THE QUESTION OF TRANSFERS

Investigation revealed a very thorough system of transfers in the territory of the Chicago City Railway Company, and with some exceptions the same condition was found on the Union Traction Company's lines. A universal transfer within the one-fare district should be considered to be a continuous ride in one general direction by the shortest distance between two points in the one-fare district. A street railway company that attempted to issue transfers under any other course of reasoning would lose a very large percentage of the receipts to which it is justly entitled, through the improper use of transfers by the traveling public. At best, transfers are a nuisance to both the public and the company, and everything that is practicable should be done to reduce their number.

(To be Continued.)

INVESTIGATION OF NEW YORK TRAFFIC CONDITIONS

The inquiry of the State Railroad Commissioners upon the transportation facilities of Greater New York has been continued during the last week, and it is probable that the investigation will occupy the rest of the present month. The public hearings have not been productive of results, although they have attracted considerable attention. The Commissioners, however, have had several executive sessions at which representatives of the several companies have been present, and they collected statistics which undoubtedly will aid them in formulating recommendations of a specific character for the improvement of operating conditions. The first result of the investigation was the order issued on Friday directing changes and improvements in the Manhattan system, working toward securing immediate relief.

Most important of the directions which are to have immediate effect is that one ordering the railroad to run throughout the day as many trains and cars as are at present operated during the rush hours. The order directs that this arrangement be effected at once. A return of the schedule fixed must be made to the Railroad Commission on or before Jan. 12.

The elevated railroad company is further directed to purchase during the month of January 100 extra cars, and to secure an equal number in February, and again in March. These cars will add 14,400 seating capacity to the rolling stock of the company by April 1.

To make it possible to run more express trains and to prevent delays at the downtown stations, the Commission further orders that the Elevated Railroad Company shall take immediate steps to build a third track on the Ninth Avenue line from Cortlandt Street to Fourteenth Street, on Third Avenue from Ninth Avenue to Fifty-Ninth Street, and on Second Avenue from Canal Street to 129th Street.

The carrying out of these directions will make it possible to run express trains on the Second Avenue line, thereby greatly relieving the congestion on the Third Avenue line during the rush hours. It will make it possible, also, for express trains on the Third Avenue line to get under full speed immediately after leaving the Ninth Street station, thereby reducing the time between downtown and the Bronx by several minutes. At present Third Avenue express trains are compelled to creep behind local trains until Fifty-Ninth Street is reached. A third track on the Ninth Avenue line from Fourteenth Street to Cortlandt Street will enable express trains to leave the outside tracks after they are full, and not be subjected to the delays which usually occur during the rush hours at Desbrosses Street, Houston Street and Christopher Street.

In compliance with the request of the Merchants' Association the Commission held a public hearing on Monday afternoon to discuss conditions affecting the operation of surface lines in Manhattan. At this meeting a committee of the Merchants' Association presented the following list of grievances, which it asked the Commissioners to investigate:

First—Full and continuous service on all lines owned and controlled by the Interurban Street Railway Company, by the running of all cars necessary for the speedy movement and proper accommodation of the public so far as physical conditions permit.

Second—Ample and frequent service on the lines east of Madison Avenue and west of Broadway, and particularly the Sixth Avenue line, in order that such increased efficiency on those lines may induce their use by the public, thereby relieving the heavy traffic on the congested main lines.

Third—The practicability of hereafter turning northbound Broadway cars into Sixth Avenue at Thirty-Fourth Street, and northbound Sixth Avenue cars into Broadway at Thirty-Fourth Street, thus abolishing the congestion at that point.

Fourth—The practicability of extending the Broadway route so as to avoid transfers at Fifty-Ninth Street, and turn east and west along Fifty-Ninth Street.

Fifth—In view of the narrowness and crowded condition of Broadway, between Seventeenth Street and Twenty-First Street,

it should be considered whether the public convenience would not be promoted, dangerous congestion at Twenty-Third Street and Fourth Avenue prevented, and the facilities for transportation increased, if the Lexington Avenue cars were run east from Broadway along Fourteenth Street to the junction with the Madison Avenue line, and thence up Fourth Avenue to Twenty-Third Street, and along Twenty-third Street to Lexington Avenue.

Sixth—The extension of the crosstown Eighty-Sixth Street line beyond Eighth Avenue and the change of motive power to electricity.

Seventh—The entire subject as to whether the efficiency and character of service on the downtown crosstown lines is such as the public has a right to expect.

Eighth—As at present operated, the surface lines in the Bronx and other suburban districts do not furnish adequate, or, in fact, any suitable accommodation for the protection of passengers at junctions or transfer points.

Ninth—The service of said roads in point of frequency of running cars is entirely inadequate to the public needs, and should be treated on the same principle as increased accommodations in Manhattan.

Tenth—The removal of unused car tracks in greater New York, provided the city will safeguard the present franchise rights to the future use of those streets from which said tracks are removed.

Eleventh—The question of vestibuling cars.

Twelfth—The question of two conductors on every car during the rush hours, and on all the long cars at all times.

Thirteenth—The question of the issuance of transfers at junction points, and the proper marking of all cars to show the route and destination of each car.

Fourteenth—The promotion of proper police regulations of trucking and traffic on the streets through which lines are operated.

Fifteenth—The removal of obstructions of all kinds, including snow, from the public portions of streets on which car lines run.

Sixteenth—The question of the enforcement of the public ordinances respecting ventilation and cleanliness.

Seventeenth—The prevention of permitting passengers to stand between seats in open cars.

When these complaints were examined it was found that everything pertinent to the present inquiry had been thoroughly discussed by the Commissioners and the officials of the Interurban Company at the executive sessions. Some of the points raised by the Merchants' Association were discussed by President Vreeland, who attended the hearing. The extension of certain lines and the transformation of existing horse car lines into electric lines had been suggested, and Mr. Vreeland said that everything was ready for the substitution of electricity for animal power, but that it had been impossible to secure material and equipments. The company had been for years trying to get the extensions which the merchants now asked, and would welcome any assistance in securing the needed consents of property owners. He added that the Eighty-Sixth Street line would be built within a month if permission could be obtained. The most important feature of the subject discussed was the delays and difficulties growing out of the obstructions to traffic for which the trucks were responsible. President Vreeland said that the company was helpless at present, that the principal lines of the city were repeatedly tied up by truckmen, who obstructed the tracks while unloading and by breakdowns. The records of the company showed that in one day ninety-seven calls had been received for the emergency wagons, and that not in a single instance was the blockade due to any fault of the cars or the equipment, but in every case to the obstruction of the track by a crippled dray. Just before the meeting fifty cars had been blocked in lower Broadway by a team which was unloading structural iron at Fulton Street. The material was deposited on the car tracks, and had to be moved out of the way before the service could be resumed. The subway operations had also hampered the surface railway management, and had effectually taken the control of three important lines out of the hands of the operating department, as it was simply impossible to maintain a schedule owing to conditions over which the railway company had no control. The revenue of the company had suffered in consequence, and the investment for electrical equipment had not produced the results

which had been expected, merely because the company could not operate its cars to advantage. Mr. Vreeland said the company would welcome any assistance the Commission, the association and the public might extend in bringing about improvement in these conditions. The responsibility for the present state of affairs rested with the municipal administration, as the ordinances regulating trucking were not enforced.

Members of the Merchants' Association, at the conclusion of Mr. Vreeland's remarks, expressed their gratification and appreciation of the frankness with which he had met their requests, and assured him of their support in securing redress. The Railroad Commissioners suggested that the association appoint an expert to investigate the conditions and confer with the experts of the Board and of the railway company. Assurances were given that the Interurban Company would cooperate with the association and the Commission in placing at their disposal facilities for securing all the data necessary for a complete understanding of the problem. The chairman of the Commission and the spokesman for the association acknowledged their indebtedness to Mr. Vreeland for the courtesies already extended by him and the assistance he had voluntarily given in the present investigation.

BROOKLYN HEARING

The Brooklyn situation was the subject of another public hearing on Tuesday and Wednesday. The company presented a statement reviewing the situation and covering practically the same points as those mentioned in President Greatsinger's letter to Mayor Low. This answer declared that during the two rush hours of the afternoon it was impossible at present to produce or purchase sufficient electricity to heat the cars. Cars in suburban localities were heated for the benefit of those going the longest distances, but if all cars were heated now there would have to be a reduction in the number operated. Concerning the troubles of the company on the subject of power, the statement set forth that the company had contracted for a \$3,000,000 power house, which was to have been completed last November, and would add 40 per cent to the power of the company. Because of strikes, inability to obtain material, etc., the contractors will not be able to complete the work until next March. The situation has been aggravated, it was said, by the destruction of the power house at Ridgewood. In the meantime the company has been purchasing all the power the Edison Company, of Brooklyn, could spare during the afternoon. More power is promised by the Edison Company soon, and the company expects, Jan. 15, to be able to turn on some heat in all of its cars, and that after Feb. 15 it will be able properly to heat all of its cars.

As to overcrowded cars and the "intolerable evils of the bridge crush," the company pointed out that the situation could be relieved immediately by erecting an overhead crossing for trolley cars at Sands Street, at the Brooklyn end of the bridge. On their exit from the bridge at Sands Street, according to the company, the cars should be allowed to proceed on a direct extension of the trolley tracks across Sands Street and the bridge plaza, and on Liberty Street to Fulton, thereby avoiding the necessity of crossing the lines of other cars and vehicle traffic at the exit from the bridge at Sands Street. The trolley tracks on the bridge should be kept absolutely free from all other traffic during the rush hours. The company continued:

"These three improvements, with the additional four loops now in process of construction at the Manhattan terminal, would increase by 25 per cent the number of surface cars which could be operated across the bridge during the rush hours. No additional weight would be imposed on the bridge by the same number of cars, the same distance apart, because of their moving more rapidly.

"The widening of Livingston Street and the operation of a surface railroad thereon, will relieve all congestion on Fulton Street above Liberty Street."

The company said that it believed the situation in non-rush hours could be relieved, and that every effort to have it done was being made. It was suggested that all unnecessary truck traffic on the railroad lines should be prohibited.

As to the lighting complaint, electric lights were being substituted for the oil lamps as rapidly as possible, it was declared. The company kept its cars as clean as practicable, and the method of ventilation in use is the most improved modern form.

The Grand Jury, of Kings County, which investigated the Brooklyn situation, has recommended drastic measures, including an appeal to the State administration for relief and the municipal ownership of the lines. Attorney-General John Cunneen has received the recommendation of the Grand Jury of Kings County that he institute proceedings to annul the charter of the street railway companies forming the Brooklyn Rapid Transit system. The recommendation is as follows: "We find that by reason of its negligence, inefficiency and unwillingness to perform its duty, the Brooklyn Rapid Transit Company and its constituent companies have forfeited the right to longer continue in the enjoyment and exercise of their charters and franchises, and we recommend to the Attorney General and urge upon him that, with all due speed, he institute an action to annul their charters and strip them of their franchises accordingly." The presentment finds that the Brooklyn Heights Railroad Company "is falling far short of discharging to the public of Brooklyn the duty it owes them. On some of the branches the cars are poorly ventilated and dirty, the heating of the cars is seriously neglected, to the menace of public health; cars are poorly lighted, the service is grossly insufficient, both in number of cars and in seating capacity, and the transportation of passengers along the routes of the company is badly managed."

MAYOR LOW ON TRANSPORTATION PROBLEMS

In his annual message to the Board of Aldermen Mayor Low devotes considerable attention to transportation problems and reviews the progress that has been made during the year in securing additional facilities and improving those already existing. The present investigation and discussion are expected to bring some relief, although the Mayor frankly admits that many of the demands upon the transportation companies, especially those pertaining to rush-hour service, are such that "nobody is sanguine enough to believe that the situation will be importantly relieved."

THE METROPOLITAN STREET RAILWAY COMPANY RAISES WAGES

On Jan. 1, 1903, the Metropolitan Street Railway Company made a most acceptable New Year's gift to its employees by making a general increase in wages. The announcement of the increase was made in the form of a general order, which was posted in all of the car houses of the Metropolitan Street Railway Company (Interurban Street Railway Company) at 1 o'clock Thursday morning, and which read as follows:

The management takes pleasure in recognizing the faithful and efficient service of the motormen and conductors in its electric service. Beginning Sunday, Jan. 18, all motormen and conductors will be paid at the following rates:

Motormen:

First year's service at the rate of \$2.10 per day.

Second year's service at the rate of \$2.25 per day.

Third, fourth and fifth years' service at the rate of \$2.35 per day.

After five years' service, at the rate of \$2.50 per day.

Conductors:

First year's service, at the rate of \$2 per day.

Second year's service, at the rate of \$2.15 per day.

Third, fourth and fifth years' service, at the rate of \$2.25 per day.

After five years' service, at the rate of \$2.35 per day.

OREN ROOT, JR., Assistant General Manager.

MICHIGAN RAILROAD COMMISSIONER'S REPORT

The thirteenth annual report of the Commissioner of Railroads of Michigan discusses two subjects affecting electric railway operation in that State, namely, "Separation of Grades" and "State Supervision of Electric Railways." Under the first heading the report says:

SEPARATION OF THE GRADES

Attention is called to the position taken by the department four years ago regarding the crossings of electric and steam roads and in opposition to the approval of grade crossings of this nature. There has been no deviation from this position, and during that time no new grade crossings of electric lines with the main lines of any steam road have been approved.

The opposition to this rule upon the part of some builders and promoters of electric lines, apparent at its inception, has almost disappeared, and opposition to grade crossings is now so generally accepted as the established policy of the State that applications for such crossings are rare. The electric railway companies now lay out their lines so as to provide for a separation of the grades at crossings of steam roads, and in almost every instance express themselves after the construction of their lines as pleased with the change from their original plans.

In a great many cases the construction of grade crossings has been prevented, and a separation of the grades accomplished by this policy. In Ann Arbor, with the hearty cooperation of the Hon. R. S. Copeland, Mayor of the city, a complete separation of the grades at crossings of the Ann Arbor Railroad with several streets has been begun and will undoubtedly be completed within the next year.

In this case applications were received from the Detroit, Ypsilanti, Ann Arbor & Jackson Railway and the Detroit & Chicago Traction Company for approval of grade crossings of the Ann Arbor Railroad. These were denied and the crossings ordered to be made by overhead bridges. This action led to the opening of negotiations between the railroad and railway companies with the city that finally resulted in an agreement and contract for a separation of the railroad and street grades, as stated, and will result in a much to be desired improvement in the conditions existing in that city.

STATE SUPERVISION OF ELECTRIC RAILWAYS

The Commissioner then takes up the question of "State Supervision of Electric Railway," which has already been the subject of extended discussion in the last two annual reports of the department. Especial attention has been called to the absence of any State law for the proper regulation and control of electric railways. To emphasize again the necessity of legislation upon this subject, the report says:

As is well known, there are a large number of these lines completed and in operation in this State, furnishing very satisfactory freight and passenger service to a class of traffic that has heretofore been without transportation facilities, to the great benefit of the communities accommodated by such service.

It is also true that nearly, if not quite, all such lines are well built and equipped, being in a number of cases quite up to the average standard adopted by steam roads, and are provided with fences, cattle guards and farm crossings for the safety and convenience of the general public, and with convenient stations and accommodations for their patrons.

While it is undoubtedly true that the building of this class of roads is a great benefit to the people of the State, and should be encouraged to the limit of consistent public policy, it would appear at the same time that they should be constructed, equipped and operated under such reasonable regulations and restrictions as shall be found necessary in order to safeguard the interests and lives of the traveling public, and the property of the railroad companies as well.

The only important power vested in the Commissioner of

Railroads regarding electric railways is that conferred by Act 171, session on laws of 1893, which provides that it shall be unlawful for any railroad company to construct its tracks across the tracks of any street railway, and likewise for any street railway company to construct its tracks across the tracks of any railroad company, until the place where and the manner in which such crossings shall be made shall have been approved by the Commissioner of Railroads. It also provides that such crossings shall in all cases where the Commissioner of Railroads deems it reasonably practicable be made otherwise than at grade, and in accordance with plans to be approved by the Commissioner.

Acting under the authority conferred by the statute, the construction of any additional grade crossings of electric railways with the main lines of steam railroads has been prevented and the position taken by the department not only in opposition to the construction of new grade crossings, but in favor of the abolition as rapidly as possible of all existing grade crossings, has been consistently maintained.

Grade crossings of electric roads, or of electric and steam roads, are an undoubted source of constant danger, even when protected with the best mechanical appliances, and especially so when, as is the case at nearly all crossings of this nature in this State, there is no mechanical protection, but dependence for safety is placed entirely in the law requiring all cars to be brought to a full stop before passing over such crossings.

Accidents at grade crossings of this nature are nearly always caused by violation of the running rules of the company, as well as the law of the State, as it is the invariable rule of street railway companies to require their cars to come to a stop, while the conductor or person in charge of the car goes ahead and flags the car over the crossing; but in some cases accidents have been caused by the power giving out while the car was going over the steam road tracks, or by the trolley leaving the wire and stalling the car in front of the steam engine or train.

Owing to the fact that this department has no jurisdiction over electric railways and no authority to require them to make reports of accidents occurring upon their lines, it is impossible to furnish any statistical information upon this subject. There is no doubt, however, that many accidents have occurred at grade crossings of this nature, and that the action of this department in refusing to approve of crossings at grade, and in ordering mechanical protection at existing crossings, has had a beneficial effect in preventing the occurrence of many accidents of a similar nature.

While, as stated, no statistics upon the subject of accidents on electric railways in this State are available, reference to the report of the Railroad Commissioners in the State of New York, where such statistics are kept, shows that there is a steady increase in the percentage of passengers injured with reference to mileage of road operated in that State. It also appears that the greatest loss of life and injury to persons in that State during the last five years has been caused by rear-end collisions, the next largest loss of life and injury to persons has been caused by head-on collisions, and in this comparative line of causes of death and injury to persons are collisions at grade crossings of steam and electric roads, the derailment of cars and the collapse of bridges and trestles.

It seems, therefore, that while the law of this State regarding crossings is a step in the right direction, and that good results have been derived therefrom, the experience of other States where reports of accidents from electric railway companies are required, would indicate that there are other matters connected with the operation of electric railways that are fully as important to the traveling public, and that should have just as much or more attention.

The New York State Railroad Commissioners, after having given the subject a thorough investigation, recommended the adoption of a standard code of rules for the operation of elec-

tric railways, and that every company be required to adopt rules based upon such standard rules. They also recommended the adoption of specifications for the construction of various sizes of cars, all to be of uniform height of buffer, and a uniform construction for each size of car, for the purpose of preventing the telescoping of cars in case of collision.

The adoption of these recommendations would undoubtedly result in the saving of many lives, but there is no authority under our laws to require their adoption, even should the Commissioner decide that such action were advisable. Therefore, it is again urged that the Legislature be requested to enact the necessary legislation to bring these companies under the regulation and control of State authority, to the same extent and in the same manner as steam railroads are now controlled.

At the last session of the Legislature, a number of bills were introduced, having for their purpose the accomplishment of such a result, and meetings of the representatives of the electric railway interests were held for a discussion of the question.

At these meetings, and from a discussion of the question by members of the Legislature, it developed that there are decided differences of opinion as to the extent that State authority should be exercised and the manner in which it should be brought about. It is therefore recommended that this matter be called to the attention of the Legislature early in the session in order that ample time may be given for a thorough and careful consideration of the subject, to the end that intelligent legislation upon the question may be enacted that will provide ample protection for the general public traveling over or across such lines, and at the same time will work no unnecessary hardship upon the companies, but will foster and encourage the building of such lines in all portions of the State where business will justify, having always in mind the building of permanent lines and the protection of the public safety.

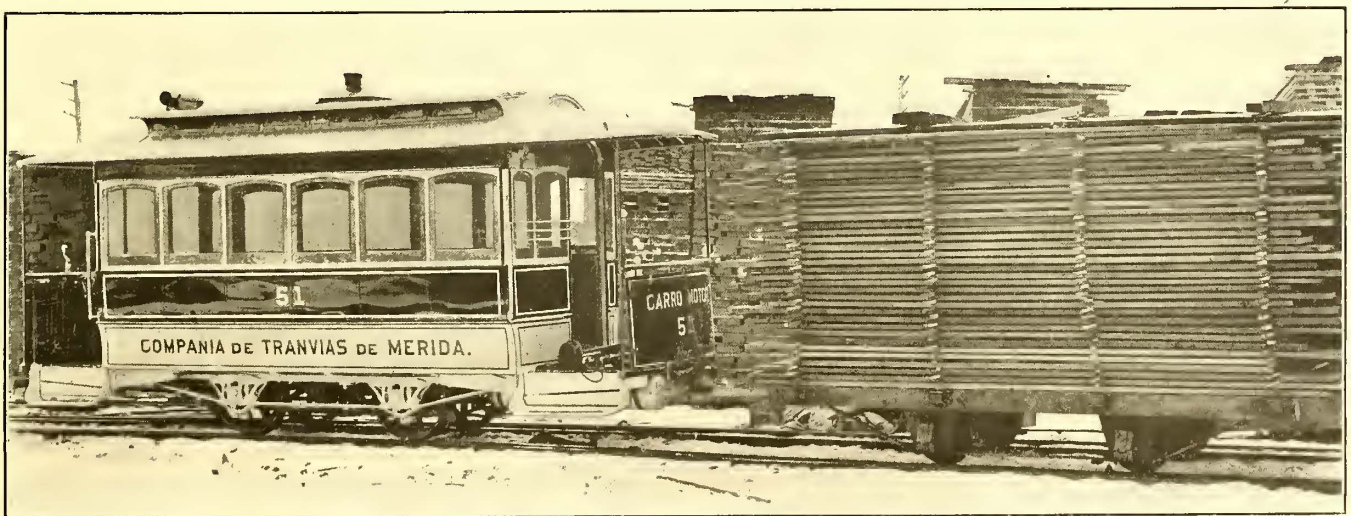
A STEAM PROPELLED STREET CAR

The Compañia de Tranvias de Merida, of Merida, Yucatan, Mexico, is about to make an interesting experiment in self-propelled street cars. The company is now operating 33 miles of horse railway, and is having built at the works of the John Stephenson Company, of Elizabeth, N. J., a small motor car, by means of which the experiment will be made. The car is a

railway, and the propelling mechanism was constructed by the Reeves Engine Company, of Trenton, N. J., maker of the well-known Reeves marine and stationary engines. A short time ago the car was tested on the tracks which are provided for carrying lumber, etc., about the Stephenson works, and showed itself to be thoroughly up to the requirements of the service for which it is intended. One of the illustrations shows the car attached to a heavily-loaded flat car, which was used as a trailer load during the test. Scrap iron was placed on the motor car in order to increase the tractive effort as well as give a heavier load.

The engine is of the compound type, placed under the car, with its shaft connected to one of the axles by means of a sprocket chain in a similar manner to the ordinary practice in automobile construction. The boiler is placed on the front platform, as seen in the enlarged view. This boiler is of the automobile type and occupies but little room on the platform, not interfering at all with the entrance and exit of passengers on account of the position of the car door. The boiler is supplied with water from two tanks at the opposite end of the car, and with gasoline from a third tank of the same size placed between them, as shown in the plan view. The arrangement of the apparatus shown in this plan has been slightly changed, especially in regard to the steam piping in the car, as at present constructed. The throttle, levers for regulating the link motion, injector for the boiler, feed pumps, etc., are all on the front platform within easy reach of the motorman, so that he has his car under perfect control at all times. The waste gases from the burner are carried up through the hood by means of the stack shown, and discharge through a horizontal pipe open at each end just above the roof. A pipe runs from the top of the steam chamber in the boiler up through the hood and is provided with a safety valve. The boiler in ordinary service is expected to carry a pressure of 200 lbs., although it has been tested to twice that pressure. The brake on the car is the ordinary ratchet hand-brake, and is placed in the center of the dash. A steam whistle is installed on the top of the hood.

One of the most interesting features of the whole equipment is the engine, a cross section showing the working parts of which is shown in one of the illustrations. This engine contains nearly all the features which are contained in the Reeves compound marine engine, and is built for hard, everyday use, is light and rigid in design, and is so simple in construction



VIEW OF MOTOR CAR DRAWING A LOAD OF LUMBER

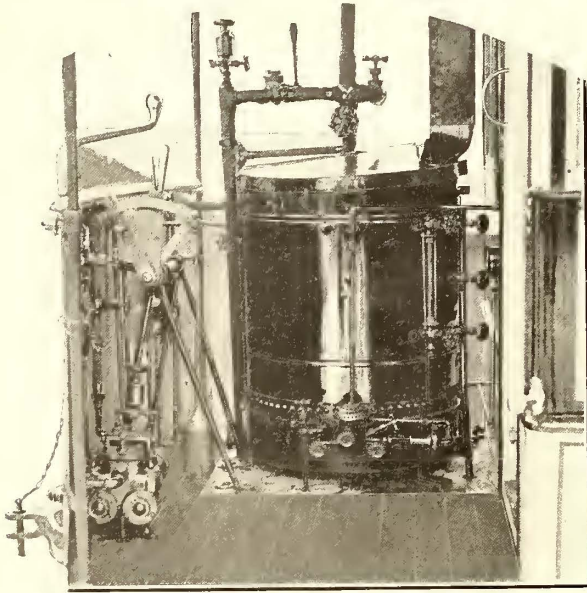
small four-wheeled one of the old horse-car type, with the exception that the doors are placed at the sides of the platform instead of in the middle. The truck used, as seen in the accompanying illustrations, is the same as is used in standard horse car practice. The car has been built under the direction of Thebaud Brothers, of New York, purchasing agents for the

that it does not require the constant service of an expert engineer to keep it in running order. The cylinders are $3\frac{1}{2}$ ins. and $6\frac{1}{2}$ ins. by 5-in. stroke, and the normal speed is about 600 r. p. m. When running with 200 lbs. of steam at the most economical cut-off it develops about 25 hp, but this can easily be increased to 45 hp under exceptional conditions. A single

reduction gear is used, as shown in the plan, consisting of a sprocket chain and wheels. The two axles of the trucks are connected by another sprocket chain, so that all four of the wheels are drivers. The chains are of the Renold silent chain type, made by the Link Belt Engineering Company, of Nicetown, Philadelphia.

A cross section of the cylinders is shown. Both cylinders are made from a single casting of very close grained charcoal iron, and are lined on the outside with asbestos to prevent radiation.

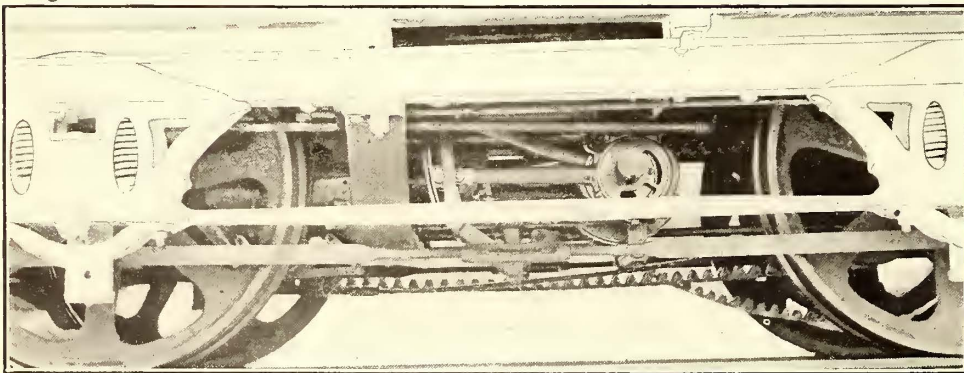
The central valve has deep grooves at the top and bottom, where the steam is held in compression between strokes, this operation raising the temperature to such an extent that upon



FRONT PLATFORM OF AUTO CAR

the admission of more steam to the low-pressure cylinder no condensation can take place.

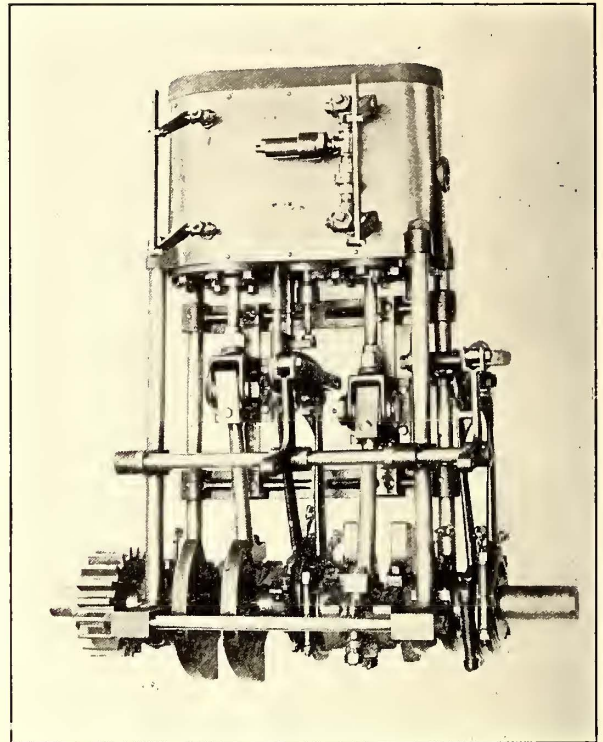
As will be seen upon an examination of the illustration the upper port of the low-pressure cylinder has been closed considerably sooner than the upper port of the high-pressure cylinder, and just at the end of the upper stroke, therefore, of the high-pressure piston a considerable compression had taken



ENGINE AND RUNNING GEAR

place in the upper groove of the central valve, and in the position shown in the cut this highly-compressed steam is confined between the valve and the walls of the valve chamber. Upon the next outward stroke, therefore, of the low-pressure piston, when the steam is admitted from the high-pressure cylinder it will enter the low-pressure cylinder in conjunction with this compressed and superheated steam. The central valve is operated by a fixed eccentric, and its cut-off is entirely independent of the position of the link motion. The admission valve, shown on the right, has but one function, that of admitting steam to the high-pressure cylinder, and it will be seen

that the path of the steam is very similar to that found in Corliss engines, namely, that the admission ports and exhaust ports are separate. This is practically the case in the low-pressure cylinder, although not appearing from the figure, as the conditions at exhaust, as shown at the top of the valve, give a very much wider opening to the port than when steam is being admitted from the groove in the valve. On account of using the groove in the valve to contain a steam cushion for the



LOOKING DOWN ON ENGINE

pistons, the clearance in the cylinders is extremely small. Having the central valve connected to a fixed eccentric regulates the compression in both cylinders, and its travel being absolutely determined it is impossible for the compression to fluctuate above or below the point of highest efficiency. A view of the Reeves engine, as modified for use on the Yucatan auto-car, is shown in one of the illustrations.

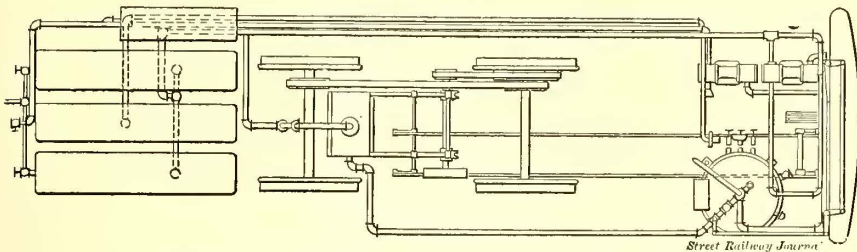
The town of Merida has had a most prosperous career, and the stock of the street railway system is held by local capitalists. The experimental car, which will soon be shipped for use there, will, if successful, probably result in the adoption of self-contained motor cars on the entire system, and for this reason it is of considerable interest. The development of the automobile has placed steam-propelled vehicles in a much more advantageous position for competing with electricity than they were during the period of previous attempts to operate them on street railways, and

the Yucatan Railway is taking a step which will be carefully followed by railroad men.

The use of steam for the propulsion of street cars is no novelty. The "dummy," with and without passenger compartments, was a familiar sight in many cities ten years ago, but the new motor car is an entirely different class of rolling stock from the now practically defunct "dummy." The rapid and extensive development of steam-driven automobiles has resulted in greatly increasing the practicability of small boilers, engines, etc., for this service, and the successful operation of these vehicles has proved that, with the present facilities, the

problem of constructing a self-contained street car has lost much of its difficulty. How such a motor car will stand actual

duce between each two of these Lynn cars a "through" car from Salem, running the Salem cars also on fifteen-minute headway, and giving a car between Central Square, Lynn, where the company's headquarters are located, and Scollay Square, Boston, every seven minutes and a half.



PLAN SHOWING RESERVOIRS, ENGINE, ETC.

operation under average service conditions remains, of course, to be determined.

MORE SUBURBAN CARS TO BE OPERATED IN BOSTON

In addition to the plan of the Newton & Boston Street Railway Company to operate a through service between Waltham and the Park Street subway station, in Boston, operating in the latter city over the lines of the Boston Elevated Railway Company, the company plans to operate the cars of the Commonwealth Avenue Street Railway Company, which it controls, into Boston. The Commonwealth Avenue Street Railway Company at present operates only between Norumbega Park, in the Auburndale district of Newton, and Lake Street, on the boulevard, near Chestnut Hill Reservoir. These cars have brought their passengers in as far as Lake Street, where the Commonwealth Avenue Company's tracks came to a "dead end" under a shelter of artistic construction over the reserved space in the middle of the boulevard. On the Boston side of this shelter the passengers could find cars of the Boston Elevated Company, in which they could make the trip to Park Street in the subway either by way of Commonwealth Avenue and Brighton Avenue; Beacon Street, or Brookline Village and Huntington Avenue; all three of which lines are on the same tracks by the time they reach Copley Square, Boston. At present workmen are busy connecting the tracks of the two companies at Lake Street, and it is stated that the intention is to have the cars running through from Auburndale to Park Street station about Jan. 15.

Some months ago the plan of the Boston & Worcester Street Railway Company, now building between Boston and Worcester, for operating into Boston, was given in the STREET RAILWAY JOURNAL. The original plan of this company seems to have been changed, however, for the plan now is to send part of the cars only as far as Park Square, and part of them down into the subway to the Park Street station. The cars which are to be run through from Worcester will be too large to negotiate the subway curves and portals, and will enter the city over the Boston Elevated Company's surface tracks in Columbus Avenue, and shift ends in Park Square. The smaller cars, which the Worcester Company is to run between Boston and South Framingham, will enter the city in the same way, but after coming down Columbus Avenue as far as Berkeley Street, will swing over to Boylston Street, thus gaining the direct route to the Back Bay portal of the subway.

An interesting report in connection with the use of the opposite, or notherly, end of the subway by surface cars, is, that beginning in the spring, the Boston & Northern Street Railway Company will run "through" cars into Boston from Salem. It uses the so-called Scollay Square loop for surface cars, and for the past two or three years has been operating what it calls an "express service"—although for passengers only—between Swampscott and Lynn and Boston, running long, double-truck cars over a private right of way across Lynn Marsh on fifteen-minute headway. The new plan is to intro-

EAST BOSTON TUNNEL IMPROVEMENT

The Boston Transit Commission has awarded a contract to Woodbury & Leighton for the construction of a part of the East Boston Tunnel at the head of State Street, and for making alterations in the Old State House, to adapt it to station purposes. Nine bids on the work were received, Woodbury & Leighton offering the lowest at \$39,101.75. The highest bid was \$103,000.

The section of the tunnel under the harbor is substantially completed. Less than 200 ft. remain outside of Long Wharf. With the exception of a vein of soft, sandy clay, which crossed the path about half way between Long Wharf and the middle of the harbor, no difficulties were encountered by the engineers. The only case of a tunnel of equal size worked by compressed air is that of the Blackwell, under the Thames River in England.

The State Street and Atlantic Avenue station will have two side platforms, each 160 ft. long, 10 ft. wide and 54 ft. below the street level. This portion of the station will probably be covered with a masonry-arched roof. To the east of each platform a space about 32 ft. long and 18 ft. wide is reserved for elevators, stairways and approaches. These and the track space between them will be included in a large space 40 ft. x 57 ft. 6 ins., which will be nearly enclosed by four vertical walls, extending to the surface of the street. These walls are from 1 ft. 9 ins. to 3 ft. in thickness, reinforced by twisted steel bars. They are connected by three floors, which altogether form four chambers.

The tunnel proper will be under State Street in "Section C," 23 ft. 8 ins. wide inside, and 20 ft. 8 ins. high. The invert will be 24 ins. thick, the arch 31 ins., and the side wall from 31 ins. to 33 ins., all being of concrete.

In view of the close proximity of the sides of the tunnel to large buildings in State Street careful provision has been made for the support of the ends of buildings nearest the tunnel. At the westerly end the sides of the tunnel are within 3 ft. of the buildings, and the bottom of the tunnel is 25 ft. below the buildings' foundation. In order to give the required additional support the front foundation walls were pierced at intervals of about 4 ft. and supported on steel I-beams. These beams were from 18 ft. to 21 ft. long, and from 18 ins. to 24 ins. high. Their front ends rest on a concrete wall under the sidewalk, the wall itself resting on piles, reaching below the proposed bottom of the tunnel. The rear ends of the I-beams rest on a concrete wall that is nearly parallel to and about 18 ft. from the front of the buildings. The rear wall was dug in cellars, and extends about 10 ft. below the cellar bottom. Shorter I-beams support the party walls, and are themselves supported by a portion of the long I-beams just referred to. All of these beams are carried below the cellar and surrounded by concrete, which was carried up to the level of the cellar bottom. A layer of asphalt waterproofing was imbedded at a depth of 12 ins. from the cellar floor surface. The building walls were in each case carefully rebuilt where cut out for I-beams, and the whole structure well secured.

On Dec. 30 an accident occurred in the State Street section, caused by the caving in of a mass of earth in front of the construction shield, on account of the infiltration of tide water. The tide reached its highest point at noon, and although pumps

were constantly at work, the water drained through the earth sufficiently to dissolve and loosen the earth ahead of the shield, so that it gave way. Some of the building foundations along the line settled several inches, according to report, and the buildings are now supported by heavy stays. The whole district is made land. Additional pumping is now being done.

About \$1,600,000 has thus far been expended in the tunnel work.

RAILWAY SWINDLER COMES TO GRIEF IN BALTIMORE

Samuel Finklestein, alias Fink, alias Louis Semmel, was convicted in the Criminal Court, of Baltimore city, recently on the charge of conspiracy to defraud the United Railways & Electric Company, of Baltimore, out of \$800. The plan prepared by Finklestein and his confederates was to board a car and have with him one or two friends as witnesses, who would also take seats immediately in the rear of him. After the car had come to a stop, and just as it was about to start again Finklestein would alight, fall to the ground, roll over several times and pretend that he was badly injured. His confederates would condemn the conductor for his alleged negligence, but would take good care to give the conductor their names and addresses, so that in making the investigation, they would have evidence to make it a case of negligence against the company.

Finklestein fell from a car of the United Railways at the corner of Fayette and Arch Streets, May 31, 1901. He refused to go to the hospital, and gave his address as 717 W. German Street. Herman Max Blumenthal, who was also on the car, gave his name to the conductor as a witness, and his address as 721 W. German Street, and volunteered to take Finklestein to his home. The company's surgeon was immediately sent to the alleged injured man, but he was not permitted to make an examination. On the following day a physician who was on the car when the alleged accident happened put Finklestein's arm and body in a plaster of paris cast, and gave out the statement that the man had his arm fractured in two places and had a probable fracture of the fourth rib.

Finklestein and Blumenthal then began to press the company hard for a settlement, Blumenthal calling frequently at the office to urge a settlement, and on one occasion stating that Finklestein was dying, and requested that the company send its physician at once, which was done. Upon the arrival of the physician, he found Finklestein groaning and writhing, apparently in great agony. Upon examination he found Finklestein's temperature, pulse and respiration to be normal. No examination, of course, could be made of the injuries, as the man was in plaster of paris. The railway company declined to take the case up with a view to settlement until the plaster cast was removed and the alleged injuries submitted to the X-ray. Finklestein then filed a suit in the Baltimore City Court for \$10,000, and in about four weeks left Baltimore. Finklestein and Blumenthal were both indicted in Baltimore in August, 1901, charged with conspiracy to defraud the United Railways of \$800.

Finklestein was next heard of in Washington in the early part of August, 1901, when in company with an accomplice named Samuel Kupferberg he attempted to work the same game. They took a Baltimore man in with them. He boarded the car with Finklestein and Kupferberg, and when the car made a stop Finklestein jumped off and rolled over several times, and cried out in great agony. Kupferberg, as witness, was standing immediately behind him. The new confederate who had been taken in the game in Washington went at once to the Washington Railway Company's office and gave the whole scheme away. Finklestein and Kupferberg were both arrested and indicted in Washington, and were tried and convicted in the early part of April. Before the trial Kupferberg

was released on \$2,000 bail, and during the trial he jumped his bail. Finklestein served six months in jail in Washington, and immediately upon his release was brought to Baltimore and tried. The jury in the Washington case was out only five minutes, and in Baltimore did not leave the box. Finklestein has not yet been sentenced. He admits that he collected \$50 from the Boston Elevated about a year and a half ago under the name of Samuel Fink, and that Kupferberg shared it; also, that he collected money from the Brooklyn and Philadelphia roads. He filed his claim in Baltimore under the name of Samuel Finklestein, and in Washington gave the name of Louis Semmel.

It is believed that Finklestein is one of the gang who have systematically worked railway companies in other cities.

WHAT WAS DONE IN OHIO IN 1902

The year 1902 will probably go down in the history of Ohio as the greatest year on record, so far as the building of electric railways is concerned. This, too, in the face of the sensation, early in the year, caused by the announcement of the embarrassment of the Everett-Moore Syndicate, which is responsible for a greater mileage in that State than any other group of capitalists. The difficulties of the Cleveland syndicate undoubtedly held up many projects which might have been carried through during the year, but only in a few cases was there any interruption in the completion of roads which were already under construction. In August, 1901, the STREET RAILWAY JOURNAL published a review of the electric railways of Ohio, in which it was stated that there were in operation at that time 898 miles of city lines and 868 miles of interurban roads. It was estimated at that time that 1435 miles of road were actually under construction. This, however, included considerable mileage of proposed roads, which were being built in sections, while in many cases portions of the lines had only been surveyed. The estimate also included several parallel lines, where work had been done by two or more rival companies, which have since consolidated or terminated the controversy between them. Notwithstanding, about 847 miles of interurban roads, over half of the original estimate, have been placed in operation during the year, making a total of 2613 miles of electric lines in operation, as compared with about 9000 miles of steam road. The new mileage is detailed below:

Toledo & Western Railway, 60 miles, from Sylvania to Adrian and Fayette; Toledo & Indiana, 10 miles, from Toledo to Holland (just completed); Toledo, Bowling Green & Southern, 10 miles, connecting two divisions; Toledo, Fostoria & Findlay, 17 miles, Findlay to Fostoria; Western Ohio Railway, 57 miles, Lima to Celina and New Bremen, and Sidney to Piqua; Dayton & Troy, 22 miles, Dayton to Troy; Dayton, Covington & Piqua, 35 miles, Dayton to Piqua; Dayton & Northern, 43 miles, Dayton to Greenville; Cincinnati, Dayton & Toledo, 5 miles, extensions into Cincinnati; Cincinnati, Georgetown & Portsmouth, 42 miles, Cincinnati to Georgetown; Cincinnati & Eastern, 22 miles, Cincinnati to New Richmond; Columbus, London & Springfield, 52 miles, Columbus to Springfield; Cincinnati Interurban, 15 miles, Glendale to Hamilton; Lake Shore Electric, 35 miles, connecting two divisions; Lake Erie, Bowling Green & Western, 10 miles, Bowling Green to Pemberville; Cleveland, Elyria & Western, 27 miles, Oberlin to Norwalk; Cleveland & Southern, 23 miles, Berea to Medina and Chipewa Lake; Ohio Central Traction Company, 20 miles, Mansfield to Galion; Canton-Akron Railway, 23 miles, Akron to Canton; Northern Ohio Traction Company, 8 miles, Kent to Ravenna; Pennsylvania & Mahoning Valley Railway, 20 miles, Lowellville to New Castle, and Warren to Leavittsburg; Youngstown & Sharon Railway, 40 miles, Youngstown to Sharon and New Castle; Eastern Ohio Traction Company, 10

miles, Troy to Garrettsville; Stark Electric Railway, 25 miles, Canton to Alliance and Sebring; Columbus, Buckeye Lake & Newark, 39 miles, Columbus to Newark; Columbus, New Albany & Johnstown, 10 miles, Columbus to Gahanna; Columbus, Delaware & Marion, 25 miles, Columbus to Delaware; Parkersburg & Marietta, 15 miles, Parkersburg to Marietta; Ohio & Pennsylvania, 26 miles, Conneaut to Ashtabula and Jefferson; Columbus, Grove City & Southwestern, 8 miles, extension to Morgan Station; Springfield & Xenia, 18 miles, Springfield to Xenia; Steubenville Traction & Light Company, 10 miles, Steubenville to Toronto and Alikanna; Suburban Railway, 28 miles, Cincinnati to Bethel; Miami & Erie Canal Transportation Company, 27 miles, Cincinnati to Hamilton (freight only).

INCREASE IN SOUTH SIDE ELEVATED WAGES

On New Year's the South Side Elevated Railroad Company, of Chicago, increased the wages of conductors from 19 $\frac{1}{4}$ cents to 20 cents an hour. The wages of guards were increased from 16 $\frac{1}{2}$ cents to 18 cents an hour. Ticket sellers at the stations, who have received \$1.50 per day, will get an increase of 10 per cent. On Oct. 1, 1901, an increase of about 10 per cent was given. The total increase in a period of a year and a quarter has, therefore, been very substantial. "We have increased the wages as earnings have increased," says General Manager M. Hopkins, which expresses briefly and to the point the policy of the company.

STATION SIGNAL FOR SUBURBAN ROADS

The Ohio Brass Company has brought out a device for use by prospective passengers for signalling electric cars to stop at night at stations or at other designated points, to correspond to the flagging practice in use on steam railroads. The presence of a trolley wire makes an electric device of this kind particularly convenient, as the signal is arranged for use with 500 volts. It consists of an ordinary switch, which throws into circuit a group of lamps between the trolley and the ground return. The switch-box carries a notice directing any passenger who wishes to stop the car to throw up the switch handle, and the lamps, which are carried in a box on the pole, shine through bulleyes in the sides of the box, and thus attract the attention of the motorman. After the passenger has boarded the car the conductor throws down the switch. The device is called the Haycox electric car signal.

PRIZES FOR EMPLOYEES AT ROCKFORD

There was a general distribution of good things among the conductors and motormen on the Rockford & Interurban Railway Company, at Rockford, Ill., the first of the year. This company operates the city lines in Rockford and Beldivere and the interurban line between those two points. There were three cash prizes for conductors, given in recognition of general good service, such as care in signalling the starting and stopping of cars, courtesy to passengers, strict compliance with rules, excellence of reports and freedom from accidents. The first prize among the conductors was \$25, the second \$20, and the third \$15. The awards among the motormen were to those who had no accidents in which there was damage to property or injury to persons. Seven motormen participated in a bonus of \$10 each for this.

A new wage scale for conductors and motormen went into effect Jan. 1, as follows: First year, 14 cents per hour; second year, 15 cents per hour; third year, 16 cents per hour; fourth year and fifth year, 17 cents per hour; after fifth year, 18 cents per hour. T. M. Ellis is general manager of the company.

OHIO RAILWAYS DISTRIBUTE FAVORS

Several of the leading roads in Ohio remembered their employees in a liberal manner during the holidays. Following its time-honored custom, the Columbus Railway Company presented each married man a turkey, and each single man a silver dollar. The company has 700 men in its employ. The Cleveland Electric Railway Company posted an announcement that in consideration of the faithful services of its employees, all demerit marks received during the year would be cancelled, and that every employee could start the new year with a clean record. It meant much to some of the men. The Lorain Street Railway acted upon the petition for higher wages, received some time ago, and advanced the first-year men to 19 cents; second year, 21 cents, and third year, 23 cents an hour. This rate is better than is being paid by the majority of small roads in the State. Two weeks ago the Cincinnati, Dayton & Toledo Traction Company announced a substantial advance to take effect the first of the year. The Appleyard syndicate roads presented turkeys to employees.

ELECTRIC EXPRESS SERVICE BETWEEN BUFFALO AND NIAGARA FALLS

The increasing population along the Niagara frontier has so developed the business of the Buffalo & Niagara Falls Electric Railway as to make very frequent stops necessary, and in order that passengers from Niagara Falls may be landed in Buffalo as quickly as possible the International Traction Company has inaugurated a fast express service of electric cars between Niagara Falls and Buffalo in addition to the regular service of every fifteen minutes now running. The special express cars are to leave the corner of Falls Street and Second Street, Niagara Falls, every hour during the day, from 9 a. m. to 7 p. m., reaching Buffalo in one hour.

To operate the express cars in connection with the present service it has been arranged to allow the through cars to pass the local cars at convenient points along the line and without delay to either. On the trip from Niagara Falls to Buffalo stops will be made only to take on passengers in Echota at Sugar Street, in La Salle at the electric railway station, at Payne's Avenue Junction, Main Street and Sweeney Street, North Tonawanda; Young Avenue and Delaware Avenue in Tonawanda, Hertel Avenue in Buffalo, and in entering Buffalo stop to discharge passengers at the desired streets along the route. The last car leaving Niagara Falls at 7 p. m. will enable patrons of the railway to reach all Buffalo theaters in time for the evening performances, the car arriving at Main Street and Court Street, Buffalo, exactly one hour after leaving the Falls.

Cars from Buffalo are scheduled to leave Main Street and Court Street at thirty minutes past the hour from 8:30 a. m. to 5:30 p. m., and a theater car will leave this point in Buffalo at 11:15 p. m., landing passengers in Niagara Falls at 12:15 a. m. On the trip northbound from Buffalo stops will be made only to take on passengers along Niagara Street at Connecticut Avenue, Ferry Avenue and Foreest Avenue, and at the crossing of Hertel Avenue and Military Road, Young Avenue and Delaware Avenue in Tonawanda, Main Street and Sweeney Street and Payne's Avenue Junction, North Tonawanda, stopping at La Salle and Echota only to discharge passengers.

IMPROVEMENTS AT NASHVILLE

The extensive improvements which are projected by the Nashville Railway & Lighting Company, of Nashville, Tenn., which have been outlined in these papers, have been fully decided upon, and steps will immediately be taken to carry them into execution. Ford, Bacon & Davis, of New York, have been selected to draw up a comprehensive scheme for the improvement of the property, and the work will be carried out under their direction.

FINANCIAL INTELLIGENCE

The Money Market

WALL STREET, Jan. 7, 1903.

A more hopeful feeling over the money outlook has sprung up during the last two weeks. Previous to that time many authorities, numbering among them some of the leading bankers of this city, had genuine misgivings as to whether we were to have again this season anything approaching an easy money market. They believed that the demands for trade being exceptionally large, and with unusual uses for credit both in the settlement of our foreign debt balance and in financing vast issues of new securities at home, money rates were likely to remain considerably above the low level which is to be expected at this time of year. It cannot truthfully be said that these feelings of doubt have altogether disappeared, but several developments in the situation have combined to modify them decidedly. First, and most important, the currency movement from the interior, which was so far retarded as to give ground for apprehending that it would be very much less than usual, has now begun in large volume. New York exchange at the Western and Southwestern cities has advanced to the customary premium, and, although what has happened during the last few weeks may not be wholly conclusive, yet it is a fact that the excess of cash receipts over shipments at the New York banks is fully up to the average of the season. In the second place, contrary to general expectation, sterling exchange has not risen in response to the falling money rates. This seems to be due in part to renewed purchases of our securities by foreign capital, and in part to the freer movement of the staple products, corn and wheat, especially, to market, which has increased commodity exports and the supply of exchange bills drawn against them. Finally, the Treasury, which throughout December was a source of heavy drain upon the local money supply, has not only ceased to draw, but, owing to enlarged government expenditures, has become a debtor in its operations in the local market. These various influences have been reflected in immediate easing of the rates on both call and time loans, in a rapid recovery in New York bank reserves, and, as already remarked, in a more cheerful feeling in financial circles as to the future. Call money kept high, of course, while the New Year settlements were in progress, rising at one time to 15 per cent. But this class of accommodations are now obtainable again at 6 per cent. Meanwhile for time loans $5\frac{1}{2}$ per cent is asked for periods of thirty days to six months.

The Stock Market

Higher prices have been the rule on the Stock Exchange during the fortnight. Inasmuch as money stringency, both that which was felt and that which was apprehended, was the main reason for the previous decline, it was logical that the easier money situation should find prompt response in a movement in the opposite direction. The stock market has acted in the manner it usually does after a term of violent speculative liquidation, when a great mass of securities has been transferred from weak to strong hands. That is to say, the supply of stocks available for purchase has been comparatively limited, and a new speculative demand settling in has had to bid up prices sharply in order to fill its requirements. Pools and cliques which were able to weather the heavy autumn storm have taken a fresh lease of life, and have resumed the manipulation of their specialties with some confidence. It does not appear as yet that the public are much of a factor in the market. But the very large class of traders sometimes referred to as semi-professional speculators, who transact their business through commission houses, have supplied a considerable buying power, which has furnished the pool manipulators with the following they are looking for. At the moment a good deal of hesitation is visible, a large section of the Wall Street contingent feeling that the upward movement has lasted about as long as it is entitled to without some reaction. There is nothing in the general situation, however, upon which any important decline could be based. The facts regarding trade and earnings are altogether favorable, and so long as apprehension is relieved over the money market the present level of prices does not seem unduly high.

Manhattan Elevated has been the active favorite among the

local traction shares, taking the place of Brooklyn Rapid Transit, which was the leader two weeks ago. The order from the State Railroad Commission, calling upon the company to construct a third track for its entire route, gave rise to conflicting opinions as to what effect this would have upon Manhattan finances. One idea was that the new construction would mean a very heavy outlay without a proportionate return in revenue. The other view was that the increase in business resulting from the better facilities would be more than enough to compensate for the additional expenditure. At all events, a strong pool operating in the shares has been able without much difficulty to sustain and advance the price. Brooklyn stock was adversely affected by the action of the Kings County Grand Jury in recommending that the company's franchise be revoked unless proper measures were taken to remedy the present discomforts and delays of travel in the borough. Nobody imagines, however, that any drastic action will be taken. The stock recovered very sharply in yesterday's market, indicating that it is being very well held. The trading in Metropolitan has been without special feature, except for a sharp rise in Metropolitan Securities stock, which was pretty plainly the work of manipulation. All the traction shares have been favorably influenced during the last day or two by intimations that the Appellate Division of the Supreme Court will declare the State franchise tax unconstitutional.

Philadelphia

The turn for the better in the general market has naturally had a favorable effect upon the more active of the Philadelphia street railway specialties. Rapid Transit, after a prolonged period of dullness, grew suddenly active again, and advanced sharply from $16\frac{1}{2}$ to $17\frac{7}{8}$ on a fairly heavy volume of dealings. There was no explanation of a special nature accompanying the movement, and it is most logically accounted for by a resumption of activity on the part of the pool which is trying to make a wider market for the stock. Union Traction, moving as usual in sympathy with Rapid Transit, rose a point and more to 47, while Philadelphia Traction gained a half point to 98. On the other hand, American Railways has been rather heavy, selling down from 53 to $51\frac{1}{2}$, apparently on offerings by speculators who bought on foreknowledge of the recent increase in the dividend rate. The rest of the traction market during the last two weeks has been devoid of significance. Sales may be noted of a hundred shares of Reading Traction at 30, New Jersey Traction at 68, Railways General at 43-16, and Haddington Passenger at 75.

Chicago

In the Chicago market the principal incident of the fortnight was the advance in Metropolitan Elevated issues. It took a very small quantity of stock to move the common up from 36 to $39\frac{3}{4}$ and the preferred from 86 to $89\frac{1}{2}$. The basis for this movement appears to lie in the expectation that not less than 2 per cent will be declared as a dividend on the preferred stock at the February meeting, making a distribution of $3\frac{1}{2}$ per cent for the year. The earnings of the company are also making an excellent showing. For December they increased nearly 15 per cent over the month a year ago. Lake Street Elevated continues rather depressed. It sold last week at $7\frac{1}{2}$, which was the low point of the season, and has only recovered fractionally since then. Despite rumors to the contrary, the head officials of the company say that probably no radical changes in any respect will be made at the annual meeting this month. A more active demand has appeared for North Chicago Street Railway shares, which have advanced from 160 to 162. West Chicago is also up two points from 85 to 87, and City Railway, from 208 to 210. On the other hand, no interest at all has been displayed in Union Traction, only one or two trades occurring in the common, at $15\frac{1}{4}$, and in the preferred, at 46.

Other Traction Securities

The strength of Massachusetts Electric common, reflecting a cautious renewal of speculative ventures for the rise, is the main feature of the recent traction dealings in Boston. The stock sold up from 36 to $37\frac{1}{4}$, reacting fractionally later on. Massachusetts preferred meanwhile rose a point from $94\frac{1}{2}$ to $95\frac{1}{2}$. Boston Elevated was neglected, vacillating between $153\frac{1}{2}$ and $154\frac{1}{2}$. In West End a few isolated trades were reported in the common

between 94 and 95, and in the preferred between 111 and 111½, ex-dividend. The recovery in the Baltimore market has reflected itself most positively in the United Railways securities. The stock, which sold at 13¼ a fortnight ago, rose to 14¼ and then fell back to 14; the income bonds advanced from 66¾ to 68, and the general 4's gained a half point, from 94¾ to 95¼. Other minor transactions of the two weeks' period comprised United Railways' ten-year 5's, at 102¾, Nashville Railway 5's, at 107; City & Suburban (Washington) 5's, at 98, Norfolk Railways & Lighting 5's, at 93; Atlanta Street Railway 5's, at 105¼, and Virginia Railway & Electric debenture 5's, at 95. On the New York curb the only feature of note was a sharp advance in the new Interborough Rapid Transit shares. The stock bearing the denomination "40 per cent paid" rose from 110 to 116½ on transactions of only 600 shares. The full-paid stock jumped up at the same time from 107½ to 115. Only a single hundred sold between 108½ and 115. Other sales on the curb include New Orleans Railway common, from 14¾ to 14¾, the preferred at 47, and the 4½ per cent bonds, at 79 and 79¼; Brooklyn Rapid Transit 4's, at 84; Brooklyn City Railroad, at 245; United Railways of St. Louis 4's, between 84½ and 85; New Jersey Traction 5's, at 107½; Washington Traction 4's, at 79¾, and San Francisco subscriptions, at 46.

Security Quotations

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

	Closing Bid	
	Dec. 23	Jan. 6
American Railways Company	51¾	51¾
Aurora, Elgin & Chicago	37	40
Boston Elevated	154½	153½
Brooklyn R. T.	65¼	69¾
Chicago City	208	208
Chicago Union Tr. (common)	14½	14¾
Chicago Union Tr. (preferred)	44	46
Cleveland Electric	84¾	84
Columbus (common)	60	65
Columbus (preferred)	105½	104½
Consolidated Traction of N. J.	68½	69
Consolidated Traction of N. J. 5s.	107	107
Detroit United	84	86
Electric People's Traction (Philadelphia) 4s.	—	98¾
Elgin, Aurora & Southern	48	48¼
Indianapolis Street Railway 4s	85½	—
Lake Shore Electric	13½	13½
Lake Street Elevated	8½	8
Manhattan Railway	145¾	150
Massachusetts Elec. Cos. (common)	35½	36½
Massachusetts Elec. Cos. (preferred)	94	95
Metropolitan Elevated, Chicago (common)	35	37½
Metropolitan Elevated, Chicago (preferred)	84½	88
Metropolitan Street	139	142
New Orleans Railways (common)	—	15
New Orleans Railways (preferred)	46	46½
North American	114	117½
Northern Ohio Traction (common)	a67¾	a70
Northern Ohio Traction (preferred)	a93	88
North Jersey	29½	—
Northwestern Elevated, Chicago (common)	—	31¾
Philadelphia Rapid Transit	16½	17¾
Philadelphia Traction	97½	98
St. Louis Transit (common)	26¼	28
South Side Elevated (Chicago)	109¼	a109
Syracuse Rapid Transit	31¾	a31¾
Syracuse Rapid Transit (preferred)	76	76
Third Avenue	124	127½
Toledo Railway & Light	a35	33¾
Twin City, Minneapolis (common)	115¾	119¾
United Railways, St. Louis (preferred)	80½	80
United Railways, St. Louis, 4s.	—	84¾
Union Traction (Philadelphia)	45¾	46¾
Western Ohio Receipts	23	25

a Asked. b Last sale.

Iron and Steel

The leading authorities in the iron trade agree that the outlook for the first half of 1903 is very bright. Orders already on the books are ample enough to assure this. The *Iron Age* is inclined, however, to be cautious regarding the course of events at the end of that time. In the meantime business continues quiet, as is usually the case at this season. This applies not only to the home industries, but to the import trade as well. A very heavy tonnage in wire is reported, and it is further said that a much

larger volume would have been done during the last month had the capacity of the mills been greater. Prices are not quotably changed on the basis of \$21.75 to \$22 for Bessemer pig iron, \$20 to \$29.50 for steel, and \$28 for steel rails.

Metals

Quotations for the leading metals are as follows: Copper 127½ cents, tin 28 cents, lead 4½ cents, and spelter 4.70 cents.

INCREASE IN CHICAGO ELEVATED TRAFFIC

The South Side and the Northwestern Elevated Roads in Chicago carried more people in December, 1902, than in any previous month in their history. The following figures show the traffic for the year by months, as compared with 1901, on three of the elevated systems of Chicago:

SOUTH SIDE ELEVATED			
	1902.	1901.	Inc.
January	79,154	71,137	8,017
February	79,386	74,525	4,861
March	80,313	76,269	4,044
April	81,009	77,782	3,227
May	76,063	74,205	1,858
June	76,449	69,645	6,904
July	70,767	63,763	7,004
August	68,334	61,143	7,191
September	76,572	67,627	8,945
October	83,112	73,062	10,050
November	83,299	76,776	6,523
December	88,513	79,739	8,774
Daily average for year	78,566	72,110	6,456

Increase for year, 8.95 per cent.

METROPOLITAN			
	1902.	1901.	Inc.
January	98,029	89,699	8,320
February	100,466	97,650	2,807
March	105,512	98,739	7,173
April	109,246	97,018	12,228
May	105,199	92,572	13,227
June	101,743	86,179	15,564
July	97,929	79,302	18,627
August	100,099	81,256	18,843
September	100,751	88,226	21,525
October	115,980	96,020	19,960
November	110,289	97,337	12,952
December	115,682	100,770	14,912
Average for year	105,127	92,064	13,846

Increase for year, 14 per cent.

NORTHWESTERN			
	1902.	1901.	Inc.
January	62,010	52,022	9,988
February	64,760	55,256	9,504
March	65,362	57,193	8,169
April	65,430	58,623	6,807
May	63,199	56,999	6,200
June	60,813	53,587	7,226
July	56,110	48,559	7,551
August	57,911	49,770	8,141
September	63,950	54,065	9,885
October	69,562	59,044	10,518
November	67,236	59,857	7,379
December	71,607	63,375	8,232
Average for year	63,996	55,696	8,300

Increase for year, 15 per cent.

ANNUAL MEETING OF BOSTON ELEVATED RAILWAY COMPANY

The annual meeting of the stockholders of the Boston Elevated Railway Company was held on Jan. 5. Quincy A. Shaw, Jr., was elected a director as successor to William A. Gaston, who resigned his position on Oct. 1 before he began his campaign for the Governorship of Massachusetts. The directors re-elected were: Frederick Ayer, William A. Bancroft, John J. Bright, Samuel Carr, T. Jefferson Coolidge, Jr., Francis H. Peabody, James Phillips, Jr., James M. Prendergast, Nchemiah W. Rice, William S. Spaulding, Walter S. Swan and Robert Winsor. At the meeting the annual report of the directors to the stockholders was submitted. The revenue passengers of the road increased 4.1 per cent, while the increase in the subway traffic was 14.97 per cent. Contracts have been made with the Boston & Suburban and the Boston & Worcester Street Railway Companies whereby the cars of those companies will be taken by the elevated road's conductors and motormen at outlying surface points, brought

to the intown terminals of that system and returned to the points where they were taken. This arrangement will obviate the necessity of a change of cars where the two systems meet. An agreement has been made with the Old Colony Street Railway Company's officers, in pursuance of a provision of law, by which there may be made a lease to the elevated road of all the Old Colony Street Railway Company's tracks within the limits of the city of Boston, except those at Neponset. The terms of the lease are subject to the stockholders' approval, as well as that of the Railroad Commissioners. The practical result of the operation of this lease will be that the people of West Roxbury will have a 5-cent fare such as is now afforded to people living in other parts of Boston.

The number of free transfer passengers was estimated at 115,000,000, the revenue passengers being 222,484,811. For every two passengers who paid a fare to the company more than one received a free transfer.

The surface-track extension during the year has amounted to but 1.4 miles, the total surface track operated by the road being 393.4 miles. Adding to this 16 miles of elevated track, the total mileage operated is 409.4. Fifty cars were added during the year to the elevated division.

CHANGE IN CONTROL OF THE VIRGINIA PASSENGER AND POWER COMPANY

Control of the Virginia Passenger & Power Company, it is announced, has been purchased by Frank Jay Gould. The transaction was consummated through the Merchants' Trust Company, of New York, which is to be the fiscal agent and also the depository of all funds. The Virginia Passenger & Power Company was organized in 1901, under a special perpetual charter from the State of Virginia, and at present controls by mortgage, consolidation and purchase these properties: The Richmond Passenger & Power Company, operating about 70 miles of railway in Richmond, Manchester and suburbs, also owning an electric light and power plant; the Richmond Traction Company, with 20 miles of track in the city of Richmond; the Virginia Electric Railway & Development Company, owning the water rights on the James River at Richmond and Manchester, where 15,000 hp is being developed; the Upper Appomattox Company, owning water rights, land and navigation canal for 50 miles on the Appomattox River, above Petersburg, and at present developing 20,000 hp from the fall of water in that river; the Richmond & Petersburg Railway Company, operating an interurban line 21 miles in length, from Richmond through Manchester to Petersburg, and the South Side Railway & Development Company, operating about 15 miles of railway and the electric light and power plant in Petersburg.

The company has outstanding \$4,000,000 6 per cent non-cumulative preferred stock, and \$10,000,000 common stock, in addition to \$6,000,000 5 per cent first consolidated mortgage bonds. The total authorized issue of these bonds is \$15,000,000, of which \$7,000,000 are reserved for underlying bonds of the constituent companies, and \$2,000,000 will remain in the company's treasury.

More trouble has resulted from "Jim Crow" cars in Southern cities than from any other cause in many years. The latest city to suffer from legislation of this kind is Mobile, Ala., where an ordinance has been passed by the City Council prohibiting whites and colored people riding in the same car or compartment. The local street railway company found it impossible to enforce the rule, the whites persisting in taking seats without reference to the part of the car in which they might be. Consequently these efforts were abandoned. In the future negroes will be allowed to sit wherever they please, and the company will test the constitutionality of the law. An officer of the company is reported as saying that the reason for this was because the whites would not obey the law, and were giving the conductors trouble by refusing to sit where they were told. He said that if the law had been enforced it would have resulted in the arrest of the wife and daughter of a city official, and that there is hardly a car on which the whites did not cause trouble by refusing to move when they were asked to do so.

The Utica & Mohawk Valley Railway, of Utica, N. Y., was tied up a few days ago, through the short circuiting of its power lines. When the cause of the trouble was investigated the body of a large crane was found hanging over the wires. It is supposed the bird flew against one of the wires, and, being killed by the shock, fell against the other wires. The company, it is said, plans to mount the bird's body.

THE GROWTH OF THE TROLLEY IN CONNECTICUT

The annual report of the Railroad Commissioners of Connecticut, which has recently been made public, contains some interesting figures indicating the street railway development of the State since the company first began to make annual returns to the Commission in 1895. During the seven years the electric railway mileage has grown from 317 miles to 517 miles, an increase of 63 per cent, or an average annual growth of 28 miles. The capital stock was \$8,604,240 in 1895, as against \$23,571,284 in 1902, an expansion of 174 per cent. The earnings were then \$2,232,051, while now they are \$3,937,771, an increase of 80 per cent. The passengers carried in 1895 numbered 38,037,474, while the figure for the past fiscal year was 91,554,028, a growth of 140 per cent. The amount of taxes paid then was \$76,522.34, but in 1892 the amount was \$244,768, an increase of 220 per cent.

DECISION AGAINST NEW YORK FRANCHISE TAX LAW

It is reported from Albany that the Third Appellate Division of the Supreme Court will, in a few days, hand down a decision declaring the Franchise Tax law of 1898 to be unconstitutional. So far \$12,000,000 in taxes is involved, the State by the decision practically losing that amount, while at least \$4,000,000 a year in future revenues also is involved. The constitutionality of the Franchise Tax law was attacked by the interested corporations on two grounds, namely:

First, that it violated the home-rule provision of the State Constitution, in that it gave to the State Board of Tax Commissioners the power to assess real estate for the purposes of local taxation, a power which is reposed in the Local Board of Assessors.

Second, that it violated the provision of the National Constitution, which holds inviolate contracts made between individuals, corporations or other corporate bodies. It was also alleged that it violated the National Constitution, because a corporation when granted the privilege to use streets and highways for the purpose of their corporate existence entered into a contract with the power vested by statute to grant them the franchises, which constituted a contract beyond the power of the Legislature or any public body to modify or to break.

Corporations operating forty-seven of the largest franchises in Greater New York combined in a test case to carry the case to the courts. Judge Earl took testimony and heard arguments covering a period of several months. Last spring he handed down a decision declaring the franchise tax to be constitutional in all its features and upholding its interpretation by the State Board of Tax Commissioners in all but one point. The board had assessed special franchises at their full value, whereas, according to Judge Earl's interpretation, they should have been assessed at the same rate as other species of real estate in the same tax districts.

Justice D. Cady Herrick affirmed pro forma and without opinion the decision of Judge Earl for the purpose of permitting an appeal to be taken to the Appellate Division. This appeal was heard in December.

THE LEASE OF THE INDIANAPOLIS COMPANY

The stockholders of the Indianapolis Street Railway Company, of Indianapolis, Ind., have ratified the lease of the property to the Indianapolis Traction & Terminal Company, which will build extensions, belt lines, a terminal passenger station, two freight stations. The terminal company will increase its capital stock from \$500,000 to \$5,000,000. No alteration has been made in the terms of the lease as approved by the directors and announced to the stockholders Dec. 9. A bonus of \$1,500,000 will be paid to the shareholders of the old company in shares of the new company, and a dividend of 1 per cent has been declared. Dividends on the capital stock of the Indianapolis Street Railway Company are guaranteed as follows: 1903, 2½ per cent, an increase of 1 per cent a year until 1907, during which year and every year thereafter of the duration of the lease the dividend will be 6 per cent. The Terminal Company proposes to assume all responsibility for maintenance, construction and extension of the present system, to pay all interest on the bonded debts of the Indianapolis Street Railway Company, of the old Citizens' Street Railway Company and the Broad Ripple Traction Company. The lease dates from Jan. 1, 1903, and will continue during the life of the Indianapolis Street Railway Company.

The officers of the Traction & Terminal Company are: Hugh J. McGowan, president; H. P. Wasson, first vice-president; James M. Jones, secretary, vice-president and assistant manager; Hugh J. McGowan, H. P. Wasson, W. Kelsey Schoepf, Arthur W. Brady and John J. Appel, directors.

NEW PUBLICATIONS

Successful Advertising. How to Accomplish It. By J. Angus MacDonald. 400 pages. Price \$2. Published by the Lincoln Publishing Company, Philadelphia.

The art of writing advertisements has developed almost, if not quite, as rapidly during the last twenty years as, perhaps, any other specialty in business, so that when it is conducted along well-established principles it may as safely be classed as a science as many other branches which rejoice in that classification. Mr. MacDonald is one who has done a great deal toward creating modern methods in this important business, and while he objects to being called an "expert," because he considers that word "over-worked," his book contains many good suggestions on the essentials of ad. writing, and is worthy of being read by every writer of advertisements.

The How and Why of Electricity. By Charles T. Child. 126 pages. Illustrated. Price \$1.00. Published by the Electrical Review Publishing Company, New York.

This book was written for non-technical readers, and in this Mr. Childs, formerly editor of the *Electrical Review*, and whose lamented death was chronicled a few months ago, has been very successful. The style is extremely clear, and the author has been particularly successful in explaining in a lucid way the more complex electrical phenomena, the chapter on the principle of operation of wireless telegraphy being particularly good. We can unhesitatingly recommend this book to all non-technical readers who desire a simple and yet correct account of the different features of modern electrical development.

TOPICS OF THE WEEK

The Waterloo & Cedar Falls Rapid Transit Company has made a traffic agreement with the Chicago Great Western Railway Company, whereby it will sell tickets to all points over the Great Western system in the United States, Canada and Mexico.

The Cincinnati & Eastern Railway will introduce a novelty in the shape of moonlight excursions over the road between Cincinnati and New Richmond. The road runs along the Ohio River for a number of miles, affording a fine view of some of the most picturesque portions of the stream. On moonlight nights there will be no lights in the cars.

A report from Paris says that the crusade of dog lovers for transportation of their best friends by the Metropolitan lines has bobbed up again, and the management of the underground road, at last touched by the appeals of dog owners, seriously contemplates placing on ears in which the inseparable master and dog will be allowed passage.

The Metropolitan Street Railway Company, of Kansas City, has received 6 cents "conscience money" from a man who, while on a visit in Kansas City several years ago, was not asked for his carfare. The sending of the money, so the letter to the company says, resulted from the attendance of the sender at a revival meeting being held at Concordia. President Corrigan, of the company, says he wishes the people who are holding the revival at Concordia would come to Kansas City. It might be wished that they would tour the country.

The annual count made by the Brooklyn Rapid Transit Company of the number of passengers it carries across the Brooklyn Bridge to Manhattan every day was made recently. The figures returned show that the company carries across the bridge to Manhattan every day 163,282 persons, carrying back again only 144,015. Some wag, as the "Tribune" says, has been figuring how long it will take for Brooklyn to become depopulated if 19,357 more persons go to Manhattan from Brooklyn than from Manhattan to Brooklyn every day.

There will be no negro picnics in New Orleans if the Jim Crow law is enforced, and the colored population is very much disturbed over the situation. The negroes have for years held memorial services at their burying ground in Carrollton, in the upper part of New Orleans. This year the memorial services were abandoned, as it would have taken twenty-four hours to get the negroes there under the Jim Crow law. Only four seats are reserved for negroes in each car under this act. William Penn,

president of the Colored Protective Union & Benevolent Association, said that balls and entertainments have been discontinued because of the inability of the members of the organizations to go in bodies or get to their places in a reasonable time.

The City Council of Salt Lake is one of the few municipal bodies that believe in leaving to those who are competent to judge the settlement of problems with which such bodies are entirely unfamiliar and incompetent to render an opinion. The Council, in the question of equipping the street cars of the city with fenders, has left the solution of the question with the street railway company, realizing that the best interests of the company demand the equipment of the cars with the most efficient device available. This is a wise decision. It has often happened that in their efforts to serve the best interests of the city in considering questions regarding street railway operation, city officials have ignorantly disregarded the pleadings of the street railway manager, and have recommended for adoption a cure worse than the disease.

The officials of the Union Traction Company, which some months ago fitted up palatial offices in the Williamson Building, Cleveland, have retired from public view. The company advertised freely for clerks, stenographers, bookkeepers, conductors and motormen, and when replies were received the applicants were told that they would have to buy stock in the company. Motormen and conductors were promised 23½ cents an hour, and were to be given employment "after cars began to run between Saginaw and Flint, Mich." For the last month there has been no one in the offices. Recently a furniture company which furnished the offices attached the furniture, but the agent of the building declined to permit the constable to use the freight elevator, as the building had an account against the traction company for office rent. The constable carried his point by hiring several husky laborers and carrying the goods down twelve flights of stairs.

From the Wild West—Kansas City, Mo.—there comes a tale of the doings of a runaway cable car that makes one think that Munchausen has returned from other worlds and is at large. According to the story, the car left its place in the car house, "quietly" glided out onto the main track, ran down a 4½ per cent grade for six blocks, crossed three double tracks, ran up the 11 per cent grade on Ninth Street, between Main Street and Walnut Street. Dear reader, the tale is not yet ended, but we need breath—something the car didn't need or it would not have gone half this distance. The car backed down the Ninth Street grade, the momentum carrying it two blocks up the 4½ per cent grade, where it was caught by a gripman from a car on the other track, and returned to the car house. Strange to say, so our report says, the car did not come in contact with any other vehicle, and no damage of any kind was done. No one seems to know how the car got loose in the first place, we are told. We are inclined—mind you, inclined—to discredit this tale.

"TRAMWAY ACCOUNTS"

Gee & Company, London, proprietors of The Accountant, and publishers of many works on accountancy subjects, have just published a volume on Tramway Accounts. It is based on the thorough methods of accounting in operation in the Glasgow Corporation Tramways Department, and contains fac-similes of all the forms and books recommended, this in itself being a valuable feature. The entire system of accounts, from the commencement to the published results, will also be clearly and fully described, and the difficulties of juniors and those inexperienced in the work will be kept specially in view. The book should assist the much desired standardization of Tramway Accounts, a subject now under consideration by a committee of the Association of Municipal Tramway Managers of Great Britain. The author is Donald McColl, chief bookkeeper Glasgow Corporation Tramways.

ENGINEERING SOCIETIES

NEW ENGLAND STREET RAILWAY CLUB.—The annual meeting and banquet of the New England Street Railway Club is scheduled for Thursday evening, January 22, 1903, at the Hotel Somerset, Commonwealth Avenue and Charlesgate, East Boston.

A CANADIAN COMPANY TAKEN OVER BY THE MUNICIPALITY

The St. Thomas Electric Street Railway Company, which stopped running cars about two months ago, has been taken over by the city, which is now operating the road as a municipal concern. During the two months the road has been shut down, all necessary repairs have been made, and everything is in fair running order. Already the question of cheap fares is being agitated. The city has control of the system by virtue of a mortgage on the property in which was a clause to the effect that if the cars should not be operated for sixty days, the mortgage could be foreclosed.

CONTRACTS FOR DAYTON & MUNCIE LINE

E. P. Roberts & Company, of Cleveland, Ohio, consulting engineers for the Dayton & Muncie Traction Company, have closed contracts for the greater portion of the equipment necessary for building the road. The Westinghouse Electric & Manufacturing Company will furnish the electrical equipment for power house, sub-stations and cars. The order includes two 500-kw three-phase alternating-current generators, four 200-kw and one 300-kw rotary converters with static transformers for reducing 15,000 volts, and switchboards; also ten 450-hp motor equipments, each for ten cars. The Buckeye Engine Company secured the order for the two cross-compound condensing engines. These are to be rated at about 780 hp, operating at 94 r. p. m. The Shone-Kendall Company, of Toledo, will furnish the piping and auxiliaries. The buildings will be erected by Hiram Wittemore, of Dayton. Eight vestibuled passenger coaches, a work car and a freight car will be furnished by the Stephenson Car Company. The cars are to be equipped with Peckham trucks. At each sub-station and at the power house there will be a storage battery of 320 amp.-hours' capacity, furnished by the Gould Storage Battery Company. The line work will be done by the Chase Construction Company, of Detroit. The main power house will be at Winchester, and there will be sub-stations at Greenville, Union City and Selma. The road is in reality an extension of the Dayton & Northern, which was thoroughly described in a recent issue of the STREET RAILWAY JOURNAL. When the line is completed cars will be operated through from Dayton to Muncie, a distance of 90 miles. The completion of the line will also complete through electric connection from Indianapolis to Cincinnati and Indianapolis to Columbus. The completion of the Muncie, Hartford & Fort Wayne, which is also being built under the supervision of E. P. Roberts & Company, will extend the electric system to Fort Wayne.

STREET RAILWAY PATENTS

[This department is conducted by W. A. Rosenbaum, patent attorney, Room No. 1203-7 Nassau-Beekman Building, New York.]

UNITED STATES PATENTS ISSUED DEC. 23, 1902

716,362. Trolley; W. L. Baker, Painesville, Ohio. App. filed Sept. 29, 1902. The trolley is spring-mounted in the fork in a manner to permit it to tilt laterally.

713,376. Trolley Pole; T. C. Buder, St. Louis, Mo. App. filed Dec. 18, 1901. A triangular frame is pivoted in the harp and three trolley wheels are mounted therein; if one wheel strikes an obstruction, the frame swings to bring another into position on the wire, and thus avoid derailing the trolley.

716,411. Electric Tram and Railway; R. Hacking, Nottingham, England. App. filed Dec. 13, 1901. Details of a system whereby current is applied successively to the sections of a supply conductor by the passage of the vehicle.

716,425. Brake-Shoe; W. E. Hutton, Chicago, Ill. App. filed April 26, 1902. The brake-shoe is provided with hooks for securing the same as the brake-head.

716,428. Device for Pinching and Moving Cars; H. J. Kayser, Duquesne, Pa. App. filed June 27, 1902. Detail.

716,443. Automatic Railroad Switch; A. G. Lawrence, Motley, Minn. App. filed Feb. 6, 1902. The combination with main and side track rails of vertically-movable guide blocks having recesses forming beveled faces to engage the wheel-flanges and direct a train from one track to the other, and means for raising and lowering the blocks.

716,477. Trolley Guard; P. M. Reed, Paterson, N. J. App. filed July 10, 1901. A split pulley is mounted above the main wheel and runs above the wire, its parts being carried on two outwardly-opening spring arms having sufficient tension to keep the trolley in place, but capable of opening when required to remove the trolley.

716,562. Railway Signaling System; W. Locke, Troy, N. Y. App. filed Feb. 26, 1902. An arrangement of track circuits and apparatus in a block signaling system.

716,616. Track Brake; H. L. Baines, Mauch Chunk, J. E. Waaser, East Mauch Chunk, Pa. App. filed June 30, 1902. A support, a brake-shoe suspended from the support, a guide secured to the support, and a bar connected with the brake-shoe and arranged in the guide for limiting the movement of the brake-shoe.

716,622. Handle for Fare Register Rods, &c.; F. Frostrom, Jersey City, N. J. App. filed June 14, 1902. A handle, removable from the bar or rod commonly found in trolley and tram-cars by means of which the fare register therein is operated, without disconnecting the same from the fare register or otherwise interfering with the operations of the said bar or rod.

716,715. Foot Rest for Car Seats; L. Janson, Brooklyn, N. Y. App. filed March 17, 1902. A foot rest hung under the seat in such a manner that it will be automatically shifted relative to the position of the back of an adjustable car seat.

716,758. Device for Automatically Opening or Closing Switches; J. T. Rice, Grand Rapids, Mich. App. filed July 19, 1902. A wheel is manipulated from the car platform to engage the switch tongue and throw the switch.

716,775. Brake Mechanism; W. H. Swith, Pawtucket, R. I. App. filed March 15, 1902. A brake mechanism having revoluble friction-discs, a brake-wheel between the discs, and a brake-band engaging the brake-wheel, to brake the latter.

UNITED STATES PATENTS ISSUED DEC. 30, 1902

716,880. Switch Iron; J. Flynn, Bridgeport, Conn. App. filed Aug. 16, 1902. The handle and blade are formed separately, but adjustably connected together and insulated.

716,882. Car Seat; M. N. Forney, New York, N. Y. App. filed July 12, 1902. A seat back, pairs of crossed reversing arms at the ends thereof, pivoted supports for the reversing arms, extensible bearing bars, pivots coupling the reversing arms to the extensible bearing bars, and bearings attached to the seat and resting on the extensible bearing bars.

716,897. Fare Register; T. S. Huntington, New York, N. Y. filed Dec. 13, 1901. Means for indicating the number of operations of the register between two readings of the same.

716,935. Car Brake Mechanism; H. E. Putney, Toledo, Ohio. App. filed March 22, 1902. Consists, primarily, of friction discs concentrically secured to the axles of a car truck, brake-bars movably mounted on the frame of the truck, shoes vertically hinged to the bars and supported there by concentric to the axles and opposite the friction discs and means for moving the bars to press the shoes on the discs and retract them therefrom.

716,944. Sanding Mechanism for Cars; N. Seibert, Malden, Mass. App. filed May 5, 1902. The combination with a disintegratable body of a grinding disc upon which said member is seated, a horizontally disposed gear wheel carrying said disc, means for rotating the gear and means for conveying the disintegrated material to the track rails.

716,978. Section Insulator; J. M. Andersen, Boston, Mass. App. filed Aug. 25, 1902. Consists of two terminal pieces to be secured to the ends of the wire and an intermediate joining piece.

716,984. Brake-Shoe; R. L. Brown, Chicago, Ill. App. filed Feb. 24, 1902. A soft metal body and a continuous relatively hard metal insert embedded in the body in the wearing face of the shoe opposite to that part of the tread of the wheel which is worn by the rail and extending parallel with the sides of the body.

716,988. Overhead Electric Trolley Wire; J. P. Cribb, Southsea, England. App. filed Sept. 8, 1902. The circuit is maintained complete by a hinged connection, so long as the wire is horizontal, but in case the latter breaks and falls, the connection opens the circuit to render the broken end dead.

716,993. Brake-Shoe; R. L. Durbin, Chicago, Ill. App. filed July 26, 1902. Hard metal strips in the form of a grid are inserted in the face of the shoe.

716,995. Electric Railway; E. W. Farnham, Chicago, Ill. App. filed April 11, 1902. An oscillatory switch device is thrown to close the circuit to a section of the rail, by a movement of a portion of the third rail.

717,067. Brake Mechanism; G. F. Brandau, Utica, N. Y. App. filed June 30, 1902. Means whereby the brake-shoes may be operated in the ordinary manner by means of winding posts and chain and lever connections, and also means whereby the brake-shoes may be dropped from suspended positions, so as to throw the brake-shoes underneath the rear wheels of the car in case of an emergency.

717,070. Contact Box for Electric Railways; W. M. Brown, Johnstown, Pa. App. filed Nov. 30, 1901. Details.

717,071. Electric Switch; W. M. Brown, Johnstown, Pa. App. filed April 18, 1902. The switch has an intermediate closing position and two open-circuit positions, a locking device for holding the switch in one of its open positions, and means for retarding or prolonging the movement across its closing position.

717,075. Railroad Signal and Alarm; A. E. Caughey, Omaha, Neb. App. filed Dec. 12, 1901. Details.

717,092. Car Truck; H. S. Goughnour, Johnstown, Pa. App. filed April 9, 1901. Details.

717,100. Tongue Switch; C. H. Krauss, Johnstown, Pa. App. filed April 16, 1902. A switch tongue having a depending pivot pin formed with a groove or recess, a fastening pin seated in the supporting structure and formed with a tapered portion engaging the said recess, and means for adjustably securing the said pin.

717,112. Electrical Signaling System; A. C. McKnight, Brooklyn, N. Y. App. filed March 7, 1902. Details.

717,114. Car Bolster and Bearing; J. E. Norwood, Baltimore, Md. App. filed May 27, 1902. In a roller-bearing for cars, the combination with a casing having spaced ball-passages therein, of a race plate common to both passages, and having bearing portions corresponding to the passages, spacing means between the passages and means carried by the spacing means and engaged with the casing for holding the spacing means and the race plate against displacement.

717,124. Ball-Bearing Truck or Cars; R. V. Sage, Johnstown, Pa. App. filed Nov. 4, 1901. Details.

717,208. Car Seat; L. Janson, Brooklyn, N. Y. App. filed Sept. 12, 1902. Arms pivoted to the back of the seat at one end and supported upon movable pivots at the other end, means for moving the seat with one of said pivots as a fulcrum and controlling means on the seat or shifting the pivots as the seat is moved.

717,219. Train Control System; S. L. G. Knox, ————. App. filed June 5, 1902. Improvements in a master and sub-controller system.

App. filed Sept. 24, 1902. A standard capped by an insulating ring held in place by a metal ring upon which the rail rests.

717,398. Trolley Wire Support; E. Hill, Jr., Norwalk, Conn. App. filed April 18, 1902. Two plates containing cavities for solder are clamped together upon the wire.

717,401. Trolley Stand; H. Holland, Detroit, Mich. App. filed March 7, 1902. Details.

717,406. Railway Electric Signal; S. W. Huff, Baltimore, Md. App. filed Dec. 6, 1898. An automatic device is provided to set each signal to the position which it is to normally occupy; also an electrical tripping mechanism set in operation by the train at a given point, provided certain conditions exist in the track to be guarded.

717,414. Trolley Stand; W. H. Kilbourn, Greenfield, Mass. App. filed April 1, 1902. A dash pot prevents the trolley arm from flying upward.

717,423. Trolley Stand; O. F. Lidke, Detroit, Mich. App. filed Dec. 14, 1901. Details.

717,442. Electric Radiator; J. F. McElroy, Albany, N. Y. App. filed Jan. 16, 1896. The heater is so constructed that it can be placed against the riser of the seat.

717,443. Combined Magnetic and Mechanical Brake; J. F. McElroy, Albany, N. Y. App. filed July 14, 1899. The magnetic brake is first applied by turning the brake-handle and afterwards the mechanical brake is applied, if necessary.

PERSONAL MENTION

MR. W. R. CLARKE, ex-Mayor of Stockton, has been appointed general manager of the Stockton Electric Railway Company, of Stockton, Cal.

MR. H. D. HANFORD, who has been connected with the Puget Sound Electric Railway Company, of Salem, Ore., has been appointed construction engineer in charge of the Noblesville office of the Indiana Northern Railway, a part of the Union Traction system.

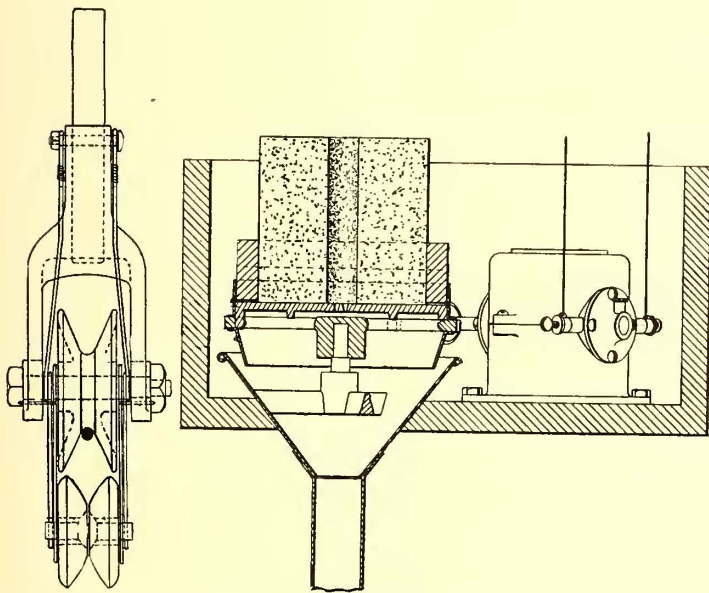
MR. C. WUSTENFELD, formerly superintendent of the Elgin Railway Company, of Elgin, Ill., has been appointed superintendent of the Southern Indiana Interurban Railway and the New Albany Street Railway, of New Albany, Ind. Within the next year a number of improvements and extensions will be made to these roads.

MR. J. L. HANER, who resigned as secretary, manager and purchasing agent of the Richmond & Petersburg Electric Railway when the company passed into the control of the Richmond Passenger & Power Company, of Richmond, Va., has been presented with a handsome gold-headed umbrella by the employees of the company, as a token of appreciation of courtesies and favors extended to the employees by him during his incumbency.

MR. GEORGE W. MORSE, of Newton, Mass., has sold his entire interest in the Boston & Suburban Electric Companies, and has resigned from the board of trustees. Mr. Morse will devote himself as formerly to the general practice of his profession, and has entered the firm of Messrs. Morse, Hickey & Kenny, practicing attorneys, who are the successors of Messrs. Morse and Lane.

HON. SAMUEL JONES, Mayor of Toledo, Ohio, has been elected president of the Toledo & Indiana Railway in place of Hon. C. P. Griffin, who died a few days ago. Frank Yesbera has been chosen president of the Toledo & Indiana Construction Company, Mr. Griffin having been president of both companies. At a recent meeting of the directors of the Toledo & Indiana Railway Company resolutions of regret and respect were adopted relative to the death of President Griffin.

MR. J. C. WEBB and MR. MILLER ROBBINS, division superintendents of the Brooklyn Rapid Transit Company, have resigned. Superintendent Webb was in charge of the East New York Division, and had been in the company's employ since 1875. Superintendent Robbins had been for some time in charge of the Flatbush Division. Superintendent Wuhlstein, of the Bergen Street Division, who vacates his present position, has been appointed assistant superintendent of transportation, under Mr. W. B. Graham, the present superintendent of transportation. Mr. William Duncan will have charge of the East New York and Canarsie Divisions, which have been consolidated, and Mr. Boland, superintendent of the Crosstown Division, will have charge of the Flatbush Avenue and Bergen Street Divisions, now consolidated. Mr. Bush, superintendent of the Canarsie Division, will succeed Mr. Boland at the Crosstown Division.



PATENT NO. 716,477

PATENT NO. 716,944

717,291. Trolley Connection and Guard for Electric Cars; J. G. Sharwell, Newark, N. J. App. filed April 10, 1902. Details.

717,304. Car Truck; J. C. Wands, St. Louis, Mo. App. filed June 4, 1902. In a car truck, the combination with side frames, of a support provided with vertical guideways, a casting vertically movable in said ways, and side bearings located on each side of the side frame of the truck.

717,304. Car Replacer; A. R. Batchelder, Portsmouth, N. H. App. filed Nov. 22, 1902. An inclined plane up which the car can be pushed is hinged to an automatic device which grips the rail.

717,325. Apparatus for Automatically Block Signalling on Railways; F. B. Behr, Twickenham, England. Details.

717,326. Street Car Fender; W. Bilkowitz, Kansas City, Mo. App. filed Oct. 11, 1902. Gripping jaws mounted above and in advance of the fender, are adapted to catch and elevate a person above the track, when struck.

717,340. Car Wheel; O. A. Cadmus, Newark, N. J. App. filed April 18, 1902. Relates to a wheel so constructed as to eliminate the grinding action of the car wheel flange upon the rail in rounding a curve in the track.

717,375. Railway Switch; S. Fierbaugh, Huntington, W. Va. App. filed Oct. 4, 1902. Details.

717,386. Body Bolster; J. H. Geer & D. Wisor, Johnstown, Pa. App. filed June 30, 1902. In a car bolster, an upper member composed of a rolled channel with its flanges extending downwardly and a plate riveted to and extending throughout the length of the top of the web of said channel members.

717,387. Truck Bolster; J. H. Geer & D. Wisor, Johnstown, Pa. App. filed June 30, 1902. Details.

717,389. Third-Rail Insulator; E. Gonzenbach, Wheaton, Ill.

EXTENSIONS DURING 1903

In the STREET RAILWAY JOURNAL for Dec. 27, 1902, was published reports from a number of street railway companies as to new work to be done by them in 1903. Since this information was published additional reports have been received, and below is given an outline of some of this work:

GREENWICH TRAMWAY COMPANY, of Portchester, N. Y., expects to build a new car house.

ORANGE COUNTY TRACTION COMPANY, of Newburgh, N. Y., will build $2\frac{1}{2}$ miles of road.

KANSAS CITY INTERURBAN RAILWAY, of Kansas City, Mo., is to build 5 miles of double track.

THE WASHINGTON WATER-POWER COMPANY, of Spokane, Wash., will build 2 miles of new track.

ROCHESTER & SUBURBAN RAILWAY COMPANY, of Rochester, N. Y., is building 3 miles of second track.

KNOXVILLE TRACTION COMPANY, of Knoxville, Tenn., is to build two extensions, one $\frac{3}{4}$ mile, and the other $1\frac{1}{2}$ miles.

THE STEUBENVILLE TRACTION & LIGHT COMPANY, Steubenville, Ohio, early in the spring will build a $2\frac{1}{2}$ -mile extension.

BAY SHORE TERMINAL COMPANY, of Norfolk, Va., within sixty days, will continue the construction of the balance of its road—7 miles.

UNION ELECTRIC COMPANY, of Dubuque, Ia., will build a new car house and power station. Contracts are to be let within six months.

MADISON LIGHT & RAILWAY COMPANY, of Madison, Ind., is to rebuild 2 miles of track. Ties, switches, frogs, spikes, etc., will be required.

TOLEDO & MONROE RAILWAY COMPANY, of Monroe, Mich., during 1903 will build 31 miles of new track and two sub-stations, and purchase fifteen cars.

OMAHA & COUNCIL BLUFFS RAILWAY & BRIDGE COMPANY, of Council Bluffs, Ia., will build a new car house and shop, and rebuild some track.

SCHENECTADY RAILWAY COMPANY, of Schenectady, N. Y., is building a double-track extension of 13 miles, and a new car house, 116 ft. x 306 ft.

MUSKEGON TRACTION & LIGHTING COMPANY, of Muskegon, Mich., will purchase some park attractions. It is possible that automatic stokers will be purchased.

FERROCARIL ELECTRICO DE LERDO A TORREON, Gomez Palacio, Durango, Mex., will purchase a 400-hp feed-water heater and four eight-bench open trail cars.

TRI-CITY RAILWAY COMPANY, of Davenport, Ia., during 1903, will rebuild 5 miles of old track, and build 5 miles of new track. The company is building its own cars.

ROCKFORD & FREEPORT ELECTRIC RAILWAY COMPANY, of Rockford, Ill., will, within three months, award contracts for 29 miles of track, overhead material and equipment.

CITY ELECTRIC RAILWAY COMPANY, of Rome, Ga., is considering the advisability of extending its track and enlargement of its plant, but the matter is not yet finally determined.

KINGSTON CONSOLIDATED RAILROAD COMPANY, of Kingston, N. Y., is in the market for five G. E. 800 or G. E. 1000 two-motor equipments to supersede five W. P. 50 equipments.

PITTSFIELD ELECTRIC STREET RAILROAD COMPANY, of Pittsfield, Mass., in the spring is to place contracts for building 5 miles of line in Pittsfield, and 6 miles in North Adams.

MOLINE, EAST MOLINE & WATERTOWN RAILWAY COMPANY, of Moline, Ill., will rebuild 10 miles of its road; also build a new car house, twenty-car capacity, and a power station.

FOX RIVER ELECTRIC RAILWAY & POWER COMPANY, of Green Bay, Wis., will buy three or four cars with equipments; also fenders to equip all of its cars, now numbering twenty-two.

SHREVEPORT BELT RAILWAY COMPANY, of Shreveport, La., will purchase a 300-kw or 400 kw railway generator, a 500-hp to 750-hp Corliss engine, and two 150-hp return tubular boilers.

THE NEWARK & GRANVILLE STREET RAILWAY COMPANY, of Newark, Ohio, is to build an extension between Newark and Zanesville. A new car house and car shops are to be erected at Newark.

CHATTANOOGA ELECTRIC RAILWAY COMPANY, of Chattanooga, Tenn., during 1903, will extend its road a distance of 8 miles. New cars, motors, etc., will be bought, but to what extent is not definitely decided as yet.

GRAND RAPIDS, HOLLAND & LAKE MICHIGAN RAPID RAILWAY, of Holland, Mich., is in the market for complete park attractions. Correspondence should be addressed to Charles Floyd, traffic and purchasing agent.

HUDSON VALLEY RAILWAY COMPANY, of Glens Falls, N. Y., is building a new power house at Warrensburg. The company expects to open a new line, now nearly built, between Saratoga and Glens Falls (18 miles), May 1.

SAVANNAH ELECTRIC COMPANY, of Savannah, Ga., is building a 2-mile extension, the material for which has all been bought. It is not yet determined whether any power station apparatus, rolling stock, etc., will be purchased.

FORT SMITH TRACTION, LIGHT & POWER COMPANY, of Fort Smith, Ark., during the next sixty days will award contracts for building two to three miles of track. The company will purchase one 250-hp or 300-hp water-tube boiler.

POUGHKEEPSIE CITY & WAPPINGER FALLS ELECTRIC RAILWAY COMPANY, of Poughkeepsie, N. Y., will build 7 miles of new track and relay 4.88 miles of track. Several new open cars, new dynamos and engines will be bought.

CITIZENS' ELECTRIC RAILWAY COMPANY, of Eureka Springs, Ark., is enlarging its power station. The company will require pipe covering and roofing, a 120-kw alternator, complete with switchboard, etc.; also a 1100-volt 250-hp to 300-hp engine.

WATERVILLE & FAIRFIELD RAILWAY & LIGHT COMPANY, of Waterville, Maine, will build a 1000-hp steam plant and purchase two direct-connected, alternating current units of 500-hp each. These will be 60-cycle machines operating at 2000 volts.

ELMIRA WATER, LIGHT & POWER COMPANY, of Elmira, N. Y., with the introduction of natural gas, will reconstruct its power station and operate part of the lighting with gas engines. A new 500-kw, direct-connected railway unit is now being installed.

PEOPLE'S GAS & ELECTRIC COMPANY, of Defiance, Ohio, is in the market for a 200-kw, six-pole, 550-volt railway generator and a good second-hand electric launch, which can carry fifty to seventy-five people. The company is desirous of securing catalogues of park attractions.

VINCENNES CITIZENS' STREET RAILWAY COMPANY, of Vincennes, Ind., is finishing 3000 ft. of new track in the northern part of city, and will build a 1-mile extension in the southern portion during the spring. A new power house will be built and four new cars put on when the road is finished.

CUMBERLAND & WESTERNPORT ELECTRIC RAILWAY COMPANY, of Cumberland, Md., is now having built by the Penn State Construction Company, of Philadelphia, Pa., $8\frac{1}{2}$ miles of track and a power house thoroughly equipped. Cars are to be double-truck, of the latest type, and will be equipped with air brakes, etc.

MOUNT VERNON ELECTRIC RAILWAY COMPANY, of Mount Vernon, within two months, will let contract for a 14-mile extension and the building of a car house with a capacity of twenty cars. The company will purchase two combination interurban cars, an 18 x 42 Corliss engine, a 125-hp corrugated furnace boiler, and a 150-kw direct-connected railway generator.

SYRACUSE & ONTARIO RAILROAD, of Syracuse, N. Y., which owns the Syracuse, Lakeside & Baldwinville Railway and the Fulton & Oswego Falls Street Railway, will, by 48 miles of extensions and new work, have a road from Syracuse to Oswego, via Baldwinville, Phoenix, Fulton, etc. Specifications are to be ready in about thirty days, and contracts are to be placed within six months.

HELENA LIGHT & TRACTION COMPANY, of Helena, Mont., will purchase two fifteen-bench double-truck, four-motor open cars, one 150-kw, 2200-volt alternating-current, three-phase generator, a direct-connected motor generator, and other similar apparatus. A twenty-four panel switchboard for distributing light and power will also be purchased. The company will build a new fireproof sub-station. Orders are to be placed this month.

FLORENCE ELECTRIC STREET RAILWAY COMPANY, of Florence, Col., expects to build about 25 miles of track, power house, two car houses, repair shop, sub-station and six bridges. The company will purchase two 220-kw generators, two 250-hp direct-connected Corliss engines, six 250-hp boilers, and perhaps one transformer; about twenty cars and fifty motors, and two sprinklers. The company owns over 80 acres of park ground, but has not decided on the attractions to be provided.

RAILWAYS & LIGHT COMPANY OF AMERICA, of Richmond, Va., which controls the Macon Railway & Light Company, of Macon, Ga.; Augusta Railway & Electric Company, of Augusta, Ga.; Knoxville Traction Company, of Knoxville, Tenn., reports that extensions will be made in Knoxville and Macon; new car houses to be built in Augusta, Macon and Knoxville; purchases to be made for Macon and Knoxville of power-station apparatus; also cars for Macon. Address inquiries to the street railway companies.

SOUTHWESTERN ELECTRIC RAILWAY COMPANY, of Webb City, Mo., will place contracts during the next thirty days for building two extensions, one of 9 miles and the other of 4 miles, and will increase the capacity of its power station in Webb City. The plan is to add to the equipment a 1200-kw three-phase generator, direct connected to 1800-hp Corliss engine, and 1200-hp boilers. A rotary converter station of 250 kw will be established. Two steel bridges, one 80-ft. span, and the other 150 ft., will be purchased.

CONSOLIDATED TRACTION COMPANY, of Indianapolis, Ind., expects to build a line from Indianapolis to Crawfordsville; a line from Frankfort down to its Crawfordsville lines, through Lebanon, and a line from Lafayette to Lebanon parallel to the Chicago, Cincinnati, Cleveland & Columbus Railroad. A total of about 106 miles of line will be built, and all the necessary car houses, power stations, repair shops, bridges, etc., will be required, together with power-station apparatus sufficient to operate a road of the size mentioned. Contracts will be awarded within a few months.

WISCONSIN RAPID TRANSIT COMPANY, of Fond du Lac, Wis., expect to build from Fond du Lac to Waverly Beach, on the Fox River Valley Electric Railway, and to the city of Chilton, Wis., a total mileage of 42. The road will be located on the east shore of Lake Winnebago, in Fond du Lac and Calumet Counties. The line is surveyed and part of the right of way secured. A power plant will be built at or near Calumet Harbor. The company owns Waywayanda Park, at Calumet Harbor, Wis., and expects to build there an "Ocean Wave." The company will negotiate to let the contract for building and equipping the road.