STREET AND ELECTRIC RAILWAYS

PART I

STREET AND ELECTRIC RAILWAYS.

PART I.

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CHAPTER I.

SCOPE AND METHOD OF INVESTIGATION.

Definition of street and electric railways.—The statistics in this report cover all electric railways in the United States irrespective of their length or location and all street railways irrespective of their motive power. In the corresponding investigation at the census of 1890 the term "street railways" was used as defining the scope of the statistics. At that time practically all railways, except ordinary steam railways, could be correctly designated by this term, as they were confined mainly to urban districts and operated almost exclusively upon the public streets and roads. During the past few years there has been an extraordinary development of electric railways outside the limits of cities and villages, and a considerable proportion of these suburban and interurban lines are located on private rights of way and not on the public thoroughfares. Hence the more inclusive term "street and electric railways" has been adopted, as covering more adequately the scope of the present investigation. It includes all railways doing a public business except the ordinary steam lines, which report to the Interstate Commerce Commission.

The statistics, in fact, cover the electric business of two steam railways which have either placed electric cars upon part of their tracks in connection with steam trains or have equipped certain tracks exclusively for electric traction. This practice has been most extensively adopted by the New York, New Haven and Hartford Railroad Company. The Pennsylvania Railroad also operates an electric system in New Jersey in connection with the West Jersey and Seashore Railroad. The recent movement of the New York Central and Hudson River Railroad and the Pennsylvania Railroad in determining upon the installation of electric traction for all passenger trains entering their New York termini, together with other electric installations now contemplated by steam railroads, may mark the approach of a time when all steam lines will have introduced electric traction in connection with steam, or in place of it, and when it will not be possible to distinguish clearly between electric and steam railways. At present the distinction is still a fairly clear one, although the methods and service of some electric interurban lines already resemble those of the steam railways in many important respects.

The present report also includes eleven inclined planes operated separately from other railway systems. These, which for the most part use cable traction, are found in a few cities and towns where steep bluffs exist, notably in Pittsburg. They differ materially in their methods of operation from ordinary street railways. Their traffic is insignificant in comparison with the total for all street and electric railways.

Period covered.—The statistics, as a rule, cover the twelve months ending June 30, 1902, but in a considerable number of instances the reports are for the calendar year 1901 and in a few instances for the calendar year 1902 or for other periods of twelve months. Companies in operation during only part of the year are included, but not companies whose lines were under construction and not yet in operation. The number of companies reporting for only part of the year was 57 out of a total of 817 operating companies. This number includes a few companies which were actually in operation during the entire year but for which, on account of changes in ownership, only partial reports could be secured. These part-time railways, however, are in most instances much less important than a large proportion of those in operation throughout the entire census year, so that the inclusion of them does not materially affect the relations between the totals for the various items.

Completeness of returns.—In most instances the rail-

way companies replied in full to the inquiries in the schedule submitted by the Bureau of the Census. The officials of every company were visited by the special agents of the Bureau, who undertook to secure uniformity in the returns. In some instances the agents found it necessary to make estimates, in conjunction with the officials of the railways, for certain data of which accurate records had not been kept. Most companies, however, and particularly the important ones, kept such records as to permit precise replies. In a few instances only have figures not reported by the companies been supplied by office estimates. Those cases in which information is wholly omitted or in which it has been supplied by estimates made by the Bureau are indicated in connection with the detailed presentation of the statistics.

In the appendix will be found a copy of the schedule employed in this investigation and of the instructions to special agents conducting the fieldwork.

Basis of classification of companies.—The results of street railway operation differ so greatly under different conditions that it becomes necessary, in the presentation of summaries, to group the companies in such a way as to bring together, so far as possible, those which operate under similar conditions. For this purpose two classifications have been made. The first is based chiefly on the kind of power used, one of the groups being further subdivided according to certain operating conditions. The second classification is based upon the distinction between urban and interurban railways, and the urban railways are further divided upon the basis of the population of the urban center served. These classified summaries are the more essential for the presentation of financial data regarding street railways, since these can not be published for individual companies, as is done with the items concerning physical equipment and traffic.

Classification according to power used.—The first method of classification divides the companies into the following groups and subgroups:

1. Electric surface railways.
   - *a.* Without commercial lighting.
   - *b.* With commercial lighting.
   - *c.* Part time.
2. Animal power railways.
3. Steam and electric elevated railways.
4. Cable railways, surface and inclined planes.
5. Steam surface railways.

The companies reporting for only part of the year all operate electric surface lines. The separation of these companies from the other electric surface lines makes it possible to observe more precisely the results of operation under normal conditions.

The separation of the first two subgroups of group 1 is based upon the obvious fact that the running of a lighting plant in connection with an electric railway business must materially affect the operating results for the railway. Moreover, it is impossible in most of such cases to separate satisfactorily the capital invested or the current expenses for the lighting business from those for the street railway business, so that the returns must necessarily cover both branches. There is no sharp line of demarcation between subgroups *a* and *b*, a large proportion of electric railway companies receiving some income from the sale of light and power. The aim has been to include under subgroup 1 *b* only companies which operate distinctly commercial light or power plants. Most of these companies presented to the Bureau of the Census supplementary schedules regarding the equipment and operations of these auxiliary plants, as far as it was possible to make a segregation, and these supplementary data are included in the present report. A company which sells, incidentally, a small amount of current, especially if the current is delivered to the consumer directly at the dynamo, is placed in subgroup 1 *a*.

A considerable number of street railway companies under 1 *a* and a few under 1 *b*, while operating primarily electric surface lines, have also some trackage operated by cable or animal power or some elevated trackage. Among leading instances of this class may be mentioned the Interurban Street Railway Company, of New York city, which operates a large number of horse cars, the passengers carried constituting a very large proportion of the total horse-car traffic of the United States. In Chicago and San Francisco extensive cable lines are operated by companies which are now primarily electric in their equipment, and the elevated systems in Brooklyn and Boston are operated by the companies which run the surface lines of those cities. In all such instances it is impossible to divide the statistics of the company and apportion them between different kinds of traction. The amount of traffic carried by predominantly electric surface railways on horse, cable, or elevated cars is, however, but a small fraction, probably not more than 2 or 3 per cent, of their aggregate traffic, so that the significance of the totals for the group is not materially affected. On the other hand, the statistics presented for elevated railways, while they do not cover the entire business of this description, doubtless show the typical results of operation. The number of companies operating cable railways predominantly (aside from inclined planes) is now only 3, and the number of exclusively steam street railways is only 3, so that the statistics of these two groups are less significant than those of the larger groups.

Classification according to population.—The second method of classification divides street and interurban railway companies into the following groups:

1. Railways in urban centers of 500,000 population and over.
2. Railways in urban centers of 100,000, but under 500,000 population.
3. Railways in urban centers of 25,000, but under 100,000 population.

4. Railways in urban centers of less than 25,000 population.

5. Fast, long interurban railways.

6. Miscellaneous interurban railways.

Statistics grouped into the 6 classes above named are presented for all companies, whatever the power used, and also separately for those full-time companies which operate electric surface railways without lighting plants.

This classification of companies according to population involves no little difficulty. In the first place the more important street railways are no longer confined, as they were formerly, to a single municipality. They extend into the suburbs and adjacent rural districts, and often to cities and towns at a considerable distance. In determining the area to be credited to a given urban center, the rule followed has been to include all the municipalities reached by the lines of the company, or companies, which serve the city that constitutes the leading component in that center. The statistics of minor railways serving any part of the area thus defined have been added to those of the more central systems, and the population of any additional localities reached by these minor companies. The population of strictly rural areas, through which primarily urban street railway systems pass, has necessarily been disregarded in discussing urban centers, since there is no way of ascertaining what proportion of the inhabitants of such areas are actually within reach of street railway facilities.

Pittsburg and the neighboring cities and towns furnish a striking illustration of the difficulty of ascertaining the population served by a railway company. Of the 469.47 miles of track reported by the 8 Pittsburg companies, 188.19 miles lie entirely outside of the limits of any municipality. Nevertheless, the traffic is so largely carried on within city limits that these companies have been classed as urban rather than interurban. A somewhat similar condition exists in Buffalo, N. Y., and its vicinity, while the railways serving Detroit, Mich., Fall River, Mass., Canton and Akron, Ohio, and several other important cities are so largely interurban that their statistics have been excluded from the urban groups. Not only are certain predominantly urban companies thus engaged to some extent in interurban traffic, but all companies which are predominantly interurban in character likewise carry passengers wholly within city limits and, in many instances, the proportion of passengers thus carried is large.

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When, therefore, the attempt is made to compare the population of a given urban center with the number of passengers carried in that center, the result is only approximate, since it is impossible to distinguish between the different classes of traffic carried by a single street railway company. Nevertheless, in most large cities the margin of error arising from these complications is not very great. The totals for the four groups of cities adopted in this report show fairly well the true conditions of urban street railway operation, since all companies whose business is to a large extent interurban have been placed in the fifth and sixth groups.

These considerations point clearly to the heterogeneous character of many of the railways which are classed as interurban. A large part of the traffic of so-called interurban railways is really intraurban. As a general rule all companies which have more than half of their trackage outside of municipal limits have been considered interurban in the present investigation. For the purpose of showing the operating results of the more typical modern interurban railways, 55 companies have been selected, which may be fairly described by the term fast, long interurban lines. No company is included in this group which reported less than 15 miles of single track, or which had more than one-third of its trackage within municipal limits, or which operated cars at a maximum speed of less than 20 miles per hour. The distinction between such interurban railways and those in the miscellaneous group is necessarily more or less arbitrary. Several of the companies in the miscellaneous group operated at least part of their trackage in such a way as to conform to the criteria indicated for fast, long interurban lines. This is notably the case with the Detroit United Railway Company, which yet carries the greater proportion of its passengers wholly within the limits of the city of Detroit, thus rendering the statistics of its total business quite incomparable with those of more strictly interurban lines. Group 6, the miscellaneous interurban class, includes on the one hand such cases as the Detroit United Railway Company, and the Boston and Northern Street Railway Company which serves several of the large cities of eastern Massachusetts, and, on the other hand, many small railways connecting mere villages, or operated in connection with summer resorts. It thus represents such widely varying conditions that the totals are less significant than in the case of any of the other groups.

CHAPTER II.

COMPARISON WITH CENSUS OF 1890.

Difficulty of comparison.—Comparisons between the statistics of street railways for 1890 and 1902 must be made with great caution. In 1890 only 706 out of the 789 street railways in the country made reports to the Census Office. The figures of trackage, cost of construction, number of cars, number of employees, and number of passengers for the remaining 83 companies were either obtained from outside sources or were estimated. The figures thus secured from sources other than certified returns constitute from 4.20 to 10.36 per cent of the totals for the respective items mentioned. The returns of earnings and expenditures and of car mileage were incomplete, even for many of the companies which reported fully other statistics; but these items were not supplemented by estimates, so that the figures given as totals represent from 10 to 20 per cent less than the actual totals for all companies. The degree of error in the statistics of 1890 is more fully discussed in connection with the analysis of the data on each subject. The returns for 1902 were much more nearly complete, as all but two companies covered by the statistics furnished certified returns, and in most cases all inquiries in the schedule were answered.

Comparative summary.—Table 1 contains a summary of the more comparable statistics for all street railways at the censuses of 1890 and 1902, together with the percentages of increase.

TABLE 1.—*Comparative summary: 1902 and 1890.*

	1902	1890	Percentage of increase.
Number of companies, operating and lessor	987	789	25.1
Length of line, miles[1]	16,651.58	5,783.47	187.9
Length of track, miles[1]	22,576.99	8,123.02	177.9
Cost of construction and equipment	$2,167,634,077	$389,357,289	456.7
Number of employees	140,769	70,764	98.9
Number of passenger cars	60,290	32,505	85.5
Number of fare passengers	4,774,211,904	2,023,010,202	136.0
Fare passengers per mile of track	[2]212,217	249,047	[3]14.8
Ratio of operating expenses to operating earnings for companies reporting, per cent	57.5	68.4	.....

[1] By "length of line," as used throughout this report, is meant length of first main track or of roadbed. By "length of track" is meant total length of all trackage, including sidings. Thus, in the case of a double track road, "length of track" would be double "length of line."
[2] Exclusive of trackage of two railways carrying freight only.
[3] Decrease.

The 1902 figures include, for cost of construction and equipment, 967 out of 987 operating and lessor companies, while of the 817 operating companies, 797 reported the number of employees, 811 the number of fare passengers, and 799 earnings and expenses. The figures for 1890, except as to ratio of expenses to earnings, cover all companies, though some of them are based partly on estimates.

The contributions of the different sections of the country to the development of the street railway industry are indicated in the following table:

TABLE 2.—COMPARATIVE SUMMARY, BY GEOGRAPHIC DIVISIONS: 1902 AND 1890.

DIVISION.	Year.	Length of track, miles.	LENGTH OF LINE, MILES.					Number of passenger cars.	Number of fare passengers carried.	Total cost.	Number of employees.
			Total.	Electric.	Animal.	Cable.	Steam.				
United States	1902	22,576.99	16,651.58	16,230.62	195.21	113.93	111.82	60,290	[1]4,774,211,904	[1]$2,167,634,077	[1]140,769
	1890	8,123.02	5,783.47	914.25	4,061.94	283.22	524.06	32,505	2,023,010,202	389,357,289	70,764
Increase	.....	14,453.97	10,868.11	15,316.37	[2]3,866.73	[2]169.29	[2]412.24	27,785	2,751,201,702	1,778,276,788	70,005
Percentage of increase	.....	177.9	187.9	1,675.3	[2]95.2	[2]59.8	[2]78.7	85.5	136.0	456.7	98.9
North Atlantic	1902	10,164.89	7,702.22	7,579.01	66.02	5.50	51.69	31,319	2,618,528,979	1,088,932,237	75,928
	1890	2,951.85	2,063.94	278.22	1,658.51	47.27	84.94	14,651	1,141,187,460	199,404,200	37,412
Increase	.....	7,213.04	5,638.28	7,305.79	[2]1,592.49	[2]41.77	[2]33.25	16,668	1,477,341,519	889,528,037	38,516
Percentage of increase	.....	244.4	273.2	2,674.0	[2]96.0	[2]88.4	[2]39.1	113.8	129.5	446.1	103.0
South Atlantic	1902	1,670.15	1,195.29	1,182.04	13.25	.....	.....	4,290	297,198,541	162,507,589	9,839
	1890	611.96	465.93	83.58	307.49	3.70	71.16	1,702	101,647,174	16,125,671	4,139
Increase	.....	1,058.19	729.36	1,098.46	[2]294.24	[2]3.70	[2]71.16	2,588	195,551,367	146,381,918	5,700
Percentage of increase	.....	172.9	156.5	1,314.3	[2]95.7	[2]100.0	[2]100.0	152.1	192.4	907.8	137.7
North Central	1902	7,815.32	5,631.59	5,524.28	50.91	56.40	.....	18,643	1,344,000,951	705,553,933	39,405
	1890	2,753.57	1,867.93	384.56	1,229.90	129.69	123.78	11,335	538,309,887	110,741,609	20,314
Increase	.....	5,061.75	3,763.66	5,139.72	[2]1,178.99	[2]78.29	[2]123.78	7,308	805,691,064	594,812,324	19,091
Percentage of increase	.....	183.8	201.5	1,336.5	[2]95.9	[2]56.5	[2]100.0	64.5	149.7	537.1	94.0
South Central	1902	1,322.45	1,007.10	959.45	17.75	.90	29.00	3,007	210,103,861	87,294,862	6,731
	1890	968.67	773.05	81.63	559.83	.....	131.59	2,342	98,005,026	24,602,138	3,830
Increase	.....	353.78	234.05	877.82	[2]542.08	.90	[2]102.59	665	112,098,835	62,692,724	2,901
Percentage of increase	.....	36.5	30.3	1,075.4	[2]96.8	.....	[2]78.0	28.4	114.4	254.8	75.7
Western	1902	1,604.18	1,115.38	985.84	47.28	51.13	31.13	3,031	304,379,572	123,345,456	8,866
	1890	836.97	612.62	91.26	306.21	102.56	112.59	2,475	143,860,655	38,483,671	5,069
Increase	.....	767.21	502.76	894.58	[2]258.93	[2]51.43	[2]81.46	556	160,518,917	84,861,785	3,797
Percentage of increase	.....	91.7	82.1	980.2	[2]84.6	[2]50.1	[2]72.4	22.5	111.6	220.5	74.9

[1] Of the 987 companies, 967 reported the cost of construction and equipment; while of the 817 operating companies, 797 reported the number of employees and 811 the number of fare passengers carried.
[2] Decrease.

Number of companies.—There were 789 operating and lessor companies in existence at the census of 1890 and 987 in 1902. Of the 706 companies which actually reported in 1890, 681 were in independent operation and only 25 were leased, 5 of the latter reporting their operations separately. At the present time the method of combination by lease, which usually means virtually the absorption of the lessor company, has been extensively adopted. Only 817 of the companies reporting in 1902 were operating companies. Moreover, in several cases, these include companies which were really, by ownership or lease, controlled by other companies, although they made distinct reports to the present census. The number of companies having actual independence of control is, therefore, even smaller than appears from the returns. For instance, 11 companies in the District of Columbia and the adjacent parts of Maryland made separate returns, although all are controlled by a single company.

The small increase in the number of operating companies since 1890 is explained by the fact that railways formerly separate have been merged into systems, a process which is more fully described in Part I, Chapter VIII. As a matter of fact, a considerable number of these merged railways, aside from those held under lease, still continue to maintain a separate corporate existence, being controlled by ownership of their stock, so that the aggregate number of actual street railway corporations at present is considerably greater than appears from the statistics. Where, however, these merged companies have ceased to report operations separately they have not been counted.

Although some railways in small towns, especially in Western states where they were constructed in connection with temporary "booms," have ceased to operate since 1890, a much larger number of new street railways have been constructed. It is impossible, however, to determine by the dates of the charters of the present companies the number of railways established since 1890, since in many cases the companies now in operation are merely reorganizations or combinations of earlier companies.

The combination of street railways has greatly increased the size of many operating railway companies. Moreover, many railways which have not undergone consolidation have extended their tracks very materially since 1890. The difference in the importance of the average railway company at the two census periods may be seen from Table 3, which is based on the number of operating companies.

TABLE 3.—*Comparative size of operating companies: 1902 and 1890.*[1]

	AVERAGE PER OPERATING COMPANY.	
	1902	1890
Length of track, miles	27.63	10.56
Number of passenger cars	74	42
Number of fare passengers carried	5,886,821	2,630,702
Number of employees	177	92

[1] The number of operating companies in 1890 was 769 and this number is used in all the computations. In 1902, 817 companies reported trackage and cars, 811 fare passengers, and 797 number of employees, and these numbers have been used respectively.

These figures indicate that the average operating company in 1902 was more than twice as important in both trackage and traffic as the average operating company in 1890.

Trackage and motive power.—As will be seen from Table 1 the increase in the length of line of street railways in 1902, as compared with 1890, is 10,868.11 miles, or 187.9 per cent, and the increase in the length of track is 14,453.97 miles, or 177.9 per cent. By length of line is meant the length of the first main track exclusive of second track and sidings. The length of all track is a more valuable basis for comparison. Double tracks for cars operating in opposite directions cost nearly twice as much, and have nearly twice as great maximum traffic capacity, as a single track with short sidings for cars to pass. In some cities the track used by cars running in one direction occupies one street, while the corresponding track for cars in the opposite direction occupies a parallel street. This is particularly true of Philadelphia, because of its narrow streets. The length of line in such case is double that which would be reported if the two tracks had been laid side by side in a single street, yet the traffic capacity is practically the same.

The fact that the length of line has increased more rapidly than the length of track is due to the recent large extension of street railways in small towns and rural districts. Railways so situated have usually only a single track, while the dense traffic of the large cities, to which the street railways of 1890 were mostly confined, requires double tracks in most instances. In 1880 the length of line of street railways in the United States was 2,050.16 miles, or a little less than one-eighth as great as in 1902.

Table 2 shows that the increase in trackage since 1890 has been largest, 244.4 per cent, in the North Atlantic states, notwithstanding the comparatively high development of street railways in the cities of that division in 1890. A great part of this increase is due to the

extensive construction of interurban railways. The ratio of increase in trackage is least in the South Central states, where the railways are, for the most part, still confined to a few leading cities.

The most striking feature of the street railway development since 1890 has been the replacement of other methods of traction by electricity. The great majority of the companies which used other power in 1890 have since changed to electric power, while practically no new street railways have been constructed which use any other form of traction. Even since the time covered by the present investigation this change has rapidly progressed. The elevated railways in New York city, which used steam up to 1902 and during a portion of that year, and a part of the trackage operated by animal power in that city, have since been equipped for electric traction.

The following table shows the number of miles of track in the United States in 1890 and 1902, grouped according to the character of the motive power. Elevated railways are not separately presented, as in later tables, since this distinction was not made in the statistics of track given by the census of 1890; their trackage is included with that operated by steam and electricity, respectively.

TABLE 4.—*Comparative summary of track mileage, classified according to motive power: 1902 and 1890.*

CHARACTER OF POWER.	Miles of track, 1902.	Miles of track, 1890.	Percentage of increase.
United States	22,576.99	8,123.02	177.9
Electric	[1] 21,907.59	1,261.97	1,636.0
Animal	259.10	5,661.44	[2] 95.4
Cable	210.69	488.31	[2] 50.7
Steam	169.61	711.30	[2] 76.2

[1] Includes 6.06 miles operated by compressed air.
[2] Decrease.

In 1890 the trackage operated by electric power was less than one-sixth of the total, while in 1902 it had increased to 97 per cent, the track mileage thus operated increasing from 1,261.97 miles to 21,907.59 miles. In 1890 horses or mules were used to haul cars on more than two-thirds of the total track, but in 1902 while 67 companies still used animal power wholly or in part only on 1.1 per cent of the trackage was such power used. The mileage operated by cable decreased 50.7 per cent and that operated by steam 76.2 per cent. It is understood that since the date of the census inquiry the small amount of trackage operated by compressed air has been equipped with electric power.

It is not possible to make an exact comparison of the number of companies using each class of power in 1890 and 1902, as in the former year many companies did not submit individual reports. Of the 686 operating companies which did report in 1890 (counting 5 lessor companies which operated separately), 126 used electric power wholly or in part, 506 animal power, 55 cable power, and 74 steam power. Of the 817 operating companies in 1902, 747 used electric power wholly or in part, 67 animal power, 26 cable power (including inclined planes), and 9 steam power.

Cost of construction.—For reasons more fully set forth on page 47, the figures for cost of construction as returned by the street railway companies in 1890 can not be considered as in any sense representing the actual amount of cash put into the physical properties. This is even more the case in 1902. Aside from the fact that part of the cost in 1890 was based on census estimates only, the cost of construction, as reported by the companies themselves at both censuses, represented, in many instances, merely the amount of cash or the amount of securities which had been paid for the purchase of a railway or railways already long in operation. The purchase price in such a case is naturally based on earning capacity and not on the original cost of construction or the cost of duplication. The apparent percentage of increase in this item since 1890, 456.7 per cent, can therefore be considered as of only slight significance.

Number of employees.—The reported number of salaried employees and wage-earners on street and electric railways (4.23 per cent of the number in 1890 being estimated or obtained from indirect sources) increased 98.9 per cent during the interval between the two census investigations. The actual increase was probably somewhat greater since 20 companies, with a trackage of 417.03 miles, did not report this item in 1902. Moreover, at the census of 1890, report was made of the average number of employees for the time during which each street railway was in operation. Since at that time there were many roads which had only recently begun operation and which reported for less than an entire year, the total number of employees reported in 1890 was somewhat greater than the number which would have been necessary to conduct an equal amount of business if distributed throughout an entire year in every case. In the present investigation, as more fully explained in Twelfth Census, Volume VII, Manufactures, page lxi, the effort has been made to ascertain what would be the average number of employees, on the assumption of twelve months of operation.

The returns indicate that the number of employees at present bears a considerably smaller ratio to the number of passengers carried than was the case in 1890, and this is doubtless true, though the disparity is exaggerated by the statistics.

Number of cars.—The necessary limit to the size of cars when horses were employed has been greatly extended by the introduction of electricity. The consequent increase in the average size of cars is presumably one cause of the fact that the total number of passenger cars was only 85.5 per cent greater in 1902 than in 1890, despite an increase of 136.0 per cent in the number of passengers carried. The proportion of

passenger mileage (by which is meant the total distance covered by all passengers) to the number of cars owned has increased in still larger measure. In Part II, Chapter III, will be found detailed information regarding the development of cars and the size of the cars at present accepted as standards in the leading cities.

Traffic.—The number of fare passengers reported for street and electric railways rose from 2,023,010,202 in 1890 to 4,774,211,904 in 1902. In 1890, 5.13 per cent of the passengers were estimated or ascertained from unofficial sources, while the figures for 1902 cover 811 out of 817 operating companies.

No separate return of transfer passengers was made in 1890 and, generally speaking, the statistics were based on the number of fare passengers although, in some instances, apparently, the total of fare and transfer passengers was reported and included in the United States total. As a matter of fact, the total number of transfer passengers in 1890 is known to have been comparatively small, while in 1902 the number of passengers carried on free transfers was no less than 1,062,403,392. Where, as in Philadelphia, a charge is made for a transfer, the passenger is counted as a fare passenger.

The actual increase in the number of fare passengers was slightly greater than appears from the figures, since the statistics of 1890, even those based on certified returns, included estimates on the basis of twelve months of operation for those roads operating less than the entire year, while for part-time railways at the present census only the actual number of passengers carried is stated.

At first glance it seems surprising that the average number of fare passengers carried per mile of single track should be considerably less in 1902 than in 1890, the figures being, respectively, 212,217 and 249,047. If, however, the number of transfer passengers could be added to the number of fare passengers, the density of traffic per mile of track would probably appear somewhat greater in 1902 than in 1890. It is well known that the traffic on the leading street railways in the more thickly populated parts of our great cities has become much more dense than ever before. The explanation of the decline in the average number of fare passengers per mile of track is found in the increased length of rides taken by passengers, both in the large cities and on interurban roads—an increase partly attributable to the greater use of transfers—and in the construction of electric railways in small towns, suburban areas, and rural districts, where the number of passengers per mile of track is low. In 1890 the street railways were mainly confined to the large cities and to the more densely populated parts of those cities. Year by year urban railways, with the higher speed which electric traction has made possible, have been able to extend their tracks farther out and to offer longer journeys to their patrons. The average length of ride on the new interurban railways is also much greater than on railways within city limits. It is quite probable that, taking all street railways together, the passenger mileage, or number of passengers carried 1 mile, per mile of track operated, is larger to-day than it was in 1890, but statistics on this subject are wholly lacking.

The increase of traffic in the different sections of the country, as may be seen from Table 2, does not correspond closely with the increase in trackage. In those sections where, on account of the development of interurban railways, the trackage has been extended most markedly, the number of passengers has naturally risen with less rapidity. Thus, in the North Atlantic section, which shows the greatest addition to trackage, the number of passengers carried increased only 129.5 per cent. The most remarkable augmentation of traffic is in the South Atlantic states, 192.4 per cent. In view of the small increase of track in the South Central states, the fact that 114.4 per cent more passengers were carried in 1902 than in 1890 is striking.

Traffic in relation to population.—Table 5 shows for the country as a whole and its grand divisions the relation between street railway traffic and population at the two census periods.

TABLE 5.—*Relation of traffic to population by geographic divisions: 1902 and 1890.*

DIVISION.	Year.	POPULATION.[1]		Total number of fare passengers carried.	AVERAGE NUMBER OF RIDES PER INHABITANT.	
		Total.	Urban (in places of 4,000 and over).		Total.	Urban.
United States..	1902	75,994,575	28,372,392	4,774,211,904	63	168
	1890	62,947,714	20,745,974	2,023,010,202	32	98
Increase...	.....	13,046,861	7,626,418	2,751,201,702	31	70
North Atlantic..	1902	21,046,695	13,613,736	2,618,528,979	124	192
	1890	17,406,969	10,071,957	1,141,187,460	66	113
Increase...	.....	3,639,726	3,541,779	1,477,341,519	58	79
South Atlantic..	1902	10,443,480	2,049,520	297,198,541	28	145
	1890	8,857,922	1,554,190	101,647,174	11	65
Increase...	.....	1,585,558	495,330	195,551,367	17	80
North Central...	1902	26,333,004	9,343,213	1,344,000,951	51	144
	1890	22,410,417	6,744,936	538,309,887	24	80
Increase...	.....	3,922,587	2,598,277	805,691,064	27	64
South Central...	1902	14,080,047	1,896,655	210,103,861	15	111
	1890	11,170,137	1,339,232	98,005,026	9	73
Increase...	.....	2,909,910	557,423	112,098,835	6	38
Western.....	1902	4,091,349	1,469,268	304,379,572	74	207
	1890	3,102,269	1,035,659	143,860,655	46	139
Increase...	.....	989,080	433,609	160,518,917	28	68

[1] Population shown is that reported at the census of 1900.

Taking the population as determined by the census of 1900 for comparison with the statistics of traffic for 1902, the average number of rides per inhabitant is 63, as compared with 32 in 1890. To correct the computation for the present census in a rough manner, it may be assumed that during the one and one-half years from

the date of the population census to the middle of the year covered by the statistics of street railways, the population increased at the same ratio as from 1890 to 1900. On this basis the population at the beginning of 1902 would have been somewhat more than 78,300,000, and the average number of rides per inhabitant would be about 61. These figures indicate the great increase in the importance of the street railway as a factor in the life of the people. The table shows very wide differences between the sections of the country in the ratio of rides to total population, as might be expected from the great differences in the proportion of urban population. The South Atlantic states present the greatest percentage of increase in the number of rides per inhabitant, but the patronage of street railways there is still less than one-fourth as great as in the North Atlantic states.

Urban population and the number of street railway passengers are somewhat less closely related at present than in 1890, because of the recent extension of electric railways into rural districts. Nevertheless, more than nine-tenths of the passengers are probably still carried within urban areas, and comparison with urban population will give a much truer idea of the significance of street railway service to the people than comparison with the total population. On the basis of the population census of 1900, the number of street railway rides in 1902 was equal to 168 for every inhabitant of urban areas of 4,000 population and over, as compared with 98 in 1890. If the population of urban centers at the beginning of 1902 be roughly estimated, the average number of rides per urban inhabitant would be reduced to approximately 160 (calculating the increase in urban population for one and one-half years at the same ratio as from 1890 to 1900). Even thus it is seen that there has been a remarkable increase in the patronage of street railways by urban dwellers. Among the causes of this increase may be mentioned the construction of railways in urban communities where they were formerly lacking; the growth in geographic area covered by the larger cities, necessitating more extensive resort to street railway transportation; and the improved character of the service. The ratio of passengers to urban population is now highest in the Western states, next in the North Atlantic states, and lowest in the South Central states. The increase in the number of rides per urban inhabitant has been most marked in the South Atlantic states.

A comparison of the street railway traffic with the population of individual urban centers of more than 100,000 inhabitants for the censuses of 1890 and 1902 is presented elsewhere (page 24).

Car mileage.—The number of miles run by passenger cars on street and interurban railways in 1902 was 1,120,101,944. The report of passenger car mileage in 1890, 383,178,085 miles, did not cover the entire number of street railways in operation. The length of line of the railways for which the 1890 figures were reported was 4,375.81 miles out of a total of 5,783.47 miles. Most of the companies which failed to report car mileage, however, were those with light traffic. The number of passengers carried by companies reporting car mileage in 1890 was 1,775,174,685, or 87.7 per cent of the entire number of passengers for all street railways. If it be assumed that the car mileage represented the same proportion of the total car mileage for all street railways, the increase in car mileage from 1890 to 1902 would be about 155 per cent. Presumably, however, the car mileage reported in 1890 was a somewhat smaller proportion of the total car mileage than the proportion which passengers carried by companies reporting car mileage was of the total number of passengers, so that the actual increase in car mileage may have been slightly less.

The average number of fare passengers per passenger car mile has decreased slightly. Those companies which reported in full both passengers and car mileage in 1890 carried on the average 4.63 passengers per car mile. The railways which did not report car mileage were, for the most part, newer lines with light traffic, and it is possible that if their returns had been secured they would have served to reduce the average number of passengers per car mile for 1890 more nearly to the figure for 1902, which was 4.26. Since street cars are now of much larger size than in 1890, and are probably quite as crowded, the decrease in the number of passengers per car mile is doubtless due chiefly to the fact that the average ride is longer than formerly, and that the street railway service has been extended to areas where the density of the traffic is comparatively low.

Receipts and expenditures.—The total operating earnings for companies reporting earnings in 1890 were $90,617,211. On the assumption of a 5-cent fare, which is a trifle more than the average for companies which reported both passengers and earnings, the passenger earnings ($89,711,829) would represent 1,794,236,580 passengers, or not quite nine-tenths of the number carried by all street railways in that year. The operating earnings of all street railways in 1890 were probably, therefore, in the neighborhood of $100,000,000, as compared with $247,553,999 for the 799 operating companies which reported this item in 1902.

The operating expenditures reported for 1890, representing the same companies which reported operating earnings, amounted to $62,011,185, as compared with $142,312,597 in 1902. Of the reported earnings from operation in 1890, 99 per cent consisted of the receipts from passengers. In 1902, on the other hand, passenger earnings were only 94.5 per cent of the total receipts. There has been a great increase in the revenue derived by street railway companies from the sale of electric current, from freight, mail, and express service, and from advertising.

A comparison of the ratio of operating expenses to receipts for the two census periods can be made with approximate accuracy, since the companies reporting

these items were fairly typical of the street railway business generally at both censuses. Such a comparison shows an extremely interesting change. In 1890 the operating expenses reported were equal to 68.4 per cent of the operating receipts, while in 1902 the corresponding proportion was only 57.5 per cent. The street railways which in 1890 operated exclusively by animal power, and which were at that time much the most important group, showed a ratio of operating expenses to earnings of 73.7 per cent. The great reduction in the ratio of expenses to earnings is not due to an increase in the number of passengers carried per mile of track or per car mile, but is chiefly attributable to the economy of operation which has resulted from the introduction of electric traction. The increase in the size of cars and other less important changes in methods have also contributed to lessen expenses. While current expenses have thus been materially reduced in proportion to the traffic, it must be remembered that the fixed charges of street railways have been augmented, for in large measure this economy of operation has been made possible only through larger, though not necessarily proportionately larger, investment of capital.

Distribution of income.—The following table shows the distribution of gross income of street railway companies to different purposes in 1890 and 1902. Since the financial statistics of both censuses, particularly those for 1890, omitted some of the companies, the absolute figures should not be compared, but the proportions which the items bear in each case to the total represent fairly the financial operations of street railways in general at the respective periods.

TABLE 6.—*Distribution of the gross income of operating companies to leading items of expenditure: 1902 and 1890.*

	AMOUNT.		PERCENTAGE.	
	1902[1]	1890	1902	1890
Gross income from all sources	$250,504,627	$91,721,845	100.0	100.0
Operating expenses	142,312,597	62,011,185	56.8	67.6
Fixed charges, total	77,595,053	13,978,903	31.0	15.2
Taxes and licenses	13,078,899	3,308,190	5.2	3.6
Rentals	25,518,225	2,561,343	10.2	2.8
Interest	38,085,911	8,086,216	15.2	8.8
Miscellaneous	912,018	23,154	0.4	(2)
Dividends	15,882,110	10,180,726	6.3	11.1
Miscellaneous payments	.....	1,217,193	.....	1.3
Surplus	14,714,867	4,333,838	5.9	4.8

[1] Not including 18 companies with a trackage of 378.90 miles.
[2] Less than one-tenth of 1 per cent.

Aside from the relative decrease in operating expenses, already discussed, the more conspicuous changes since 1890, shown by this table, are the great increase in the proportion of total income devoted to taxes, to rentals of leased lines, and to interest on debt. The dividends paid by operating companies were a smaller proportion of their income in 1902 than in 1890. In 1890 the amount paid as interest by such companies was only four-fifths as great as the amount paid in dividends, while in 1902 it was more than twice as great. A comparison of the distribution of income, based on the returns of lessor as well as of operating companies, can not be made because no separate returns of lessor companies were made in 1890.

Capital stock and funded debt.—The statistics of the capitalization of street railways in 1890 were not complete. The length of line for companies reporting both trackage and capitalization at that census was 4,542.88 miles, or 78.5 per cent of the total mileage. The capital stock of these companies amounted to $272,441,843 and their funded debt to $176,611,826. The returns for 1902, which are essentially complete, show capital stock of $1,315,572,960 and funded debt of $992,709,139. The length of line in 1902 being 16,651.58 miles, it will be observed that the capitalization has increased much faster than the mileage.

The average total capital liabilities per mile of line in 1890 for companies reporting capitalization were $98,848. In 1902 the capital liabilities, not deducting that part of the capital stock and funded debt which is represented by investments in securities or nonrailway property, but excluding about 50 miles of line leased from steam railroads, amounted to $139,778 per mile of line. The comparison, based on length of line rather than on length of track, is necessarily imperfect, but the figures on the basis of trackage are not available in the census of 1890. Some of the reasons why an increase of capitalization per mile should be expected are mentioned in Part I, Chapter IV. It is evident that the track, the power plant, and the equipment of a modern electric railway must cost much more than the old-fashioned horse car track and its equipment. The increase in funded debt since 1890 has been more than in proportion to the increase in capital stock. Capital stock constituted 60.7 per cent of the total capital liability reported in 1890 and 57 per cent of the total in 1902.

CHAPTER III.

TRAFFIC.

I.

TRAFFIC OF COMPANIES, CLASSIFIED ACCORDING TO POWER.

From the standpoint of the public welfare the most important information regarding street and electric railways is that which has to do with their traffic.

The details of traffic on each street and electric railway of the country are shown in Table 97, which also presents the totals for each state. The operations of 813 out of 817 operating companies, representing all but 57.29 miles of the trackage, or about 99.8 per cent of the total, are included in this table. Four companies failed to furnish information regarding traffic. As shown in footnotes, moreover, a number of other companies furnished incomplete returns, and therefore the figures for passengers carried and car mileage have been estimated when necessary, on the basis of other data in the returns or of unofficial information. Two of the 813 companies included in the table handle freight business only.

The totals of the more important items for the United States as a whole are presented in Table 7, which also groups the statistics according to the kind of power and character of service, as explained in Chapter I. It will be remembered that a considerable number of companies classed as electric surface lines operate in part by animal or cable power or on elevated tracks. It should be noted also that the distinction between electric lines which operate lighting plants and those which do not operate them is of much less significance in connection with traffic statistics, as in this table, than in connection with those for finances.

TABLE 7.—TRAFFIC OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric, elevated.	Cable, surface and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time only.				
Number of companies	[2] 813	570	112	57	52	5	14	3
Fare passengers	4,774,211,904	4,062,447,908	365,833,612	37,738,491	33,556,832	315,105,775	19,359,341	169,945
Transfer passengers	1,062,403,392	994,946,863	48,099,978	2,327,853	11,978,789	.....	5,049,909	.....
Fare passengers per mile of track constructed	[3] 212,217	216,365	124,304	46,404	214,943	1,381,437	584,698	14,092
Passenger-car miles	1,120,101,944	942,021,415	84,173,113	12,810,588	5,648,107	72,226,315	3,142,756	79,650
Fare passengers per passenger car mile	4.26	4.31	3.63	2.95	5.94	4.36	6.16	2.13
Mileage of freight, mail, express, and miscellaneous cars	[4] 24,328,522	[5] 11,776,544	869,823	209,460	21,546	[6] 11,421,099	1,400	28,650
Total car miles	1,144,430,466	953,797,959	85,042,936	13,020,048	5,669,653	83,647,414	3,144,156	108,300
Car miles per mile of track constructed	50,820	50,737	34,565	15,665	36,316	366,714	94,961	8,980
Accidents:								
Persons killed	1,217	1,059	105	21	6	25	1	.....
Persons injured	47,429	42,740	4,198	242	18	157	74	.....

[1] Exclusive of reports for 4 companies which failed to furnish this information.
[2] Includes 2 railways carrying freight only.
[3] Exclusive of trackage of 2 railways carrying freight only.
[4] Includes 15,201,575 car miles run by locomotives on Brooklyn Rapid Transit and Manhattan (elevated) railways.
[5] Includes 3,983,738 car miles run by locomotives on Brooklyn Rapid Transit Railway.
[6] Includes 11,217,837 car miles run by locomotives on Manhattan (elevated) Railway.

Number of passengers.—The entire number of fare passengers carried by the street and electric railways during the census year was 4,774,211,904. Of the companies reporting 57 were in operation less than the entire year. These companies, however, were of much less average importance than the full-time companies. Their trackage was only 4 per cent of the total for all companies, and the number of passengers carried by them, 37,738,491, was less than 1 per cent of the total number.

The relation between the number of passengers and the population of the country, both total and urban, has already been presented in connection with the comparison between 1890 and 1902.

The total number of free-transfer passengers carried in 1902 was 22.2 per cent as great as the number of fare passengers. Free-transfer passengers are not to be considered as constituting strictly an addition to the amount of street railway traffic. Of the 811 companies reporting, 408, or almost exactly one-half, grant free

transfers. The total number of transfer points reported is 4,455, an average of nearly 11 for each of the 408 companies.[1] In the few instances where a charge is made for transferring passengers they are counted as fare passengers.

The street railways of the United States carried in 1902 more than seven times as many fare passengers as the steam railways, which transported 649,878,505 persons during the year ending June 30, 1902; but such a comparison means little, since steam railway journeys average very much longer than those on street railways. The average distance traveled by passengers on steam railways is 30.3 miles.[2] Though no similar figures can be given for street railways, as they do not—and most of them could not—keep records of the distances traveled by their passengers, it is probable that the total distance traveled by passengers on the street railways is less than the total distance traveled by those on steam railways. Another view of the relative importance of passenger traffic on the two classes of railways may be gained by comparing their receipts from passengers. The steam railways in 1902 received $392,963,248 from passengers; the street railways, $233,821,548.

Railways which used electric power primarily and which operated chiefly on the surface, carried 92.3 per cent of the fare passengers of all street and electric lines. Though a considerable amount of animal, cable, and elevated trackage is included in this group, it is safe to assume that seven-eighths of the traffic of all the railways covered by the investigation is carried on surface tracks operated by electricity.

The electric lines which operate lighting plants in connection with their railway business, though they are one-fifth as numerous as those without lighting plants and operate more than one-eighth as much track, carried only one-thirteenth as many passengers in 1902. The reason for this condition lies in the fact that, as shown in Table 96, with a few exceptions, the electric railways which operate lighting plants are confined to small and medium-sized towns. The financial statistics show that of urban centers having more than 100,000 inhabitants, only Milwaukee, Toledo, and St. Joseph have railway companies which do a lighting business worthy of the name. There are economies in combining the two kinds of service in smaller towns which do not accrue in such large measure in great cities. In some cases, moreover, particularly in the larger cities, state or municipal law does not permit street railways to do a lighting business. Perhaps the most important reason why street railways in the largest cities do not operate lighting plants lies in the fact that electricity was commercially applied to the production of light before it was applied to street railways. Lighting plants were already established in many cities before the horse railways had begun to change to electric traction.

Of the other kinds of street and interurban railways those operating exclusively by animal power carried in 1902 only about two-thirds of 1 per cent of the fare passengers. The 5 strictly elevated railways carried about 6.6 per cent of the total number. Of the passengers on these elevated railways, the Manhattan Elevated Railway of New York carried about two-thirds. The 3 purely cable roads in San Francisco carried 15,562,352 passengers, and the 11 inclined-plane cable roads carried 3,796,989.

Density of traffic per mile of track.—No other single factor in street railway business exercises such a powerful influence upon its profitableness as the density of traffic. The number of passengers carried by each street railway per mile of track operated is shown in Table 97. The figures for each individual company are based on the total length of track operated by it, including in a number of cases a certain amount of track belonging to other companies and operated jointly under trackage rights. From the standpoint of the individual railway this method gives a more correct basis for calculating the density of its traffic than a computation based on the trackage owned or leased by the company for its exclusive use, for the operating expenses include those incurred upon the tracks used under trackage rights, and the payment to other companies for such use is virtually equivalent to a fixed charge on part of the capital invested in the tracks so operated. The mileage basis used in computing the density of traffic for the United States and for the separate states and groups of companies is the mileage of track constructed, regardless of the question whether any part of such track is operated by more than one company.

The number of passengers per mile of track for the country as a whole is 212,217. If only companies operating the entire year be considered, the number of passengers carried per mile of track is 218,616. This number is independent of the length of journeys, and of course does not represent the number of persons who actually pass over a given length of street railway track during the year. The average density of traffic on electric railways which furnish commercial lighting is less than three-fifths as great as on other electric railways. This results naturally from the fact that the railways furnishing commercial lighting are mainly in the smaller towns of the country. The average density for all full-time electric surface railways combined is 205,478 passengers per mile of track. The fact that roads operated exclusively by animal power show a still greater density of traffic is due to the influence of the four horse car lines in New York city, which carried more than 90 per cent of the total number of passengers reported by the 52 exclusively horse roads in the United States. The average number of fare pas-

[1] For fuller discussion of the subject of transfers, see page 41.
[2] Report of Interstate Commerce Commission on Statistics of Railways, 1902.

sengers per mile of track owned on these four railways was 989,100. If, however, the mileage operated under trackage rights, which is largely owned by companies primarily electric, be included, the average number of fare passengers per mile of track was 693,923. The other 48 companies of this group, operating in very small towns that do not afford enough traffic to justify the installation of electricity, carried an average of only 24,523 passengers per mile.

It is also primarily because the elevated railways are situated in very large cities that they show a much greater density of traffic than the average for other classes of railways, 1,381,437 passengers per mile of track. Elevated roads perhaps have a somewhat greater possible carrying capacity than surface roads because of their large cars, long trains, and high speed. It may be noted, however, that the number of passengers per mile of track on the Manhattan Elevated Railway in New York city, 1,837,625, only slightly exceeds that on the Third Avenue and Interurban surface systems in that city, 1,612,630 and 1,434,088, respectively. But in making such comparisons it should be recalled that traffic on surface railways is probably somewhat more evenly distributed through the day than that on elevated railways, and also that the average ride on the elevated railways is considerably longer than on the surface lines in the same cities.

The density of traffic on the ordinary cable railways and the inclined plane cables is also high as compared with that of electric railways as a group. The three ordinary cable railways, all in San Francisco, show an average density of 564,877 per mile, which is twice as great as the average density for electric railways in cities of from 100,000 to 500,000 inhabitants. On account of the heavy initial investment required, cable railways are profitable only where traffic is very dense, and they do not, therefore, extend into suburban districts as electric lines do. The still higher density of traffic on inclined planes, 682,912 passengers per mile, is due to the fact that these lines are very short and that the passengers in most instances ride only a fraction of a mile. These inclined plane cables are built, in most cases, up the steep bluffs of river valleys, as, for instance, in Pittsburg.

Car mileage.—Statistics of car mileage are unsatisfactory because of the difference in the size of cars and in the conditions under which they are operated. Car mileage on a fast interurban railway, which runs cars 50 or 60 feet in length with 150-horsepower motors at an average speed of 20 miles per hour, means quite a different thing from that on a horse railway operating cars 16 feet long at an average speed of 5 or 6 miles per hour. The use of "trailers" is also a source of confusion in some cases. On important street railway lines in Chicago, Washington, and one or two other cities, from one to three trail cars are regularly attached to the power car, while on some other railways trailers are attached to cars during rush hours, either every day or occasionally. The practice of companies with regard to registration of car mileage where trailers are used is not uniform; sometimes the entire train is treated as the unit; sometimes the individual car. Thus one of the systems in Washington, D. C., uses the first basis for computing car mileage while the other system uses the second. In Chicago, where trailers are more extensively employed than in any other city, the mileage of each car in a train is counted. Where trailers are used the individual cars are usually comparatively small, and in some cases the entire train may carry few more passengers than an ordinary large single car on other urban railways. However, the use of trailers is not sufficiently common to affect materially the totals for groups of companies. The car mileage on the elevated railways represents single cars, but includes that of steam locomotives.

The total distance traversed by street and interurban railway cars, including steam locomotives on elevated roads, in 1902 was 1,144,430,466 miles, or more than 45,000 times the circumference of the earth. About 92 per cent of this mileage was upon railways operating wholly or chiefly by electric traction, and on the surface of the street. Further, the car mileage per mile of track constructed for the country, as a whole, was 50,820. In other words, each mile of track in the country was traversed by an average of 50,820 cars during the year, or 139 cars each day. There is a wide range in the number of car miles per mile of track upon different railways, as is seen in the statistics of companies classified according to population.

On elevated railways each mile of track was traversed on an average by 366,714 cars a year or 1,005 a day. On these railways, cars are usually run in trains of from 3 to 6 cars. The number of car miles per mile of track on the three ordinary cable railways was 103,676; on inclined planes it was 51,776.

The distance traveled over all street and interurban railways by express, mail, freight, work, and miscellaneous cars was 9,126,947 miles in 1902, or less than 0.8 per cent of the total car mileage. The mileage of such miscellaneous cars on elevated, cable, and horse railways is insignificant. The travel of steam locomotives on the elevated railways amounted to 15,201,575 miles. A considerable proportion of the express, mail, and freight traffic is handled on passenger cars, but reference to the statistics of street railway receipts shows that the income from these classes of traffic amounts to only about three-fourths of 1 per cent of the total income of street and interurban railways.

Density of passenger traffic per car mile.—The ratio of the number of fare passengers to the number of car miles run has a very important bearing upon the prosperity of the street railway business. For the country as a whole the average number of fare passengers per

car mile in 1902 was 4.26, the cars running, therefore, on an average, nearly one-fourth of a mile for each fare collected. The figures for each company are given in Table 97. Differences in the size of cars and the length of rides on different railways and groups of railways render comparisons of the density of traffic per car mile misleading, unless the local conditions are thoroughly known. Where passengers ride long distances the number of passengers per car mile is proportionately reduced, and thus a street railway whose cars are always crowded may yet be less profitable than another with apparently lighter traffic, but whose passengers ride shorter distances.

In the absence of information as to the average length of rides, it is impossible to determine in what proportion the capacity of the street railway cars of the country, considered as a whole, is occupied. There are times of the day on most railways, particularly in large cities, when the cars are greatly overcrowded; but there are other times on many railways when the maintenance of a schedule considered satisfactory by the people means the operation of half-empty cars. Not infrequently a railway finds it advantageous to grant liberal transfer privileges, reduce fares, or extend the possible length of journey, in order that new traffic thus created may fill the cars which the regular patrons would in any event consider necessary to a satisfactory schedule. With slight qualifications it may be said that it costs no more to operate a car full than a car empty. When, however, increase of traffic thus secured involves a corresponding addition of cars to the schedule, the advantages to the railway company may disappear.

Though cars on elevated railways are considerably larger than those on ordinary surface lines, the average journey on the elevated is longer, so that the number of fare passengers per car mile is only a fraction greater on these railways than on the electric surface lines as a whole. Indeed, the number of fare passengers per car mile is less on the elevated railways than on the leading surface railways of the same cities. The Manhattan Elevated Railway, of New York, shows 4.78 fare passengers per passenger car mile as compared with 6.51 for the Interurban, and 6.59 for the Third Avenue line.

Similarly, though, the cars operated by animal power are smaller than those operated by electricity, the average ride on the horse car is so much shorter that the ratio of fare passengers to car mileage in New York city, where the greater part of the traffic is found, is higher on horse railways than on electric railways. Three of the 4 horsepower companies in New York city report more fare passengers per car mile than either of the 2 leading electric surface systems in Manhattan borough. A large proportion of the passengers who pay fares on these horse railways are transferred, without charge, to the electric lines. The railways operating by animal power outside of New York, however, have only 2.25 passengers per car mile, a figure which points to a very low rate of profit.

The 3 ordinary cable railways report 5.09, 5.10, and 5.79 passengers, respectively, per car mile. The rides on the inclined-plane cable railways are so short that they all present a very high ratio, the average being 13.26 fare passengers per car mile. The Monongahela Incline Plane Company, of Pittsburg, shows even 69.15 fare passengers per mile run.

Car hours.—Statistics for the number of hours during which street railway cars run are of significance, since in connection with the statistics of car mileage they show the average speed maintained. Moreover, the number of passengers per car hour is a datum which, to the street railway manager, should be scarcely second in interest to the number of passengers per car mile, since upon it largely depends the outlay for wages of motormen and conductors, as well as various other items of expense. Thus a railway which has fewer passengers per car mile than another may yet be more profitable, if each of its cars earns more fares within a given length of time.

Unfortunately, however, less than half the street railways of the country keep records of car hours. The total number of car hours reported in 1902 by the 390 companies which gave this information was 65,869,342. These companies carried 2,176,886,559 fare passengers; therefore, each car carried an average of 33.28 passengers per hour of operation. Most of the companies reporting car hours are operated by electricity. The 4 elevated railways in Chicago have from 43.21 to 56.93 passengers per car hour; these figures, as might be expected from the high speed of elevated trains, being considerably larger than for most surface railways in great cities.

Accidents.—The following table shows the figures for accidents on street railways. The details for each company are shown in Table 97.

TABLE 8.—*Accidents on street and electric railways: 1902.*[1]

	Persons killed.	Persons injured.
Total	[2]1,218	47,429
Passengers	265	26,690
Employees	122	3,699
Other persons	831	17,040

[1] Exclusive of 4 companies which failed to furnish information concerning accidents.

[2] One company, with 1,323 accidents, failed to distinguish those killed from those injured, and they are all included in the second column. Three companies, with 23 persons killed and 1,983 injured, reported accidents to passengers and employees under "other persons." One company, with 12 persons killed and 656 injured, reported "other persons" under passengers.

The returns show 1,218 persons killed and 47,429 injured by accidents on street railways. It is believed that the total for persons killed is essentially correct, but the reports of persons injured are known to vary in their completeness as between different companies,

according to the degree of injury deemed sufficient to justify recording. Some companies stated to the agents of the Bureau of the Census that their return of accidents included only injuries of a really serious character; while others asserted that it was impracticable for them to distinguish accurately between serious injuries and the many wholly unimportant accidents reported by conductors, and they, therefore, included all accidents in their report.

In another place will be found statistics showing the large amount of damages collected from railway companies and the large legal expenses incurred in connection with damage suits. It is asserted by the street railway companies that a large proportion of the claims made upon them for damages are altogether unwarranted or greatly exaggerated.

It is noteworthy that 831, or 68 per cent of the persons killed by the street railways, were neither passengers nor employees. The number of passengers killed was 1 for every 18,015,894 fare passengers carried; while 1 passenger was injured for every 178,876 fare passengers carried. The number of street railway employees killed was 122, or 1 out of 1,095 wage-earners employed (omitting officers and clerks). Injured employees numbered 1 for every 36.1 wage-earners. Corresponding proportions for steam railways in the year ending June 30, 1902, were 1 killed to 401, and 1 injured to 24 employed. The risk of accidental death to street railway employees is, therefore, apparently less than two-fifths as great as the risk to steam railway employees, and the risk of injury about two-thirds as great.

The following table shows the number of accidents in relation to the number of car miles operated, for the various groups of street railways as classified according to power:

TABLE 9.—*Accidents on railways, classified according to power: 1902.*[1]

CLASS OF RAILWAYS.	Persons killed.	Persons injured.	Number of car miles to each person killed.	Number of car miles to each person injured.
Electric, surface	1,185	47,180	887,646	22,295
Animal	6	18	944,992	314,981
Elevated	25	157	3,345,897	532,786
Cable, surface and inclined planes	1	74	3,144,156	42,489
Steam, surface	0	0	.....	.....

[1] Exclusive of reports for 4 companies which failed to furnish information regarding this item.

The total number of accidents, particularly those of a fatal character, is so small on the animal power, elevated, and cable railways that comparisons based on the returns of a single year have little value for general conclusions. On the face of the statistics it appears that the elevated railways are much less dangerous than the surface lines. The number of car miles run for each person killed on the elevated lines is 3,345,897, as compared with 887,646 for electric surface railways. Persons other than passengers and employees are not likely to be killed or injured on elevated railways, while such persons are probably less likely to suffer accidents from horse cars than from other surface cars. The number of persons injured but not killed is, according to the returns, much greater in proportion to the car mileage on electric and cable railways than on animal power and elevated roads.

Traffic by states in relation to population.—The statistics of traffic by states, as presented in Table 97, require no special comment. Comparisons among states are less significant than those among individual cities or groups of cities. It is interesting, however, to compare the amount of street railway traffic in the several states with their population, and more particularly with their urban population, in places of 4,000 inhabitants and over. These data, based on the population census of 1900, are presented in Table 10, which also shows the proportion of urban population to the total population for each state. Similar comparisons for the grand divisions of the country have already been presented in connection with the summary of statistics for 1890 and 1902.

The most important factor in determining the extent of street railway traffic in the different states is obviously the presence or absence of cities, and particularly of large cities. Thus the relative rank of the states in the proportion of street railway rides to total inhabitants corresponds quite closely with their rank as regards the proportion of urban to total population. The proportion of rides to the total population is greatest in the District of Columbia, where the whole population is urban, and is next greatest in Massachusetts, which ranks third among the states in respect to proportion of urban population, 86.9 per cent of all its inhabitants living in places of 4,000 inhabitants and over. In New York, which ranks fourth in the proportion of urban population, the number of rides per inhabitant is next to that for Massachusetts. There are 14 states in which more than 40 per cent of the population is urban; and all of these 14, except New Hampshire and Delaware, report more than 60 street railway rides per inhabitant. On the other hand, only 2 states that have an urban population less than 40 per cent of their total population, namely, Washington and Missouri, report more than 60 rides per inhabitant. There are 7 states and territories which show less than 10 street railway rides per inhabitant, and in no one of these, except Kansas, does the proportion of urban to total population exceed 12 per cent.

A comparison of the number of rides with the number of urban inhabitants in the several states gives some idea of the comparative extent to which street railways are developed, and also of the extent to which they are patronized by those within reach of their service. The number of rides and the number of

urban inhabitants are somewhat less closely related items in such states as Michigan, Ohio, and Indiana, where interurban railways have been developed very extensively, than in states like New York and Pennsylvania, where the great bulk of railway traffic is still confined to urban areas.

TABLE 10.—RELATION OF PASSENGER TRAFFIC TO TOTAL POPULATION AND URBAN POPULATION (PLACES OF 4,000 INHABITANTS OR OVER), BY STATES AND TERRITORIES: 1902.[1]

STATE OR TERRITORY.	Number of companies.	Population, 1900.	Total number of fare passengers carried, 1902.	Average number of rides per inhabitant.	Urban population (places of 4,000 inhabitants and over), 1900.	Ratio of urban to total population, percentage.	Average number of rides per urban inhabitant.
United States	811	75,994,575	4,774,211,904	63	28,372,392	38.0	168
Alabama	9	1,828,697	22,748,871	12	182,448	10.0	125
Arizona	2	122,931	797,970	6	13,075	10.6	61
Arkansas	7	1,311,564	6,880,479	5	90,396	6.9	76
California	35	1,485,053	182,196,999	123	726,655	48.9	251
Colorado	7	539,700	42,371,590	79	222,184	41.2	191
Connecticut	22	908,420	77,447,101	85	595,250	65.5	130
Delaware	3	184,735	9,956,559	54	76,508	41.4	130
District of Columbia	8	278,718	66,162,321	237	278,718	100.0	237
Florida	6	528,542	8,249,542	16	87,414	16.5	94
Georgia	10	2,216,331	32,463,851	15	308,687	13.9	105
Idaho	1	161,772	314,340	2	10,003	6.2	31
Illinois	49	4,821,550	463,190,986	96	2,460,143	51.0	188
Indiana	27	2,516,462	66,255,767	26	770,407	30.6	86
Iowa	22	2,231,853	38,559,589	17	456,479	20.5	84
Kansas	11	1,470,495	6,832,064	5	282,611	19.2	24
Kentucky	12	2,147,174	56,293,852	26	423,646	19.7	133
Louisiana	8	1,381,625	55,343,843	40	347,276	25.1	159
Maine	19	694,466	25,495,164	37	251,685	36.2	101
Maryland	10	1,188,044	99,989,552	84	572,795	48.2	175
Massachusetts	75	2,805,346	461,745,615	165	2,437,994	86.9	189
Michigan	24	2,420,982	113,916,992	47	900,556	37.2	126
Minnesota	5	1,751,394	73,236,612	42	542,251	31.0	135
Mississippi	5	1,551,270	3,101,015	2	82,099	5.3	38
Missouri	16	3,106,665	211,808,737	68	1,084,014	34.9	195
Montana	5	243,329	6,858,502	28	69,989	28.8	98
Nebraska	4	1,066,300	22,228,325	21	221,693	20.8	100
New Hampshire	7	411,588	11,304,908	27	192,240	46.7	59
New Jersey	26	1,883,669	188,976,899	100	1,272,259	67.5	149
New Mexico	1	195,310	73,000	37	11,841	6.1	6
New York	96	7,268,894	1,144,491,509	157	5,176,414	71.2	221
North Carolina	7	1,893,810	5,337,367	3	152,019	8.0	35
Ohio	63	4,157,545	285,434,579	69	1,864,519	44.8	153
Oregon	6	413,536	18,729,442	45	114,184	27.6	164
Pennsylvania	98	6,302,115	642,513,812	102	3,223,337	51.1	199
Rhode Island	8	428,556	62,279,165	145	392,509	91.6	159
South Carolina	7	1,340,316	9,056,818	7	157,111	11.7	58
Tennessee	8	2,020,616	35,697,835	18	285,886	14.1	125
Texas	17	3,048,710	30,037,966	10	454,926	14.9	66
Utah	3	276,749	11,493,501	42	81,480	29.4	141
Vermont	9	343,641	4,274,806	12	72,048	21.0	59
Virginia	20	1,854,184	44,275,661	24	305,229	16.5	145
Washington	8	518,103	41,544,228	80	188,750	36.4	220
West Virginia	8	958,800	21,706,870	23	111,039	11.6	195
Wisconsin	17	2,069,042	62,537,300	30	714,556	34.5	88

[1] Exclusive of reports for 6 companies, with a trackage of 80.14 miles, distributed as follows: Colorado, 4.08 miles; Connecticut, 1.36 miles; Illinois, 21.49 miles; Kansas, 39 miles; South Dakota, 2 miles; and Virginia, 12.21 miles.

States having one or two very large cities may be expected to show a higher proportion of rides to urban inhabitants than states which have an equally large percentage of urban population scattered in smaller towns. Thus, in California, which has the highest proportion of rides to urban population (251), the cause is found in the fact that a large proportion of the street railway trackage is in San Francisco, whose hilly streets compel general resort to this method of travel. New York, with her enormous metropolis, ranks third in the ratio of passengers to urban population. The steep streets of the cities in Washington account in part for the high ratio of rides to urban inhabitants in that state. The other states which show more than 150 rides per urban inhabitant are, in the order named: District of Columbia, Pennsylvania, Missouri, West Virginia, Colorado, Massachusetts, Illinois, Maryland, Oregon, Louisiana, Rhode Island, and Ohio.

Only 5 states report fewer than 50 rides per urban inhabitant, and in none of these except Kansas is there a city of more than 25,000 population. The report of the total number of rides for Kansas is quite misleading, since the passengers belonging to Kansas City, Kans., and smaller adjacent towns are included in the returns of the Metropolitan Street Railway, of Kansas City, Missouri.

II.

TRAFFIC OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION.

Table 11 is a summary of the most important items relating to traffic for street and electric railways as classified on the second basis described in Chapter I, according to the population of the centers in which they lie, with the further distinction of "fast, long," and "other" interurban railways.

TABLE 11.—TRAFFIC OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		Over 500,000.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	[2] 813	66	47	85	315	55	245
Fare passengers	4,774,211,904	2,456,542,270	994,327,853	433,049,842	195,219,320	113,820,795	581,251,824
Transfer passengers	1,062,403,392	608,062,946	276,401,373	67,695,795	17,255,506	12,158,763	80,829,009
Fare passengers per mile of track constructed	[3] 212,217	491,418	279,320	150,273	87,711	40,199	96,888
Passenger-car miles	1,120,101,944	504,811,418	239,940,699	115,411,493	63,571,907	45,358,873	151,007,554
Fare passengers per passenger-car mile	4.26	4.87	4.14	3.75	3.07	2.51	3.85
Mileage of freight, mail, express, and other miscellaneous cars	[4] 24,328,522	[4] 17,842,405	821,948	364,333	617,901	1,719,402	2,962,533
Total car miles	1,144,430,466	522,653,823	240,762,647	115,775,826	64,189,808	47,078,275	153,970,087
Car miles per mile of track constructed	50,820	104,554	67,633	40,176	28,840	16,627	25,568
Accidents:							
Persons killed	1,217	491	221	124	89	90	202
Persons injured	47,429	18,289	19,518	3,109	632	1,481	4,400

[1] Exclusive of reports for 4 companies which failed to furnish this information.
[2] Includes 2 railways carrying freight only.
[3] Exclusive of trackage of 2 railways carrying freight only.
[4] Includes 15,201,575 car miles run by locomotives on Brooklyn Rapid Transit and Manhattan (elevated) railways.

The data in Table 12 are for the same statistical inquiries as in Table 11, but they apply only to full-time electric surface railways not furnishing commercial lighting.

TABLE 12.—TRAFFIC OF FULL-TIME ELECTRIC SURFACE RAILWAYS, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		Over 500,000.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	[2] 570	48	38	68	168	42	206
Fare passengers	4,062,447,908	2,107,329,902	902,383,125	321,659,513	128,602,963	85,162,271	517,360,134
Transfer passengers	991,946,863	594,326,985	251,242,536	58,195,785	10,913,058	9,227,851	71,040,648
Fare passengers per mile of track constructed	[3] 216,365	446,527	277,509	150,739	95,204	38,226	101,593
Passenger-car miles	942,021,415	427,973,469	220,024,584	86,238,634	39,423,259	35,585,153	132,776,316
Fare passengers per passenger-car mile	4.31	4.92	4.10	3.73	3.26	2.39	3.90
Mileage of freight, mail, express, and other miscellaneous cars	[4] 11,776,544	[4] 6,419,906	821,948	219,872	312,973	1,369,315	2,632,530
Total car miles	953,797,959	434,393,375	220,846,532	86,458,506	39,736,232	36,954,468	135,408,846
Car miles per mile of track constructed	50,737	92,045	67,921	40,517	29,417	16,588	26,471
Accidents:							
Persons killed	1,059	460	200	96	57	68	178
Persons injured	42,740	18,117	16,974	2,440	453	1,133	3,623

[1] Exclusive of reports for 2 companies which failed to furnish this information.
[2] Includes 2 railways carrying freight only.
[3] Exclusive of trackage of 2 railways carrying freight only.
[4] Includes 3,983,738 car miles run by locomotives on Brooklyn Rapid Transit Railway.

Though the presence or absence of a lighting plant in connection with a street railway does not materially affect its traffic conditions, yet for the purpose of comparison with the financial tables, the group of electric railways without commercial lighting only is included in Table 12.

Number of passengers.—The first conspicuous fact which appears in Table 11 is that 2,456,542,270, or more than one-half of all fare passengers on street and interurban railways, were carried by companies in the few urban centers of more than 500,000 population. Urban railways in cities and towns of less than 100,000 population carried less than one-seventh of all fare passengers.

It should be noted that a considerable proportion of the fare passengers of companies classed as interurban are carried wholly within the limits of urban communities, and especially of communities of less than 100,000 population. Thus the whole urban traffic of several important cities, such as Detroit, Mich., Lawrence, Lowell, Worcester, Springfield, and Fall River, Mass., Hartford and New Haven, Conn., and Canton, Akron, and Youngstown, Ohio, is handled exclusively by companies classed, in accordance with the criteria mentioned in Chapter I, as interurban. Even with the deductions indicated, however, the amount of interurban street railway traffic in its strict sense is very considerable. The relative importance of the traffic on the fast, long interurban lines does not fully appear from the statistics of the number of fare passengers, since the average length of journey of passengers and the average fare paid by them on these railways are considerably greater than on urban railways. On the slower interurban lines included in the last column of Table 11, it is frequently the practice to collect separate 5-cent fares for different stages of a journey, so that a single passenger may be reported two or more times; but this practice does not usually prevail on the faster interurban lines, where the business is conducted more in the manner of a steam railway.

The use of free transfers is naturally more developed in great cities having many interlacing street railway lines than in small towns, where cars often run over only a single route, or on interurban railways. The free transfers of elevated railways are not reported, even when they are allowed. In judging the extent to which the transfer system is developed in cities of different sizes, it is preferable to confine attention to full-time electric surface railways without commercial lighting.

For such railways the proportion of free transfers to fare passengers for the largest urban centers, 28.2 per cent, is about the same as for those of the second group, 27.8 per cent. The corresponding proportions

of transfer to fare passengers on railways falling within the other groups are as follows: Urban centers of 25,000 to 100,000 inhabitants, 18.1 per cent; urban centers of less than 25,000 inhabitants, 8.5 per cent; fast, long interurban lines, 10.8 per cent; other interurban lines, 13.7 per cent.

Relation of traffic to population as affected by size of cities.—The influence of the size of cities served by street railways on the amount of their business can be measured only by comparing the number of passengers within each of the urban groups in Table 11 with the aggregate population of the group. Such a comparison, however, is difficult, since many railways that are primarily urban in character extend into rural communities, though serving only an unknown fraction of the population of such communities, while roads that are essentially interurban in character also carry urban passengers. These complexities are so conspicuous in the case of the smaller cities and towns that it is impossible to make a satisfactory comparison between traffic and population for the two groups of urban centers of less than 100,000 population as a whole. From these two groups, however, a considerable number of typical urban centers have been selected, in which the largest part of the street railway traffic lies within municipal limits. The names of the centers thus selected and the population and traffic in each are shown in Tables 13 and 14.

TABLE 13.—*Relation of trackage and traffic to population in selected urban centers with population of from 25,000 to 100,000: 1902.*

NAME OF CENTER.	Population of center.	NUMBER OF PASSENGERS.		NUMBER OF MILES OF TRACK.	
		Total.	Per unit of population.	Total.	Per 1,000 of population.
Total	1,258,615	135,842,312	107.9	951.93	0.76
Montgomery, Ala	30,346	1,849,395	60.9	20.00	0.66
Little Rock, Ark	38,307	3,841,415	100.3	20.70	0.54
Sacramento, Cal	29,282	3,948,791	134.9	23.50	0.80
Pueblo, Colo	28,157	4,065,162	144.4	36.25	1.29
Meriden, Wallingford, Conn	31,033	2,589,737	83.5	19.50	0.63
Augusta, Summerville, Ga	42,686	2,360,674	55.3	31.02	0.73
Peoria, Averyville, North Peoria, Peoria Heights, Ill	60,340	6,750,000	111.9	41.25	0.68
Quincy, Ill	36,252	2,127,623	58.7	17.38	0.48
Rockford, Ill	31,051	1,989,080	64.1	23.00	0.74
Springfield, Ridgely, Ill	35,328	3,532,013	100.0	23.83	0.67
Evansville, Howell, Ind	60,428	3,629,534	60.1	30.50	0.50
Dubuque, Iowa	36,297	2,391,355	65.9	20.85	0.57
Sioux City, Iowa; South Sioux City, Nebr	34,000	4,138,944	121.7	43.00	1.26
Topeka, Kans	33,608	2,730,287	81.2	28.63	0.85
Lexington, Ky	26,369	2,350,682	89.1	15.13	0.57
Bay City, West Bay City, Essexville, Mich	42,386	1,986,982	46.9	23.30	0.55
Duluth, Minn.; Superior, Wis	84,060	9,418,517	112.0	73.84	0.88
Dayton, Ohio	85,333	14,667,094	171.9	52.88	0.62
Springfield, Ohio	38,253	3,784,338	98.9	28.13	0.74
Altoona, Gaysport, Juniata, Bellwood, Pa	46,034	4,759,279	103.4	27.50	0.60
Williamsport, South Williamsport, Pa	32,085	2,582,297	80.5	16.41	0.51
Dallas, Tex	42,638	6,574,773	154.2	46.30	1.09
Galveston, Tex	37,789	2,851,603	75.5	35.86	0.95
San Antonio, Tex	53,321	5,268,627	98.8	45.51	0.85
Salt Lake City, Murray, Utah	56,833	10,631,591	187.1	78.04	1.37
Richmond, Va	85,050	16,313,560	191.8	43.96	0.52
Spokane, Wash	36,848	5,028,388	136.5	36.55	0.99
La Crosse, Onalaska, Wis	30,263	1,706,728	56.4	17.11	0.57
Oshkosh, Neenah, Wis	34,238	1,973,843	57.7	32.00	0.93

TABLE 14.—*Relation of trackage and traffic to population in selected urban centers with population of less than 25,000: 1902.*

NAME OF CENTER.	Population of center.	NUMBER OF PASSENGERS.		NUMBER OF MILES OF TRACK.	
		Total.	Per unit of population.	Total.	Per 1,000 of population.
Total	718,254	49,179,495	68.5	485.95	0.68
Fort Smith, Ark	11,587	731,553	63.1	8.93	0.77
Riverside, Cal	7,973	547,051	68.6	9.52	1.19
San Diego, Cal	17,700	2,220,000	125.4	16.60	0.94
Santa Barbara, Cal	6,587	814,405	123.6	8.50	1.29
New London, Conn	17,548	1,320,791	75.3	8.51	0.48
Stamford, Greenwich, Conn	18,417	1,327,617	72.1	12.69	0.69
Pensacola, Fla	17,747	998,290	56.2	9.00	0.51
Athens, Ga	10,245	356,969	34.8	6.53	0.64
Alton, North Alton, Upper Alton, Ill	17,487	1,497,130	85.6	12.25	0.70
Cairo, Ill	12,566	870,838	69.3	9.67	0.77
Kankakee, Bradley, Bourbonnais, Ill	15,708	714,769	45.5	12.78	0.81
Vincennes, Ind	10,249	450,000	43.9	8.00	0.78
Burlington, Iowa	23,201	1,600,000	69.0	14.50	0.62
Muscatine, Iowa	14,073	865,120	61.5	8.60	0.61
Ottumwa, Iowa	18,197	1,211,028	66.6	10.00	0.55
Atchison, Kans	15,722	533,867	34.0	9.00	0.57
Wichita, Kans	24,671	1,460,000	59.2	18.50	0.75
Shreveport, La	16,013	1,450,000	90.6	8.80	0.55
Biddeford, Saco, Me	22,267	728,909	32.7	8.15	0.37
Benton Harbor, St. Joseph, Mich	11,717	1,198,826	102.3	10.50	0.90
Marquette, Mich	10,058	373,672	37.2	7.00	0.70
Menominee, Mich	12,818	529,764	41.3	6.71	0.52
Vicksburg, Miss	14,834	1,188,289	80.1	8.75	0.59
Springfield, Mo	23,267	1,700,715	73.1	19.10	0.82
Great Falls, Mont	14,930	939,436	62.9	11.90	0.80
Concord, N. H	19,632	1,510,856	77.0	12.71	0.65
Laconia, N. H	8,042	436,171	54.2	8.87	1.10
Long Branch, Deal, Allenhurst, Asbury Park, Bradley Beach, Neptune City, Belmar, N. J	16,148	3,737,541	231.4	23.68	1.47
Perth Amboy, Metuchen, N. J	19,485	880,128	45.2	9.06	0.46
Dunkirk, Fredonia, N. Y	15,743	681,770	43.3	7.00	0.44
Kingston, N. Y	24,535	2,217,334	90.4	9.16	0.37
Ogdensburg, N. Y	12,633	478,283	37.9	10.00	0.79
Ashtabula, Ohio	12,949	999,857	77.2	5.75	0.44
Lima, Ohio	21,723	1,375,979	63.3	18.55	0.85
Tiffin, Ohio	10,989	482,000	43.9	7.33	0.67
Zanesville, Ohio	23,538	1,800,000	76.5	10.00	0.42
Sayre, Athens, Pa.; Waverly, N. Y	9,481	1,059,507	111.8	9.11	0.96
Tarentum, New Kensington, Pa	10,137	622,447	61.4	6.61	0.65
Greenville, S. C	11,860	537,603	45.3	7.00	0.59
Austin, Tex	22,258	1,213,703	54.5	13.38	0.60
Waco, Tex	20,686	1,605,525	77.6	16.29	0.79
Ogden, Utah	16,313	861,910	52.8	11.00	0.67
Burlington, Winooski, Vt	22,423	1,270,136	56.6	11.22	0.50
Everett, Wash	7,838	971,650	124.0	9.65	1.23
Ashland, Wis	13,074	503,658	38.5	7.68	0.59
Janesville, Wis	13,185	304,398	23.1	7.41	0.56

The totals for the selected towns are shown in Table 15, which also presents a comparison of population and traffic for the two groups of urban centers of more than 100,000 population, the statistics including all the cities of each group. The details for individual cities of these two groups are given on page 24.

TABLE 15.—*Relation of trackage and traffic to population in groups of urban centers: 1902.*

	All centers over 500,000 population.	All centers of 100,000 but under 500,000 population.	Twenty-nine selected centers of 25,000 but under 100,000 population.	Forty-six selected centers of less than 25,000 population.
Total population served	10,274,470	5,380,647	1,258,615	718,254
Number of miles of track	4,998.89	3,559.82	951.93	485.95
Miles of track per 1,000 of population	.49	.66	.76	.68
Number of passengers	2,456,542,270	994,327,853	135,842,312	49,179,495
Number of rides per inhabitant	239.1	184.7	107.9	68.5

The totals of population and traffic for the four groups present a fairly correct view of the density of street railway traffic in its relation to the size of cities. The table also shows the relation of trackage to population. A discussion of the relation between population and traffic in the case of interurban railways will be found in Part I, Chapter VII.

The proportion of street railway trackage to the population is considerably less in cities of over 500,000 population than in other cities. In the largest cities, with their closely built houses and tenements, the number of inhabitants tributary to a given trackage is greater than in smaller cities, even though street railways in the more thickly populated parts of these large cities may be run on almost every street. In the smallest cities, however, the total populated area is so restricted that a large proportion of the people find little occasion to use street railways at all, and so the proportion of trackage to population is not materially different from that in cities of from 100,000 to 500,000 inhabitants, though the population of smaller cities is much more scattered. Indeed, the trackage per 1,000 inhabitants in selected centers of less than 25,000 inhabitants is actually less than that reported for centers of from 25,000 to 100,000 inhabitants.

As the size of the urban center diminishes the number of street railway rides per inhabitant decreases rapidly. In cities of more than 500,000 inhabitants each person, on the average, rode 239 times during the year, while in the selected centers of less than 25,000 inhabitants each person rode, on the average, only 68 times during the year. In comparing passengers with population in the larger cities it should be borne in mind that the great numbers of transient visitors to such cities, who are not enumerated in the census of population, contribute materially to the street railway traffic. Due allowance for this fact having been made, it yet remains true that the permanent residents of such cities patronize the railways much more than the inhabitants of small towns. The reason for this fact is obvious. As cities increase in size a constantly greater proportion of the people, despite the crowding together, live far from their places of business and are forced to use the street railway daily.

Density of traffic per mile of track.—In comparing the number of passengers per mile of track in urban centers of different sizes, as shown in Tables 11 and 12, it should be borne in mind that the average distance traveled by passengers is greater in the large cities than in those of smaller population. Despite this fact, the proportion of fare passengers carried to track mileage increases very rapidly as the size of urban centers increases. In urban centers of the first group the railways, as a whole, in 1902 carried 491,418 fare passengers per mile of track, while the full-time electric surface railways, without commercial lighting, as shown in Table 12, carried 446,527 fare passengers per mile. The traffic on such electric surface lines in urban centers of 100,000 to 500,000 population is only about three-fifths as dense; in centers of 25,000 to 100,000 inhabitants, about one-third as dense; and in still smaller urban centers, about one-fifth as dense, as on similar railways in the largest cities.

The number of fare passengers per mile of track on fast, long interurban lines, without commercial lighting, operating the entire year, was 38,226, and on other interurban lines covered by Table 12, 101,593. On the fast, long interurban railways the average ride of passengers, however, is decidedly longer than on urban railways.

Averages for density of traffic might be vitiated by the undue influence of a few companies having extremely high or extremely low density of traffic. To guard against such errors Table 16 has been prepared, which shows the number of street railways within each population group reporting traffic of different degrees of density.

TABLE 16.—*Distribution of full-time electric surface railway companies without commercial lighting, in the various population groups, according to number of fare passengers carried per mile of track operated: 1902.*[1]

PASSENGERS PER MILE OF TRACK.	Total.	NUMBER OF COMPANIES.					
		Urban centers, population.				Interurban railways.	
		500,000 and over.	100,000 to 500,000.	25,000 to 100,000.	Under 25,000.	Fast, long.	Other.
Total	568	48	38	68	168	42	204
Under 25,000	72	4	.....	2	8	17	41
25,000 but under 50,000	86	1	1	3	23	14	44
50,000 but under 100,000	191	10	3	13	75	10	80
100,000 but under 200,000	150	13	7	40	54	1	35
200,000 but under 300,000	36	3	15	8	6	.....	4
300,000 but under 400,000	16	4	8	2	2	.....	.....
400,000 and over	17	13	4	.....	.....	.....	.....

[1] Exclusive of reports for 2 companies carrying freight only and 2 companies which failed to furnish this information.

The table includes only full-time companies operating primarily electric surface railways, and not furnishing commercial lighting. The companies, of course, differ greatly in the amount of track operated. Thus there are in some of the large cities a considerable number of small railway lines, usually in the outskirts, the traffic of which is insignificant as compared with that of the one or more great systems which serve the larger part of the population. For this reason, while the average number of passengers per mile for all full-time electric surface railways without lighting plants in urban centers of more than 500,000 population was 446,527, only 13 of the 48 such companies had more than 400,000 fare passengers per mile of track. These 13 companies, however, operated 2,486.69 miles of track, or 52.7 per cent of the mileage for the entire group.

Only 4 of the 38 companies operating in urban centers of from 100,000 to 500,000 inhabitants showed more than 400,000 fare passengers per mile, and these

4 companies reported only 347.84 miles of track, or less than 10 per cent of the total for the entire group. On the other hand, 15 companies, with 45.6 per cent of the entire trackage of the group, fall within the limits of 200,000 to 300,000 fare passengers per mile of track. The average number of fare passengers for all full-time electric surface railways without lighting plants, in cities of this group, 277,509 per mile, thus corresponds fairly with the figures for a large proportion of the companies and the larger part of the trackage.

In cities of from 25,000 to 100,000 population there are no electric surface railways with more than 400,000 fare passengers per mile, and only 10 with more than 200,000, while 40 out of the 68 companies carried between 100,000 and 200,000 fare passengers per mile. Here again, then, the proportion for the larger number of companies corresponds broadly to the arithmetical average for the group as a whole, 150,739 passengers per mile.

Only 8 of the 168 full-time electric surface companies in urban centers of less than 25,000 population reported more than 200,000 fare passengers per mile of track, while 75 of the companies carried between 50,000 and 100,000 passengers per mile of track. The average for the entire group, 95,204, is thus seen to correspond fairly with the ratio of passengers to trackage in the case of a large proportion of the companies in the group. Much the larger proportion of interurban railways of both classes carried, in 1902, less than 100,000 passengers per mile of track, and a considerable number of companies in each of these groups reported less than 25,000 passengers per mile of track.

Further information in regard to the relation of density of traffic to population may be gained from the statistics for individual urban centers presented in Tables 13, 14, and 19.

Of the 8 centers of more than 500,000 population, 3 show more than 400,000 fare passengers per mile of track, and all but Baltimore show more than 300,000. Of the 24 urban centers of from 100,000 to 500,000 population, only 3 report less than 200,000 passengers per mile, and only 2 show more than 400,000. Of the 29 selected urban centers of from 25,000 to 100,000 population, 9 have less than 100,000 passengers per mile of track, and only 2 have more than 200,000. Of the 46 selected towns of less than 25,000 inhabitants, 27 show less than 100,000 passengers per mile of single track, and only 6 report more than 150,000.

Car mileage.—The figures showing the number of car miles run in urban centers of different sizes and on interurban railways (Tables 11 and 12), require no special comment. The relation of car mileage to trackage and to passengers carried is more significant, although comparisons between different population groups are rendered uncertain by the great difference in the size of cars. The proportion of car mileage to the length of track naturally increases, like the proportion of passengers to trackage, as the population of the area served increases. The number of car miles per mile of track for companies of all classes ranges from 28,840 in centers of less than 25,000 population to 104,554 in centers of more than 500,000 population. On interurban railways, particularly those of the fast, long class, larger cars are run than in cities, a fact which accounts, though of course only in part, for the smaller number of car miles per mile of track.

Passengers per car mile.—The average number of fare passengers per passenger-car mile on all street railways in urban centers of more than 500,000 inhabitants was 58 per cent more than the average for urban centers of less than 25,000, the figures being 4.87 and 3.07, respectively. For full-time electric surface railways, without commercial lighting, the largest urban centers show 4.92 fare passengers per passenger-car mile, and the smallest 3.26. Between the two extremes there is a steady gradation in the density of traffic per car mile.

Naturally these proportions do not show such wide differences between the groups of urban centers as appear in regard to density of traffic per mile of track, since the number of cars can be adjusted rather closely to the amount of patronage. It is probable that as between the largest cities and the smallest urban centers there is as great a difference in the average size of cars as in the number of passengers per car mile. The effect of this difference in size, however, is almost beyond question fully counteracted by the longer average rides of passengers in great cities. The statistics of passengers per car mile, therefore, seem to indicate that the cars are more generally crowded in large cities than in smaller towns, a point which is borne out by common observation. The ratio of passengers to car mileage on fast, long interurban railways as a group can not properly be compared with the similar ratios for urban lines.

Table 17 shows, by population groups, the number of full-time electric surface railway companies, without commercial lighting plants, reporting specified numbers of fare passengers per passenger-car mile.

When the relative length of track operated by each company is taken into account, the figures confirm in a general way the conclusion, drawn from the averages in Table 12, that the number of passengers per car mile is greater in the large urban centers than in the small ones and greater on urban lines than on interurban lines. While only 18 of the 48 companies in urban centers of more than 500,000 population report 4 or more passengers per car mile, these companies have 3,612.35 miles of track, or 77 per cent of the total mileage for the group. A detailed examination of the other data in Table 17 will show that the average number of passengers per car mile for all railways of this class, in the various other population groups, corresponds fairly well with the actual ratio reported by the greater number of companies in the respective groups.

TABLE 17.—*Distribution of full-time electric surface railway companies without commercial lighting, in the various population groups, according to number of fare passengers carried per passenger-car mile: 1902.*[1]

PASSENGERS PER CAR MILE.	NUMBER OF COMPANIES.						
	Total.	Urban centers, population.				Interurban railways.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Total	568	48	38	68	168	42	204
Under 1	4	2	.....	.....	.....	1	1
1 but under 2	83	4	.....	4	24	21	30
2 but under 3	146	10	6	18	58	9	45
3 but under 4	174	14	16	18	47	5	74
4 but under 5	98	6	11	21	20	4	36
5 but under 6	41	5	5	6	11	2	12
6 but under 7	14	5	.....	1	4	.....	4
7 and over	8	2	.....	.....	4	.....	2

[1] Exclusive of reports for 2 companies carrying freight only, and 2 companies which failed to furnish this information.

Mileage of freight, mail, express, and other miscellaneous cars.—For all classes of companies the greatest absolute mileage run by freight, mail, express, and other cars, including steam locomotives, as shown by Table 11, is found in urban centers of more than 500,000 population, the distance covered by such cars in these centers being 17,842,405 miles, or 3.4 per cent of the total of the car mileage for this group. Of this mileage 15,201,575 miles represent the distance traveled by steam locomotives on the elevated lines in New York and Brooklyn. The mileage of freight, mail, express, and other nonpassenger cars on street railways in urban centers of from 100,000 to 500,000 population and in urban centers of from 25,000 to 100,000 population is, in each case, less than 0.4 per cent of the total car mileage, and in centers of less than 25,000 inhabitants, less than 1 per cent. On fast, long interurban railways the mail, and still more, the freight and express traffic, are relatively much more important than on urban lines. The mileage run by other than passenger cars on such fast, long interurban railways was 3.7 per cent of their total car mileage in 1902, and on the other group of interurban railways 1.9 per cent of the total. A single company, however, the Old Colony Railway, of Massachusetts, contributed 700,927 of freight, mail, express, and other car miles, or more than one-fourth of the total for the sixth group.

Some idea of the complexity of the business of modern large street railway systems may be gained from the following classified presentation of the statistics of car mileage of two of the leading companies of New York, the Brooklyn Rapid Transit Company and the Manhattan Elevated Railway Company, for the year ending June 30, 1902. The Brooklyn system reports a much greater variety of cars, for the reasons that it operates both surface and elevated lines and that it keeps its records in greater detail than the Manhattan Company.

Detailed statistics of car mileage of Brooklyn Rapid Transit Company and Manhattan Railway Company.

CLASS OF CARS.	NUMBER OF CAR MILES.	
	Brooklyn Rapid Transit.	Manhattan (elevated) Railway.
Passenger cars:		
Revenue	52,684,980	44,631,618
Light (nonrevenue)	951,549	440,125
Total	53,636,529	45,071,743
Miscellaneous cars:		
Freight	11,785	.....
Mail	163,635	.....
Express	159,662	.....
Foreign companies	21,798	.....
Flat	72,165	141,851
Wrecking	2,533	.....
Pay	12,065	6,788
School	42,626	.....
Ash	67,128	.....
Shop cars	.....	23,174
Collectors and ticket cars	.....	31,449
Sprinkling	2,240	.....
Snowplows and sweepers	2,305	.....
Sand	4,596	.....
Other	6,966	.....
Total	569,499	203,262
Engines (elevated):		
Revenue	3,386,394	10,191,148
Light (nonrevenue)	538,728	935,792
Supply and miscellaneous	58,616	90,897
Total	3,983,738	11,217,837
Total mileage of all sorts	58,189,766	56,492,842

A conspicuous feature of these statistics is the large amount of mileage of passenger cars and of locomotives in passenger service on the elevated lines from which no direct revenue is derived. Such "light" mileage occurs chiefly in the switching of cars, in running cars to the barns or terminals after their day's service is completed, and in taking the additional cars required during the rush hours to and from the part of the line where they are needed. The mileage of "light" cars is included in the passenger-car mileage in the general tables. The school cars mentioned are used for the instruction of motormen. The ash cars carry away the ashes from locomotives and from power-plant boilers. Flat cars and working cars of other sorts are used in conveying coal and other operating supplies and in construction and repair work.

Car hours.—The incompleteness of the returns of car hours makes it impossible to present an accurate comparison of the different groups of urban centers as regards the number of fare passengers carried per car hour operated. Some idea of the relative density of traffic as thus measured may be gained, however, from the statistics for selected companies. Of important surface railways in urban centers of more than 500,000 inhabitants only five keep records of car hours, three of these being in Chicago, one in Boston, and one in St. Louis. The number of passengers per car hour ranges from 26.99 for the Consolidated Traction Company, of Chicago, Ill., to 41.04 for the St. Louis Transit Company, of St. Louis, Mo. Fourteen of the leading railways in urban centers of from 100,000 to 500,000

population present these statistics, and with them the number of passengers per car hour ranges, on the face of their returns, from 12.62 for the Louisville Railway Company, of Louisville, Ky., to 64.34 for the St. Joseph Railway, Light, Heat, and Power Company, of St. Joseph, Mo. The figures for the other reporting companies in this group vary between 24.94 and 45.97. Fifteen of the selected companies—Table 13—in centers of from 25,000 to 100,000 population, and twenty of the selected companies—Table 14—in centers of less than 25,000 population also reported car-hour figures. For all electric surface companies reporting car hours in the first two groups of urban centers and for the selected companies in the other two urban groups the average numbers of passengers per car hour were respectively as follows: In urban centers of more than 500,000 inhabitants, 39.96; in centers of 100,000 to 500,000 inhabitants, 31.35; in centers of from 25,000 to 100,000 inhabitants, 25.42; in centers of less than 25,000 inhabitants, 24.04. The ratio of fare passengers to car hours appears, therefore, to increase regularly with increasing population.

Accidents.—The following table shows for all street railways, and separately for all full-time electric surface railways (including those with commercial lighting) classified according to population of the urban centers served, the number of persons killed and injured during the census year 1902, and the proportion which fatal accidents bear to car mileage:

TABLE 18.—ACCIDENTS ON RAILWAYS, CLASSIFIED ACCORDING TO POPULATION: 1902.

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
All street railways:							
Persons killed	[1] 1,217	491	221	124	[1] 89	90	202
Persons injured	47,429	18,289	19,518	3,109	632	1,481	4,400
Number of car miles run to each person killed	940,370	1,064,468	1,089,424	933,676	721,234	523,092	762,228
Electric surface full-time railways:							
Persons killed	[1] 1,164	460	220	119	[1] 87	85	193
Persons injured	46,938	18,117	19,443	3,054	611	1,414	4,299
Number of car miles run to each person killed	892,475	944,333	1,080,480	934,993	695,140	516,448	782,914

[1] This number does not include one fatal accident on a railway not reporting car mileage. See also notes to Table 8.

While according to the returns more than twice as many persons were killed on street railways in urban centers of over 500,000 population as on those in centers of from 100,000 to 500,000 population, the number of injured reported was actually smaller. In the absence of detailed knowledge of local conditions, it is impossible to present any sufficient explanation of this wide discrepancy. It may be due in some measure to differences in the degree of completeness with which returns of injuries are made.

Taking the average for all railways, 940,370 car miles were run to each person killed. The risk of fatal accident was apparently least in cities of from 100,000 to 500,000 population. That it was somewhat greater in the largest urban centers than in urban centers of from 100,000 to 500,000 population is perhaps due to the greater crowding of the streets. The fact that the proportion of fatal accidents to car mileage was in 1902 higher in cities of 25,000 to 100,000 than in the larger cities, and still higher in cities of less than 25,000 population, is not readily explicable. There remains a large element of doubt as to whether the figures reported for the single year are typical of general conditions.

As might have been expected, the risk of fatal accidents was apparently considerably higher on fast, long interurban railways than elsewhere, one person being killed to each 523,092 car miles operated by such railways. The high speed maintained by interurban cars, combined with the inadequate protection of crossings and the often imperfect signaling devices, serve to explain, at least in part, this high proportion of fatal accidents.

III.

TRAFFIC AND TRACKAGE IN SELECTED URBAN CENTERS.

A more vivid picture of street railway conditions, and of the development which has taken place between the two census periods, can be obtained from the data for individual cities than can be gained from averages. Table 19 shows for 1890 and 1902 the length of track, the number of passengers carried, and the car mileage of street railways in each urban center having in 1900 more than 100,000 population. It shows also the relation of traffic to population at the two census periods and, for 1902 only, the ratio of passengers carried to trackage and to car mileage.

TABLE 19.—TRACKAGE AND TRAFFIC IN URBAN CENTERS OF 100,000 POPULATION AND OVER: 1902 AND 1890.

URBAN CENTER.	POPULATION.		MILES OF TRACK.		MILES OF TRACK PER 1,000 POPULATION.		FARE PASSENGERS CARRIED.		PASSENGERS PER INHABITANT.		PASSENGERS PER MILE OF TRACK.		PASSENGER-CAR MILES.	PASSENGERS PER CAR MILE.
	1902[1]	1890	1902	1890	1902	1890	1902	1890	1902	1890	1902	1890	1902	1902
Albany, Troy, Rensselaer, N. Y	216,530	207,306	75.83	58.57	0.35	0.28	26,417,076	11,197,414	122	54	348,372	191,180	7,449,410	3.5
Baltimore, Ellicott City, Md	510,288	435,887	365.12	156.55	.72	.36	96,763,878	40,659,982	190	93	265,019	259,725	23,330,292	4.1
Boston, Cambridge, Chelsea, Everett, Malden, Newton, Somerville, Brookline, Waltham, Mass.	927,994	704,768	451.68	271.94	.49	.38	228,179,308	116,646,338	246	166	505,179	428,941	47,524,724	4.8
Buffalo, Niagara Falls, Lockport, North Tonawanda, N. Y	421,694	302,373	320.48	72.27	.76	.24	74,136,881	17,244,388	176	57	231,331	238,611	17,290,756	4.3
Chicago, Ill.; Hammond, Ind	1,769,951	1,136,846	1,036.24	390.33	.58	.34	410,284,094	180,326,470	232	159	395,935	461,985	102,366,407	4.0
Cincinnati, Ohio; Newport, Covington, Ky	429,137	370,850	263.57	147.80	.61	.40	86,208,384	41,440,045	201	112	327,080	280,379	23,940,175	3.6
Cleveland, Ohio, and vicinity	405,359	264,114	237.04	158.88	.58	.60	81,370,202	39,164,773	201	148	343,276	246,505	18,768,515	4.3
Columbus, Ohio, and vicinity	127,022	89,479	106.43	34.75	.84	.39	26,489,927	8,202,662	208	92	248,895	236,048	5,619,476	4.7
Denver, Colo	133,859	106,713	149.77	130.75	1.12	1.22	31,085,443	21,535,735	232	202	207,554	164,709	6,458,908	4.8
Indianapolis, Ind	169,164	105,436	109.86	70.00	.65	.66	30,005,026	9,863,000	177	94	273,120	140,900	6,921,490	4.3
Jersey City, Elizabeth, Hoboken, Paterson, Passaic, Newark, Bayonne, Orange, N. J	969,736	666,389	463.54	178.59	.48	.27	148,094,623	47,039,699	153	70	314,639	263,395	24,589,773	6.0
Kansas City, Independence, Mo.; Kansas City, Argentine, Rosedale, Kans	237,042	188,573	181.24	143.08	.76	.76	57,148,083	41,669,894	241	221	315,317	291,235	15,979,864	3.6
Los Angeles, Pasadena, Santa Ana, Orange, Cal	118,746	60,394	164.16	144.79	1.38	2.40	30,803,086	10,524,966	259	174	187,641	72,691	9,533,269	3.2
Louisville, Ky	204,731	161,129	147.13	128.00	.72	.79	34,503,388	21,281,584	168	132	234,510	166,262	9,566,844	3.6
Memphis, Tenn	102,981	64,634	71.88	46.00	.70	.71	16,598,823	4,300,000	161	66	230,924	93,478	3,653,631	4.5
Milwaukee, Whitefish Bay, Wauwatosa, Wis	301,701	212,557	145.50	97.06	.48	.46	46,974,373	14,512,156	156	68	322,848	149,517	9,143,023	5.1
Minneapolis, St. Paul, Stillwater, Minn	378,923	309,841	251.02	158.79	.66	.51	63,009,957	26,357,532	166	85	251,016	165,990	12,895,343	4.9
New Orleans, La	287,104	242,039	180.31	153.14	.63	.63	53,184,273	30,510,662	185	126	294,960	199,234	17,810,169	3.0
New York, Yonkers, White Plains, Mt. Vernon, New Rochelle, Pelham, N. Y	3,548,096	2,564,403	1,299.10	775.78	.37	.30	943,687,316	600,413,862	266	234	726,416	773,949	180,499,539	5.2
Oakland, Alameda, Berkeley, Hayward, Emeryville, Cal	101,872	66,595	122.80	17.98	1.20	.27	17,247,022	2,807,956	169	42	140,448	156,171	5,449,713	3.2
Omaha, South Omaha, Dundee, Nebr.; Council Bluffs, Iowa	155,268	169,988	105.95	119.03	.68	.70	21,418,791	13,613,283	138	80	202,159	114,368	6,373,697	3.4
Philadelphia, Pa	1,293,697	1,046,964	517.53	351.12	.40	.34	331,304,685	165,117,627	256	158	640,165	470,260	61,175,495	5.4
Pittsburg, Allegheny, McKeesport, Bellevue, Sharpsburg, McKees Rocks, Carnegie, Wilkinsburg, Braddock, Homestead, Connellsville, Uniontown, Pa	640,380	428,005	469.47	113.32	.73	.26	168,632,339	46,299,227	263	108	359,197	408,571	34,311,111	4.9
Providence, Pawtucket, R. I	268,946	205,923	137.05	59.48	.51	.29	45,163,704	18,473,722	168	90	329,542	310,587	8,016,662	5.6
Rochester, Irondequoit, N. Y	178,333	148,899	95.86	62.17	.54	.42	20,171,260	11,372,596	113	76	210,424	182,927	5,196,819	3.9
St. Joseph, Mo	102,979	52,324	35.15	22.88	.34	.44	8,534,278	2,014,868	83	38	242,796	88,062	2,198,630	3.9
St. Louis, Mo.; East St. Louis, Granite, Ill	614,328	468,087	396.21	169.22	.64	.36	129,596,027	63,299,479	211	135	327,089	374,066	31,014,097	4.2
San Francisco, San Mateo, Cal	344,614	298,997	276.50	156.22	.80	.52	117,357,377	80,619,005	340	270	424,441	516,061	20,553,252	5.7
Scranton, Dunmore, Olyphant, Jermyn, Carbondale, Pa	155,655	112,385	76.68	30.00	.49	.27	8,331,663	3,023,493	54	27	108,655	100,783	2,322,162	3.6
Syracuse, Onondaga, Geddes, De Witt, N. Y	123,776	99,409	68.16	44.13	.55	.44	14,234,508	6,437,197	115	65	208,840	145,869	3,704,195	3.8
Toledo, Ohio	135,271	85,505	97.78	42.00	.72	.49	20,104,076	5,656,813	149	66	205,605	134,686	5,517,484	3.6
Washington, D. C	279,940	231,901	139.67	83.00	.50	.36	63,829,752	31,032,187	228	134	457,004	373,882	15,577,212	4.1

[1] Population shown for 1902 is that reported at the census of 1900.

As most of the cities increased materially in population during the two years between the 1900 census of population and that of street railways, the apparent increase in the proportion of trackage and traffic to population since 1890 is somewhat exaggerated.

The method of selecting the areas which should be considered as a single urban center in preparing this table has been described in Part I, Chapter I. Attention was there called to the fact that, because of the complications arising where urban railways extend into rural districts, or where part of the strictly urban traffic is carried by railways that are primarily interurban, comparisons between cities in respect to the proportions which trackage and traffic bear to population are not exact. Nevertheless, except with regard to two or three cities which have been omitted from the table, the data, especially those showing traffic, are not sufficiently affected by these complications to vitiate conclusions.

Relation of trackage to population.—In 1890 the development of street railway service, as shown by the amount of trackage constructed, varied widely in different cities. In a few urban centers new electric systems had recently been installed and trackage had increased considerably, but in other cities the limits of the horse railway had not yet been escaped. During the interval between the two census periods most of the cities which had been more backward in street railway enterprise made a rapid advance, so that at present the proportion of trackage to population is more nearly uniform than it was in 1890. Some of the urban centers, therefore, show a great increase in the length of track per 1,000 inhabitants since 1890, while others show little increase, and 8 of the 32 cities even show a a decrease, which, however, with a single exception, is slight.

The extension of the leading railway system of Buffalo, N. Y., to Lockport and Niagara Falls, N. Y., and other neighboring places, accounts in part for the conspicuous increase in the ratio of trackage to population in that urban center. Similar suburban and interurban extensions also explain in large measure the marked addition to trackage in the great iron and steel center

of which Pittsburg, Pa., is the leading city, and in Oakland, Cal., and vicinity.

In two of the very largest cities, New York and Philadelphia, the rate of increase in trackage since 1890 has been only about one-fifth greater than that in population. This is primarily because the tremendous demand for rapid transit in these cities had forced a greater development of street railways even in 1890 than was found in many of the less densely populated urban centers. In Chicago, however, the proportion of trackage to inhabitants increased about 70 per cent during the interval between the two census periods. The only urban center which shows a conspicuous decline in the proportion of trackage to population since 1890 is that of Los Angeles, Cal., and the neighboring municipalities. In 1890 there were no less than 2.4 miles of track for each 1,000 inhabitants in that center, a much greater proportion than was found in any other. This extreme development was doubtless attributable in part to the boom then prevailing in southern California. Street railways were built partly in the expectation that great cities would grow up throughout the section, and partly with the purpose of facilitating the sale of real estate. The street railways of this urban area carried three times as many passengers in 1902 as in 1890, but their trackage had increased by only one-seventh, while the population had nearly doubled.

In comparing the different urban centers at the present time it may be observed that length of track is a less accurate measure of street railway development than the number of passengers carried or the car mileage operated. The amount of track required to serve adequately the needs of the people depends largely on the density of population and the topographical conditions of the city. Thus, largely because of the dense population in New York city, the proportion of trackage to population there is lower than in any other urban area except Albany and Troy, N. Y., and St. Joseph, Mo. Philadelphia and Boston also show considerably less track per 1,000 inhabitants than most of the smaller cities. The population of Chicago is more scattered than that of the large cities just named, and it has, therefore, a larger proportion of trackage to population. The greatest length of street railway track per 1,000 of population is found in the western cities, Denver, Colo., and Oakland and Los Angeles, Cal. This is explained by their scattered population and also by the fact that the companies operating there have a considerable suburban and interurban trackage.

Relation of traffic to population.—While many urban centers of more than 100,000 inhabitants show little increase, and some show an actual decrease, in the ratio of trackage to inhabitants since 1890, there is no center in which the proportion of street railway passengers to inhabitants has not increased, and there are few in which the increase has not been a large one.

The slightness of the increase in the proportion of passengers to population in New York city is in part explained in another part of this report (see pages 31 to 38 passim). Up to the present time the railways of that city have not been able fully to meet the demand for transportation. In a few other cities in which street railway traffic was most fully developed in 1890 the increase in the proportion of passengers to inhabitants also has been slight. Denver, Colo., and Kansas City, Mo., are conspicuous instances.

On the other hand, Baltimore, Philadelphia, Boston, Chicago, and Pittsburg-Allegheny, among urban centers of more than 500,000 population, show a very marked increase in the proportion of passengers to inhabitants. In 1890 a large part of the railway systems of Chicago, Pittsburg, and Philadelphia was still operated by horsepower. The subsequent increase in traffic is, therefore, partly due to the superior convenience of electric traction. The number of rides per inhabitant in Pittsburg and vicinity was 108 in 1890 and 263 in 1902. Another illustration of the increase in traffic that has followed the introduction of electricity is seen in Baltimore, where in 1890, with a system confined almost entirely to horse cars, there were but 93 passengers per inhabitant, while in 1902, the system having become entirely electric, 190 rides per inhabitant were reported. Several smaller cities, which were almost wholly dependent on horse cars in 1890, also present very marked increases in the density of traffic. Altogether there are 12 out of the 32 centers in which the proportion of passengers to population doubled between 1890 and 1902.

Other conditions being equal, the extent to which the people of a city will patronize its street railways will depend largely on the size of the city. This is borne out by the figures in Table 19. The rank of the cities in 1902, as regards the ratio of passengers to inhabitants, bears a rough parallelism to their rank in population. Other factors, however, also influence the relative amount of street railway traffic, among which are the shape and general topographical features of the city, especially the presence or absence of hills; the density of population per unit of area; and the situation of the business sections with reference to the residence sections. The average wealth of the masses of the people and their habits and customs of life also affect their patronage of the street railways.

Of the 8 urban centers of more than 500,000 population, 7 show little difference in the degree of street railway patronage, the range being only from 190 to 266 rides per inhabitant. The eighth of the urban centers of this class, showing only 150 rides per inhabitant, consists of the neighboring cities of northern New Jersey and differs from the others in material characteristics.

San Francisco, though falling in the second group of urban centers, has by far the largest ratio of street railway rides to inhabitants. On the average, each inhabitant of that city took about one ride per day during 1902. The city abounds in steep hills, and the manu-

facturing and commercial interests are mostly centralized within a small area, while the residence section is extensive and comparatively thinly populated.

Among the centers of less than 500,000 population, Los Angeles, Cal., Kansas City, Mo., and Washington, D. C., follow San Francisco in the ratio of passengers to inhabitants. The patronage of street railways is least per inhabitant in the Scranton, Pa., center. The low ratio is probably due to the fact that the patronage comes largely from a mining population, with a low average of per capita wealth and with residences near the place of work. St. Joseph, Mo., Rochester, and Albany-Troy, N. Y., are also conspicuous for the small degree of street railway patronage.

Passengers per mile of track.—The column in Table 19 indicating the number of passengers carried per mile of track in the largest urban centers needs little comment.

With seven exceptions the number of passengers carried per mile of track in these 32 urban centers has increased since 1890, and despite the fact that the average ride in practically all of the cities has doubtless lengthened materially during this period. The decline in the density of traffic per mile of track in Buffalo, New York city, Chicago, Pittsburg, St. Louis, San Francisco, and Oakland is attributable to the extension of railways into thinly populated parts of these cities and into suburban and rural districts where traffic is comparatively light. Beyond question in these, as in other cities, the traffic upon tracks which were already built in 1890 has increased since that time. If attention be confined to those cities in which the increase in trackage since 1890 has been relatively slight, a very great increase in the ratio of passengers to trackage appears in nearly every case. Thus, of the 12 urban centers named in Table 19, in which the length of track per 1,000 inhabitants did not increase more than one-fifth between 1890 and 1902, 4—Los Angeles, Cal., Memphis, Tenn., Milwaukee, Wis., and St. Joseph, Mo.—more than doubled the number of passengers per mile of track; 4 others—Indianapolis, Ind., Louisville, Ky., New Orleans, La., and Omaha, Nebr.—show an increase of more than 40 per cent; and 3 others—Denver, Colo., Cleveland, Ohio, and Philadelphia, Pa.—show an increase of between 25 and 40 per cent. In New York city the number of passengers per mile is 726,416, and in Philadelphia, 640,165, while Boston, San Francisco, and Washington are the other cities which report more than 400,000 passengers per mile. The ratio is least in Los Angeles and Oakland, Cal., because of their extensive suburban lines, and in Scranton, Pennsylvania.

A comparison of these statistics for individual cities in 1902 bears out in a general way the opinion that the larger the city the greater tends to be the number of passengers who will be carried per unit of track, but many other influences also enter in and often counteract that of population.

Passengers per car mile.—Because of differences in the size of cars and in the average length of rides a bare comparison of the number of car miles operated in the different individual cities and of the number of passengers per car mile is much less instructive than the other comparisons thus far presented. It is impossible, from the statistics, to trace any connection between the size of the city and the number of passengers carried per car mile. The highest ratio of passengers to car mileage is reported from the great urban center in northern New Jersey, of which Jersey City, Newark, and Paterson are the most important constituents; yet this center, as has been explained, was the only one of the eight centers having a population severally of 500,000 and over that showed a ratio of passengers per inhabitant below 190. Other cities showing more than five passengers per car mile are, in the order named, San Francisco, Providence, Philadelphia, New York, and Milwaukee. The lowest ratio of passengers per car mile, that of New Orleans, was 3, while that of both Los Angeles and Oakland was 3.2.

Statistics of the relation of passengers and trackage to population, for selected cities and towns of from 25,000 to 100,000 inhabitants and of less than 25,000 inhabitants, respectively, are to be found in Tables 13 and 14.

IV.

THE URBAN STREET RAILWAY AS A SOCIAL FACTOR.

The enormous movement of human beings on the street railways shown by the statistics must evidently constitute a factor of great importance in the social and economic life of the people. The social service of the street railways in the largest cities is so much more fundamental in importance than in smaller towns that it deserves special consideration. It is chiefly to such cities that attention is now directed. The benefits which have resulted from the recent development of interurban and rural electric railways are more fully discussed in Part I, Chapter VII.

Distribution of urban population by street railways.—The chief function of the street railway in a great city is the distribution of the population over a wider area than it would otherwise be possible to occupy. Economic and social forces tend powerfully to draw multitudes of people into huge urban communities, and as the inhabitants increase in numbers, they must either crowd ever closer and closer together, to the detriment of health and comfort, or they must find some means by which, without intolerable waste of time and strength, they may live farther from one another and from their places of business. The introduction of street railways in large cities, as well as the extension of their tracks and every improvement in respect to speed and comfort, came in response to an imperative social need. The relation between such improvements in street railway service and the demand for them is, of course, a recip-

rocal one. Had not the enterprise of street railway managers offered the opportunity for the wider distribution of population, the people would not have realized fully the unsatisfactory character of their housing conditions.

As more fully shown hereafter, a constant increase in the density of population, even since the introduction of street railways, has taken place in certain of the older crowded quarters of our great urban centers which continue to be used for residence purposes. But the fact is significant that a large majority of urban inhabitants have escaped the necessity of living in these crowded quarters. The occupied area of cities has extended steadily and rapidly. It is not true that the street railway has been the sole cause of this extension. To some extent it has been due to the establishment of manufacturing and commercial enterprises in the outlying parts of cities. The street railway, however, has been probably the most important single influence in dispersing urban population. The greater part of the breadwinners in the outlying sections of our largest cities are people who must rely upon street railways as a means of going to and from their places of daily employment.

The influence of the street railway in the distribution of urban population is often concretely illustrated by the manner in which the residence sections have followed the lines of the railways. In many cases the boundaries of the built-up area of a city, instead of being fairly uniform, consist of long fingers or tentacles reaching out from the more solid center, each owing its growth to a radiating street railway.

A few illustrations of the manner in which the outer areas of cities have increased in population during the decade from 1890 to 1900 will serve to indicate the influence of the street railway, particularly since the greatest development of street railway service has taken place during this decade. In the following discussion, where comparative statistics for the population of city wards or other areas are given, the area covered is the same in 1900 as in 1890, account having been taken of changes in boundaries.

The population of Manhattan borough of New York city grew from 1,441,216 in 1890 to 1,850,093 in 1900, an increase of 408,877. Of this increase, 231,556, or considerably more than one-half, took place in the Twelfth ward alone, the population of that ward having practically doubled during the decade. This ward comprises that part of Manhattan Island lying north of Eighty-sixth street, which is approximately 7 miles from the southern extremity of the city. The great majority of the breadwinners of this ward do business elsewhere and make daily use of the street railways.

The population of Bronx borough, which lies northeast of the Harlem and even more distant from the business center of the city than the thickly settled part of the Twelfth ward, increased from 88,908 in 1890 to 200,507 in 1900. Without surface and elevated railways but a small fraction of this great addition to the population above the Harlem would have been possible. The manner in which the street railways have affected the growth of this borough may be understood by observing how the dwellings have followed the lines of the elevated railway and the Third avenue surface system.

The borough of Brooklyn, a large part of whose breadwinners find their employment either in Manhattan or in parts of Brooklyn which are reached from the residential sections only by street railways, shows a much more rapid growth in population than Manhattan. During the decade between the last two censuses the inhabitants increased from 838,547 to 1,166,582, or about 39 per cent, as compared with about 28 per cent for Manhattan borough. Much the greater part of this addition to the population of Brooklyn has taken place in the outlying wards. Thus the extensive wards numbered 8, 18, 22, 24, and 26, in 1890, together with the still more distant wards known at that date as Flatbush, New Utrecht, Gravesend, and Flatlands, advanced in population from 234,929 in 1890 to 455,264 in 1900, the increase amounting to more than two-thirds of the total increase of the population of Brooklyn. While the population of these outlying wards nearly doubled during the decade, that of the remaining 21 wards increased only 18 per cent. The transportation facilities of even the most distant residential sections of Brooklyn are almost wholly confined to the electric surface and elevated railways.

The borough of Queens shows an even more remarkable increase of population than Brooklyn, the inhabitants numbering 87,050 in 1890 and 152,999 in 1900 and the increase has been largely in the more distant and thinly populated wards, which are largely occupied by people doing business far from their homes. Thus the ward known as Jamaica shows an increase from 14,441 to 30,761, and Newtown an increase from 17,549 to 40,903. The transportation facilities of these sections are, in part, furnished by steam railways, but it is believed that the electric surface and elevated lines carry the greater proportion of the traffic. There has been a marked increase in the street railway facilities of these wards in recent years. Indeed, a detailed examination of the maps of both Brooklyn and Queens boroughs shows distinctly that the extension of population has largely been determined by the location of such railways.

The city of Boston, with the immediately adjacent cities of Somerville, Cambridge, and Chelsea, and the town of Brookline, furnish another conspicuous illustration of the influence of electric railways in distributing population. Of the seven wards lying nearest to the business center of Boston, five showed a decrease in population from 1890 to 1900; although in the Sixth and Eighth wards, which are largely occupied by the poorest immigrant classes, there was an

increase from 31,473 to 40,085. The Eleventh and Seventeenth wards, which lie next to these central wards, added only moderately to their population, and the same is true of the three wards across the Charles river in Charlestown. On the other hand, the Eighteenth, Twentieth, Twenty-first, Twenty-second, Twenty-third, Twenty-fourth, and Twenty-fifth wards, which are farthest from the center of the city toward the southwest, increased in population from 149,978 in 1890 to 243,373 in 1900. The increase of 93,395 inhabitants in these outlying wards was nearly five-sixths of the total increase for the city of Boston. The Twenty-fourth ward, whose nearest boundary is several miles from the business center of the city, increased in population from 29,638 to 61,676. During the interval between the two censuses, moreover, the population of Cambridge, Somerville, Chelsea, and Brookline increased from 150,192 to 207,536, or much more rapidly than that of the older parts of Boston. A very considerable proportion of the breadwinners, both of the outlying wards of Boston and of the adjacent cities mentioned, are employed in the business district of Boston and depend for transportation upon the electric railways.

The change in the distribution of the population of Philadelphia since 1890 has been no less remarkable. Almost all of the wards in the heart of the city show a decrease in population, while several of the large outlying wards to the west and north of the business center have added greatly to the number of their inhabitants. Thus Ward 34, which lies west of the Schuylkill and comprises a part of what is known as West Philadelphia, increased from 23,721 in 1890 to 43,706 in 1900. Wards 28, 37, and 38 (which constituted one ward in 1890) situated to the northwest of the business center, increased from 46,390 to 99,480, and the adjoining Ward 33 increased from 33,171 to 65,372. At their nearest boundary these last-mentioned wards are nearly 3 miles from the city hall, and they extend to a distance of more than 4 miles from that point.

Chicago also shows the influence of railways in scattering population. It is scarcely necessary, however, to present additional statistics to illustrate this movement in the largest cities. But even cities of the second class have experienced a similar tendency toward the pushing of their population into the outlying districts. Thus the inhabitants of that part of the city of Cleveland which was included within city limits in 1890 increased from 261,353 in that year to 356,923 in 1900. Of this gain of 95,570, more than two-thirds took place in the wards 18 to 27, inclusive, the population of which increased from 83,349 to 148,857. These wards lie in a double row along the eastern and southeastern boundary of the city. They are at no point less than 2½ miles from the business center of Cleveland, and they extend to a distance of about 6 miles from that center.

Street railways not only help to prevent excessive crowding of urban population, but in most cities they even aid a large fraction of the people in continuing the practice, so characteristically American, of living in independent houses instead of in tenements. This is true even in such large cities as Philadelphia, Chicago, and Boston, a thing which would be obviously impossible if the occupied territory were as contracted as it would have to be in the absence of the railways. The social advantages of the individual dwelling house need no emphasis. The street railway likewise aids in such a spreading of the population of many of our medium-sized cities—such, for instance, as Buffalo, Detroit, and Cleveland—as to permit a large proportion of the dwellings to be detached structures with open yards, which add greatly to the health and pleasure of the people.

In still smaller towns the street railway becomes less essential as a means of dispersing population. As might be expected, the proportion of railway rides to inhabitants is much less in such places than in great cities. Even here, however, the same function of the electric railway manifests itself to some extent as one of the influences that makes possible houses with large yards and placed in the most pleasant situations. The demand for street railway service in such towns varies greatly with local topographical conditions. Sometimes these conditions, or other causes, dictate that industrial establishments shall be situated at some distance from the most desirable residence sites. Sometimes a town is shut into a narrow valley, or confined along the borders of a river, so that the expansion of population must be chiefly in one direction. In either of these cases, more demand for street railway transportation will be found than in a compact town of equal population. For these and other reasons, it is impossible to generalize with regard to the extent of the patronage which street railways may expect in places of small size. Many of the railways which serve towns of this sort find it necessary to seek interurban business as well.

Influence of electric railways on suburbs.—The electric railway has given a powerful impetus to suburban life in the vicinity of our large municipalities. Prior to its advent the suburban dweller was confined to the steam railway as a means of transportation. Suburbs were, of necessity, situated chiefly along the lines of the great through railways, since it would not usually prove profitable to construct a local steam line primarily for suburban traffic. The electric railway has not by any means wholly superseded the steam road as a means of transportation for suburban residents, but a large proportion of the suburbs which were formerly accessible only by steam roads are now served also by electric lines, while many new suburbs have been created by the extension of electric railways. The possible area for suburban life has thus been increased and the way opened to many favorable sites which were

previously inaccessible. The relative advantages of the street railway and the steam railway for suburban traffic differ in different cases. On account of having its own right of way, the steam railway can run its trains faster within the limits of the closely built area of the city than can most electric railways, which traverse the public streets. Even outside of the closely built area, the speed of the steam train is at present greater than that of most suburban electric cars. The electric railway has counter advantages. Its cars run much more frequently (which may more than offset any advantage of the steam railway in regard to speed); it is free from smoke, and, more important still, it can usually carry the suburban passenger more nearly to the precise point which he desires to reach. The steam railway has at most but a few stations within the city limits, and its nearest station is often a considerable distance from the business center of the city.

The census of 1900 shows a very marked increase in the suburban population in the vicinity of our great cities since 1890. To be sure, the growth of suburbs has in most instances been no faster than that within the limits of the city. In considering this fact, however, it should be noted that the limits of several of our great cities are so extensive that a considerable number of the inhabitants in their outskirts are living under an approach toward suburban conditions. Since a large fraction of the addition to the population of such cities is in these outlying districts, it is not proper to judge of the relative importance of the growth of suburbs by comparing the population of the villages outside the city limits with the total population inside.

Urban centers differ materially from one another in the degree to which the growth of their suburbs has been aided by the electric railway. On account of the great geographic areas within the limits of New York city and Chicago it is probable that the larger part of the passenger traffic between these cities and the suburban villages outside their boundaries is at present carried by steam railways. Electric suburban service is about to be introduced on the leading steam railways entering New York city, and new exclusively electric lines for fast suburban service have been recently built or are planned in both Chicago and New York. Boston illustrates more clearly the influence of the electric railway. Several of Boston's residential suburbs, the people of which patronize the trolley railway much more than the steam lines, show marked increases in population since 1890. Thus the population of Newton rose from 24,379 in that year to 33,587 in 1900; that of Hyde Park from 10,193 to 13,244; that of Medford from 11,079 to 18,244; and that of Arlington from 5,629 to 8,603. The population of several other residential suburbs increased in similar proportions. Philadelphia is another city whose suburbs are served largely by electric railways, and their population has considerably increased since 1890. The population of St. Louis county, Mo., which adjoins the city of St. Louis, increased from 36,307 in 1890 to 50,040 in 1900; that of Milwaukee county, Wis., outside the city of Milwaukee, from 28,500 to 44,702; and that of comparable areas of Cuyahoga county, Ohio, outside the city of Cleveland (the city limits having been extended during the decade), from 34,522 to 57,352. The traffic of the suburbs of all three of these cities is, in considerable measure, carried by electric railways.

Effect of street railways in concentrating business.—The presence of a rapid and cheap means of passenger transportation permits the manufacturing establishments, and still more the commercial establishments of a city to be located in a manner which will be most convenient and economical for themselves and their patrons. With regard to retail and wholesale trade, and to office business, there is a great economic advantage in concentration in specialized centers. The same is true in varying degree of many classes of manufacturing concerns. It is often advantageous to have those of the same character near together, or even to have the entire manufacturing business of a city concentrated in one district. Without effective methods of transporting passengers, such concentration could not have been accomplished to the same extent.

A conspicuous illustration of the advantages of local concentration in business is found in the retail sections of our great cities. By means of the street railway, customers from all parts of the city are able to come to a common center where they find huge stocks, wide variety, and effective competition, all of which would have been largely lacking had they been compelled to patronize small local concerns within walking distance from their homes. The large scale on which retail business in cities is now conducted, with its resultant economies, would not have been possible in any such degree without the opportunity of bringing widely separated customers to a single shopping section. The department store could never have attained its present importance except through the aid of the street railway.

There are no satisfactory statistics regarding the degree to which the business of cities has become concentrated in narrow areas. Mr. B. J. Arnold, in his report on the Chicago Transportation Problem, presented to the city council toward the end of 1902, estimated the daily movement of people into the central section of Chicago, by means of the surface street railways alone, at about 225,000. He assumed that 20 per cent of the total surface railway traffic was carried by cross town lines which did not reach the business center, but that only 25 per cent of the trunk-line traffic consisted of short rides, the remainder representing travel to and from the business center. A still larger proportion of the traffic on the elevated railways, which carry more than a fourth of the city's passengers, was to and from the same center, which has an area of scarcely more than a square mile. It has been estimated

that the day population of Manhattan Island below Canal street is about half a million greater than the night population, and a large proportion of this enormous number of persons is brought thither by street railways.

Effect of street railways on land values and rents.—Closely connected with the influence of the street railway in spreading out the residential sections and concentrating the business sections of cities is its influence upon the values of land and upon rents. Every extension of a railway line into new territory increases the selling and rental value of the real estate in the vicinity. In numerous cases real estate syndicates have built railways for the purpose of rendering their lands accessible to the people and increasing their price. This was conspicuously true during the "booms" in the Western states.

While the street railway is thus a creator of land values in certain sections, it sometimes helps to destroy them in other sections by making it possible for the population and business to move elsewhere. Broadly speaking, the railways tend to distribute and equalize land values in the residential parts of cities and to prevent the excessive rents in certain sections which would follow from overcrowding. On the other hand, the street railway tends to increase land values in those sections of a city which become specialized as centers of industry and trade.

Relation of street railways to the social life and recreations of the people.—The street railway has done much to increase the opportunities of city dwellers for enjoyment and improvement. To a large proportion of the city population it is the usual conveyance employed in making social calls and carrying on other forms of social intercourse. The distances which must be covered for these purposes in large cities are so great that social intercourse would be very much restricted without cheap and rapid transit. Again, the street railway enables thousands to attend theaters, music and lecture halls, and other places of entertainment and instruction, who would otherwise either be excluded altogether, or be compelled to confine their patronage to establishments of a neighborhood character which could not offer such attractions as are now readily accessible.

More important is the social service rendered by street railways in carrying the people from the crowded parts of cities to places of outdoor recreation and amusement. The public parks of our municipalities find their usefulness immensely enhanced by the cheap and easy means of access afforded by street railways. The large country parks which have recently been opened at some distance from the closely built areas of Boston, New York, and several other great cities, depend almost wholly on this means of transportation for their patronage. In this connection it may be suggested that the restriction of urban land values which is so largely due to the influence of street railways, has made it possible for cities to set aside parks even within their more closely populated areas. Bathing beaches, race tracks, ball grounds, and private amusement and recreation parks of all sorts owe their accessibility in no small measure to the electric railway. A very considerable proportion of the people of our large cities obtain numerous outings in the evenings or on holidays and Sundays, which would be impossible without the aid of this form of transportation. While the forms of recreation thus obtained are not always of a high character, they are in general far more beneficial than none at all, or than those which would be available in the crowded city. In this way, as in many others, the electric railway is an important factor in improving the health and increasing the happiness of city people.

The street railways of smaller towns likewise render an important service in furthering the social life and the recreations of the people. Indeed it is probable that a larger proportion of the traffic of railways in such places may be considered pleasure travel than in the great cities.

Street railway parks.—An interesting development in the street railway business, which has taken place almost wholly since the introduction of electricity, is the establishment of parks and resorts by the street railways themselves. A very large proportion of street railway companies now operate, either directly or indirectly, amusement and recreation places of some sort. The companies which reported to the Bureau of the Census that they maintained such enterprises numbered 289, and some of these have two or more parks. Table 97 indicates, for each company, the number of parks operated. An attempt was made, in connection with the present investigation, to obtain a statement of the number of persons visiting these street railway resorts during the census year. It was found, however, that many of the companies were unable to make even the roughest estimate on this point, while others submitted estimates that were obviously very far from correct, and the data were, accordingly, omitted from the report.

It is much more common for street railway companies to maintain parks in the medium-sized and smaller cities and towns than in the great cities, where places of recreation are amply supplied by public authorities or by independent private enterprise. Of urban centers of 500,000 or more inhabitants the only ones in which important parks are operated by urban railway companies are Philadelphia, Pittsburg, and Baltimore. The Pittsburg Railways Company reports 2,113,340 visitors to its parks during the census year. The centers of from 100,000 to 500,000 population in which street railway parks of importance exist are Washington, D. C.; Minneapolis-St. Paul, Minn., where the company has 4 parks, with an estimate of 1,000,000 visitors during the year 1902; Kansas City and St. Joseph, Mo.; New Orleans, La. (965,000 visitors); Indianapolis, Ind.; Columbus, Ohio (455,000 visitors); and New Haven, Conn.

(600,000 visitors). The interurban railways radiating from some of the other large cities also operate parks. Among other companies whose parks are an important feature may be mentioned the Connecticut Railway and Lighting Company of Bridgeport and surrounding towns, which estimates that 800,000 persons visited its 3 parks in 1902; the People's Railway Company of Wilmington, Del., with 750,000 visitors; the United Traction Company of Reading, Pa., with 1,103,000 visitors; the Boston and Northern Railway Company, with 4 parks and 800,000 visitors; the Old Colony Railway Company of Massachusetts, with 600,000 visitors; the Butte (Mont.) Electric Railway, with 350,000 visitors; the Portland (Me.) Railroad Company, with 750,000 visitors; and the Seattle Electric Company, with 4 parks and 750,000 visitors.

In the case of some of the still smaller railways the traffic connected with the parks constitutes a very large proportion of the total business. The Bridgeton and Millville (N. J.) Railway estimates the visitors to its park at 350,000, while the total number of fare passengers for the year was 1,698,227. In judging of the importance of the traffic connected with the park in this, as in other cases, it should be remembered that probably most of the visitors to the park pay two fares. The railway at Muskegon, Mich., reports 250,000 park visitors, and total fare passengers, 1,655,762. The Kingston (N. Y.) Consolidated Railway estimates 500,000 visitors to its park, and total fare passengers, 2,217,334. The Youngstown (Ohio) Park and Falls Railway had 366,000 park visitors, its fare passengers numbering 1,241,016. Youngstown, however, has other more important railways. The Holyoke (Mass.) Street Railway Company reports 1,280,000 park visitors and 6,336,300 fare passengers.

In practically all cases street railway resorts are located at some distance from the closely built parts of cities and towns. One of the chief attractions to the patrons is the long, swift ride in the open car with the cooling breeze created by the motion. In a considerable number of instances the railways charge a second fare for the outer part of the trip to the resort. Thus the large park operated by the Union Traction Company of Philadelphia is about 13 miles from the city hall, and a fare of 5 cents is collected in addition to the city fare. The grounds are often of considerable size and present the attractions of woodland, sea, lake, or river, but since these natural features are not sufficient to create the traffic upon which the railway company depends for the profitableness of its resort, except possibly on Sundays and holidays, forms of amusement suitable for evening are usually provided. Some companies have invested large sums in fitting up their parks with theaters, merry-go-rounds, switchback railways, and similar attractions. Decorative and brilliant electric illumination is usually a prominent feature.

Many street railway companies incur heavy expense in the operation of such resorts and parks. Admission to the grounds is almost always free, and while there is ordinarily a charge for some of the amusements, the statistics show that the total direct receipts from parks seldom materially exceed the running expenses and usually leave a deficit. The company expects its profit in the increase of transportation business. Some street railway men assert that even from this standpoint the maintenance of a park or resort is often an unprofitable enterprise. Local conditions vary widely, and a place of recreation which would pay well in one city would prove a failure in another. Among the difficulties mentioned are the facts that the traffic created is largely confined to a few months of the year and to pleasant days, that it is so heavy during certain hours in the season as usually to necessitate a double track, that empty cars must be accumulated to take people home at the close of the day or evening, and that it is often difficult to combine successfully in one individual the qualities of an efficient railway officer and director of recreation grounds.

V.

INADEQUACY OF PRESENT STREET RAILWAY FACILITIES IN GREAT CITIES.

Inadequate speed and carrying capacity.—Remarkable as have been the strides in methods of transportation, and important as are the social benefits which they confer, it is generally recognized that the railway service of our greatest cities is still inadequate. Indeed it may be doubted whether, as compared with the needs of the people, the facilities in such cities at present are any more adequate than they have been in the past. The city of New York naturally presents the most striking evidence of insufficient transportation, both on account of its enormous population and on account of the physical limitations upon the distribution of its population. The long and narrow Manhattan Island is cut off from the broad areas to the east and west by wide rivers, the facilities for crossing which have hitherto been hopelessly inadequate, so that the expansion of the population in these directions has been seriously hindered. More relief for that city will be secured by the construction of bridges and tunnels than by any improvement of railway service alone.

Leaving aside the question of fares in their relation to the use which the people make of the street railways, the inadequacy of street railway service consists chiefly in the insufficient speed of transit and the insufficient number of cars. These conditions are so familiar that they scarcely need to be illustrated.

Notwithstanding the immense saving in time effected by the street railways as compared with walking, the total number of hours which are still spent by the people of a metropolis in monotonous travel represents a great social waste. It is quite probable that the average citizen of such cities as New York, Philadelphia,

Boston, or Chicago, who takes the railway to and from his place of business regularly, spends not less than an hour every day on the cars, while thousands upon thousands spend two hours or more daily in this way. The uncertainty as to the length of time required to make a journey, due to the frequent blocking of traffic, is a further source of annoyance and loss. Naturally, the consumption of time in travel is usually more serious for those who live in the suburbs than for those in the city itself. The time required for the suburban end of the journey, however, is generally less than for that in the city proper, where the speed of cars is greatly restricted.

An illustration of the extent to which railway cars in large cities are habitually overcrowded at certain times of the day was given in connection with the proposal recently made by one of the elevated lines in New York to put on several additional trains during the afternoon hours in order to relieve congestion. The press in estimating the relief which would be afforded assumed that each train, according to the customary practice, would be able to carry 700, when, as a matter of fact, each train would seat about 300 persons. A count of the actual passengers on the surface cars passing north and south at the corner of Madison avenue and Fifty-ninth street in New York on December 29, 1902, showed the following conditions during rush hours: From 7 to 9 a. m. about 3,000 seated passengers passed to the south, with about 1,700 standing. From 6 to 7 p. m. about 4,300 seated passengers were carried to the north, with more than 3,200 standing. At several other points on surface lines during the same hours the overcrowding of cars was nearly as great.[1]

In several of our cities surface railways may be said to have accomplished practically all that is possible toward meeting the need for ample and rapid transportation. All, or nearly all, the streets in the business centers of these cities are already occupied by tracks, and, as shown hereafter, the number of cars run over the tracks in those centers has reached the limit of safety. The introduction of electricity made possible some increase in speed, and thus not merely saved time but increased the number of cars which could be run over a given track, at the same time permitting the use of larger cars. The great increase in the number of passengers on the surface railways in our largest cities immediately after the substitution of electricity for animal power showed the importance of the relief afforded. But the demand for more and longer rides outran the progress of the surface railways. Difficulties more fully set forth below have made the increase of speed much less than would otherwise have been possible. The average schedule speed of electric surface cars in Chicago has been estimated at 8.22 miles per hour, which is only 2¼ miles per hour faster than the schedule time with horsepower.[2] In the more crowded streets in all great cities the speed is much less than the average, so that to take the car for a short trip may consume more time than to walk. Even the addition of elevated railways to surface systems has failed to meet fully the needs of transportation in our greatest cities.

Effects of inadequacy in transportation.—Some of the results of this inadequacy of urban railways are familiar. Rather than ride in slow and overcrowded cars, thousands of people walk even considerable distances to their business and on social errands. The growth of suburbs has been far less rapid than would have been the case with proper transit facilities. Although, as pointed out above, there has been a marked absolute increase in the number of suburban dwellers since 1890, the proportion of people who do business in the city and have their homes in the suburbs is still small, and great numbers, who would prefer to reside there, are unable to do so under present transportation conditions. Strictly suburban life is still almost wholly confined to the well-to-do.

Nor do the street railways accomplish all that could be desired in distributing population within the city itself. In several of our great cities are found overpopulated quarters occupied by the poorer working classes, composed largely of the foreign born and their immediate descendants. Most of these people do not use the street railways to any considerable extent, but live within walking distance of their places of employment. Of course, inadequacy of transportation is not the sole cause of overcrowding in such sections; other important influences contribute to it. In other cases city dwellers, although they live in quarters where there is no marked crowding, yet find their health and comfort impaired by the proximity of the smoky, dirty, noisy factories in which they must find their employment. The inadequacy of transportation agencies is one of the most important causes of these unsatisfactory adjustments of population. Doubtless to some extent the failure of certain classes to use the railways is due to poverty, and patronage would increase if fares were reduced; though, even under present conditions, the lower rent in outlying districts would often offset the cost of street car journeys. But the poor can not spare the time for railway rides. The time required to reach a less crowded section of the city is quite a different matter to the working man or woman who toils ten, eleven, or twelve hours every day at a regular occupation, from what it is to the business man or clerk who is employed from six to nine hours only.

The lower East Side of New York city is the most conspicuous illustration of a section tenanted by people who do not, to any important extent, patronize street railways. In the Seventh, Tenth, Eleventh, Thirteenth,

[1] Report of F. H. Shepard, transportation expert of the New York state board of railroad commissioners, Street Railway Journal, January 31, 1903.

[2] Report of B. J. Arnold on the Chicago Transportation Problem, 1902, page 49.

and Seventeenth wards (all below Fourteenth street and east of the Bowery), a population of 455,173 is huddled into an area of 979 acres (exclusive of parks and cemeteries). About one-fourth of the population of Manhattan Island thus occupies less than one-twelfth of its habitable area. Despite all the improvements in transportation the population in these wards has continued to grow, the increase from 1890 to 1900 being 34.1 per cent. While the density of population in the upper wards of Manhattan ranges from 90 to 180 per acre, these five wards have from 381 to 678 inhabitants per acre. Much the greater part of the people in this excessively crowded section find their employment in the immediate vicinity.

One other illustration may be taken from Philadelphia, a city which is subject to no such physical limitations upon its extension as New York, but which still has an overcrowded section. The Second, Third, and Fourth wards of the city, lying south of Market street, near the Delaware river, have a combined area about one-fifth as great as that of the Thirty-third ward, and less than one-fifth of that of the Twenty-eighth, Thirty-seventh, and Thirty-eighth wards jointly. The total population, however, of the Second, Third, and Fourth wards in 1900 was 82,461, or about one-fourth greater than that of the Thirty-third ward and only about one-sixth less than that of the three other wards mentioned. Furthermore, these three overcrowded wards increased their population 14.7 per cent between 1890 and 1900.

Several conditions which confront the street railways in cities of the first rank contribute to make the problem of furnishing adequate transportation an infinitely more difficult one than is encountered in smaller places. These conditions are not only to a large extent incapable of removal, but they grow more serious from year to year. They point to the necessity of comprehensive and far-seeing plans for the reorganization of methods of transportation.

Increase in demand for transportation more rapid than increase in population.—The comparative statistics of street railway traffic for urban centers of different sizes heretofore presented (page 19) show clearly that the number of street railway rides tends to increase faster than population. This tendency is even stronger than the traffic statistics indicate, since in the largest cities the actual traffic, for reasons already indicated, does not equal the needs of the people. As a matter of fact, the relationship between street railway rides and population revealed in these figures is a necessary one. For in the first place it is evident that, as the city grows in population and area, a constantly larger proportion of its citizens must, or at any rate should, reside so far from their places of employment as to require means of transportation. Moreover, as the city grows, the distance which must be covered by the average passenger increases. Still another cause of this relationship is found in the fact that as the population of a city increases its individual citizen widens his social and economic circle and needs to be put into connection with more people; hence he more frequently requires transportation.

Local concentration of traffic.—The modern tendency toward greater local concentration of the business of a city, while itself a product, to a considerable extent, of improved methods of passenger transportation, constitutes in another sense a cause of the unsatisfactory condition of the street railway service. This concentration not only tends to increase the total number of persons needing transportation, but it draws so many railway lines and cars to a common center that the traffic there becomes congested by its very magnitude. One has only to stand for an hour at such a point as the corner of Madison and State streets in Chicago, the street railway terminus at City Hall in New York, or the Park street station in the Boston subway, to appreciate how greatly the enormous magnitude of the traffic interferes with rapid handling of it.

Unequal distribution of traffic.—Perhaps the most important source of difficulty in urban transportation lies in the fact that the traffic is very unequally distributed throughout the day. A large proportion of the passengers consist of people going to their places of employment in the morning and returning at night. The flow of shoppers toward the retail centers is better distributed through the day, but the return tide of shoppers is at its height during the very hours when employees are seeking their homes.

This inequality of traffic, though striking, is perhaps not so great as is sometimes supposed. A careful estimate made by the Metropolitan (Interurban) Street Railway Company (now the New York City Street Railway Company, a surface line) for all its lines on December 17 1902, put the number of passengers carried during the five busiest hours, from 7 a. m. to 10 a. m. and from 5 p. m. to 7 p. m., at about 35 per cent of the total number carried during the twenty-four hours—practically the entire traffic of the company being carried during eighteen hours. The Union Railway Company and the Southern Boulevard Railway Company, whose lines are in the less densely populated Bronx borough, estimated that about 40 per cent of their passengers were carried during these same five hours.[1]

In every city there are certain points at which the distribution of traffic is much more unequal than is true of the street railway system as a whole, and at these points congestion of movement is likely to occur during the rush hours. This fact may be illustrated by further data regarding passengers on the north and south surface lines at Fifty-ninth street and Madison avenue in New York city. On December 29, 1902, about 4,700 passengers were carried on the southbound surface cars at that point during the hour from 7 to 8

[1] Wheatly, "The Passenger Traffic Problem of Greater New York," Street Railway Journal, January 10, 1903.

a. m., while at the same time less than 600 were carried north. From 9 to 10 a. m., on the other hand, only about 1,300 passengers were carried south and about 500 north, the total traffic in both directions being barely one-third as great as during the earlier hour. From 2 to 3 p. m. about 1,400 passengers rode toward the south and about 1,250 toward the north. From 6 to 7 p. m. only about 500 passengers were carried south, while nearly 7,600 passed toward the north, the total traffic being thus more than three times as great during this hour as from 2 to 3 o'clock.[1]

Street railway companies, of course, adjust the movement of cars, in some measure, to this great variation in the traffic. Since ordinarily it is impossible to allow cars to collect in the business center of a city, the operation of additional cars for the accommodation of the traffic during the rush hours means that many partly empty cars must be run in the opposite direction at about the same time. This is often the case even where the cars running in the direction of greatest travel are seriously overcrowded. The total number of cars in operation in both directions during the rush hours is usually, moreover, materially greater than the number employed at other hours.

In the particular instance just mentioned, the number of cars passing Fifty-ninth street and Madison avenue toward the south from 7 to 9 a. m. was about four-fifths greater than the number moving in that direction from 9 to 11 a. m. The count of the passengers showed that while the cars south bound from 7 to 9 a. m. were greatly overcrowded, the cars north bound from 8 to 10 a. m. had less than one-third of the seating capacity occupied. The seating capacity of the cars running in both directions from 8 to 9 a. m. was about 4,500, while during several hours in the middle of the day the seating capacity of cars moving in both directions was only from 3,000 to 3,500 per hour. From 6 to 7 p. m., on the other hand, the cars passing both ways had a seating capacity of 6,100. Just before and during this rush hour, the south bound cars had only about two-fifths of their seats occupied, while from 6 to 7 p. m. barely half of the north bound passengers could find seats. The number of cars passing Madison avenue and Fifty-ninth street in the evening hours was smaller even than in the middle of the day, and yet a large part of the seating capacity of those south bound was unoccupied. A comparison with similar counts at other points on the Metropolitan Railway system shows that the degree of inequality in the total number of cars moved which exists at Madison avenue and Fifty-ninth street is by no means exceptional. The traffic in a city like Brooklyn, which is chiefly a place of residence, is even more irregular. In this city the state board of railroad commissioners found in 1903 that the leading surface system was operating an average of 545 cars per hour during nonrush hours, while during the busy period of morning and evening it expected to run about 1,200 cars per hour.[2]

This irregularity in the distribution of traffic on street railways tends in two ways to hinder the provision of prompt and adequate service. In the first place, there are important instances in which, even though the railway companies might be willing to run a sufficient number of cars, they would be prevented from doing so by the physical limitations of their tracks. This point is more fully treated below.

In the second place, it costs more to handle a given number of passengers irregularly distributed than would be the case if they were evenly distributed through the day. Railway companies are, therefore, naturally indisposed to incur the expense which would be entailed by furnishing sufficient cars to seat all passengers during the busy hours. Even under present conditions, when cars are so greatly overcrowded, the inequality in the distribution of cars is a source of complaint among street railway managers. They are constantly lamenting over the "peaks in the load line." A larger power plant and more cars are necessary to maintain the present schedules than would be required if the number of cars could be evenly distributed throughout the day. Fixed charges per unit of traffic are accordingly increased. Even the current expenses in the running of cars are somewhat augmented by the unequal distribution of traffic. Despite the most complicated adjustments of the trips of conductors and motormen to secure an even distribution of their work, most street railway companies in large cities are either forced to pay a certain number of their car-service employees full-time wages for operating cars only part of the day, or they must find men who are willing to work and draw pay for a part of the day and who usually must be paid at higher hourly rates than the full-time employees. The so-called "tripper" problem constantly confronts the manager of an urban railway.

Causes limiting speed and carrying capacity of surface railways.—Four facts connected with surface railway transportation put very rigid limits upon the speed and carrying capacity of electric surface cars in cities, namely, the frequency of the necessary stops, the danger to pedestrians in crowded streets, the interference of cars with one another, and the blocking of the tracks by other vehicles. The first two limitations are obvious. The danger of accident is indicated by the statistics elsewhere presented. The number of persons, other than passengers, who are killed or injured by street cars is very considerable. The last two limitations require more extended consideration.

The number of cars which can be run over a given railway route, as a whole, depends upon the number which can pass the point where the greatest interference is encountered and where the speed is least. To increase

[1] Report of F. H. Shepard, Street Railway Journal, January 31, 1903.

[2] Street Railway Journal, Vol. XXII, 1903, page 1039.

the speed over other parts of the route will not enable more cars to be operated. At many points where important railway lines cross one another in the business centers of cities, the extreme limit of the number of cars which can be safely operated has already been reached.

An investigation made at the instance of the Merchants' Association of New York in 1903 showed that the number of cars which passed the intersection of the Broadway and Twenty-third street lines was no less than 573 per hour. At Broadway, Sixth avenue, and Thirty-fourth street (Herald square), where two north and south lines and one cross town line intersect, the number of cars per hour was 464. Several other points showed as great congestion of traffic.[1] The crowding of surface cars at the New York end of the first East River bridge is likewise enormous. Here the difficulty is enhanced by the fact that the several car routes terminate at the bridge. Unlike the cars from Brooklyn, which pass around closed loops, the Manhattan cars run up to stub ends, and considerable delay is caused by the necessity of changing gates, fender, and controller handle to the other end of the car.

The traffic in the business center of Chicago is also hampered by the necessity, under present arrangements, of running many cars to stub terminals. The use of the cable system, with the difficulty at railway crossings due to the necessity of dropping the cable, tends still further to limit the number of cars which can pass over the tracks in the heart of Chicago. According to a recent report it is impossible to increase the number of cars on most of the lines which run into the business center, and very little improvement in service can be made without radical changes in methods.[2]

At the corner of Eighth and Market streets in Philadelphia, where a single track crosses a double track, 315 cars pass between 5 and 6 o'clock every afternoon.[3]

It is evident that even if there were no other vehicles besides cars it would be difficult to operate many more cars than now pass such points as have been described, but the situation is made much worse by other classes of vehicles. Interference from this source is inevitable in the business quarters of cities, particularly where, as too often happens, the streets are absurdly narrow and suited only to the primitive conditions under which they were laid out. A conflict of interests exists between the commerce and trade of the great city (which require the most speedy and convenient handling of merchandise) and the patrons of the street railways. It has frequently been asserted, not merely by street railway men, but by public authorities and citizens' organizations as well, that at present the owners and drivers of vehicles do not sufficiently regard the rights of the street railway and its passengers. Truckmen prefer to drive on the railway tracks because of the smooth surface afforded the wheels, and they do not always turn out as promptly as they could. Moreover drays are often backed up to the curb and left standing for some time in such a way as to make it impossible for street cars to pass; in many such cases it would be possible for the dray to avoid interference by standing lengthwise of the street. Again there are frequent blockades of vehicles, in part unavoidable with the enormous traffic, in part due to the lack of stringent and well-enforced "rules of the road."

How easily vehicle traffic may interfere with the movement of street cars may be judged from a count taken by the Metropolitan Street Railway of New York on December 27, 1902. During the hour from 11 a. m. to 12 m. 1,910 vehicles, not including cars, crossed the tracks of the company at the junction of Broadway and Twenty-third street. From 3 to 4 p. m. 1,250 vehicles crossed the tracks at Canal street and West Broadway, while during the same hour at each of three points on lower Broadway more than 1,000 vehicles crossed.[4] The New York State Board of Railroad Commissioners in 1903, after investigating the complaints regarding the inadequate service on the surface railways of Manhattan, asserted that "the very first and largest measure of immediate relief that can be obtained is that which could be derived from the regulation of independent vehicles in the streets." The board further expressed the belief that with adequate regulation of vehicles and with the removal of the obstructions due to the building of the subway, 25 per cent more cars could be operated, even during rush hours. In accordance with these recommendations certain new regulations have recently been adopted by the city authorities.

Elevated railways.—In view of the conditions which have been described, it is possible that a wholly satisfactory solution of the problem of transportation in great and rapidly growing cities may never be attained. What is wanted, eliminating the question of fares, is simply more cars and higher speed, but while there has been a steady progress in both of these directions, serious physical and financial difficulties stand in the way of adequately meeting the requirements. It long ago became apparent that in the largest cities the surface railways must be supplemented either by elevated or by underground lines, which would both increase the number of available tracks where the traffic was most dense, and greatly add to the speed of travel, thus saving time and lengthening possible journeys.

The first elevated urban railway in the world was chartered in New York as far back as 1867. It was the Greenwich street and Ninth avenue line. Before 1880, the system in Manhattan had attained almost its present form, in which four trunk lines run lengthwise of the narrow island. The relief afforded by these elevated

[1] Report of F. H. Shepard, Street Railway Journal, January 31, 1903.

[2] Report of B. J. Arnold to the Chicago city council.

[3] Wheatly, "The Philadelphia Rapid Transit System," Street Railway Journal, April 4, 1903.

[4] Wheatly, Street Railway Journal, January 17, 1903.

lines was enormous. During the eighties an extensive elevated system was also built in Brooklyn.

The extension of the population northward, which the elevated lines of Manhattan had quickly aided, developed a traffic which soon overtaxed their capacity. The laying of a third track over part of their structures increased somewhat the possible number of trains, and also permitted the operation of express trains which, by making very few stops, especially during the middle part of the trip, could carry passengers from the foot of the island to Harlem or the Bronx in about half an hour. These express trains were introduced almost solely to meet the heavier traffic at rush hours. But elevated lines suffer even more than the surface lines from the unequal distribution of traffic. The greater proportion of their passengers are persons going to their business in the morning and returning home at night. The longest train which the steam engines, formerly used in New York, could haul was five cars. It became impossible to increase further the number of trains at rush times; indeed, blockades at the terminals, which are quite inadequate in platform space and in number of switch tracks, were of frequent occurrence. In 1902 the vice-president of the Manhattan Railway Company stated that during the rush period 81 trains per hour, going north alone, passed the junction of the Sixth and Ninth avenue lines at Fifty-third street, a number which could not with safety be exceeded, since about half of the trains are compelled to cross tracks at this junction.[1] For these reasons, tens of thousands of long-distance passengers in New York, who would have preferred to take the elevated trains, were compelled by the overcrowding to patronize the slower surface cars.

It is a remarkable fact that the number of passengers carried on the Manhattan Elevated Railway actually decreased considerably for several years. In the year ending September 30, 1901, the passengers numbered 191,152,316, nearly the same as in 1890, and more than 28,000,000 less than in 1893. The traffic on the Brooklyn elevated lines decreased still more, falling from 100,181,372 passengers (including transfer passengers), in 1893 to 62,587,361 in 1901. This decrease in elevated traffic is doubtless attributable chiefly to the improvement of the surface railways, which offered advantages to short-distance passengers in the greater number of their lines and the frequency of stops.

The installation of electricity on the elevated lines of New York and Brooklyn during the years 1901 to 1903 has materially increased their carrying capacity, by making it possible to operate trains of six cars and to maintain a somewhat higher average speed. As a result the passenger traffic has risen rapidly, the number of passengers carried by the Manhattan Railway reaching 255,565,390 in the year ending September 30, 1903, an increase of more than 30 per cent over 1901. But the present elevated lines of Manhattan have now almost reached the limit of improvement, and they do not begin to meet the demand for rapid long-distance transportation. The capacity of the Brooklyn elevated railways has heretofore been limited chiefly by the concentration at a single bridge terminal. It is now proposed, however, to make use of the new Williamsburg bridge for elevated trains, and this will greatly relieve the congestion.

Beginning in 1892, four elevated railway systems, radiating from the business center, were constructed in Chicago. While the traffic of these lines is much lighter than in New York, the single loop around the business center, which is used by all of them jointly for all trains, has virtually reached the limit of its capacity.

It is, of course, possible to increase considerably the number of elevated lines in any city, even in New York, and thereby to relieve the congestion of traffic. The construction of additional tracks in the crowded business centers toward which trains converge would alone add greatly to the carrying capacity. But serious objections lie against elevated railways in the more important streets. The pillars interfere with traffic on the surface; the structures are usually ugly and shut out the light from the street and buildings below; and the noise of the trains is a very great annoyance. As a result, the value of real estate on certain streets occupied by elevated railways, particularly in the residential sections, has either been diminished or has increased less rapidly than elsewhere, and the companies have been compelled to pay large sums for damages to property. For these reasons the attitude of the people and of municipal authorities is usually one of strong opposition to the erection of additional elevated structures in the business centers or on the more important residential streets. It is doubtful whether any new elevated lines would be tolerated on Manhattan Island.

Nevertheless, subway railways, which are the only alternative to elevated lines for rapid urban transportation, are much more expensive, and it is probable that a considerable extension of elevated railways in the suburbs of several of the leading cities of this country will be seen. Where the city is not contracted in area by geographic peculiarities it may prove socially and financially profitable to devote a few of the streets to these structures despite their disadvantages. The present tendency, as shown in existing or contemplated systems in Boston, Philadelphia, and Chicago, is toward the combination of elevated with subway construction for rapid transit railways. The fact that the elevated and subway lines in New York have come under the control of a single company may mean ultimately some passage of trains from elevated tracks to subway.

Subways.—Subways in connection with urban passenger transportation may serve two quite different purposes. They may be used to carry through the more densely crowded business center of the city the cars

[1] Wheatly, Street Railway Journal, January 10, 1903.

which elsewhere operate on the surface, or they may be used in any part of the city for the operation of cars and trains at higher rates of speed than would be possible on the surface. These two classes may be conveniently designated by the terms subways for surface cars and rapid transit subways. The two functions may in some cases be combined in a single subway. Subways for surface cars are naturally comparatively short. If rapid transit is sought, either the subway must be greatly extended or it must connect outside of the business center with elevated lines.

European cities preceded those of our own country in the construction of subways. London's underground steam railroads date back many years. The first underground electric line was opened in Budapest about 1896. Within the past few years high-speed electric subway railways have been constructed in London, Berlin, and Paris, and very extensive additions to these lines are in process of construction or are planned.

Aside from a few short and insignificant tunnels for surface cars, such as those under the Chicago river, the first subway for urban transportation in the United States was that constructed by the city of Boston, opened for operation in 1897. The narrowness and crookedness of most streets in the business center of Boston, and the concentration of traffic in Washington and Tremont streets, rendered the operation of surface cars utterly unsatisfactory. The present subway, most of which lies under Tremont street, has a total length of about 1½ miles. It accommodates both surface cars and high-speed electric trains, the latter emerging from the subway onto an elevated structure. For that part of its length in which the surface cars operate there are four tracks, two for each class of traffic. The subway is leased to the Boston Elevated Railway Company, which operates both the elevated and the surface systems of the city. The center of the elevated system is a large loop, of which the subway constitutes one side, inclosing the chief business section. From the loop radiate two lines, one toward the southwest, extending into Roxbury, and the other across the Charles river into Charlestown. The total length of the elevated and subway lines is about 8 miles of double track. Passengers coming from more distant points are given transfers to the elevated trains at the terminals, while, in the subway itself, passengers may transfer freely from surface cars to the elevated train, or from the elevated train to surface cars in cases where the cars are going in the same general direction. At present no surface cars run entirely through the subway. Those entering from one direction pass around a loop at Park street and return, while those from other directions pass around a loop at Scollay square. The short distance between these two loops is traversed only by elevated cars, but passengers, by a double transfer, can pass from the surface lines at one end of the subway to those at the other.

Great as has been the relief afforded by the Boston subway and elevated system, the situation is still far from satisfactory. The subway is so short as to necessitate sharp curves, and these diminish speed to such an extent that the subway accommodates with difficulty the cars which are already turned into it. To relieve the situation the city has planned to construct two practically parallel subways through the business center of Boston. One of these, under Washington street, will be used for the elevated trains, and the other, under Devonshire street, will be for surface cars. It is proposed when the Washington street subway is completed to withdraw the elevated trains from the Tremont street subway and devote it wholly to surface cars, part of which, at least, will then pass through its entire length instead of going around loops. A tunnel for street cars has just been completed under the bay to East Boston. When these plans are completed, the chief direction in which further development can be made will be in lengthening the present elevated lines and constructing one or more additional radiating lines for fast service, either on elevated structures or in subways. Definite plans of this nature are already under consideration.

Much more ambitious is the purpose of the New York Rapid Transit Subway, which will soon be ready for operation. The purpose here is to accommodate exclusively long-distance traffic. The tracks are kept underground for about three-fourths of their length, but for several miles in the northern part of Manhattan Island they are on a viaduct. The present subway extends from the city hall, where it terminates in a large loop, north on Center street and Fourth avenue to Forty-second street, thence west to Broadway and north on Broadway. At One hundred and fourth street the subway divides, one branch crossing Central park and running northeast to Bronx park, while the other, or direct line, continues north to Kingsbridge. The total length of the present subway is 20.81 miles. The subway below One hundred and fourth street has four tracks. On two of these, "accommodation" trains will be operated, stopping at intervals of from one-fourth to one-half mile, and maintaining an average speed of about 15 miles per hour. Over the other tracks will run express trains, making fewer stops and with much higher speed. The branches above One hundred and fourth street have two tracks. The upper parts of both branches reach into territory now rather sparsely built, which gives opportunity for considerable expansion of population.[1]

It has been estimated by experts that by the time the new subway is opened the long-distance travel on Manhattan Island will fully equal the capacity of both subway and elevated lines, and that the congestion of traffic

[1] Report of the Board of Rapid Transit Railroad Commissioners, 1900–1901.

will be as great after the subway is opened as it was before its construction was begun in 1900. The maximum capacity of the subway is estimated at 30 express trains and 50 local trains per hour in one direction, with a total seating capacity of 28,000 or a possible capacity when crowded of about 43,000 persons per hour. The elevated trains at present carry more than three times that number in one direction during rush hours. Nevertheless, a great relief will be afforded to the overcrowded elevated lines and to the thousands of long-distance passengers who now take the surface cars. The decrease in the amount of such traffic on the surface lines, by increasing the available space in the cars, will, it is believed, lead many people to ride short distances who now prefer to walk. Already plans are on foot for the construction of additional north and south subways in Manhattan Island, and it is evident that with the constant increase in population, only rapid progress in this direction will keep pace with the growing need for transportation.

Further relief for the population of Greater New York will result from the tunnels and bridges which are under construction, or planned, across the North and East rivers. These improvements are of a character so strictly bound up with the peculiar local geographic conditions that they throw less light upon the general problem of urban transportation than do the subways in Manhattan itself. It may be noted, however, that one prominent feature in the improvements which are to be effected in connection with these bridges and tunnels will probably be the additional use of elevated and subway tracks in the crowded parts of Manhattan and Brooklyn, both for the accommodation of surface cars and for the operation of fast trains.

In Philadelphia a comprehensive plan for securing rapid transit and for relieving the congestion of surface traffic is now in process of execution. The plan involves a subway about two miles long running under Market street, the leading business thoroughfare. The subway will pass around the city hall in a small loop. In addition, a larger loop, beginning at about the same place, will be constructed around the principal business center. This latter loop will have for its longer sides Arch street, two blocks to the north of Market street, and Walnut street, two blocks to the south. The subway west of the city hall will have four tracks, two for surface cars and two for trains which are to pass upon elevated structures at the termini of the subway. For the rest of its length the subway will have two tracks only. The elevated lines to be opened first will consist of a short spur along the river front south from the eastern foot of Market street, and a much longer line west on Market street to Sixty-third street, about 4½ miles from the city hall. Several other elevated railways are planned, branching to the north and south at three different points on the central stem.

Plans for the improvement of transportation conditions in other cities by means of elevated railways and subways have not yet reached such an advanced stage of development. In Pittsburg it has been proposed to construct an elevated railway in the business center of the city, subway construction being practically out of the question on account of the physical conditions. In Chicago, among other measures for the relief of the transportation situation, such as the construction of additional loops on the present elevated railways in the center of the city, plans are on foot for the construction of an elaborate system of subways, running in both directions under several of the streets in the business center, for the use of the surface cars.

An important point in connection with elevated and subway railways has to do with the relations between them and the surface lines. In Brooklyn, Boston, and Philadelphia, single companies control both systems, while in Manhattan and Chicago the elevated and surface lines are controlled by different companies; the Manhattan subway and elevated lines, however, being controlled by one company. It is evident that the most satisfactory service to the people will be rendered where transfer from one system to the other is easy and free. A normal arrangement would be one of radiating elevated or subway trunk lines, with interlacing and parallel surface lines, by which the passenger could more precisely reach his destination.

Satisfactory suburban and interurban service can be secured only in connection with elevated or subway lines in the densely populated parts of the great cities. There seems no reason why the suburban and interurban cars should not be run directly onto the rapid transit lines in the city, as the cars could be so constructed that they could be connected with the regular elevated or subway trains. Something of this sort already exists in Brooklyn where, at the ends of some of the elevated structures, the trains descend to the surface and continue into the suburbs. It will probably not be long before the interurban railways radiating from such cities as Cleveland, Detroit, and Cincinnati will take the initiative in the provision of some method by which their cars can reach the centers of these cities at high speed.

The chief difficulty which stands in the way of a rapid development of subway systems for fast long-distance urban transportation is the heavy cost of construction. The cost varies greatly with local conditions. In New York, where an immense amount of rock excavation has been necessary, the present subway and tracks, exclusive of power house and equipment, and of damages to abutting property, will cost the city about $36,500,000, or about $1,750,000 per mile of line. From the standpoint of profits, moreover, both elevated and subway railways intended for fast traffic are confronted by the facts that most of their passengers ride long distances; that a majority must be carried to a single business cen-

ter; and that a very large proportion of the traffic is during the few rush hours. As population, aided by the facilities offered, extends farther from the center of the city, these peculiarities will become more marked. Nevertheless there is every reason to believe that, either through private or public enterprise, additional subways will gradually be constructed in New York and other cities. It is conceivable that, as subways and elevated railways become more adequate to handle the entire long-distance traffic, while short-distance traffic becomes the chief business of the surface lines, some difference in fares between the two may be established, presumably by a reduction in the present fares of the surface railways.

VI.

STREET RAILWAY FARES.

Prevalence of the 5-cent fare.—The rate of fare on about two-thirds of the urban street railways in the United States is 5 cents for any distance covered by a single car. The journey is often extended by means of transfers to other cars, a practice which will be fully discussed in the succeeding section. The practice, very common in Europe, of grading fares according to distance, does not exist in any proper sense in American cities. In some cases the restrictions on transfers are such that certain journeys within the city limits can be accomplished only by paying two fares. Naturally this is usually the case where different parts of a city are served by distinct companies. The most conspicuous illustration is in Chicago, where the railway systems of the south, west, and north sides are operated as independent units. The one-city one-fare principle is being strongly urged for Chicago. Consolidation of street railways has already virtually brought this about in most cities. American street railway managers very generally maintain that the uniform fare is more advantageous to the public than fares graded according to distance. Their strongest argument is that the graduation of fares would tend to restrict the expansion of the residential area of cities. They sometimes claim that this effect would be the more certain because to reduce fares for short distances to, say, 2 or 3 cents would make it necessary to raise the charge for longer distances above 5 cents. This necessity might, indeed, arise in cases where the present 5-cent fare brings only a low return to the railway companies, although the reduction in earnings through a lower fare would be at least partly offset by increased traffic. It is of interest to observe that in several German cities, where graded fares formerly prevailed, the uniform charge for all distances, at least within city limits, has lately been substituted.

The 5-cent fare likewise prevails on a majority of interurban lines, which either are so short that a fare of 5 cents will cover a ride over their entire length, or else collect this amount at different stages of longer journeys. The longer and faster interurban railways in most cases, however, collect single fares for the entire distance traveled by the passenger, issuing tickets in somewhat the same way as do the steam railways.

For the street railways of the country as a whole the average fare during the census year, obtained by dividing the receipts from passengers by the number of fare passengers carried, was 4.94 cents. On urban railways in cities of more than 500,000 inhabitants the average fare was 4.82 cents; in urban centers of from 100,000 to 500,000 inhabitants it was 4.93 cents; in those of 25,000 to 100,000 inhabitants, 4.78 cents; and in those of less than 25,000 inhabitants, 4.83 cents.

The fact that the average fare on urban railways of each group is thus somewhat less than 5 cents per passenger is due to the existence on certain railways of lower rates open to all passengers; to special rates on other railways for certain classes of passengers, particularly for children and workmen; and to some extent to the counting of transfer passengers as full-fare passengers in cases where an extra charge less than the full fare is made for a transfer. This latter practice prevails, for example, in Philadelphia.

Reduced fares open to all classes of passengers.—The returns made to the Bureau of the Census show that more than one-third of all the operating street railways in the United States offer fares of less than 5 cents to all of their patrons under certain conditions. In almost all such cases the cash fare for a single trip is 5 cents, but tickets for a number of trips are sold at reduced rates. Sometimes these tickets are good only during the busy hours of the morning and evening. The reports in the present investigation do not, in some cases, indicate whether the reduced fares are so restricted or not. More than 200 railway companies offer tickets at a price of approximately 4 cents each. By far the most common practice among such railways is to sell 6 tickets for 25 cents. Sometimes a further reduction is made if a larger number of tickets is bought, 25 tickets being frequently sold for $1, and sometimes 26 or even more. On some railways the reduced fare is granted only to those who buy tickets to the value of $1. It is quite common for such companies to sell 24 or 25 tickets for $1. This is the custom, for instance, on the lines of the Connecticut Railway and Lighting Company, and on the systems at Springfield, Ill., Des Moines, Iowa, Muskegon, Mich., Syracuse, N. Y., Chattanooga, Tenn., Seattle, Wash., and a considerable number of smaller places. Occasionally, the purchase of a still larger number of tickets is required in order that the reduced fare may be obtained. Thus the Torrington and Winchester Railway in Connecticut sells 75 tickets for $3, and the companies at Atchison, Kans., and Cumberland, Md., with one or two others, sell 100 for $4. Two railways, in Olean, N. Y., and Bradford, Pa., require the passen-

ger to buy 200 tickets in order to get a 4-cent fare, while the Altoona and Logan Valley Electric Railway Company of Altoona, Pa., offers 500 tickets for $20. It is evident that a great majority of passengers will not take advantage of reduced fares if they are required to buy more than a dollar's worth of tickets at a time.

The approximately 4-cent fare in the various forms mentioned is found for the most part in cities and towns of medium or small size. In no urban center of more than 500,000 inhabitants are tickets sold to all classes of passengers at reduced rates. The largest cities in which, at the time of the census, 6 tickets were sold for 25 cents were Washington, D. C., Detroit, Mich., Milwaukee, Wis., Dayton, Ohio, Indianapolis, Ind., Reading, Pa., Worcester, Mass., Utica, N. Y., Wilmington, Del., and Richmond, Va. In Detroit, however, these tickets are good only during the "rush hours" of morning and evening, and the same may be true in some of the other cities named. Subsequent to the date of the census, the two railway companies in Cleveland, Ohio, reduced fares to the same basis, but they later restored the straight 5-cent fare.

The sale of tickets to patrons generally at reduced rates is quite rare among the street railways of New England, although a few of them grant lower rates to passengers who buy a dollar's worth of tickets. In the smaller cities and towns of New York, a considerable number of railways sell 6 tickets for 25 cents. This is the practice, for example, in Binghamton, Oswego, Rome, and Schenectady. On several railways in this state 24 or 25 tickets are offered for $1. Pennsylvania has even more railways which sell 6 tickets for 25 cents than New York. Among the more important Pennsylvania railways offering this rate are the Chester Traction Company, of Chester and vicinity; the Conestoga Traction Company, of Lancaster and vicinity; the Lebanon Valley Traction Company, of Lebanon and vicinity; the Schuylkill Valley Traction Company, of Norristown and vicinity; the Wilkesbarre and Wyoming Valley Traction Company; the Warren Street Railway Company; and the United Traction Company, of Reading. Altogether, there are more than forty street railways in this state which have approximately a 4-cent fare.

In the Middle Western states of Ohio, Michigan, Indiana, Illinois, and Wisconsin, the reduced fare, usually in the form of 6 tickets for 25 cents, is more common than elsewhere, and may almost be said to be the prevailing rate, except in two or three of the largest cities and on interurban railways. Practically all urban street railways in Indiana and Wisconsin sell 6 tickets for 25 cents, and the same is true of more than twenty-five of the street railways of Ohio. A fare at least as low as 4⅙ cents is available for all passengers in every city of more than 25,000 inhabitants in Ohio, except Youngstown, Toledo, and Cincinnati. A fare of approximately 4 cents appears also in about a dozen places in Iowa, the largest of which is Des Moines. Similar rates are also found occasionally in the Western and Southern states.

Fares even lower than 4 cents exist in a few cities and towns. The most familiar instance is Detroit, Mich., where, on part of the system now operated by the Detroit United Railways Company, 8 tickets for 25 cents are sold, in accordance with the terms of the franchise under which these lines were constructed. The new Central Market Street Railway in Columbus, Ohio, sells 8 tickets for 25 cents, while the older street railways in this city offer 7 tickets for 25 cents. The rate of 7 tickets for 25 cents also prevails in Salem and Delaware, Ohio, while in two or three other towns of the state where 6 tickets are sold for 25 cents, 27 may be bought for $1. A rate of 7 tickets for 25 cents is also made on the Pittsburg, McKeesport, and Greensburg Railway, of Pennsylvania, while in Kansas one of the minor companies offers 28 tickets for $1 and another 30.

In addition to railways which thus practically fix their fares at 4 cents or less, there are a number which grant slight reductions from the 5-cent fare. The rate of 11 tickets for 50 cents exists in Pueblo, Colo., on two interurban railways of Maine, and in several other places. In Mobile, Ala.; Santa Barbara, Cal.; Colorado Springs, Colo.; Auburn, N. Y.; Lincoln, Nebr.; Toledo, Ohio; Spokane and Tacoma, Wash.; and a number of other places, the railways sell 22 tickets for $1. The leading companies of northern New Jersey offer 21 tickets for $1, while on a number of railways of minor importance in various parts of the country, from 105 to 110 tickets are sold for $5.

Reduced fares for particular classes of passengers.—Sometimes street railway companies carry young children in company with their parents for half-fare. In Baltimore, Md., for example, the fare for children is 3 cents. It is probably more common, however, to charge full fare for children above a certain age and carry others free. A more important practice is that of granting reduced fares to school children. In such cases the most common rate is 2½ cents, though sometimes 3 or 4 cents is charged. In New England, it is almost universal for street railways to carry school children at reduced rates. Outside of New England, the practice is frequently found in smaller cities and towns, and in a few instances, in large cities also. Among the important cities which offer a fare of 2½ cents to school children are Boston, St. Louis, San Francisco, and Denver. Street railway companies presumably act on the theory that, by thus reducing the fares of school children, they will secure a considerable amount of traffic from those who would otherwise walk.

The practice of granting special rates to working people is comparatively rare in the United States. The returns to the Bureau of the Census do not indicate, in some cases, whether such special rates reported are limited in any way, and in other cases they do not show pre-

cisely the restrictions imposed; but usually there is no restriction except as to the time of day at which the journey is taken. In general, it may be said that the reduced fare for workingmen is confined to the hours from about 6 to 8 in the morning and from about 5 to 7 in the evening. Naturally any person who rides at that time may usually avail himself of the reduced fare. The special rate is sometimes confined to particular routes or distances. The practice is more common in New England than elsewhere. About sixteen of the street railway companies of Massachusetts reported reduced fares for workingmen, the most common rate being 2½ cents, although several railways reported 3 or 4 cents. The most important company which makes special rates for workingmen is the Boston and Northern Railway Company, which serves many cities and towns in eastern Massachusetts.

Among other instances of reduced fares for working people may be mentioned the practice of certain railways in the mining districts of Pennsylvania. For example, two companies centering at Shamokin, and several others elsewhere, sell 30 workingmen's tickets for $1. The Detroit and Port Huron Shore Line and the Saginaw Valley Traction Company sell 8 tickets for 25 cents to workingmen, while the railways of Zanesville, Ohio, and Clinton and Dubuque, Iowa, make a 2½-cent rate. When the elevated railways were first opened in New York they charged a 10-cent fare, but were required by law to carry passengers for 5 cents during the rush hours morning and evening.

It is rarely if ever true that workingmen taking advantage of such special rates are confined to particular cars. One frequently hears the suggestion, on behalf of the more well-to-do patrons of American street railways, that a class distinction in cars and fares should be made systematically, as is frequently done in European cities. It is complained that the presence of laborers in a crowded car is often distasteful to many of the passengers, and that, in some cases, their working clothes soil those of the other passengers. Aside from the general objection that such a plan would be contrary to American ideas of equality, street railway officers are very generally opposed to it from a business standpoint. Presumably it would mean a loss in revenue in many cases, since the distinction probably would have to be made by lowering the fares of second-class passengers rather than by raising those of first-class passengers. It is also argued that the attempt to enforce any such distinction would be virtually impossible in those cities where traffic is heavy, and where to wait for a car of the desired class would be most annoying. In all probability, the cars or compartments with reduced fares would be largely patronized by all classes of people, and would be greatly overcrowded, while the first-class cars and compartments would run partly empty.[1]

[1] The Report of the Massachusetts Railroad Commissioners for 1903 contains an interesting discussion of the subject.

VII.

TRANSFERS.

Prevalence of transfer system.—The fact that transfers were issued to more than one-fifth of the fare passengers on street railways in 1902 indicates the great importance of this practice in connection with the social service of street railways. As already pointed out, the proportion of passengers who transfer is highest in the large cities, where the railway lines are complex and where the distances to be covered are great. An examination of the detailed statistics for individual companies shows that there is scarcely an important surface railway in a city of more than 100,000 inhabitants which does not grant transfers on an extensive scale. The proportion of transfer to fare passengers, however, varies greatly among these railways. In the case of the Pittsburg Railways Company, which has 70 transfer points, only 11.4 per cent as many transfer as fare passengers are carried; and in Louisville, Ky., the proportion is still lower, 7.5 per cent. On the other hand, the great railway system of Boston, with only 38 transfer points, grants transfers to 51.7 per cent of its fare passengers. The construction of the elevated system in Boston, connecting by free transfer with many of the surface lines, has greatly increased the number of transfers granted. The Interurban Street Railway Company in New York has no less than 318 transfer points, and its transfer passengers are equal to about 40 per cent of its fare passengers. The Brooklyn Rapid Transit Company has a still larger number of transfer points, but the proportion of fare passengers who take transfers is much smaller—20 per cent. The Chicago Union Traction Company has 300 transfer points, and the proportion of transfer to fare passengers is 41 per cent.

The differences in the relative number of transfer stations and in the proportion of transfer passengers are due less to differences in the liberality with which transfers are granted than to differences in the geographic characteristics of cities, in the location of railway lines, and in the arrangement of continuous trips. Generally speaking, in most of our large cities, transfers are granted in such a way that a passenger can go from any point to any other point within the city limits, reached by the cars of the same company, unless the trip involves a return to approximately the starting point. Sometimes transfers are granted only on cash fares, not upon other transfers.

While transfers are given without charge in the great majority of instances there are a few exceptions, particularly where the transfers are between lines of separate companies. An arrangement of the latter type existed until recently between the Manhattan Railway's elevated lines and the Third Avenue Railroad Company's surface lines in New York, 3 cents being charged for a transfer ticket. The only important company

which requires payment for a large proportion of all transfers is the Union Traction Company of Philadelphia. An "exchange ticket" on its lines costs 8 cents, or 3 cents in addition to the single-trip fare. But the ticket is of indefinite duration and good at many different points, so that it can be held by the passenger until he has occasion to take a ride for which the transfer will serve. The company claims that the system has practically resulted in reducing the fares for a considerable portion of its patrons to a 4-cent basis, and that it is preferred by them to the granting of free transfers limited as to time and place. A considerable number of free transfer points also exist in Philadelphia.

Causes of the extension of transfer privileges.—The granting of transfers is largely a recent development. The consolidation of the street railways in most cities into one or two companies has offered opportunity for the extension of the system to a degree previously impossible. The transfer has served to increase greatly the possible length of ride which can be taken for a single fare, and to lengthen materially the average ride of all passengers. Moreover, the use of transfers makes it possible, without adding to the aggregate number of car miles operated, to increase the frequency of service between the more widely separated parts of a city. It might be possible for a railway company to cover the trip from a point on one line to a point on another line by a continuous car. In fact, in some European cities, complicated routes are arranged so that a person can go from any part of the city to almost any other part without change of cars. To carry out such an arrangement to its full extent, however, means that the cars which cover a given trip between widely separated points must run on a very infrequent schedule unless they run largely empty. By breaking the possible journeys into separate units connected by means of transfers, it becomes possible to operate on each unit of track the number of cars which the amount of its traffic demands, and often also to collect into a single car passengers transferred from several different lines.

The extension of the transfer system is partly the result of a direct popular demand. This demand, in the opinion of various street railway managers, would have expressed itself in a movement for lower fares had it not been met by greater liberality in regard to transfers. In several cities transfers are now made compulsory by law. Thus the present street railway law of the state of New York provides that any company, which has obtained its franchise since the law was passed, must, for a single fare, carry passengers between any two points within the limits of a single city which can be reached by its lines. When the control of the Third Avenue Railroad and its subsidiary lines was secured by the Metropolitan (Interurban) Street Railway Company, it was at first held by the latter company that the two railway systems were distinct, and that transfers between them were not obligatory under the law, but the courts have taken the opposite position in a recent case. The same decision, however, upheld the railway company in its refusal to issue transfers at certain points, on the ground that the congestion of traffic there renders the transfer of passengers dangerous to life and limb.

In Chicago the city council, under its authority to regulate the charges of railway companies, has passed an ordinance requiring every street railway to grant a free transfer from a car on which a cash fare has been paid to the cars of any other of its lines with which it connects. Transfers are good only if used within one hour. The supreme court of Illinois has held that the power to regulate fares includes the power to require the issue of transfers, or, in other words, the power to regulate the fare charged for trips over more than one line of the same company. It has also held that transfers must be granted between the lines of the Chicago Union Traction Company and those of the Chicago Consolidated Traction Company, since the former corporation controls the latter.[1]

As a rule street railway companies themselves have been liberal in their policy regarding transfers, and have made most of the extensions of the transfer privilege on their own initiative, in the belief that traffic and profits would be increased thereby. The head of one of the largest street railway systems in the country has stated that, in his opinion, nothing since the adoption of electric traction has done more to increase the receipts of his company than the giving of transfers. Other highly favorable opinions regarding the financial results of the system have frequently been expressed by prominent street railway managers. It is reasoned that for many people the extent to which street cars are patronized depends largely on the convenience of the service; that street car riding is, in some measure, a matter of habit which can be cultivated; and that, as a result of the longer possible rides under the transfer system, thousands of people live in the outskirts of the city or in the suburbs who would otherwise seek homes within walking distance of their places of business.

Difficulties in administration of transfer system.—The use of transfers involves certain administrative difficulties which are not fully appreciated by patrons of street railways. The railway company can not reasonably be asked to issue a stop-over ticket which will allow the passenger an indefinite amount of time at the transfer point. Still less can it be expected to grant transfers in such a way that the passenger can return to his starting point without paying an additional fare. In most cities there are railway lines so situated that an unlimited grant of transfers would make this possible, particularly if transfers be issued upon transfers. For this reason companies sometimes decline to permit

[1] Chicago Union Traction Company *vs.* City of Chicago, 65 Northwestern Reporter, pages 451 and 470, October 25, 1902.

transfers at certain points where they would be of material convenience to many people. Other companies, however, prefer to incur the comparatively small loss due to the failure of a few passengers to pay fares for what are practically return trips, rather than to displease the public by withholding transfers which can reasonably be demanded. An effective enforcement of the time limit on transfers would do away with many of the abuses of the system, but such enforcement is often found to involve considerable difficulty, and the railways naturally desire to avoid altercations between conductors and passengers as to the validity of transfers.

A further difficulty arises from the fact that passengers occasionally take transfers which they do not need and give them to other persons, who either use them themselves or sell them at a reduced price. Still more serious is the fraud sometimes practiced by conductors, by which they turn in transfers obtained from passengers, or from other conductors, in collusion in place of cash fares which have actually been paid. Much difference of opinion exists among street railway managers as to whether there is more opportunity for this practice when transfers are registered or when they are not registered.

Notwithstanding all these difficulties, street railway officers quite generally favor the transfer system, and believe that their losses through its abuse are small in the aggregate as compared with its advantages to themselves and to the people.

An act passed by the legislature of the state of Rhode Island in 1902 contains provisions which represent in a general way the ideas of railway men as to what constitutes a fair system of transfers. It requires every street railway company to issue a transfer to any cash-fare passenger in such a way as to enable him to reach any point in the city or town which can be reached by a second car, but which could not be reached by the first. The passenger must demand the transfer ticket at the time he pays his cash fare, and must continue his journey on the first car which passes the point of intersection. No company is required to issue a transfer which will enable a passenger "to return toward the point where he first took passage by a line running parallel with or in substantially the same general direction as the one to which he is transferred." Transfer tickets are not transferable, and any person who gives a transfer to another except to a conductor, or any person who offers to a conductor a transfer ticket which was not issued to himself, is subject to a fine.[1]

[1] Public Laws of Rhode Island, 1902, chapter 965.

CHAPTER IV.

CAPITALIZATION.

Basis of statistics and method of presentation.—Table 93 shows for each company, both operating and lessor, the amount of authorized capital stock, whether common or preferred, the amount issued and outstanding, and the dividends declared thereon; the amount of authorized and outstanding funded debt, with the rate of interest thereon; and the combined total of the capital stock and funded debt outstanding. A further column shows the capitalization per mile of track owned by each company, based on the net capital liabilities, as described more fully hereafter. The statistics of 7 companies operating 134.98 miles of track are not given. In the case of most of these companies the electric railway system is part of an ordinary steam railway system, and the capital properly assignable to the former can not be segregated from the general capitalization of the company as a whole. The capitalization of 52.97 miles of track leased from steam railways by electric companies is also omitted for the same reason.

Many companies have promissory notes for considerable amounts outstanding. The schedule, however, did not distinguish between notes of this sort and other floating obligations, such as accounts payable, audited vouchers, etc., and for this reason it is impossible to ascertain for companies individually, or for all companies combined, the amount of floating debt which can be strictly designated by the term "bills and notes payable." In many instances such floating debt has been incurred, not for the purpose of construction and equipment, but merely as an incident to current operations. There are, however, a considerable number of companies, particularly in Massachusetts, which have borrowed large sums on promissory notes, to be used for construction or equipment, and these properly constitute a part of their capital liabilities. It is possible that the prevalence of this practice in Massachusetts is connected with the strict regulation by the state law of the amount of capital stock and funded debt of street railways. For companies having large floating debts of this character, the items in Table 93, showing the total capital stock and funded debt, and the net capital liabilities per mile of track, are, in a sense, misleading. In the case of various companies in Massachusetts, footnotes have been appended to the table calling attention to the fact that a large amount of floating debt is outstanding. To the extent that these floating debts are properly to be considered capital liabilities, the total capital liabilities of street railway companies in the United States are understated. The amount so involved is, however, small as compared with the aggregate amount of capital stock and funded debt for the entire country.

A disturbing element in calculating the amount of capital liabilities per mile of track is found in the fact that many street railway companies own property other than the railway itself. Frequently one company owns securities of another street railway company. In the numerous cases in which an operating company owns the entire stock issue of a subsidiary company, the Census Bureau has usually dispensed with a report from the latter, and has treated the cost of its securities to the operating company as part of the cost of construction of the system of that company. In cases in which the securities owned are those of another company which reported to the Census Bureau, there is, of course, a duplication. Ordinarily the holding company has issued its own securities to an amount sufficient to cover the cost of the securities held, and expects to apply the dividends and interest which it obtains from the securities purchased to the payment of dividends and interest on its own issues based thereon. Even when securities are purchased by the use of a surplus, the transfer of part of the securities of one company into the treasury of another may be considered as, in a sense, reducing the aggregate amount of capitalization for the two combined. The holding company now derives (or at least hopes to derive) part of the income which its surplus should earn from the return on the securities owned, and need not demand so large a profit from the railway which it operates. For this reason the value of the securities of a reporting street railway which are owned by another reporting company should be deducted in determining the net capitalization based on the railway property of the holding company.

Again, it is very common for street railway companies to operate plants for the production of light and power for sale. The majority of such companies, however, declare that they are unable to distinguish at all accurately between the investment in the street railway branch and the investment in the light and power branch of the business. Accordingly, no attempt has been made in the returns of capitalization for individual companies or in the totals to segregate the value of light

and power plants. The fact that a company operates such a plant is indicated in a footnote in connection with the column showing the total capital liabilities, although, in the many cases where a company sells a small quantity of light or power without an appreciable extra investment of capital, no note is made of the fact. It is obviously improper to compare the capitalization per mile of track of street railways having light and power plants with that of other street railways. However, the figure of capitalization per mile of track for the United States as a whole, and the corresponding figures for most of the individual states and for groups of cities, are not largely affected by the presence of light and power plants. It is probable that the extra investment in such plants by the street and interurban railway companies of the country as a whole does not exceed 5 per cent of their total investment of capital. This opinion is strengthened by the fact that the total revenue of railway companies from sale of light and power is only 3.1 per cent of their operating earnings.

Footnotes to Table 93 call attention to the instances in which street railway companies have permanent investments aside from those in light and power plants and in their own railways. The amount of such investments has been stated wherever the company gave its consent, and that amount has been deducted in the calculation of the net capital liabilities based on the railway property. The figures in the last column of Table 93, showing the amount of net capital liabilities per mile of track, are obtained, with respect to most individual companies and with respect to all state and national totals, by dividing the amount of trackage owned (not the amount operated) into the net capitalization, as ascertained by deducting from the sum of the capital stock and funded debt outstanding the value of securities of other reporting railways held and the value of other outside investments, the value being in each case that at which these securities or investments are carried in the balance sheets of the holding companies, designated as "other permanent investments," in the Census schedule.[1] Much the larger part of the "other permanent investments" reported by all the companies combined represents the stocks and bonds of other reporting railways.

In many instances where street railways have been combined, either through stock ownership or through lease, the controlling company makes capital expenditures upon the lines of the subsidiary companies. The capitalization of the operating company may, therefore, appear exceedingly large in proportion to the trackage which it directly owns, being based in part on trackage of the subsidiary companies. On the other hand, the capitalization of the latter does not represent in such cases the total investment upon their lines. One of the most conspicuous illustrations of this situation is found in the Third Avenue system in New York. The Third Avenue Railroad Company itself has capital stock and funded debt outstanding to the amount of $55,995,800, while it owns outright only 27.24 miles of track. But the company owns $10,455,290 of the securities of its eight subsidiary companies, and, moreover, has advanced to them $11,383,476 for construction work. The capital stock and bonds of several of these companies are much less in amount than their cost of construction. The system as a whole has 230.73 miles of track, and the net capital liabilities are $269,142 per mile. In cases of this sort the parent and subsidiary companies have been treated as one system in computing the ratio of capital liabilities to the trackage, and any duplication of capital stock or funded debt due to the ownership of securities of one company by another has, as in other cases, been eliminated.

Capitalization of companies, classified according to power.—Table 20 is a summary of the statistics of capitalization for all street and electric railways and also for these railways classified according to power.

[1] Strictly speaking, the net capitalization should be computed by deducting the par value of the securities of other street railways held, but this figure was not called for in the schedule.

TABLE 20.—CAPITALIZATION OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	Electric, surface.			Animal.	Steam and electric, elevated.	Cable, surface and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Number of companies	980	724	121	58	54	6	14	3
Track mileage	22,389.04	18,662.29	2,464.19	831.17	158.12	228.10	33.11	12.06
Capital stock outstanding, amount	$1,315,572,960	$1,072,946,092	$116,777,854	$20,751,900	$5,469,114	$95,531,600	$4,000,500	$95,900
Preferred	127,930,179	91,077,179	21,644,900	1,500,000	.....	13,708,100	.....	.....
Common	1,187,642,781	981,868,913	95,132,954	19,251,900	5,469,114	81,823,500	4,000,500	95,900
Per mile of track	58,760	57,493	47,390	24,967	34,588	418,815	120,825	7,952
Funded debt outstanding, amount[2]	992,709,139	787,783,775	102,753,197	19,260,994	4,647,923	76,125,050	2,028,200	110,000
Per mile of track	44,339	42,213	41,699	23,178	29,395	333,735	61,256	9,121
Total capital liabilities	2,308,282,099	1,860,729,867	219,531,051	40,012,894	10,117,037	171,656,650	6,028,700	205,900
Investments in securities and nonrailway property	152,513,997	141,665,458	9,267,550	927,200	107,728	92,390	453,676	.....
Net capital liabilities	2,155,768,102	1,719,064,409	210,263,501	39,085,694	10,009,314	171,564,260	5,575,024	205,900
Per mile of track	96,287	92,114	85,328	47,025	63,302	752,145	168,379	17,073

[1] Exclusive of reports for 7 companies, having 134.98 miles of track, which failed to furnish this information, and exclusive of 52.97 miles of track leased from steam railway companies.

[2] Includes floating debt in the case of 7 companies which have not yet issued funding bonds.

The total authorized capital stock and funded debt of street and electric railways of the United States in 1902 was $2,870,629,316. Of this amount, $2,308,282,099, or 80.4 per cent had been issued and was outstanding at the end of the fiscal years covered by the various reports. This is exclusive of floating debt except in the case of 7 companies which have not yet issued intended funding bonds. Of the total outstanding capitalization, $532,813,318 represents the securities of lessor companies, $332,603,890 of this sum being stock and $200,209,428 bonds.

The total outstanding capital liabilities of companies operating primarily electric surface railways, including part-time roads, amounted to $2,120,273,812, or 91.9 per cent of the total outstanding capital liabilities for all street and electric railways. Most of the remaining capitalization is represented by elevated railways.

Of the total capital liabilities outstanding, capital stock constitutes 57 per cent and funded debt 43 per cent. The proportions which the two classes of securities bear to one another differ only slightly as between electric, animal power, and elevated railways. The great majority of the railway companies have funded debts, and in many individual instances, the amount of funded debt considerably exceeds the amount of capital stock. The United Railways and Electric Company, of Baltimore, Md., for instance, has $15,073,306 of stock and $51,381,694 of bonds; the Metropolitan Street Railway Company, of Kansas City, has $5,636,800 of stock and $16,038,400 of bonds.

The amount of preferred stock outstanding is a little less than one-tenth of the total amount of capital stock. Only 85 companies have preferred stock. Nearly all of these companies also have bonds. None of the animal power or cable railways has issued preferred stock.

The total amount of investments of street railway companies, in securities and nonrailway property, aside from the investments in the railways which they own and in electric light and power plants, as carried in the balance sheets of the companies, is $152,513,997. Nearly all of these outside investments are held by companies operating primarily electric surface railways. Deducting the value of these investments, there remains, as the net capitalization represented by the railway and electric property of street railway companies, $2,155,768,102.

Capitalization per mile of track.—The combined total capital stock and funded debt of all street and electric railway companies is equal to $103,099 per mile of track owned by them. When the value of "other permanent investments" is deducted the net capital liabilities per mile of track are $96,287. The net capitalization of those companies which operate primarily electric surface railways and which do no commercial lighting amounts to $92,114 per mile of track. From one standpoint this sum exaggerates slightly the capitalization of electric surface railways proper. For among the companies included are two, Brooklyn and Boston, which have a considerable mileage of elevated track, and several which have cable trackage in addition to their electric lines. Elevated railways and cable railways cost much more to build than the ordinary overhead trolley surface lines. The average capitalization of the exclusively elevated railways in 1902 was $752,145 per mile of track and that of cable railways, including inclined planes, $168,379. Even the exclusively animal power railways show an exceedingly large capitalization per mile of track. An examination of the returns of separate companies, however, shows that $8,960,000, or nearly nine-tenths of the total capital liabilities of these animal power railway companies, have been issued by four companies in New York city, which own only 30.82 miles of track. On the average these four companies are capitalized at $288,556 per mile. The average capitalization of the remaining 50 animal railway companies in the United States is about $8,000 per mile of track.

The figures of capitalization per mile of track just given appear at first glance very large. They greatly exceed the capitalization per mile of the steam railways of the country. The Interstate Commerce Commission itself computes the relation of capitalization to trackage for such railways only on the basis of the length of line—that is, of first main track—nor does it make deduction of the amount of securities of other reporting railways held by the companies. The report of the Interstate Commerce Commission does not show the actual length of all railway tracks in the country. It does show the number of miles of track operated, including second tracks, sidings, switches, etc. This figure (274,195 miles in 1902) is several thousand miles greater than the mileage constructed, by reason of duplication, in the statistics of track operated under trackage rights. On the basis of track operated the total capital liabilities of steam railways in 1902 ($12,134,182,964) were equal to about $45,000 per mile of track. But in order to render the figures comparable with those for street railways it is necessary to deduct the large amount ($2,208,518,793) of stocks and bonds of reporting railways which are held by other railway companies. With this deduction the net capitalization of steam railways would be about $36,000 per mile of track.[1]

The enormous increase in the capitalization of street railways per mile of track since 1890 has already been pointed out (page 11). It is not within the scope of this report to enter into a detailed discussion of the question whether or to what extent the street and electric railway companies of the United States may be overcapitalized. To do so would involve a consideration of unofficial estimates of cost of construction, which vary greatly in individual instances. It may be of value, however, to present a few general considerations regarding capitalization, which may aid in the interpretation

[1] See Statistics of Railways in the United States, 1902, pages 15, 17, and 54.

of the statistics just presented. The subject of the relation between capitalization and actual investment in the street railways is a very important one from the standpoint of the general public. Upon it hinges largely the question of the reasonableness of street railway fares and the question of taxation. Information regarding the amount of current expense necessary to carry a passenger can readily be secured. For the United States as a whole, the margin between operating expenses and fares averages a little more than 2 cents per passenger, while in the case of several important railways the margin is fully 2½ cents per passenger. (See page 86.) Though from this margin must be deducted an amount to cover the depreciation of property and taxes, much the greater part constitutes a net return to capital. The amount of dividends and interest actually going to stockholders and bondholders, taking the street railways of the country as a whole, represents less than the current rate of interest on an amount equal to the face value of their outstanding securities. Few companies pay a high rate of dividend. If the capitalization of the street railways of the country represented real value, dollar for dollar, earnings might appear to be not too great, but too small. The question of the reasonableness of profits thus becomes primarily one as to that of capitalization.

It is quite impossible to obtain accurate information as to the actual amount of money which has been spent in the construction and equipment of street railways in general or of most individual street railways. The item, "cost of construction," as carried on the books and balance sheets of street railway companies gives, in most cases, no idea whatever of the cash investment. The intervention of construction companies composed of the promoters of the railway has in many cases rendered the book value of properties misleading, and other similar reasons might be given. The most important difficulty, however, is that the greatest railway systems now existing have been built up by combination and recombination. The cost which a company enters upon its books when it buys another system is the amount of cash or securities which it has paid for the going concern. This amount is based upon the earning capacity, largely, if not wholly, irrespective of original cost. The records of cost of the absorbed companies are no longer accessible, and even if they were would probably not show correctly the actual investments. Estimates of engineers regarding the cost of construction hold good only for the conditions of the given time and place, and may be very far from correct as applied to the great majority of existing railways.

Causes tending to increase capitalization.—There are many causes which have tended to increase the capitalization of street railways during recent years. The cost of the roadbed of street railways is greater than is ordinarily supposed and has increased very materially under change from horse traction to electric traction.

Steam railways must incur large expense for grading, for making cuts and fills, for bridging streams, and tunneling mountains. Street railways, in most instances, are built on streets and roads already graded; they largely make use of public bridges and seldom have need of tunnels. Even in the case of urban railways, however, the foundation and roadbed, aside from the rails, involve much expense, particularly in the large cities, where the construction is often immensely superior to that in small towns. The heavier cars which have come into use have necessitated the most careful and expensive methods in the preparation of the foundations for tracks. In cities street railways are required, ordinarily, to pave the streets between their tracks and for a short distance on either side. The expense thus incurred is often greater than the cost of the rails themselves and greater than the cost of grading for steam railways under ordinary circumstances. The recent estimate of Mr. B. J. Arnold, regarding the cost of duplicating the Chicago street railway system, places the expense of paving at from $6,808 to $18,400 per mile of track, according to the character of pavement used.[1] Of course railways in small towns and many of the lighter interurban railways, particularly of those which are laid in or at the side of the country roads, have been subject to much less expense for grading, foundations, and paving than the best railways in the great cities. On the other hand, the highest type of electric interurban railway, operating on a private right of way, has a roadbed nearly if not quite as perfect and as expensive as that of steam railways in the same section of the country.

In the days of horse railways, the rails used were light in weight, often less than 40 pounds per yard. Nowadays the more important street railways in the cities, as well as the best fast interurban lines, are using rails of from 80 to 120 pounds weight per yard. These rails are heavier than those employed on a large proportion of the steam railway trackage. All the special work which accompanies the track has similarly increased in weight and in cost. To the cost of the track must be added that of overhead electric construction, an element of expense wholly lacking in the case of horse and steam railways. Underground trolley and cable construction are much more expensive still. The rolling stock of the modern electric railway costs far more than that of the old horse railway; the cars are larger, heavier, more comfortable, and more elegant; the motors cost far more than the horses which formerly hauled the cars; and the modern power house is a new and important source of capital expenditure.

Reconstruction in relation to capitalization.—One of

[1] See Report on Chicago Transportation Problem, 1902, page 192. The cost of macadamizing is put at $3,450 per mile.

the most important points to be borne in mind, in considering capitalization of street railways, is the cost involved in the reconstruction which has been necessitated by progress in methods. It is a fact sometimes overlooked that the tracks and equipment of the old-fashioned horse railways had practically to be thrown away when cable or electric traction was introduced, and that, in most cases, the expense of the new system was almost as great as it would have been had there been no previous railway whatever. The capitalization of the different kinds of street railways in 1890 can not be segregated accurately, but it is probable that the horse lines were represented by securities to the amount of fully $250,000,000, much the greater part of which was based on property that has since become valueless.

The cable railways which existed in 1890 have to a great extent been changed to electric operation, this being true even of two or three important cable lines completed since 1890. A considerable fraction of the large investment in cable railways has been destroyed by the change. The power houses, cables, and grips have been virtually thrown on the scrap heap; the subways in which the cables ran, the cost of which was very great, have been wholly abandoned in many instances; while in other instances the expense of reconstructing them for the use of the underground electric trolley, which has been done extensively in New York and Washington, is much greater than is ordinarily supposed. Mr. B. J. Arnold, in his report to the Chicago city council, declared that it would cost nearly as much to convert the cable lines of that city to the underground trolley system as to construct the latter at first hand. The expense, as indicated in the report, would depend largely upon the size of rails and the strength of conduit yokes used under the cable system. If, as in Chicago, heavier construction should be necessary to bear the strain of modern cars and speeds, the old work would be of little value.[1]

So, too, the change from steampower to electricity, particularly on the elevated railways of New York and Brooklyn, involved a great waste of capital.

Finally, many street railway companies have, even within the short time since electric traction was introduced, largely reconstructed their plants and equipment. The earlier motors, notwithstanding their high cost, proved insufficient in power and unsatisfactory in other ways. They have for the most part been replaced, and, in many instances, even these new motors have again been replaced. The small cars, unsuited to high speed, have given way to larger ones. The foundations of the roadbed and the tracks have had to be reconstructed and strengthened in many cases to meet the requirements of larger cars and increased speed. Even more conspicuous, perhaps, have been the replacements of the engines and dynamos in the power houses.

[1] Report on the Chicago Transportation Problem, 1902, page 158.

Changes of this sort result in greater economy of operation, and are usually profitable to the railway company even when the interest on the new investment is taken into account; but they have of necessity greatly increased the aggregate expenditure for construction and equipment. The railways, as they stand, have cost much more than they would cost if constructed de novo at the present time.

It is not true, however, that all street railways have been thus compelled to abandon or reconstruct properties representing large investments of capital. Most of the fast interurban railways have been built since the methods of construction and equipment were highly developed and have required as yet little reconstruction. Many railways in the smaller towns and cities, as well as a considerable part of the trackage even in large municipalities, date likewise from a recent period. In fact, as appears from Table 21, the capitalization of many of these newer railways is very much less per mile than that of older systems in large cities. No opinion is here expressed as to whether the present capitalization of street railways generally, or of any particular railway, corresponds to the total amount of money which has been actually invested in its present and past properties taken together. Attention is merely called to the fact that, taking the country as a whole, the aggregate waste of capital involved in the progress of street railway methods has been great. That waste must particularly be borne in mind in considering the capitalization of many individual companies.

The question at once occurs, however, to what extent property which has become valueless should continue to be represented by securities and to earn interest or dividends. It is commonplace in accounting that a certain amount should be charged annually against earnings, to cover, not merely depreciation arising from ordinary wear and tear, but also the probable depreciation arising from progress in methods. Street railway companies ought, of course, to be permitted to charge fares high enough to provide for such a reasonable depreciation allowance. Under proper accounting the net capitalization represented by depreciating property is thus gradually reduced, and the amount required from earnings for dividends and interest is correspondingly lessened. Doubtless, in many cases, street railways have in the past earned profits high enough to enable them to make such depreciation allowances if they had seen fit to do so. Their policy, however, almost without exception, has been to pay out the greater part of net income in dividends, although a surplus is often invested in the construction of extensions to old lines. Had correct accounting methods been pursued, the capitalization of many horse railways would have been completely written off by the time electric traction had rendered the plants valueless.

During the years since electricity was introduced,

changes in methods on many railway systems have been so rapid, and capital has been expended so fast, that it would have been impossible to make a depreciation allowance sufficient to write off the waste capital within the period of time during which it existed, without practically excluding the possibility of interest and dividends. Moreover, sufficient experience had not been accumulated, at least during the earlier years of electric traction, to enable accountants to determine what would be a reasonable allowance for depreciation. In instances where property is being replaced so rapidly it seems reasonable that the capitalization should be temporarily increased beyond the sum which would be necessary to construct the improved railway system from the beginning. But it seems equally reasonable that such capitalization, in excess of the cost of reproducing the properties, should thereafter be reduced as rapidly as possible by the accumulation of a depreciation fund. There is little probability that such sudden and great changes in methods will be necessary in the future as in the immediate past, and it will be possible hereafter to estimate depreciation better and to provide for it. Permanently to demand interest and dividends on securities issued for properties no longer in existence is unjustifiable.

Capitalization of companies, classified according to population.—Table 21 shows the statistics of capitalization of street and electric railways in urban centers, classified according to population, together with the two groups of interurban railways.

TABLE 21.—CAPITALIZATION OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	980	142	57	102	321	60	298
Track mileage	22,389.04	4,981.50	3,531.02	2,907.13	2,240.24	2,766.23	5,962.92
Capital stock outstanding, amount	$1,315,572,960	$678,097,721	$236,338,265	$111,533,632	$50,086,219	$78,678,375	$160,843,748
Preferred	127,930,179	66,870,006	20,650,000	18,276,137	2,004,581	6,932,475	13,196,980
Common	1,187,642,781	611,227,715	215,688,265	93,257,495	48,081,638	71,740,900	147,646,768
Per mile of track	58,760	136,123	66,932	38,366	22,358	28,441	26,974
Funded debt outstanding, amount	992,709,139	488,648,145	167,314,210	77,858,913	39,341,284	68,615,080	150,931,507
Per mile of track	44,339	98,093	47,384	26,782	17,561	24,805	25,312
Total capital liabilities	2,308,282,099	1,166,745,866	403,652,475	189,392,545	89,427,503	147,288,455	311,775,255
Investments in securities and nonrailway property	152,513,997	124,803,819	4,556,993	5,671,304	3,301,516	2,416,934	11,763,431
Net capital liabilities	2,155,768,102	1,041,942,047	399,095,482	183,721,241	86,125,987	144,871,521	300,011,824
Per mile of track	96,287	209,162	113,026	63,197	38,445	52,371	50,313

[1] Exclusive of reports for 7 companies, having 134.98 miles of track, which failed to furnish this information, and exclusive of 52.97 miles of track leased from steam railway companies.

This table shows that of the total capital liabilities outstanding, which amount to $2,308,282,099, a trifle more than one-half has been issued by the railways in cities of more than 500,000 population, and an additional one-sixth by railways in urban centers of from 100,000 to 500,000 inhabitants. The capital liabilities of the fast, long interurban railways amount to $147,288,455.

The proportions of the total capitalization represented by capital stock and funded debt do not greatly differ as among the four groups of urban centers, the bonds in each group being approximately three-fourths as great in amount as the stocks. On both classes of interurban railways the bonds are equal to about nine-tenths of the capital stock. In recent years street railway companies have become more and more disposed toward the issue of bonds. (See comparison with 1890, page 11.) Interurban railways, which are mostly of recent origin, reflect this tendency in their large proportion of bonds to stock.

The investments of companies in securities and property outside of the street railway plants themselves and lighting plants are most conspicuous in the largest cities. This is explained by the fact that in the process of combination among railways in these great centers the securities of certain companies have become in large amounts the property of other companies.

Capitalization of full-time electric surface railways without commercial lighting, classified according to population.—Table 22 presents similar classified statistics of capitalization for those street railway companies which operate primarily electric surface railways, without commercial lighting, and which operated throughout the census year.[1]

[1] Companies operating only part of the year are excluded merely in order that the table may represent the same companies for which statistics of operation and income are elsewhere presented. Obviously, the fact that a railway has been only recently constructed and has not operated a full year does not ordinarily affect its capitalization.

TABLE 22.—CAPITALIZATION OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	724	122	48	85	172	46	251
Track mileage	18,662.29	4,701.99	3,222.74	2,159.26	1,359.51	2,162.62	5,056.17
Capital stock outstanding, amount	$1,072,946,092	$576,716,121	$208,688,065	$74,375,407	$27,238,266	$61,210,375	$129,717,858
Preferred	91,077,179	53,161,906	14,350,000	9,726,237	934,581	4,832,475	8,071,980
Common	981,868,913	523,554,215	189,338,065	64,649,170	26,303,685	56,377,900	121,645,878
Per mile of track	57,493	122,654	63,203	34,445	20,035	28,304	25,655
Funded debt outstanding, amount	787,783,775	407,295,222	144,608,710	44,719,913	19,430,843	51,717,580	120,011,507
Per mile of track	42,213	86,622	44,871	20,711	14,293	23,914	23,736
Total capital liabilities	1,860,729,867	984,011,343	348,296,775	119,095,320	46,669,109	112,927,955	249,729,365
Investments in securities and nonrailway property	141,665,458	124,603,706	3,132,821	2,672,870	780,169	2,219,093	8,256,799
Net capital liabilities	1,719,064,409	859,407,637	345,163,954	116,422,450	45,888,940	110,708,862	241,472,566
Per mile of track	92,114	182,775	107,103	53,918	33,754	51,192	47,758

[1] Exclusive of reports for 7 companies, having 134.98 miles of track, which failed to furnish this information, and exclusive of 52.97 miles of track leased from steam railway companies.

The most significant fact brought to light by this table is that the capitalization of full-time electric surface railways without commercial lighting is very much greater in proportion to their trackage in large urban centers than in small ones. The average net capital liabilities of such street railways in centers of more than 500,000 population is no less than $182,775 per mile of track, or about five times as great as the net capitalization per mile of track of the steam railways of the United States. (See page 46.) For centers of 100,000 to 500,000 inhabitants the capitalization of railways of this class is $107,103 per mile; for centers of 25,000 to 100,000 inhabitants it is $53,918 per mile; and for those of less than 25,000 population, $33,754. The average capitalization of fast, long interurban railways is $51,192 per mile of track, and that of other interurban railways $47,758.

These averages include widely varying ratios of capitalization to trackage as among the different companies in each population group. Table 23 shows the number of companies in each group whose net capital liabilities fall within the limits specified.

TABLE 23.—*Distribution of full-time electric surface railway companies, without commercial lighting, in the several urban and interurban groups, according to capitalization per mile of track: 1902.*[1]

NET CAPITAL LIABILITIES PER MILE OF TRACK.	NUMBER OF COMPANIES.						
	Total.	Urban centers, population.				Interurban railways.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Total	566	48	37	69	169	40	203
Under $25,000	196	5	2	13	80	4	92
$25,000 but under $50,000	184	8	2	26	60	22	66
$50,000 but under $75,000	87	9	7	16	20	9	26
$75,000 but under $100,000	35	6	5	5	5	3	11
$100,000 but under $150,000	35	2	18	6	2	2	5
$150,000 but under $200,000	10	6	1	.....	1	.....	2
$200,000 but under $300,000	10	8	1	1	.....	.....	.....
$300,000 and over	9	4	1	2	1	.....	1

[1] Exclusive of reports for 6 companies which failed to furnish this information.

This table includes only primarily electric surface railways, without commercial lighting, operating the entire year. Lessor companies are omitted except where, as in several important cases, their capitalization and trackage are combined with those of operating companies. While only 12 of the 48 companies in urban centers of more than 500,000 inhabitants show a net capitalization exceeding $200,000 per mile of track, these 12 companies have 2,246.17 miles of track, or more than half of the total for all operating companies in the group. Six other companies in this group report more than $150,000 per mile of track. In urban centers of 100,000 to 500,000 inhabitants only 3 companies report more than $150,000 per mile of track. Half the companies in cities of this size have between $100,000 and $150,000 of net capital liabilities per mile of track, and these companies own much more than half of the total trackage of operating companies. In urban centers of 25,000 to 100,000 population, only 14 out of 69 companies have a net capitalization exceeding $75,000 per mile of track. The largest group of companies in cities of this size comprises those reporting from $25,000 to $50,000 per mile. Of the 169 companies in the smallest urban centers, only 29 have more than $50,000 of net capital liabilities per mile of track, and nearly half report less than $25,000. More than half of the fast, long interurban railways fall within the group having from $25,000 to $50,000 of net capitalization per mile of track. Very few of the many "other" interurban companies report more than $75,000 per mile of track, and 92 of them report less than $25,000 per mile.

While there is thus no uniformity in the relation of capitalization to trackage in cities of a given group, the classified statistics of Table 23 show that the averages for the groups presented in Table 22 give a roughly correct idea of the capitalization of a large proportion of the trackage in the several population groups.

The enormous disproportion between the capitalization of street railways in urban centers of different population is attributable, at least in part, to differences

in cost of construction. It may be noted in the first instance that in cities of more than 500,000 population several important companies which operate predominantly electric surface railways operate also in part more expensive forms of trackage. Thus, such companies in Brooklyn and Boston have nearly 90 miles of elevated structure; while in Chicago and San Francisco they operate more than 90 miles of cable railway. In New York city there are about 180 miles of track with underground electric conduit. Each of these kinds of construction costs necessarily very much more than the overhead trolley construction. However, the total trackage of these three classes owned by primarily electric surface companies in cities of more than 500,000 population is only about one-thirteenth of their trackage. Even if a liberal allowance of additional capitalization be made for the more expensive systems, the securities remaining as strictly attributable to the overhead trolley surface railway trackage (including therewith 82.08 miles of horsepower railway in New York and Chicago) in cities of the first group would probably still be approximately $175,000 per mile of single track.

Various causes have tended to make the cost of ordinary overhead trolley railways higher in centers of more than 500,000 population than elsewhere. The traffic is much heavier per mile of track than in smaller places, and the road must, therefore, be equipped with more cars; the expense for power houses and for car barns is much greater per unit of track than in cities where the traffic is less dense; the track, being subjected to more severe strain than elsewhere, is in general more expensively constructed, with deeper and stronger foundations and heavier rails; and the cost of paving is likewise greater.

Perhaps the most important factor tending to increase the amount of capital expended in street railway construction in the great centers of population is the fact that there, more than anywhere else, public demand has compelled speedy adoption of improvements in methods, resulting in extensive reconstruction and replacement. It was mostly in the larger cities that horse railways were developed and abandoned. It was chiefly there, too, that cable traction superseded horse traction, only to be itself soon displaced in most instances by electricity. Changes in methods of operation in these cities have had, in many cases, to be accomplished without the interruption of traffic, thus increasing the cost of reconstruction.

As the expense of constructing street railways has been greater in centers of more than 500,000 population than in those of any other class, so, doubtless, railways in centers of from 100,000 to 500,000 inhabitants have cost more than those in the centers of the next smaller size, and the latter in turn more than railways in the smallest urban centers. Whether these variations in cost are sufficient to explain altogether the wide differences in the ratio of capitalization to trackage is a question that can not be fully discussed in this report. It may be observed, however, that the temptation to overcapitalize is stronger in the great cities, for the margin of earnings over operating expenses is greater in such cities than elsewhere. In smaller cities, or on interurban railways, the profits of the business are frequently scarcely enough to pay interest on the bare cost of construction. Under such circumstances the issue of securities beyond that cost would find its motive almost solely in the hope of future increase in earning capacity.

Capitalization, by states.—Statistics showing for each state the amount of capital stock and funded debt authorized and issued, and the relation of the net capitalization of street and interurban railways to their trackage, will be found in Table 93. The capitalization per mile of track shows wide differences between states. Careful analysis will furnish a partial explanation of these differences. The ratio of capitalization to trackage would naturally be greatest in those states where the largest proportion of the trackage is situated in great cities. Moreover, in some states there is a much larger proportion of the expensive elevated, cable, and conduit trolley railway than in others.

Comparisons are often made between the capitalization of street railways in Massachusetts and in other states. In Massachusetts the issue of securities by street railway companies is closely regulated by law and by the State Railway Commission.[1] The net amount of capital stock and funded debt of the street railways of that state, according to the present investigation, amounted to only $39,067 per mile of track. Many of the Massachusetts companies have promissory notes outstanding in considerable sums, which have been issued to cover construction expenses. Even if the total floating debt of the Massachusetts railway companies be added to their stock and bonds, however, the net capital liabilities amount to only $45,600 per mile of track. This figure may be compared with $96,287 per mile of track, the average of the United States for all classes of companies combined. The only states which show a capitalization per mile of track lower than Massachusetts are Arizona, Arkansas, Idaho, Maine, New Hampshire, New Mexico, Vermont, and Texas. In none of these states is there a large amount of street railway trackage, and in most of them there are no cities of considerable size. On the other hand, the average capitalization of street railways per mile of track in the state of New York is $177,532; in Maryland, $156,142; in Missouri, $152,206; in New Jersey, $148,155; in Illinois, $135,507; and in Pennsylvania, $103,267.

In connection with the low capitalization figures for Massachusetts railways, it should be noted that the railways of that state are in a considerable measure

[1] For further description of the practice in this state see Chapter IX, Part I.

interurban in character. Most of these interurban railway companies reported less than $20,000 of capital per mile of track. Their trackage has been built, for the most part, on the public highways and at a comparatively low cost, a cost much less than that of the fast, long interurban lines more recently built, particularly in the middle Western states, and much less than that of railways in large cities.

In the case of every state where the street railways have an average net capitalization of more than $100,000 per mile of track, a larger proportion of the trackage lies within the limits of great cities than is the case in Massachusetts. In Illinois and New York a large amount of elevated, cable, and conduit trolley trackage is included in the average, while Massachusetts railways are, with the exception of 16 miles of elevated track in Boston and 25.43 miles operated on the third-rail system, purely of overhead electric trolley construction. It is highly probable, however, that the street railways of Massachusetts are more conservatively capitalized than those of most other states. The figures from which the average for that commonwealth is drawn include the excellent Boston system and other very satisfactory systems in the medium-sized cities of the state.

Capitalization of surface railway companies in urban centers of more than 100,000 inhabitants.—Table 24 shows the net capital liabilities of surface street railways in each urban center of more than 100,000 population, together with the relation between capitalization and length of track. The table includes all companies operating surface railways predominantly, whether by electric, cable, or animal power. The five strictly elevated railways have been excluded. As an aid to the interpretation of the relation between capital liabilities and trackage, the length of each class of trackage in each city is indicated. The statistics of Milwaukee, Wis., St. Joseph, Mo., and Toledo, Ohio, are not exactly comparable with those of other cities, since in these three cases the railway companies also operate lighting plants.

TABLE 24.—CAPITALIZATION OF SURFACE RAILWAY COMPANIES IN INDIVIDUAL URBAN CENTERS OF 100,000 POPULATION AND OVER: 1902.

NAME OF CENTER.	Population.	TRACK MILEAGE.					Net capital liabilities.	Net capital liabilities per mile of track.
		Total.	Electric.	Animal.	Cable, surface and inclined planes.	Steam, surface.		
Albany, N. Y	216,530	75.83	74.83	1.00			$9,150,762	$120,675
Baltimore, Md	510,288	365.12	365.12				66,455,000	182,009
Boston, Mass	927,994	451.68	[1]451.68				43,972,299	97,353
Buffalo, N. Y	421,694	320.48	320.48				[2]25,920,923	87,076
Chicago, Ill	1,769,951	925.28	826.82	6.76	91.70		[3]99,951,396	109,587
Cincinnati, Ohio	429,137	263.57	261.46	1.50	0.61		27,583,430	104,653
Cleveland, Ohio	405,859	237.04	237.04				26,916,724	113,554
Columbus, Ohio	127,022	106.43	106.43				11,605,000	109,039
Denver, Colo	133,859	149.77	149.77				[4]10,837,000	75,377
Indianapolis, Ind	169,164	109.86	109.86				14,742,260	134,191
Jersey City, N. J	969,735	463.54	462.14		1.40		102,156,242	220,383
Kansas City, Kans	237,042	181.24	148.24		33.00		21,659,200	119,506
Los Angeles, Cal	118,746	164.16	154.86		4.85	4.45	12,849,500	78,274
Louisville, Ky	204,731	147.13	147.13				12,433,372	84,506
Memphis, Tenn	102,981	71.88	71.88				4,410,000	61,352
Milwaukee, Wis	301,701	145.50	145.50				[5]18,830,000	129,416
Minneapolis, Minn	378,923	251.02	251.02				28,898,000	115,122
New Orleans, La	287,104	180.31	180.31				22,157,000	122,883
New York, N. Y	3,551,107	1,181.96	[6]1,051.12	109.64	3.78	[7]17.42	306,768,678	259,542
Oakland, Cal	101,872	122.80	121.80	1.00			10,760,215	87,624
Omaha, Nebr	155,268	105.95	105.95				9,500,237	89,667
Philadelphia, Pa	1,293,697	517.53	517.53				85,436,344	165,085
Pittsburg, Pa	640,380	469.47	464.25		5.22		86,931,900	185,170
Providence, R. I	268,946	137.05	137.05				9,025,000	65,852
Rochester, N. Y	178,333	95.86	95.86				9,584,887	99,988
St. Joseph, Mo	102,979	35.15	35.15				[5]9,100,000	258,891
St. Louis, Mo	614,328	396.21	396.21				78,705,928	198,647
San Francisco, Cal	344,614	276.50	177.53	5.65	80.35	12.97	38,982,225	140,985
Scranton, Pa	155,655	76.68	76.68				8,187,410	106,774
Syracuse, N. Y	123,776	68.16	68.16				8,351,083	122,522
Toledo, Ohio	185,271	97.78	97.78				[5]21,574,504	220,643
Washington, D. C	279,940	139.67	[8]139.67				26,036,750	186,416

[1] Includes 16.02 miles of elevated track.
[2] Not including capitalization of 22.80 miles leased from a steam railway company.
[3] Not including capitalization of 12.79 miles leased from a steam railway company.
[4] Not including capitalization of Denver, Lakewood, and Golden Railroad Company, having 6 miles of single track.
[5] This company has a lighting plant, the capitalization based on which is included.
[6] Including 67.02 miles of elevated track and 178.89 miles of conduit trolley track.
[7] Elevated track.
[8] Including 85.08 miles of conduit trolley track.

The table shows a certain rough parallelism between population and the amount of net capital liabilities per mile of track, though there are several conspicuous exceptions. The heaviest net capitalization is found in Greater New York, where each mile of street railway is represented on the average by $259,542 of securities. It will be observed that a considerable amount of the trackage of the Brooklyn Rapid Transit Company, which is included in the table, is elevated, and that some of the other New York companies have much underground trolley track. The net capitalization of the Interurban Street Railroad Company in New York, combined with that of the subsidiary companies which it directly operates (excluding the Third avenue lines

and several others which the Interurban controls in other ways), represents an average of $494,399 per mile of track owned by these companies, the highest average reported for any important surface railway system. This system comprises 198.74 miles of track, of which 131.13 miles is operated by conduit trolley. Nearly all the rest of the trackage, however, is operated by animal power. The capitalization of this system may be contrasted with that of the railways of the city of Washington, two-thirds of whose trackage is of the underground conduit type, which are capitalized at $186,416 per mile. It must be noted, however, that the lighter traffic of the Washington railways permits a smaller investment per mile in equipment than is required for the denser traffic of the Interurban railway; and again, that the Interurban company has converted to electric traction a larger amount of cable trackage than ever existed in Washington. Other causes, already mentioned, which tend to increase the cost of construction of street railways in the greatest cities, apply with special force to New York.

Several cities, however, in which only overhead trolley construction prevails, report a very high ratio of net capitalization to trackage. The railways in the great urban center in northern New Jersey are capitalized at $220,383 per mile; those of St. Louis, at $198,647; those of Pittsburg, at $185,170; those of Baltimore, at $182,009; and those of Philadelphia, at $165,085. These figures contrast strikingly with the capitalization of the railways of Boston and the adjoining municipalities, which amounts to only $97,353 per mile of track. The capitalization of the Boston lines is indeed less in proportion to the trackage than that of railways in most smaller cities of more than 100,000 population. This urban center is fifth in point of size in the United States, and its leading railway system is quite equal in its physical characteristics to that in any of the other cities just named; moreover, the system includes 16 miles of elevated track. It carries more passengers per mile of track than the railways in any of the other five centers mentioned except Philadelphia. The trackage is almost altogether located within strictly urban areas. There has perhaps, however, been less reconstruction and waste of capital in Boston than in some of the other leading cities, especially in New York.

Notwithstanding the fact that there is a considerable amount of costly cable trackage in Chicago, the ratio of the net capitalization of surface street railways in that city to their trackage is less than that of most cities of more than 200,000 population, amounting to $109,537 per mile of track. The most extensive surface system in Chicago, however, the Union Traction Company, has net capital liabilities, including that of lessor lines, of $268,577 per mile. The comparatively low average for the city is partly accounted for by the fact that the Chicago City Railway Company, with 222.5 miles of track, has kept its capitalization at the relatively conservative figure of $18,000,000, or $80,899 per mile. Moreover, there are several Chicago companies which operate in the thinly settled parts of the city and its suburbs, where the cost of construction is much less than in the heart of the city.

The amount of net capital liabilities per mile of track in most of the cities of from 100,000 to 500,000 population is between $100,000 and $150,000. The only cities of this size which show a capitalization of less than $100,000 per mile are Buffalo, N. Y.; Denver, Colo.; Los Angeles and Oakland, Cal., the companies in all of which cities operate a large amount of interurban and suburban trackage; and also Louisville, Ky.; Omaha, Nebr.; Memphis, Tenn.; Providence, R. I.; and Rochester, N. Y. The lowest ratio of net capitalization to trackage is reported for Memphis, but the railways of that city were in the hands of a receiver at the time of the census investigation and part of their securities had been wiped out of existence. The street railways of San Francisco, Cal., which have about one-third of their trackage operated by cable, are capitalized at $140,985 per mile of track.

CHAPTER V.

FINANCIAL OPERATIONS.

Of the 817 operating street and interurban railway companies 18 failed to furnish information regarding their financial transactions. These 18 companies operated 378.9 miles of track, about 1.7 per cent of the total mileage. The names of these companies are shown below, together with their mileage and the number of passengers carried by them.

Companies that failed to report data regarding financial transactions.

STATE.	Name of company.	Miles of single track.	Fare passengers.
Total		378.90	44,280,436
Arizona	Phoenix Railway Company	12.00	750,000
Colorado	Boulder Railway and Utility Company	4.08	(1)
Connecticut	New York, New Haven and Hartford Railroad Company, New Canaan Branch.	8.63	204,900
Connecticut	New York, New Haven and Hartford Railroad Company, Berlin system.	25.89	1,645,008
Illinois	South Chicago City Railway Company	38.42	4,532,047
Illinois	Galesburg Electric Motor and Power Company.	17.00	1,750,000
Indiana	Hammond, Whiting and East Chicago Company.	24.90	1,956,616
Kansas	Kansas City-Leavenworth Electric Railway Company.	39.00	(1)
Massachusetts	New York, New Haven and Hartford Railroad Company, Nantasket Branch.	39.33	1,039,810
New Jersey	West Jersey and Seashore Railroad Company.	19.03	5,206,304
Ohio	Wellston and Jackson Belt Railway Company.	10.50	928,925
Rhode Island	New York, New Haven and Hartford Railroad Company, Providence, Warren and Bristol Branch.	31.50	4,520,894
South Dakota	Rapid City Street Railway Company	2.00	(1)
Virginia	South Side Railway and Development Company.	12.85	1,248,059
Virginia	Old Dominion Railway Company	12.21	(1)
Virginia	Richmond Traction Company	18.75	6,795,946
Virginia	Richmond Passenger and Power Company.	25.21	9,517,614
Virginia	Virginia Passenger and Power Company	37.60	4,184,313

[1] Not reported.

In the case of the four branches of the New York, New Haven and Hartford Railroad and the branch of the West Jersey and Seashore Railroad (Pennsylvania system) which are operated by electricity, as well as in the case of the Wellston and Jackson Belt Railway, which is controlled by the Hocking Valley Railroad Company, it was impossible to distinguish the financial operations from those of the controlling steam lines with any clearness. The five Virginia companies, three of which were taken over by the Virginia Passenger and Power Company during the census year, were unable to furnish data on account of recent changes in ownership.

In considering the financial statistics it is essential to distinguish between operating and lessor companies. A complete view of the results requires separate accounts for these classes of companies, together with combined accounts for the two classes jointly. Financial statistics for 158 of the 170 lessor companies were obtained directly from the lessor companies or from the operating companies controlling them, or from other sources. The statistics for a considerable number of the lessor companies were computed from the rentals reported as paid by the operating companies, and from information obtained from street railway journals and similar sources. These figures are in a few instances approximate only.

The inquiries in the census schedule regarding the financial transactions of operating companies followed closely the standard form of accounting prescribed by the Street Railway Accountants' Association of America. The majority of the railway companies, including nearly all the more important ones, now keep their accounts in accordance with these forms. In those cases in which companies did not follow the standard form, the agents of the Bureau of the Census, in conference with the officials of the respective companies, rearranged the items of receipts and expenditures and the balance sheet entries, as shown by the books of the companies, in such a way as to conform to the requirements of the schedule. The financial statistics in general represent, therefore, precise bookkeeping records and are in no sense estimates.

I.

GENERAL INCOME ACCOUNT.

Condensed income account for operating companies, classified according to power.—Table 25 gives a condensed income account for all operating street and interurban railway companies in the United States, and also for the several classes of such railways, as based upon power used.

TABLE 25.—CONDENSED INCOME ACCOUNT FOR OPERATING COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Number of companies	799	556	112	57	52	5	14	3
Gross income	$250,504,627	$206,261,288	$22,418,065	$2,475,365	$1,477,294	$16,881,892	$1,024,873	$15,850
Operating earnings	247,553,999	204,076,037	22,088,656	2,475,365	1,475,901	16,397,867	1,024,323	15,850
Operating expenses	142,312,597	118,236,568	12,834,941	1,439,174	1,077,736	8,151,926	552,812	19,440
Net earnings	105,241,402	85,839,469	9,253,715	1,036,191	398,165	8,245,941	471,511	[2]3,590
Income from other sources	2,950,628	2,185,251	329,409	.....	1,393	434,025	550	.....
Gross income less operating expenses	108,192,030	88,024,720	9,583,124	1,036,191	399,558	8,679,966	472,061	[2]3,590
Deductions from income, total	77,595,053	65,775,778	6,007,847	560,012	362,018	4,720,135	162,104	7,159
Taxes	13,078,899	10,831,931	733,575	50,739	71,303	1,343,547	47,245	559
Interest, total	38,085,911	29,084,560	4,849,800	508,070	227,589	3,294,543	114,759	6,600
On funded debt	35,223,284	26,669,877	4,619,145	435,975	164,947	3,227,427	105,913	.....
On other debt	2,862,627	2,414,673	230,655	72,095	62,642	67,116	8,846	6,600
Rental of leased lines	25,518,225	25,371,536	47,413	583	63,101	35,592	.....	.....
Miscellaneous deductions	912,018	487,761	377,059	620	25	46,453	100	.....
Net income	30,596,977	22,248,942	3,575,277	476,179	37,540	3,959,831	309,957	[2]10,749
Dividends	15,882,110	12,193,247	813,091	46,500	68,877	2,594,195	166,200	.....
Surplus	14,714,867	10,055,695	2,762,186	429,679	[2]31,337	1,365,636	143,757	[2]10,749

[1] Exclusive of reports for 18 companies which failed to furnish this information. [2] Deficit.

It will be understood by anyone acquainted with bookkeeping methods that an income account does not purport to show the actual cash receipts and disbursements during the year. It presents instead the receipts and expenditures properly assignable to the year's operations. Thus the items of taxes, interest, and rentals represent the amount of such obligations accrued during the year, whether wholly paid within that time or not. Similarly the item of dividends represents dividends declared during the year, no matter when paid. Money spent on capital account, moneys borrowed and repaid, and all bookkeeping duplications or transfers are omitted.

Operating earnings and gross income.—By the term "operating earnings" are designated all receipts of the companies from the actual operation of the railway property which they own, or of light and power plants connected therewith, but excluding income from sources other than railway property. The total operating earnings of the street and interurban railways reporting to the Bureau of the Census in 1902 amounted to $247,553,999. To this must be added, to show the gross income, the income from other sources, which consists chiefly of interest and dividends on securities held by the railway companies, but which also represents, to some extent, interest on deposits of money, returns from investments in real estate not used for operating purposes, etc. A large proportion of the securities held by street and interurban railway companies are those of other such companies. The gross income of the operating street railways as a whole, therefore, includes a small amount of duplication, the earnings of certain companies becoming in part additions to the income of other companies. The gross income of all the railways, consisting of operating earnings plus income from other sources, amounted to $250,504,627.

More than four-fifths of the aggregate operating earnings were those of full-time companies operating surface railways that were mainly electric and not operating commercial lighting plants. The operating earnings of electric railway companies having light and power plants were less than one-ninth as great as that of full-time electric surface companies without such plants. The operating earnings of the five strictly elevated railways amounted to 6.6 per cent of the aggregate for the United States. The aggregate earnings of all other classes of street railways were comparatively small, and those of the three strictly steam railways insignificant.

Distribution of income.—The net earnings from operation of all street and interurban railways, calculated by deducting operating expenses from the gross earnings from operation, were $105,241,402. The "gross income less operating expenses," as designated in Table 25 and later tables, is made up of the net earnings from operation plus the income from miscellaneous sources.[1] It amounted to $108,192,030 in 1902, the income from other sources constituting 2.7 per cent of this amount.

The distribution of the gross income of street and interurban railway companies among various objects differs materially among the different classes of railways distinguished in Table 25. These differences may be grasped more readily by the aid of Table 26, which shows, for each group of companies and for all companies combined, the percentages which the operating expenses and the various other items of disbursement bear to the gross income.

[1] The designation of this item in the tables and text is that adopted by the Street Railway Accountants' Association. The Interstate Commerce Commission designates the corresponding item "net earnings and income."

TABLE 26.—PERCENTAGE DISTRIBUTION OF GROSS INCOME OF OPERATING COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric, elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Gross income	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Operating expenses	56.8	57.3	57.3	58.1	72.9	48.4	54.0	122.7
Taxes	5.2	5.3	3.3	2.1	4.8	8.0	4.6	3.5
Interest, total	15.2	14.1	21.6	20.5	15.4	19.6	11.2	41.6
On funded debt	14.1	12.9	20.6	17.6	11.2	19.2	10.3	.....
On other debt	1.1	1.2	1.0	2.9	4.2	0.4	0.9	41.6
Rental of leased lines	10.2	12.3	0.2	(1)	4.3	0.2	.....	.....
Miscellaneous deductions	0.4	0.2	1.7	(1)	(1)	0.3	(1)	.....
Dividends	6.3	5.9	3.6	1.9	4.7	15.4	16.2	.....
Surplus	5.9	4.9	12.3	17.4	[2]2.1	8.1	14.0	[2]67.8

[1] Less than one-tenth of 1 per cent.

[2] Deficit.

It will be observed that, for all operating companies combined, operating expenses amount to 56.8 per cent of the gross income. The ratio of operating expenses to operating earnings is discussed elsewhere (pages 83 and 84). The total "deductions from income," or "fixed charges," as they are often called, amount to $77,595,053. This sum, which is nearly three-fourths of the "gross income less operating expenses," is about 31 per cent of the gross income itself.

Taxes, licenses, and other payments to public authorities, taken together, constitute a larger proportion of gross and of net earnings than is generally supposed. These public charges in 1902 were equal to a little less than one-eighth of the gross income less operating expenses and to 5.2 per cent of the gross income. The amount going to taxes was relatively less in the case of electric railways furnishing commercial light and power than in the case of other classes of railways. This is chiefly due to the fact that companies of this type are, with a few exceptions, operating in cities and towns of moderate size where the rates of taxes are low. The taxes of the elevated railways are proportionately the highest, amounting to 8 per cent of their gross income.

The classification of taxes paid by operating companies, according to the returns of the companies, is as follows: Taxes on real and personal property, $5,835,542, or 44.6 per cent of the total taxes; taxes on capital stock, $2,931,252, or 22.4 per cent; taxes on earnings, $2,719,287, or 20.8 per cent; miscellaneous taxes, licenses, and public payments, $1,592,818, or 12.2 per cent. It may be remarked, however, that the names of the various classes of taxes in different states are not always uniform or consistent with accurate definitions. The statistics do not show to what extent the payments made by street railway companies represent a special return to the local government for franchise privileges granted. Beyond question, however, much the greater part of the payments to public authorities consists of ordinary taxes, levied upon the same basis as taxes on other forms of property or on corporations not enjoying special franchise privileges.[1]

[1] A presentation of the leading requirements of laws and franchises regarding special payments for franchise privileges will be found in Part I, Chapter IX.

The items of interest on bonds or funded debt and interest on notes and other floating debt amounted, as shown in Table 25, to $38,085,911, or no less than 15.2 per cent of the gross income, and 35.2 per cent of the gross income less operating expenses. This sum is slightly larger than the amount which street railway companies actually paid on their obligations during the census year, as a considerable number of railways failed partly or wholly to pay the interest due. In some instances, indeed, companies still owed back interest for a number of years. The balance sheets of the operating and lessor companies combined showed the total amount of interest unpaid at the end of the fiscal year 1902 to be $14,497,670; but, as appears from the schedules, part of this represented merely accrued interest—not yet due—of wholly solvent companies, and another part represented interest due on coupons not yet presented for payment. It appears probable, however, that the greater part of the aggregate back interest reported consisted of interest which the companies could not pay. The item of interest in the income account was conspicuously large for electric railway companies furnishing commercial lighting and for elevated railways.

The great importance of the method of lease as a means of combination among street railways may be judged from the fact that the rentals paid by operating companies to lessor companies amounted to $25,518,225 in 1902, or nearly one-fourth of the gross income less operating expenses. The rental payments are almost wholly confined, however, to companies that operate electric surface railways and that do not furnish commercial lighting.

Sinking and depreciation funds.—A noteworthy feature of the income accounts of nearly all street railways is the absence of any provision for depreciation funds or for sinking funds to redeem bonds. The total amount of "miscellaneous deductions" from income—not covered by the specified heads already mentioned—was only $912,018, and only a fraction of this sum represented systematic appropriations to depreciation or sinking funds. In this respect the American street railway companies form a striking contrast with those in most foreign countries and an even more striking contrast with foreign municipal undertakings. American

steam railways are adopting to an increasing extent the policy of providing at least sinking funds for their funded debt.

From the standpoint of the investors it is sometimes considered preferable not to provide depreciation and sinking funds in the case of a street railway company that possesses an unlimited franchise and that operates in a city with a large and steadily increasing population. The investors in such case know that the value of their franchise is steadily appreciating and that the appreciation tends to offset any depreciation in the physical properties. They feel assured that the bonds of the company as they fall due can be renewed with little difficulty and possibly at a lower rate of interest. It may therefore be deemed wise policy to provide the capital necessary for renewals and replacements by the issue of additional securities rather than by appropriating part of the earnings for depreciation.

These considerations, however, apply with much less force in the case of many railways which are not so favorably situated or are of less modern construction, as the present properties held by them may depreciate greatly in value. In some cases a large part of the investment has been made by the issue of bonds, and when these fall due they may more than equal the value of the depreciated plant. Under such circumstances sound finance would seem to demand sinking and depreciation funds. This is still more conspicuously true of those companies whose franchises are limited to a term of years, especially if there be no provision in the franchise for compensation to the present holders for the value of their tangible properties. Delegates to the American Street Railway Accountants' Association have frequently emphasized the desirability of sinking and depreciation funds.

It may be remarked, however, that the practice of many American street and interurban railway companies, of carrying a considerable fraction of their net earnings to surplus rather than distributing them in dividends, may in some measure take the place of the systematic setting aside of depreciation and sinking funds. The net surplus of the operating street and interurban railways for the census year was $14,714,867, which was nearly as much as the dividends declared by such companies. In many cases permanent improvements and extensions are made out of such surplus earnings. Though, usually, if the earning capacity will justify it, such expenditures are later capitalized by the declaration of a stock dividend or by some similar device, so as to raise capitalization above the actual value of the property, yet, from the standpoint of the existing owners, the method of paying for permanent improvements out of surplus amounts practically to the assignment of a part of the current earnings in a way which offsets depreciation.

Net income and dividends.—By net income is meant the amount remaining after deducting from the "gross income less operating expenses" the various fixed charges. The combined net income of all operating railway companies in 1902 was $30,596,977. As appears from Table 37, the total net income of the 578 companies which reported a net income amounted to $34,352,684, while the total net deficit of the 220 companies which reported a deficit aggregated $3,755,707. It is the difference between these sums, $30,596,977, that is shown in Table 25 under the head of "net income."

It is scarcely necessary to point out that the net income thus calculated in no sense represents the profitableness of the street and interurban railway industry. The item of net earnings is much more accurately indicative of the true profits. To understand why this is so one need only recall that interest on bonds is as truly a part of the return to street railway investors as dividends. Moreover, rentals paid to lessor companies, while they are designated as fixed charges by the operating companies, are likewise, strictly speaking, a return to street railway capital, since they become interest and dividends on the securities of the lessor companies. This point is the more obvious in those numerous cases where the operating and lessor companies are virtually owned by the same persons.

The amount of dividends paid by operating street railway companies in 1902—$15,882,110—constituted only 6.3 per cent of their gross income and about one-seventh of the gross income less operating expenses. The proportion of dividends, exclusive of part-time railways, was least among full-time electric railway companies furnishing commercial lighting. It was much greater in the case of elevated and cable railways than among other classes. Full-time electric surface railways not furnishing commercial lighting, paid out in dividends 5.9 per cent of their gross income in 1902.

Income account for lessor companies.—Table 27 shows, for the United States as a whole, a condensed income account of the nonoperating lessor railway companies. Several of the operating companies, such as the Third Avenue Railroad Company and its affiliated lines in New York city, are leased to other operating companies at a rental fixed for the present at the amount of net income remaining after the payment of expenses and fixed charges. Such companies are included with the independent operating companies, their accounts being in precisely the same form.

The income of nonoperating lessor companies consists almost wholly of the rentals received from operating companies. These rentals usually take the form of a fixed rate of interest on the bonds of the lessor company and a fixed rate of dividend (if any) on its stocks, though in some instances the rental is a lump sum. Many operating companies treat the funded debt of their lessor companies as though it were their own direct obligation, and in their income account, class the interest thereon with other interest rather than with

rentals. The Bureau of the Census has, however, uniformly segregated the interest on the debt of lessor companies, including it with rentals in the accounts of operating companies and treating it in the accounts of the lessor companies both as an income and as an expenditure. As a matter of fact, both interest on bonds and dividends on stocks of lessor companies are frequently, perhaps usually, paid directly to the security holders by the operating company.

TABLE 27.—*Income account for nonoperating lessor companies: 1902.*[1]

Number of companies	158
Gross income	$26,138,899
Rentals from operating companies	26,116,884
Income from other sources	22,015
Deductions from income	8,779,294
Taxes	287,436
Interest on funded debt	8,355,677
Interest on other debt	20,882
Maintenance of organization and miscellaneous disbursements	115,299
Net income	17,359,605
Dividends	17,157,061
Surplus	202,544

[1] Exclusive of 12 companies which failed to furnish this information.

The amount of rentals reported as received by lessor companies, $26,116,884, does not correspond with the amount reported (see Table 25) as paid in rentals by operating companies, which was $25,518,225. The discrepancy is due in part to imperfect information regarding lessor companies, and in part to differences in methods of accounting and in the periods covered by the reports.

The compensation paid to lessor companies for the use of their properties and franchises varies greatly. Sometimes the compensation is purely nominal, as, for instance, in a number of cases in which the lease method of control is a mere form, the securities of the lessor being, as a matter of fact, the property of the operating company. In many leases the sole compensation to the lessor company consists of the interest on its funded debt. It sometimes happens in such cases that the operating company owns part, or all, of the stocks of the lessor. The rate of rental paid to stockholders varies from a fraction of 1 per cent to as high as 72 per cent on the paid-up capital stock in the case of one lessor company in Philadelphia where only a small portion of the stock was paid up. The amount of dividends of lessor companies in 1902 was $17,157,061.

Ordinarily the taxes on the property of lessor companies are paid by the operating companies directly, but in a few instances, by special arrangement or on account of differences in bookkeeping methods, the taxes are reported as paid by the lessor companies.

Condensed income account for operating and lessor companies combined.—Table 28 presents a combined income account of all operating and lessor companies considered as one system, and shows the result of the financial operations as they would stand if the same amount and kind of business had been done but if there were no lessor companies.

TABLE 28.—*Condensed income account for operating and lessor companies combined: 1902.*[1]

Number of companies	957
Gross income	$250,526,642
Operating earnings	247,553,999
Operating expenses	142,312,597
Net earnings from operation	105,241,402
Income from other sources	2,972,643
Gross income less operating expenses	108,214,045
Deductions from income, total	60,849,231
Taxes	13,366,335
Interest, total	46,462,470
On funded debt	43,578,961
On other debt	2,883,509
Miscellaneous deductions	1,020,426
Net income	47,364,814
Dividends	33,039,171
Surplus	14,325,643

[1] Exclusive of reports for 30 companies which failed to furnish this information.

The only important differences between these figures and those for operating companies alone consist in the elimination of the item of rentals paid and in the distribution of the amount of rentals under the two heads of interest on funded debt and dividends. The distribution of the gross income of both operating and lessor companies among various objects is shown by percentages in Table 29.

TABLE 29.—*Percentage distribution of gross income for operating and lessor companies combined: 1902.*

	Percentage.
Gross income	100.0
Operating expenses	56.8
Taxes	5.3
Interest, total	18.6
On funded debt	17.4
On other debt	1.2
Miscellaneous deductions	0.4
Dividends	13.2
Surplus	5.7

Regarding the operating and lessor street railways as one system, it is found that the amount of interest accrued on funded debt was $43,578,961, which is 17.4 per cent of the gross income of all the companies, and a little more than two-fifths of the gross income less operating expenses. The net income and surplus shown in this table are not the same as would be obtained by simply adding these items for operating and lessor companies, respectively, for the reason, heretofore stated, that the income from rentals as reported by lessor companies does not precisely agree with the amount of rentals paid as reported by the operating companies. The dividends paid by operating companies and lessor companies combined amounted to 13.2 per cent of their gross income, or to 30 per cent of the income remaining after the deduction of operating expenses. The amount paid as interest on funded debt and as dividends combined, representing the total payments on the capital liabilities, is equal to 30.6 per cent of the gross income. Roughly speaking, about that proportion of each street railway fare represents the immediate return to capital invested.

Condensed income account for operating companies classified according to population.—Table 30 shows a

condensed income account for operating companies in urban centers, classified according to population, together with the similar account for fast, long interurban and other interurban railways.

TABLE 30.—CONDENSED INCOME ACCOUNT FOR OPERATING COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	799	65	47	83	312	53	239
Gross income	$250,504,627	$123,289,266	$51,063,907	$22,828,007	$12,005,511	$10,165,768	$31,152,168
Operating earnings	247,553,999	120,837,007	51,008,983	22,728,795	11,879,327	10,161,736	30,938,151
Operating expenses	142,312,597	67,300,048	27,308,769	13,480,577	8,088,172	6,076,983	20,058,048
Net earnings	105,241,402	53,536,959	23,700,214	9,248,218	3,791,155	4,084,753	10,880,103
Income from other sources	2,950,628	2,452,259	54,924	99,212	126,184	4,032	214,017
Gross income, less operating expenses	108,192,030	55,989,218	23,755,138	9,347,430	3,917,339	4,088,785	11,094,120
Deductions from income, total	77,595,053	45,785,422	12,819,488	5,057,079	2,340,694	3,130,845	8,461,525
Taxes	13,078,899	7,755,582	2,608,650	823,964	340,228	243,539	1,306,936
Interest, total	38,085,911	14,684,921	8,712,948	3,761,836	1,938,948	2,726,608	6,260,650
On funded debt	35,223,284	13,683,195	8,281,098	3,492,362	1,717,822	2,557,798	5,491,009
On other debt	2,862,627	1,001,726	431,850	269,474	221,126	168,810	769,641
Rental of leased lines	25,518,225	23,232,949	1,152,209	365,240	26,845	51,930	689,052
Miscellaneous deductions	912,018	111,970	345,681	106,039	34,673	108,768	204,887
Net income	30,596,977	10,203,796	10,935,650	4,290,351	1,576,645	957,940	2,632,595
Dividends	15,882,110	5,290,435	6,344,101	1,485,654	301,575	300,624	2,159,721
Surplus	14,714,867	4,913,361	4,591,549	2,804,697	1,275,070	657,316	472,874

[1] Exclusive of reports for 18 companies which failed to furnish this information.

The following table shows the percentage which each item of disbursement bears to the gross income:

TABLE 31.—*Percentage distribution of gross income of operating companies, classified according to population: 1902.*

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Gross income	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Operating expenses	56.8	54.6	53.5	59.0	67.4	59.8	64.4
Taxes	5.2	6.3	5.1	3.6	2.8	2.4	4.2
Interest, total	15.2	11.9	17.1	16.5	16.2	26.8	20.1
On funded debt	14.1	11.1	16.2	15.3	14.3	25.1	17.6
On other debt	1.1	0.8	0.9	1.2	1.9	1.7	2.5
Rentals of leased lines	10.2	18.8	2.2	1.6	0.2	0.5	2.2
Miscellaneous deductions	0.4	0.1	0.7	0.5	0.3	1.1	0.7
Dividends	6.3	4.3	12.4	6.5	2.5	2.9	6.9
Surplus	5.9	4.0	9.0	12.3	10.6	6.5	1.5

As appears from Table 30 about 49 per cent of the total operating earnings of all street railways were received by the 65 companies in urban centers of more than 500,000 inhabitants. These companies, moreover, received more than four-fifths of the total amount of income from sources other than the operation of railway, light, and power plants. This unequal distribution of "income from other sources" is explained by the fact that the railway companies of the great cities, by virtue of the consolidations which have taken place, hold much larger amounts of the securities of other railway companies than are held by the companies in smaller urban centers. The operating earnings of the fast, long interurban railways amounted to $10,161,736—about 4.1 per cent of the total for the country.

Table 31 shows that the manner in which the gross income of railway companies in the different population groups is distributed varies considerably. The proportion of the gross income going to operating expenses is much less in the two groups of cities of more than 100,000 inhabitants than in the other groups. This is due to the economy of operation in large cities, as more fully shown later on. On the other hand, the deductions from income, including taxes, interest on bonds, rentals, and minor expenditures, constituted a greater proportion of the gross income of operating companies in the largest cities than elsewhere, a fact which is chiefly due to the great amount of rentals paid to lessor companies in such cities.

The amount paid for taxes and other public charges in urban centers of more than 500,000 inhabitants was 6.3 per cent of gross income of the operating companies in those centers, or 13.9 per cent of the gross income less operating expenses. The proportion going to taxes decreases in each of the successive urban groups, until in urban centers of less than 25,000 inhabitants it falls to only 2.8 per cent of gross income, taxes being, however, nearly 9 per cent of the income remaining after the deduction of operating expenses. Since street railways in small cities have a higher ratio of operating expenses to operating earnings than those in large cities, they can not properly be expected to pay as heavy taxes. An important reason for the increase in the ratio of taxes to net earnings with increasing population is that, as cities become larger, the functions of government expand, and the expenses of government grow, ordinarily, not only faster than population, but faster than taxable property, so that the tax rate tends to increase. In a considerable number of the larger cities, moreover, the street railway companies are required to make special payments in addition to the taxes paid alike by railways and by ordinary forms of property and other classes of corporations. Such

special payments are seldom required in smaller towns. The proportion of gross income going to taxes is even lower for long, fast interurban railways than for street railways in the smallest urban centers. This is presumably in part due to the fact that the rate of taxation in the rural communities through which these interurban lines run is generally lower than in urban communities. The higher proportion of taxes shown for other interurban railways would then be partly explicable by the greater extent to which their trackage lies within municipal limits. It is probable that the difference in the relative burden of taxation in the various classes of cities and on the two classes of interurban railways is attributable in some measure to differences in the efficiency and judgment of tax assessors. There can be little doubt, however, that the more profitable railways of the large cities can afford to pay as taxes a higher proportion of their gross earnings, and even of their net earnings, than the railways in small towns and rural districts.

The most striking point in regard to the deductions from income is the enormous amount of rentals paid by operating companies to lessor companies in urban centers of more than 500,000 inhabitants. Fully nine-tenths of the rental payments of all companies are made by the companies in the seven largest urban centers. There has been more occasion and cause for combination and consolidation in the large cities, where formerly many street railways were in operation, than in smaller places. Rentals constitute 18.8 per cent of the gross income of operating railways in the first group of urban centers, while in none of the other groups do they exceed 2.2 per cent.

The amount paid for interest on funded debt constitutes a smaller proportion of gross income, and likewise a smaller proportion of gross income less operating expenses, among operating companies in urban centers of the first group than elsewhere. This is due to the fact that in such cities a large part of the debt of the railways is that of the lessor companies rather than that of the operating companies. The interest which lessor companies pay is received from the operating companies in the form of rentals. The proportion of interest to income is much greater for fast interurban railways than for those of any other group.

The operating railways in cities of the first group have, proportionately, less net income and dividends than in any other group except that of "other" interurban railways. Here again dividends of operating companies in large cities are reduced, because a large part of the stocks based on the railway property are those of lessor companies, and the dividends which the latter pay are deducted from the income of operating companies in the form of rentals. In the largest cities the net income of operating companies amounts to only 8.3 per cent of their gross income, while in cities of from 100,000 to 500,000 people the net income is 21.4 per cent of the gross income. In the first group dividends constitute only 4.3 per cent of gross income, while in urban centers of the next rank dividends are 12.4 per cent. The ratio of dividends to gross income and to gross income less operating expenses is least in urban centers of less than 25,000 inhabitants.

Condensed income account for full-time electric surface railway companies, without commercial lighting, classified according to population.—Table 32 shows a condensed income account of full-time surface railway companies having primarily electric traction and not furnishing commercial lighting, classified according to population of urban centers served.

TABLE 32.—CONDENSED INCOME ACCOUNT FOR FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	556	47	38	66	165	40	200
Gross income	$206,261,288	$104,912,972	$45,613,791	$15,399,948	$6,385,919	$7,640,642	$26,308,016
Operating earnings	204,076,037	102,896,131	45,589,368	15,356,895	6,377,469	7,640,642	26,215,532
Operating expenses	118,236,568	58,089,586	24,684,272	9,366,539	4,388,638	4,579,621	17,127,912
Net earnings from operation	85,839,469	44,806,545	20,905,096	5,990,356	1,988,831	3,061,021	9,087,620
Income from other sources	2,185,251	2,016,841	24,423	43,053	8,450	.....	92,484
Gross income, less operating expenses	88,024,720	46,823,386	20,929,519	6,033,409	1,997,281	3,061,021	9,180,104
Deductions from income, total	65,775,778	40,670,995	11,314,425	3,187,746	1,221,224	2,374,732	7,006,656
Taxes	10,831,931	6,335,643	2,399,990	578,866	183,729	189,522	1,144,181
Interest, total	29,084,550	11,134,669	7,690,277	2,140,530	993,147	2,092,421	5,033,506
On funded debt	26,669,877	10,267,696	7,282,840	1,951,323	862,827	1,959,117	4,346,074
On other debt	2,414,673	866,973	407,437	189,207	130,320	133,304	687,432
Rental of leased lines	25,371,536	23,135,166	1,152,209	365,240	25,000	51,347	642,574
Miscellaneous deductions	487,761	65,517	71,949	103,110	19,348	41,442	186,395
Net income	22,248,942	6,152,391	9,615,094	2,845,663	776,057	686,289	2,173,448
Dividends	12,193,247	2,610,240	5,933,901	1,194,250	199,280	201,124	2,054,452
Surplus	10,055,695	3,542,151	3,681,193	1,651,413	576,777	485,165	118,996

[1] Exclusive of reports for 16 companies which failed to furnish this information.

The percentages which the various items of disbursements bear to the gross income are shown in the following table for the same class of railways as in Table 32. These statistics present a few rather important differences as regards three of the urban groups from those for all companies combined in the preceding tables.

TABLE 33.—*Percentage distribution of gross income of full-time electric surface railway companies, without commercial lighting, classified according to population: 1902.*

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Gross income	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Operating expenses	57.3	55.4	54.1	60.8	68.7	60.0	65.1
Taxes	5.3	6.0	5.3	3.8	2.9	2.5	4.4
Interest, total	14.1	10.6	16.9	13.9	15.6	27.4	19.1
On funded debt	12.9	9.8	16.0	12.7	13.5	25.6	16.5
On other debt	1.2	0.8	0.9	1.2	2.1	1.8	2.6
Rentals of leased lines	12.3	22.0	2.5	2.4	0.4	0.7	2.4
Miscellaneous deductions	0.2	0.1	0.1	0.7	0.3	0.5	0.7
Dividends	5.9	2.5	13.0	7.7	3.1	2.6	7.8
Surplus	4.9	8.4	8.1	10.7	9.0	6.3	0.5

It will be noticed that these full-time electric surface railways in centers of 500,000 and over show somewhat smaller proportionate payments for taxes, interest, and dividends than do street railways as a whole, and that on the other hand they show a very much larger proportionate payment for rentals. (Compare Tables 31 and 33.) These differences are largely due to the fact that the elevated railways, which are all within the largest urban centers and which are excluded from the tables now under consideration, make relatively large payments for taxes, interest, and dividends, but do not operate any lines under lease, and hence reported no rentals. The electric railways having commercial lighting plants are, for the most part, in the two classes of urban centers of less than 100,000 inhabitants. Companies with lighting plants show a larger proportion of interest and a smaller proportion of dividends than companies without lighting plants. This is one explanation of the fact that in the last two urban groups the electric railway companies not furnishing commercial lighting show a smaller proportion of interest and a larger proportion of dividends than appear when all classes of companies are taken together.

Combined income account for operating and lessor companies, classified according to population.—Table 34 shows the income account for all operating and lessor companies combined, classified according to the population groups, while Table 35 shows the percentages of the various items of disbursement.

TABLE 34.—CONDENSED INCOME ACCOUNT FOR OPERATING AND LESSOR COMPANIES COMBINED, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	957	138	56	99	314	60	290
Gross income	$250,526,642	$123,310,971	$51,064,217	$22,828,007	$12,005,511	$10,165,768	$31,152,168
Operating earnings	247,553,999	120,837,007	51,008,983	22,728,795	11,879,327	10,161,736	30,938,151
Operating expenses	142,312,597	67,300,048	27,308,769	13,480,577	8,088,172	6,076,988	20,058,048
Net earnings from operation	105,241,402	53,536,959	23,700,214	9,248,218	3,791,155	4,084,753	10,880,103
Income from other sources	2,972,643	2,473,964	55,234	99,212	126,184	4,032	214,017
Gross income less operating expenses	108,214,045	56,010,923	23,755,448	9,347,430	3,917,339	4,088,785	11,094,120
Deductions from income, total	60,849,231	30,682,945	11,755,926	4,803,329	2,328,849	3,119,555	8,158,627
Taxes	13,366,335	8,021,181	2,611,881	824,099	340,228	243,539	1,325,407
Interest, total	46,462,470	22,465,107	8,798,353	3,868,726	1,953,948	2,767,248	6,609,088
On funded debt	43,578,961	21,460,962	8,366,503	3,598,997	1,732,822	2,598,488	5,821,239
On other debt	2,883,509	1,004,145	431,850	269,729	221,126	168,810	787,849
Miscellaneous deductions	1,020,426	196,657	345,692	110,504	34,673	108,768	224,132
Net income	47,364,814	25,327,978	11,999,522	4,544,101	1,588,490	969,230	2,935,493
Dividends	33,039,171	20,958,959	7,344,007	1,650,123	311,575	315,224	2,459,283
Surplus	14,325,643	4,369,019	4,655,515	2,893,978	1,276,915	654,006	476,210

[1] Exclusive of reports for 30 companies which failed to furnish this information.

TABLE 35.—*Percentage distribution of gross income for operating and lessor companies combined, classified according to population: 1902.*

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Gross income	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Operating expenses	56.8	54.6	53.5	59.1	67.4	59.8	64.4
Taxes	5.3	6.5	5.1	3.6	2.8	2.4	4.3
Interest, total	18.6	18.2	17.2	16.9	16.3	27.2	21.2
On funded debt	17.4	17.4	16.4	15.7	14.4	25.6	18.7
On other debt	1.2	0.8	0.8	1.2	1.9	1.6	2.5
Miscellaneous deductions	0.4	0.2	0.7	0.5	0.3	1.1	0.7
Dividends	13.2	17.0	14.4	7.2	2.6	3.1	7.9
Surplus	5.7	3.5	9.1	12.7	10.6	6.4	1.5

The chief differences between this combined income account and the income account of operating companies alone lie in the items of rentals, interest, and dividends. Since lessor companies are found mostly in urban centers of the largest size, the combined income account for such centers differs materially from the income account of operating companies alone, while in the other groups little difference appears.

In urban centers of more than 500,000 inhabitants the combined "deductions from income" or fixed charges—taxes, interest, and miscellaneous deductions—for all railway companies considered as a single system are equal to 24.9 per cent of the gross income. This proportion is slightly larger than for any other urban group, but is smaller than for the two interurban groups. In the largest cities the proportion of dividends to the gross income is 17 per cent, exceeding somewhat the proportion in urban centers of the next size, and greatly exceeding the proportion in any of the other groups. All the other groups except the "other" interurban railways, however, carried a larger proportion of their gross income to surplus than the companies in the largest cities. Interest and dividends combined constitute 35.2 per cent of the gross income in the first group, as compared with 31.6 per cent in the second group, 24.1 per cent in the third group, and only 18.9 per cent in urban centers of less than 25,000 inhabitants.

Condensed income accounts, by states.—Table 36 shows by states the gross income of all operating companies, consisting of the operating earnings plus the income from other sources, and Table 37 presents a condensed income account for all operating street and interurban railway companies by states.

The various items of taxes and fixed charges are shown in detail for each state in Table 38.

TABLE 36.—*Gross income of operating companies, by states and territories: 1902.*[1]

STATE OR TERRITORY.	Number of companies.	Amount.	STATE OR TERRITORY.	Number of companies.	Amount.
United States.	799	$250,504,627	Missouri	16	$10,734,692
			Montana	5	492,023
Alabama	9	1,497,351	Nebraska	4	1,148,994
Arkansas	7	371,560	New Hampshire	7	604,131
California	35	9,967,838	New Jersey	25	8,176,923
Colorado	7	2,227,766	New York	96	60,881,789
Connecticut	21	4,355,775	North Carolina	7	442,467
Delaware	3	500,559	Ohio	62	16,599,851
Florida	6	529,743	Oregon	6	1,042,895
Georgia	10	2,375,224	Pennsylvania	98	30,357,727
Illinois	48	25,029,257	Rhode Island	7	2,964,260
Indiana	26	3,813,076	South Carolina	7	653,736
Iowa	22	2,403,834	Tennessee	8	1,864,835
Kansas	11	370,481	Texas	17	1,547,846
Kentucky	12	2,933,800	Utah	3	586,611
Louisiana	8	2,910,244	Vermont	9	249,228
Maine	19	1,571,562	Virginia	16	1,667,022
Maryland	10	4,898,627	Washington	8	2,542,906
Massachusetts	74	23,633,410	West Virginia	8	1,102,171
Michigan	24	6,521,173	Wisconsin	17	3,923,884
Minnesota	6	3,727,648	All other states and territories[2]	11	3,021,063
Mississippi	5	258,654			

[1] Exclusive of reports for 18 companies which failed to furnish this information.

[2] Includes states and territories having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Arizona, 1; District of Columbia, 2 (8 reports); Idaho, 1; New Mexico 1.

TABLE 37.—CONDENSED INCOME ACCOUNT FOR OPERATING COMPANIES, BY STATES AND TERRITORIES: 1902.[1]

STATE OR TERRITORY.	Number of companies.	Gross earnings from operation.	OPERATING EXPENSES.		Net earnings from operation.	Income from other sources.	Gross income less operating expenses.	Deductions from income (taxes and fixed charges).	Net income of companies reporting net income.	Deficit of companies reporting deficit.	Net income for state.	Dividends.	Surplus.
			Amount.	Percentage of earnings.									
United States.	799	$247,553,999	$142,312,597	57.5	$105,241,402	$2,950,628	$108,192,030	$77,595,053	$34,352,684	$3,755,707	$30,596,977	$15,882,110	$14,714,867
Alabama	9	1,497,351	878,291	58.7	619,060	.....	619,060	384,762	244,243	9,945	234,298	81,000	153,298
Arkansas	7	371,560	216,433	58.2	155,127	.....	155,127	68,071	87,633	577	87,056	.....	87,056
California	35	9,967,288	5,402,245	54.2	4,565,043	550	4,565,593	2,112,959	2,461,414	8,780	2,452,634	653,412	1,799,222
Colorado	7	2,227,286	1,300,606	58.4	926,680	480	927,160	536,005	432,428	41,273	391,155	180,000	211,155
Connecticut	21	4,284,089	2,773,608	64.7	1,510,481	71,686	1,582,167	1,128,319	461,604	7,756	453,848	231,062	222,786
Delaware	3	500,412	360,590	72.1	139,822	147	139,969	77,439	79,591	17,061	62,530	9,331	53,199
Florida	6	529,743	339,375	64.1	190,368	.....	190,368	74,779	116,387	798	115,589	40,720	74,869
Georgia	10	2,375,224	1,232,320	51.9	1,142,904	.....	1,142,904	755,207	387,697	.....	387,697	33,952	353,745
Illinois	48	24,164,965	14,103,211	58.4	10,061,754	864,292	10,926,046	8,453,191	3,196,378	723,523	2,472,855	2,310,710	162,145
Indiana	26	3,813,076	2,219,791	58.2	1,593,285	.....	1,593,285	1,201,297	438,115	46,127	391,988	33,974	358,014
Iowa	22	2,384,421	1,460,993	61.3	923,428	19,413	942,841	429,373	529,085	15,617	513,468	117,660	395,808
Kansas	11	370,481	257,248	69.4	113,233	.....	113,233	64,451	48,839	57	48,782	4,000	44,782
Kentucky	12	2,932,901	1,560,270	53.2	1,372,631	899	1,373,530	777,433	602,551	6,454	596,097	371,000	225,097
Louisiana	8	2,910,244	1,758,989	60.4	1,151,255	.....	1,151,255	690,380	463,313	2,438	460,875	362,198	98,677
Maine	19	1,542,508	1,127,660	73.1	414,848	29,054	443,902	337,050	148,961	42,109	106,852	67,829	39,023
Maryland	10	4,898,627	2,312,323	47.2	2,586,304	.....	2,586,304	2,555,715	55,690	25,101	30,589	4,000	26,589
Massachusetts	74	23,617,570	16,403,667	69.5	7,213,903	15,840	7,229,743	5,108,619	2,301,508	180,384	2,121,124	1,910,060	211,064
Michigan	24	6,494,691	3,655,328	56.3	2,839,363	26,482	2,865,845	1,788,797	1,145,719	68,671	1,077,048	612,000	465,048
Minnesota	5	3,727,648	1,719,687	46.1	2,007,961	.....	2,007,961	1,027,121	980,840	.....	980,840	870,400	110,440
Mississippi	5	258,654	192,056	74.3	66,598	.....	66,598	38,684	28,764	850	27,914	.....	27,914
Missouri	16	10,691,220	6,071,971	56.8	4,619,249	43,472	4,662,721	4,635,401	459,982	432,662	27,320	313,337	[2]286,017
Montana	5	492,023	365,073	74.2	126,950	.....	126,950	74,633	66,196	13,879	52,317	.....	52,317
Nebraska	4	1,148,994	655,729	57.1	493,265	.....	493,265	150,297	343,949	981	342,968	230,800	112,168
New Hampshire	7	604,131	478,849	79.3	125,282	.....	125,282	83,786	45,225	3,729	41,496	8,250	33,246
New Jersey	25	8,137,477	4,324,112	53.1	3,813,365	39,446	3,852,811	3,625,740	385,232	158,161	227,071	78,420	148,651
New York	96	59,315,606	33,677,724	56.8	25,637,882	1,566,174	27,204,056	19,552,955	8,391,716	740,615	7,651,101	3,133,655	4,517,446
North Carolina	7	437,259	322,344	73.7	114,915	5,208	120,123	98,993	47,071	25,941	21,130	.....	21,130
Ohio	62	16,587,693	9,132,480	55.1	7,455,213	12,158	7,467,371	4,137,866	3,467,102	137,597	3,329,505	1,644,598	1,684,907
Oregon	6	1,042,895	653,912	62.7	388,983	.....	388,983	146,519	243,721	1,257	242,464	54,048	188,416
Pennsylvania	98	30,319,211	15,624,813	51.5	14,694,398	38,516	14,732,914	12,868,286	2,497,069	632,441	1,864,628	621,811	1,242,817
Rhode Island	7	2,964,260	1,892,477	63.8	1,071,783	.....	1,071,783	351,767	912,477	192,461	720,016	760,000	[2]39,984
South Carolina	7	597,577	398,662	66.7	198,915	56,159	255,074	203,196	60,318	8,440	51,878	720	51,158
Tennessee	8	1,866,835	1,079,237	57.8	787,598	.....	787,598	595,356	222,214	29,972	192,242	.....	192,242
Texas	17	1,547,846	993,600	64.2	554,246	.....	554,246	199,483	360,335	5,572	354,763	22,600	332,163
Utah	3	561,328	356,879	63.6	204,449	25,283	229,732	172,424	57,308	.....	57,308	3,000	54,308
Vermont	9	249,228	201,179	80.7	48,049	.....	48,049	45,089	20,704	17,744	2,960	8,750	[2]5,790
Virginia	16	1,553,478	1,009,356	65.0	544,122	113,544	657,666	547,730	151,899	41,963	109,936	33,395	76,541
Washington	8	2,542,906	1,576,018	62.0	966,888	.....	966,888	463,101	504,784	997	503,787	150,028	353,759
West Virginia	8	1,102,171	652,862	59.2	449,309	.....	449,309	265,842	183,467	.....	183,467	22,000	161,467
Wisconsin	17	3,902,059	1,995,024	51.1	1,907,035	21,825	1,928,860	1,081,160	847,700	.....	847,700	300,563	547,137
All other states and territories[3]	11	3,021,063	1,575,605	52.2	1,445,458	.....	1,445,458	685,777	873,455	113,774	759,681	602,827	156,854
Hawaii and Porto Rico	5	515,913	330,350	64.0	185,563	.....	185,563	106,015	99,943	20,395	79,548	19,500	60,048

[1] Exclusive of reports for 18 companies which failed to furnish this information.
[2] Deficit.
[3] Includes states and territories having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Arizona, 1; District of Columbia, 2 (3 reports); Idaho, 1; New Mexico, 1.

TABLE 38.—ANALYSIS OF DEDUCTIONS FROM INCOME (TAXES AND FIXED CHARGES) OF OPERATING COMPANIES, BY STATES AND TERRITORIES: 1902.[1]

STATE OR TERRITORY.	Number of companies.	Aggregate.	TAXES.					INTEREST.				Rent of leased lines and terminals.	Miscellaneous.
			Total.	Real and personal property.	Capital stock.	Earnings.	Miscellaneous.	Total.	Funded debt.	Real estate mortgages.	Floating debt.		
United States	799	$77,595,053	$13,078,899	$5,835,542	$2,931,252	$2,719,287	$1,592,818	$38,085,911	$35,223,284	$93,078	$2,769,549	$25,518,225	$912,018
Alabama	9	384,762	37,047	32,940	.....	669	3,438	347,330	254,653	.....	92,677	.....	385
Arkansas	7	68,071	7,213	6,229	.....	895	89	60,858	50,850	.....	10,008	.....	.....
California	35	2,112,959	495,179	471,136	.....	21,448	2,595	1,617,550	1,579,043	.....	38,507	.....	230
Colorado	7	536,005	78,264	78,264	.....	.....	.....	454,479	441,645	.....	12,834	3,262	.....
Connecticut	21	1,128,319	243,393	4,352	227,562	11,479	.....	757,580	732,108	.....	25,472	108,046	19,300
Delaware	3	77,439	13,973	11,976	.....	.....	1,997	63,466	39,000	2,250	22,216	.....	.....
Florida	6	74,779	12,439	11,714	.....	.....	725	62,340	62,220	.....	120	.....	.....
Georgia	10	755,207	110,846	108,579	.....	.....	2,267	644,361	642,712	.....	1,649	.....	.....
Illinois	48	8,453,191	1,488,359	740,989	558,794	.....	188,576	3,037,830	2,786,563	11,530	239,737	3,875,007	51,995
Indiana	26	1,201,297	185,014	151,609	.....	.....	33,405	984,391	952,219	.....	32,172	.....	31,892
Iowa	22	429,373	54,115	41,390	12,000	.....	725	353,118	344,839	.....	8,279	.....	22,140
Kansas	11	64,451	8,401	7,326	.....	.....	1,075	56,050	55,500	.....	550	.....	.....
Kentucky	12	777,433	177,775	52,843	124,174	.....	758	598,594	591,672	.....	6,922	.....	1,064
Louisiana	8	690,380	200,156	179,549	.....	20,607	.....	483,594	476,530	400	6,664	.....	6,630
Maine	19	337,050	29,704	16,748	50	12,522	384	301,772	266,969	667	34,136	4,000	1,574
Maryland	10	2,555,715	402,223	82,605	196	308,117	11,305	2,151,517	2,138,492	.....	13,025	1,975	.....
Massachusetts	74	5,108,619	1,609,496	437,893	854,402	317,055	146	1,524,248	1,071,242	712	452,294	1,967,540	7,335
Michigan	24	1,788,797	228,538	194,559	.....	30,823	3,156	1,547,772	1,501,111	.....	46,661	.....	12,487
Minnesota	5	1,027,121	131,128	128,518	.....	2,610	.....	870,088	864,422	.....	5,616	24,064	1,891
Mississippi	5	38,684	4,501	4,176	.....	.....	325	34,183	32,175	.....	2,008	.....	.....
Missouri	16	4,635,401	646,682	523,127	.....	22,528	101,027	1,756,840	1,439,798	1,677	315,365	2,230,164	1,715
Montana	5	74,633	13,975	11,075	200	1,532	1,168	60,658	58,375	.....	2,283	.....	.....
Nebraska	4	150,297	28,252	28,252	.....	.....	.....	122,045	119,750	.....	2,295	.....	.....
New Hampshire	7	83,786	7,822	6,151	1,671	.....	.....	47,390	39,550	.....	7,840	28,574	.....
New Jersey	25	3,625,740	431,912	221,200	1,616	159,561	49,535	1,573,411	1,476,383	10,114	86,914	1,586,217	34,200
New York	96	19,552,955	3,428,461	1,450,203	251,726	975,753	750,779	10,333,127	9,528,743	30,746	773,638	5,719,589	71,778
North Carolina	7	98,993	10,791	10,791	.....	.....	.....	87,219	80,310	.....	6,909	.....	983
Ohio	62	4,137,866	601,142	313,845	1,569	233,441	52,287	2,457,584	2,295,268	3,280	159,036	1,066,636	12,504
Oregon	6	146,519	17,622	13,636	.....	.....	3,986	128,897	128,719	.....	178	.....	.....
Pennsylvania	98	12,868,286	1,576,476	102,673	896,619	250,620	326,564	2,056,166	1,870,540	18,804	166,822	8,902,431	333,213
Rhode Island	7	351,767	140,814	36,777	.....	103,993	44	210,953	205,360	.....	5,593	.....	.....
South Carolina	7	203,196	21,109	21,109	.....	.....	.....	180,392	161,259	.....	19,133	720	975
Tennessee	8	595,356	113,573	107,377	.....	.....	6,196	478,473	441,222	.....	37,251	.....	3,310
Texas	17	199,483	36,919	36,525	.....	.....	394	162,564	152,912	.....	9,652	.....	.....
Utah	3	172,424	16,702	16,552	.....	.....	150	155,613	140,000	.....	15,613	.....	109
Vermont	9	45,089	4,427	644	673	3,075	35	40,662	36,721	.....	3,941	.....	.....
Virginia	16	547,730	46,845	28,989	.....	808	17,048	490,484	467,662	3,600	19,222	.....	10,401
Washington	8	463,101	78,289	61,987	.....	16,252	.....	384,862	374,163	.....	10,699	.....	.....
West Virginia	8	265,842	28,030	27,483	.....	547	.....	237,812	230,959	.....	6,853	.....	.....
Wisconsin	17	1,081,160	150,059	3,952	.....	146,107	.....	646,194	624,205	6,634	15,355	.....	284,907
All other states and territories[2]	11	685,777	161,283	49,799	.....	78,845	32,639	523,494	467,420	2,664	53,410	.....	1,000
Hawaii and Porto Rico	5	106,015	10,987	10,305	158	350	174	68,618	66,305	.....	2,313	.....	26,410

[1] Exclusive of reports for 18 companies which failed to furnish this information.
[2] Includes states and territories having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Arizona, 1; District of Columbia, 2 (8 reports); Idaho, 1; New Mexico, 1.

The income account of nonoperating lessor companies, by states is shown in Table 39, and the combined income account for operating and lessor companies considered as one system, by states, in Table 40.

TABLE 39.—INCOME ACCOUNT FOR NONOPERATING LESSOR COMPANIES, BY STATES: 1902.[1]

STATE.	Number of companies.	INCOME.			EXPENDITURES.						Net income of companies reporting net income.	Deficit of companies reporting deficit.	Net income for state.	Dividends.	Surplus.
		Total.	Rental.	Miscellaneous.	Aggregate.	Taxes.	Interest. Total.	Interest. On funded debt.	Interest. On floating debt and real estate mortgages.	Maintenance of organization, and miscellaneous.					
United States.	158	$26,138,899	$26,116,884	$22,015	$8,779,294	$287,436	$8,376,559	$8,355,677	$20,882	$115,299	$17,359,837	$232	$17,359,605	$17,157,061	$202,544
Connecticut	4	113,546	113,546	.....	77,363	18,052	43,704	36,500	7,204	15,607	36,183	.....	36,183	44,000	[2]7,817
Illinois	8	3,758,762	3,758,762	.....	1,323,507	.....	1,323,507	1,323,507	.....	.....	2,435,255	.....	2,435,255	2,435,255	.....
Massachusetts	18	1,986,774	1,986,774	.....	705,967	845	695,678	682,427	13,251	9,444	1,280,989	182	1,280,807	1,272,395	8,412
New Hampshire	6	80,875	80,875	.....	37,125	.....	37,125	37,125	.....	.....	43,750	.....	43,750	.....	43,750
New Jersey	4	1,586,217	1,586,217	.....	1,165,747	.....	1,160,560	1,160,560	.....	5,187	420,470	.....	420,470	369,220	51,250
New York	23	5,703,608	5,697,399	6,209	1,937,801	.....	1,908,060	1,908,060	.....	29,741	3,765,807	.....	3,765,807	3,747,209	18,598
Ohio	4	1,059,814	1,059,814	.....	55,425	.....	55,425	55,425	.....	.....	1,004,389	.....	1,004,389	988,956	15,433
Pennsylvania	86	9,608,918	9,593,112	15,806	1,821,203	268,404	1,497,969	1,497,542	427	54,830	7,787,765	50	7,787,715	7,529,069	258,646
All other states[3]	5	2,240,385	2,240,385	.....	1,655,156	135	1,654,531	1,654,531	.....	490	585,229	.....	585,229	770,957	[2]185,728

[1] Exclusive of reports for 12 companies which failed to furnish this information.
[2] Deficit.
[3] Includes states having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Colorado, 1; Maine, 1; Maryland, 2; Missouri, 1.

TABLE 40.—CONDENSED INCOME ACCOUNT FOR OPERATING AND LESSOR COMPANIES COMBINED, BY STATES: 1902.[1]

STATE.	Number of companies.	Operating earnings.	Operating expenses.	Net earnings from operation.	Income from all other sources.	Gross income less operating expenses.	DEDUCTIONS FROM INCOME (TAXES AND FIXED CHARGES). Aggregate.	Taxes.	Interest. Total.	Interest. On funded debt.	Interest. On other debt.	Miscellaneous.	Net income.	Dividends.	Surplus.
Connecticut	25	$4,284,089	$2,773,608	$1,510,481	$71,686	$1,582,167	$1,097,636	$261,445	$801,284	$768,608	$32,676	$34,907	$484,531	$275,062	$209,469
Illinois	56	24,164,965	14,103,211	10,061,754	864,292	10,926,046	5,901,691	1,488,359	4,361,337	4,110,070	251,267	51,995	5,024,355	4,745,965	278,390
Massachusetts	92	23,617,570	16,403,667	7,213,903	15,840	7,229,743	3,847,046	1,610,341	2,219,926	1,753,669	466,257	16,779	3,382,697	3,182,455	200,242
New Hampshire	13	604,131	478,849	125,282	.....	125,282	92,337	7,822	84,515	76,675	7,840	.....	32,945	8,250	24,695
New Jersey	29	8,137,477	4,324,112	3,813,365	39,446	3,852,811	3,205,270	431,912	2,733,971	2,636,943	97,028	39,387	647,541	447,640	199,901
New York	119	59,315,606	33,677,724	25,637,882	1,572,383	27,210,265	15,771,167	3,428,461	12,241,187	11,436,803	804,384	101,519	11,439,098	6,880,864	4,558,234
Ohio	66	16,587,693	9,132,480	7,455,213	12,158	7,467,371	3,126,655	601,142	2,513,009	2,350,693	162,316	12,504	4,340,716	2,633,554	1,707,162
Pennsylvania	184	30,319,211	15,624,813	14,694,398	54,322	14,748,720	5,787,108	1,844,880	3,554,135	3,368,082	186,053	388,093	8,961,612	8,150,880	810,732
All other states[2]	57	19,359,641	10,812,560	8,547,081	73,006	8,620,087	7,479,926	1,157,008	6,319,139	5,941,435	377,704	3,779	1,140,161	1,336,123	[3]195,962

[1] Exclusive of reports for 12 lessor companies which failed to furnish this information.
[2] Includes states having less than 3 lessor companies, in order that the operations of individual companies may not be disclosed. The companies are distributed as follows: Colorado, 1; Maine, 1; Maryland, 2; Missouri, 1.
[3] Deficit.

Wide differences appear among the states in the proportions which the various items of the income account bear to one another.

From Table 37 it will be seen that the operating earnings of the companies in the state of New York—$59,315,606—constitute no less than 24 per cent of the total for the United States, which amounts to $247,553,999. The operating earnings of the companies in Pennsylvania are somewhat more than one-half as great as those of the New York companies. Illinois is third, with about one-tenth of the street railway earnings of the country, while Massachusetts, which shows a remarkable development of interurban traffic, follows close after Illinois. Of the total net earnings from operation—$105,241,402—New York companies show $25,637,882, or 24.4 per cent. The fact that the street railway companies of New York and Illinois together have more than five-sixths of the "income from other sources" than operation is explained by the large extent to which companies in Chicago and New York city hold the securities of other companies.

Taxes in the several states.—The statistics for states showing the proportion which the contributions of street railway companies to the public treasury bear to their gross income and to their income less operating expenses throw some, though on the whole but little, light upon the policy prevailing under state laws and local ordinances concerning the taxation of this business and the requirement of compensation for special privileges. Quite as important a cause of the wide variations that appear among the states in this respect is found in the differences in the expense of government and in the general rate and methods of taxation in the communities where the railways are located. The pro-

portion of taxes to gross income, and even to gross income less operating expenses, is in general lowest in those states where the greatest proportion of railways are in small towns; notably in various states of the West and South, which are lacking in large urban communities. In a number of these states the taxes paid were less than 2.5 per cent of the gross income of the companies.

Table 41 shows the ratio of taxes to gross income, and to income less operating expenses, in the more important states. It will be seen that Michigan, Ohio, and Indiana are the only states in the table in which the taxes were less than 5 per cent of the gross income. The lower ratio of taxes in these states is probably due in part to the large proportion of interurban railways, the taxation upon which is as yet less heavy than that upon street railways in cities.

TABLE 41.—*Percentage of taxes to income, for street and interurban railways, in selected states: 1902.*

STATE.	PERCENTAGE OF TAXES TO—	
	Gross income.	Gross income less operating expenses.
California	5.0	10.8
Connecticut	6.0	16.5
Illinois	5.9	13.6
Indiana	4.9	11.6
Kentucky	6.1	12.9
Louisiana	6.9	17.4
Maryland	8.2	15.6
Massachusetts	6.8	22.3
Michigan	3.5	8.0
Missouri	6.0	13.9
New Jersey	5.3	11.2
New York	5.6	12.6
Ohio	3.6	8.1
Pennsylvania	6.1	12.5
Tennessee	6.1	14.4

Payments to public authorities are heavier in Maryland than in any other state, being 8.2 per cent of gross income and 15.6 per cent of gross income less operating expenses. This fact is due to the policy of the city of Baltimore in requiring a large franchise payment annually from her railways. Louisiana and Massachusetts come next with taxes amounting to nearly 7 per cent of gross income. The high proportion in Massachusetts is not attributable to the requirement of special franchise payments to local governments, but rather to the methods of assessing corporate property in general in that commonwealth, and to the commutation of the ordinary requirements regarding maintenance and care of the street surface into cash payments to the local authorities.

In Chapter IX will be found a digest of information regarding the special payments for franchise privileges required from street railways in various cities and towns.

Rentals of leased lines, by states.—The widest difference appears among the states as regards the amount of rental paid for leased lines. In only 12 states are there any lessor companies. The rentals paid in 3 states alone, Pennsylvania, Illinois, and New York, amount to about three-fourths of the total rentals for the United States. The rentals paid by operating companies in Pennsylvania amount to no less than $8,902,431, or 29 per cent of the gross income of the companies. The rentals paid in Pennsylvania are equal to nearly three times the amount paid by all the operating companies of that state as interest and dividends on their own securities. In Philadelphia almost all the railway trackage has come under the control of a single operating company, which itself owns no track, but which holds and operates the system under a complicated series of leases and subleases. Five-sixths of the entire net operating earnings of this company go to pay the rentals on the bonds and stocks of its 38 lessor companies. A similar condition of affairs exists in Pittsburg. A large proportion of the surface railway trackage of New York city is likewise controlled under lease, and the rentals paid by operating companies in the state as a whole are equal to nearly one-tenth of their gross income. In Illinois rentals are equal to 15 per cent of the gross income of the railway companies. The Union Traction Company of Chicago, the most important company in that city, holds its trackage altogether under lease. The most important railway system of St. Louis is likewise leased by one company to another, and the rental of leased lines in Missouri is equal to more than one-fifth of the gross income of the street railway companies of the state.

Detailed comment on the figures of interest, net income, dividends, and surplus in the several states would be superfluous. Attention may, however, be called again to the fact that profits in the street railway business do not by any means necessarily depend upon a high proportionate net income. Thus the street railway business in a state in which the proportion of net income is relatively small may yet be highly profitable business, even as disclosed in the income account. Payments to capital in the form of interest and rentals, which are deducted when computing net income, are quite as real a return as those which take the form of dividends. The combined income account for operating and lessor companies, Table 40, gives a very different view of the profitableness of street railway operation in some of the states from that which appears in the income account of operating railways alone.

II.

ANALYSIS OF OPERATING EARNINGS.

Operating earnings of companies, classified according to power.—Table 42 shows, for all companies and for the various groups distinguished according to the character of power used, the amount of operating earnings from the different sources.

TABLE 42.—OPERATING EARNINGS OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Number of companies	799	556	112	57	52	5	14	3
Operating earnings	$247,553,999	$204,076,037	$22,088,656	$2,475,365	$1,475,901	$16,397,867	$1,024,323	$15,850
From passengers	233,821,548	197,989,040	15,084,584	2,344,571	1,449,228	16,001,186	945,160	7,779
From chartered cars	303,608	261,588	38,949	3,005	66	.....	.....	.....
From freight	1,038,097	780,444	182,076	21,788	10,242	.....	35,854	7,693
From mail	432,080	390,256	20,623	2,081	1,005	17,948	17	150
From express	401,672	377,439	17,560	5,419	280	.....	824	150
From sale of electric current for light and power	7,703,574	1,196,025	6,445,542	62,007	.....	.....	.....	.....
From miscellaneous sources	3,853,420	3,081,245	299,322	36,494	15,080	378,733	42,468	78

[1] Exclusive of reports for 18 companies which failed to furnish this information.

Table 43 shows the percentage which each item bears to the total earnings of the group.

TABLE 43.—PERCENTAGE DISTRIBUTION, BY SOURCES, OF OPERATING EARNINGS OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Operating earnings	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
From passengers	94.4	97.0	68.3	91.7	98.2	97.6	92.3	49.1
From chartered cars	0.1	0.1	0.2	0.1	(1)	.....	.....	.....
From freight	0.4	0.4	0.8	0.9	0.7	.....	3.5	48.6
From mail	0.2	0.2	0.1	0.1	0.1	0.1	(1)	0.9
From express	0.2	0.2	0.1	0.2	(1)	.....	0.1	0.9
From sale of electric current for light and power	3.1	0.6	29.2	2.5	.....	.....	.....	.....
From miscellaneous sources	1.6	1.5	1.3	1.5	1.0	2.3	4.1	0.5

[1] Less than one-tenth of 1 per cent.

It will be seen that including the small amount from chartered cars 94.5 per cent of the earnings of all companies were derived from passenger traffic. Of the other sources of earnings the sale of electric current for light and power was the most important. Of the receipts from this last source 83.7 per cent were earned by that group of electric railways which operate fairly distinct and important light and power plants in addition to their railway business. They derived 29.2 per cent of their operating earnings from the sale of light and power. It is scarcely possible to draw a sharp distinction between companies which operate commercial lighting plants and those which do not. The small sales of current reported by companies which are not regarded by the Bureau of the Census as operating separate light and power plants are, in considerable measure, made to other railway companies or to electric light companies, which take the current directly at the dynamo and distribute it.

Railway companies differ to some extent in regard to the distinction which they make between freight and express business, and the amounts of these items, therefore, can not be considered as based upon exact definitions. Elevated railways reported only a small amount of income from mail service and none from freight and express. The freight earnings of the group of cable railways are confined to the inclined plane roads, which derive about one-sixth of their revenue from this source.

The item of miscellaneous earnings covers receipts from a considerable variety of sources. In the case of some companies it includes a certain amount of revenue which, strictly speaking, should be treated as miscellaneous income rather than as earnings, since it is derived from sources not directly connected with the railway or with the accompanying light and power business, but which was not distinguished in the returns from earnings proper. The most important source of miscellaneous earnings was street car advertising, and, particularly in the case of elevated railways, advertising in stations. This revenue belongs properly enough to earnings. Some companies derive a small amount of earnings from parks and other pleasure resorts which they operate. In the majority of instances, however, these establishments are run at a loss, so far as their direct operations are concerned, the company making its profit from the increase in traffic. The sums received by certain railway companies for permitting the cars of other companies to run over their tracks are likewise properly included under the head of miscellaneous earnings.

Operating earnings of companies, classified according to population.—Tables 44 and 45 show the amount and percentage distribution of the various items of operating earnings of all street and interurban railway companies, classified according to the population of the urban centers served, with the further distinction of the two classes of interurban railways.

TABLE 44.—OPERATING EARNINGS, BY SOURCES, OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	799	65	47	83	312	53	239
Operating earnings	$247,553,999	$120,837,007	$51,008,983	$22,728,795	$11,879,327	$10,161,736	$30,938,151
From passengers	233,821,548	118,195,786	49,014,651	19,928,711	9,241,431	8,994,849	28,446,120
From chartered cars	303,608	70,986	65,305	23,656	12,239	37,987	93,435
From freight	1,038,097	34,336	141,574	168,499	81,323	300,685	321,680
From mail	432,080	217,777	76,081	23,251	18,335	29,126	67,510
From express	401,672	53,193	7,191	4,946	12,023	171,111	153,208
From sale of electric current for light and power	7,703,574	425,925	1,011,031	2,236,787	2,259,694	397,217	1,372,920
From miscellaneous sources	3,853,420	1,839,004	693,150	352,945	254,282	230,761	483,278

[1] Exclusive of reports for 18 companies which failed to furnish this information.

TABLE 45.—PERCENTAGE DISTRIBUTION, BY SOURCES, OF OPERATING EARNINGS OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Operating earnings	100.0	100.0	100.0	100.0	100.0	100.0	100.0
From passengers	94.4	97.8	96.1	87.7	77.8	88.5	92.0
From chartered cars	0.1	0.1	0.1	0.1	0.1	0.4	0.3
From freight	0.4	(1)	0.3	0.7	0.7	2.9	1.0
From mail	0.2	0.2	0.1	0.1	0.2	0.3	0.2
From express	0.2	(1)	(1)	(1)	0.1	1.7	0.5
From sale of electric current for light and power	3.1	0.4	2.0	9.8	19.0	3.9	4.4
From miscellaneous sources	1.6	1.5	1.4	1.6	2.1	2.3	1.6

[1] Less than one-tenth of 1 per cent.

The corresponding statistics for full-time electric surface railways not furnishing commercial lighting are presented in Tables 46 and 47.

TABLE 46.—OPERATING EARNINGS, BY SOURCES, OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	556	47	38	66	165	40	200
Operating earnings	$204,076,037	$102,896,131	$45,589,368	$15,356,895	$6,377,469	$7,640,642	$26,215,532
From passengers	197,989,040	100,708,508	44,544,520	14,801,254	6,034,681	6,968,044	24,932,033
From chartered cars	261,588	70,986	57,210	13,466	7,571	34,044	78,311
From freight	780,444	10,904	128,234	88,172	36,192	241,082	275,800
From mail	390,256	199,829	72,981	17,841	14,172	25,303	60,130
From express	377,499	52,369	7,191	3,584	10,006	160,604	143,685
From sale of electric current for light and power	1,196,025	425,925	148,374	151,407	138,156	17,173	314,990
From miscellaneous sources	3,081,245	1,427,610	630,858	281,171	136,691	194,392	410,523

[1] Exclusive of reports for 16 companies which failed to furnish this information.

TABLE 47.—PERCENTAGE DISTRIBUTION, BY SOURCES, OF OPERATING EARNINGS OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Operating earnings	100.0	100.0	100.0	100.0	100.0	100.0	100.0
From passengers	97.0	97.9	97.7	96.4	94.6	91.2	95.1
From chartered cars	0.1	0.1	0.1	0.1	0.1	0.4	0.3
From freight, mail, and express	0.8	0.2	0.5	0.7	1.0	5.6	1.8
From sale of electric current for light and power	0.6	0.4	0.3	1.0	2.2	0.2	1.2
From miscellaneous sources	1.5	1.4	1.4	1.8	2.1	2.6	1.6

The proportion which passenger earnings bear to the total earnings depends primarily on the amount of income from light and power, and it is therefore quite different, in some of the population groups, when electric surface companies without lighting plants are considered alone, from that which appears for all classes of companies combined, including those selling light and power in a commercial way. For all companies the proportion of passenger earnings to total earnings is greatest in the centers of more than 500,000 population, and, decreasing with population, becomes smallest in those of less than 25,000 inhabitants.

The receipts from chartered cars in all classes of urban centers are exceedingly small. The item of earnings from chartered cars is of somewhat greater significance on interurban railways, constituting four-tenths of 1 per cent of the total earnings of fast, long interurban railways and three-tenths of 1 per cent of the earnings of other interurban lines. It is not uncommon for pleasure parties to avail themselves of the convenience and comfort of chartered interurban cars for long journeys into the country or for visits to neighboring towns and cities.

The earnings of urban street railways from freight, mail, and express service are insignificant as compared with their passenger earnings. The distinction between freight and express traffic as made by street and electric railways is not a very precise one, and these two items in the tables should therefore be considered jointly. The earnings from these two sources are relatively greater in small cities than in the larger cities. The freight and express business of the interurban railways of both classes is much more important than that of urban railways. The total revenue of fast, long interurban railways from freight, mail, and express traffic amounted to $500,922, or 4.9 per cent of the gross earnings of all interurban companies of this class.

There are striking differences among the various urban groups in regard to the proportion of earnings derived from the sale of electric light and power. If companies of all classes, including those furnishing commercial lighting, be considered together, it will be found that whereas only two-fifths of 1 per cent of the earnings of companies in urban centers of more than 500,000 inhabitants were derived from light and power, the corresponding proportion in cities under 25,000 inhabitants was 19 per cent. For reasons elsewhere suggested (page 13) it is much more common to find railway business combined with light and power business in small and medium-sized cities than in large ones. Several interurban railway companies of both classes also operated lighting plants and derived a considerable amount of earnings from them.

When attention is confined to those electric surface railway companies which are not regarded by the Bureau of the Census as doing a commercial lighting business, it appears that the earnings from the incidental sale of electric current were also greater among companies in urban centers of less than 100,000 inhabitants than among companies in the larger cities.

The various population groups do not show a wide divergence as regards the proportion which the earnings of railway companies from miscellaneous sources bear to the total earnings. On the face of the returns the proportion of receipts from such sources was distinctly greater in urban centers of less than 25,000 inhabitants than in the larger centers. This is probably attributable, at least in part, to the failure of companies in these towns to distinguish strictly between miscellaneous earnings, which are properly assignable to street railway operation, and miscellaneous income, which is derived from property entirely distinct from the street railway business. The miscellaneous receipts are made up of such a wide variety of items that it is impossible, in the absence of the exact figures for each item, to derive any significant comparisons from the totals for groups. One would, perhaps, expect the receipts from advertising to be comparatively larger in great cities than in those of smaller population, and this opinion seems to be confirmed by such incomplete data regarding the earnings from advertising as appear in the original schedules.

Operating earnings, by states.—Table 48 presents the sources of operating earnings, by states and territories.

The proportions of the earnings from different sources in a given state depend in considerable measure upon the size of the cities in which its street railway companies operate and upon the presence or absence of interurban railways. Thus the earnings from freight, mail, and express service combined are relatively much larger in Ohio and Michigan than elsewhere, because the interurban railways in those states have developed this class of traffic to a considerable degree. The companies of Maryland derived a greater proportion of their revenue from carrying mail than the companies of any other state, although this item was also considerable in Illinois, Missouri, and Massachusetts. Receipts from the sale of electric current for light and power constituted a larger proportion of total earnings in several of the Southern and Western states, where the total business of the companies is comparatively small, than in the leading Northern states. A considerable income was, however, derived from the sale of light and power by the street and interurban railways of Connecticut, Ohio, Illinois, Iowa, and Wisconsin.

TABLE 48.—ANALYSIS OF GROSS EARNINGS FROM OPERATION, BY STATES AND TERRITORIES: 1902.[1]

STATE OR TERRITORY.	Number of companies.	Total.	FROM—						
			Passengers.	Chartered cars.	Freight.	Mail.	Express.	Sale of electric current for light or power.	Miscellaneous.
United States	799	$247,553,999	$233,821,548	$303,608	$1,038,097	$432,080	$401,672	$7,703,574	$3,853,420
Alabama	9	1,497,351	1,135,266	2,211	34,494	1,415	1,362	318,660	3,943
Arkansas	7	371,560	322,805	114	26	.....	.....	45,630	2,985
California	35	9,967,288	9,464,723	3,637	47,625	20,116	3,576	279,216	148,395
Colorado	7	2,227,286	2,091,824	8,106	.....	2,000	.....	111,104	14,252
Connecticut	21	4,284,089	3,829,094	12,435	16,652	6,807	16,660	348,237	54,204
Delaware	3	500,412	476,539	494	2,270	.....	.....	5,112	15,997
Florida	6	529,743	411,533	667	2,486	515	.....	110,363	4,179
Georgia	10	2,375,224	1,594,982	4,972	9,772	440	150	727,847	37,061
Illinois	48	24,164,965	23,270,828	12,615	23,165	42,596	10,148	519,958	285,655
Indiana	26	3,813,076	3,532,579	6,858	18,781	1,977	17,893	144,323	90,665
Iowa	22	2,384,421	1,959,965	954	17,548	5,299	9,132	296,730	94,793
Kansas	11	370,481	343,197	200	.....	566	.....	23,007	3,511
Kentucky	12	2,932,901	2,780,487	1,407	2,500	2,168	4,162	133,337	8,840
Louisiana	8	2,910,244	2,835,262	4,457	.....	1,682	.....	37,753	31,090
Maine	19	1,542,508	1,311,198	251	80,380	6,179	9,409	102,318	32,773
Maryland	10	4,898,627	4,748,425	520	15,343	33,372	11,169	10,843	78,955
Massachusetts	74	23,617,570	22,807,316	43,182	12,876	48,454	4,140	250,109	451,493
Michigan	24	6,494,691	6,014,842	20,313	47,904	11,143	153,224	195,428	51,837
Minnesota	5	3,727,648	3,650,483	4,138	.....	4,335	.....	49,680	19,012
Mississippi	5	258,654	154,597	113	.....	.....	.....	103,236	708
Missouri	16	10,691,220	10,422,536	5,652	7,379	41,071	4,392	172,036	38,154
Montana	5	492,023	382,452	.....	50,544	365	34	43,284	15,344
Nebraska	4	1,148,994	1,107,494	1,044	.....	2,698	.....	35,073	2,685
New Hampshire	7	604,131	579,546	.....	1,182	4,050	120	10,625	8,608
New Jersey	25	8,137,477	7,989,544	21,585	5,364	4,822	96	15,459	100,607
New York	96	59,315,606	57,347,930	53,418	197,324	65,077	64,213	471,509	1,116,135
North Carolina	7	437,259	247,812	75	8,367	.....	1,500	163,657	15,848
Ohio	62	16,587,693	15,293,916	37,450	211,842	35,171	57,679	602,619	349,016
Oregon	6	1,042,895	969,231	507	17,287	2,904	163	33,522	19,281
Pennsylvania	98	30,319,211	29,537,284	24,407	35,563	61,377	28,477	138,602	493,501
Rhode Island	7	2,964,260	2,874,255	1,963	43,835	1,769	536	25,687	16,215
South Carolina	7	597,577	401,553	61	16,579	1,504	.....	171,562	6,318
Tennessee	8	1,866,835	1,759,680	68	1,239	4,836	.....	86,901	14,111
Texas	17	1,547,846	1,501,188	2,250	3,000	555	719	20,859	19,275
Utah	3	561,328	547,875	1,197	.....	800	.....	1,571	9,885
Vermont	9	249,228	216,013	.....	23,351	2,201	1,768	.....	5,895
Virginia	16	1,553,478	1,103,732	2,036	12,791	1,617	368	387,031	45,903
Washington	8	2,542,906	1,513,156	3,233	63,501	1,883	.....	641,800	19,333
West Virginia	8	1,102,171	958,805	100	6,160	755	.....	126,117	10,234
Wisconsin	17	3,902,059	3,155,168	11,489	.....	765	582	690,284	43,771
All other states and territories[2]	11	3,021,063	2,876,433	9,429	967	8,796	.....	52,485	72,953
Hawaii and Porto Rico	5	515,913	485,258	301	25	.....	.....	26,454	3,875

[1] Exclusive of reports for 18 companies which failed to furnish this information.
[2] Includes states and territories having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Arizona, 1; District of Columbia, 2 (8 reports); Idaho, 1; New Mexico, 1.

III.

ANALYSIS OF OPERATING EXPENSES.

Detailed analysis, by states.—Table 49 presents for the United States and for each state an analysis of the operating expenses of street railways under six main divisions and thirty-nine subdivisions. The classification of expenses is that adopted by the American Street Railway Accountants' Association. In the appendix to this report will be found a detailed list of the different items of expenditure which, according to the rules of that association, are to be included in each of the divisions and subdivisions. This classification applies less satisfactorily to animal power, elevated, and steam railways than to electric and cable railways, and less satisfactorily to electric railways having commercial lighting plants than to those without them. Nevertheless, electric railway companies without commercial lighting plants do such a large proportion of the total business for all classes of companies that the totals of the table, which include all operating companies, may be regarded as showing in a fairly accurate manner the distribution of expenses of this class of companies.

TABLE 49.—ANALYSIS OF OPERATING

	STATE OR TERRITORY.	Number of companies.	Aggregate.	MAINTENANCE.							
				Ways and structures.				Equipment.			
				Total.	Track and roadway.	Electric, cable, etc., lines.	Buildings and fixtures.	Total.	Steam plant.	Electric, cable, etc., plant.	Cars.
1	United States	799	$142,312,597	$12,118,296	$8,158,631	$2,959,182	$1,000,483	$16,676,532	$1,353,789	$826,604	$7,659,428
2	Alabama	9	878,291	71,473	57,864	11,218	2,391	114,402	4,828	5,845	60,243
3	Arkansas	7	216,433	18,959	16,214	1,589	1,156	19,405	3,432	249	9,873
4	California	35	5,402,245	530,602	292,041	219,005	19,556	621,653	49,956	86,183	291,809
5	Colorado	7	1,300,606	187,192	119,560	60,747	6,885	128,618	14,412	8,442	59,333
6	Connecticut	21	2,773,608	328,495	239,290	72,957	16,248	289,765	16,798	5,933	125,372
7	Delaware	3	360,590	11,657	7,036	4,317	304	35,080	2,196	3,175	9,994
8	Florida	6	339,375	20,708	15,714	3,689	1,305	26,270	6,373	696	10,595
9	Georgia	10	1,232,320	50,864	26,726	19,730	4,408	101,608	3,474	2,370	42,696
10	Illinois	48	14,103,211	1,052,973	697,579	274,732	80,662	1,999,348	148,157	278,072	1,021,645
11	Indiana	26	2,219,791	194,751	133,433	49,938	11,380	305,976	38,552	22,490	102,543
12	Iowa	22	1,460,993	159,559	121,850	29,989	7,720	156,305	16,421	8,137	62,785
13	Kansas	11	257,248	24,751	17,406	6,108	1,237	29,231	1,838	2,919	19,905
14	Kentucky	12	1,560,270	235,169	170,487	47,904	16,778	145,385	15,916	3,713	84,647
15	Louisiana	8	1,758,989	162,924	100,511	55,444	6,969	244,121	40,409	22,765	101,327
16	Maine	19	1,127,660	144,860	96,232	21,287	27,341	157,745	6,203	7,263	77,336
17	Maryland	10	2,312,323	120,257	76,886	36,751	6,620	284,097	12,641	7,884	120,560
18	Massachusetts	74	16,403,667	1,513,832	991,972	382,098	139,762	1,895,793	170,050	43,656	964,128
19	Michigan	24	3,655,328	324,077	224,484	75,081	24,512	424,800	24,409	31,425	165,231
20	Minnesota	5	1,719,687	92,707	73,745	10,268	8,694	221,043	5,932	3,575	81,492
21	Mississippi	5	192,056	16,467	10,763	5,175	529	14,857	2,013	1,358	7,525
22	Missouri	16	6,071,971	413,488	205,575	180,607	27,306	767,517	82,497	17,121	357,791
23	Montana	5	365,073	39,107	33,873	2,509	2,725	28,317	328	212	14,522
24	Nebraska	4	655,729	121,848	81,432	39,274	1,142	63,765	4,760	8,041	26,685
25	New Hampshire	7	478,849	35,199	24,990	7,798	2,411	48,540	842	188	21,380
26	New Jersey	25	4,321,112	270,285	184,007	63,588	22,690	576,440	31,694	22,525	236,151
27	New York	96	33,677,724	2,404,843	1,461,861	592,247	350,735	3,771,757	179,600	75,690	1,681,432
28	North Carolina	7	322,344	29,097	16,805	9,524	2,768	28,215	3,219	1,772	14,084
29	Ohio	62	9,132,480	787,224	572,541	178,817	35,866	863,348	77,249	31,120	372,540
30	Oregon	6	653,912	69,923	51,680	12,007	6,236	86,486	5,218	7,177	42,225
31	Pennsylvania	98	15,624,813	1,553,534	1,206,082	263,968	83,484	2,037,248	265,447	58,374	927,969
32	Rhode Island	7	1,892,477	282,185	220,484	50,907	10,794	214,981	27,501	11,820	93,842
33	South Carolina	7	398,662	23,956	14,089	4,894	4,973	35,435	3,302	1,626	16,083
34	Tennessee	8	1,079,237	96,734	71,996	15,984	8,754	126,352	2,620	2,561	71,416
35	Texas	17	993,600	111,110	84,057	20,890	6,163	110,395	5,489	2,662	59,880
36	Utah	3	356,879	54,609	45,578	7,249	1,782	41,187	1,569	935	14,041
37	Vermont	9	201,179	26,183	20,100	3,254	2,829	20,705	304	866	7,916
38	Virginia	16	1,009,356	94,060	57,431	25,036	11,593	98,804	9,666	10,280	42,950
39	Washington	8	1,576,018	186,485	143,561	29,097	13,827	135,767	16,979	12,639	59,272
40	West Virginia	8	652,862	48,946	35,151	10,988	2,807	48,669	3,889	823	24,417
41	Wisconsin	17	1,995,024	137,461	93,234	34,692	9,535	165,173	35,111	11,947	60,991
42	All other states and territories[2]	11	1,575,605	69,742	44,311	17,825	7,606	191,929	12,495	2,075	85,802
43	Hawaii and Porto Rico	5	330,350	20,799	15,597	2,126	3,076	27,677	1,556	330	13,434

[1] Exclusive of reports for 18 companies which failed to furnish this information.
[2] Includes states and territories having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Arizona, 1; District of Columbia, 2 (8 reports); Idaho, 1; New Mexico, 1.

EXPENSES, BY STATES AND TERRITORIES: 1902.[1]

MAINTENANCE—continued.			TRANSPORTATION.										
Equipment—Continued.			Operation of power plant.							Operation of cars.			
Electric, cable, etc., equipment of cars.	Miscellaneous.	Miscellaneous shop expenses.	Total.	Wages.	Fuel.	Water.	Lubricants and waste.	Miscellaneous supplies and expenses.	Hired power.	Total.	Superintendence of transportation.	Wages of conductors.	
$5,325,125	$668,875	$842,711	$23,062,328	$4,599,487	$12,827,322	$634,026	$500,967	$629,008	$3,871,518	$62,454,679	$2,598,935	$24,070,921	1
36,762	3,436	3,288	114,063	23,074	67,684	4,140	3,233	1,479	14,453	300,598	20,273	105,877	2
5,290	105	456	55,129	15,347	26,814	2,183	2,075	162	8,548	87,830	2,551	21,905	3
157,048	21,461	15,196	878,716	186,522	428,453	4,388	14,152	20,451	224,750	2,762,258	73,246	1,181,880	4
39,552	1,875	5,004	240,298	73,144	136,386	3,509	3,820	1,925	21,514	531,548	16,632	224,862	5
114,756	5,754	21,152	438,707	102,549	260,027	8,000	9,855	8,211	50,065	1,114,410	30,914	442,579	6
13,916	1,319	4,480	84,804	15,384	61,600	1,527	3,297	310	2,686	134,871	1,680	60,080	7
7,804	200	602	65,281	14,798	47,652	175	1,505	1,151	.....	102,453	6,286	39,399	8
40,386	2,805	9,877	176,835	41,571	113,619	8,086	7,628	3,784	2,147	400,180	9,451	158,480	9
388,439	59,430	103,605	2,353,311	476,336	1,306,304	49,239	37,869	80,584	402,979	5,825,552	89,704	2,444,620	10
115,675	2,284	24,482	363,879	106,528	223,900	3,312	12,100	7,441	10,603	847,307	27,146	332,116	11
47,020	8,581	13,361	293,226	74,084	187,345	4,432	8,362	5,436	13,567	513,727	13,192	177,629	12
3,022	585	962	44,452	16,790	24,986	591	1,569	516	.....	102,482	5,080	27,020	13
32,570	1,492	7,047	184,764	46,165	100,244	4,902	6,760	13,547	13,146	653,671	58,187	99,084	14
66,198	3,414	10,008	295,083	76,026	172,626	511	20,607	23,313	2,000	831,936	10,610	346,139	15
56,429	1,960	8,554	200,531	52,744	84,798	27,501	4,347	6,278	24,863	377,503	18,059	141,941	16
132,124	78	1,815	461,108	89,296	268,550	9,847	5,303	2,203	85,909	1,017,517	25,448	443,261	17
672,204	28,057	17,698	2,573,845	469,865	1,522,155	63,347	47,979	43,435	427,064	7,444,107	640,791	2,660,947	18
168,807	13,027	21,901	660,257	175,669	393,744	1,527	20,472	14,073	54,772	1,576,731	56,533	592,663	19
125,793	1,850	2,401	263,689	48,538	69,792	2,023	2,541	7,005	133,790	784,491	21,488	299,127	20
3,111	661	189	61,945	14,073	39,643	2,441	2,659	1,511	1,618	40,765	1,395	15,229	21
240,660	10,753	58,695	970,997	242,381	643,115	47,332	26,959	7,560	3,650	2,713,951	80,849	1,109,345	22
11,349	710	1,196	58,983	12,053	19,282	1,363	797	1,098	24,390	140,188	600	57,842	23
24,164	115	.....	122,058	29,539	86,296	3,690	2,533	.....	.....	264,686	1,875	119,273	24
18,572	1,308	6,250	134,413	21,144	38,348	1,349	1,611	1,584	70,377	162,911	7,549	67,679	25
238,141	19,463	28,466	753,759	112,188	301,284	17,312	14,309	17,218	291,448	1,907,598	56,302	745,342	26
1,147,418	381,005	306,612	5,266,237	659,583	3,012,882	259,145	85,333	263,583	985,711	15,420,303	721,152	5,528,938	27
7,939	701	500	78,996	16,959	48,399	1,588	2,964	700	8,386	79,180	4,288	29,688	28
294,688	19,491	68,260	1,616,321	413,639	963,623	33,839	46,376	31,463	127,381	4,211,137	113,153	1,663,807	29
30,400	1,413	53	108,877	29,980	25,022	12	3,430	1,242	49,191	293,011	9,405	126,473	30
707,628	39,570	38,260	2,056,849	579,052	1,060,602	29,197	60,838	16,872	310,288	7,267,220	281,830	3,071,514	31
58,220	4,655	18,943	296,212	48,397	170,237	15,203	4,165	6,021	52,189	792,790	31,513	304,091	32
7,351	6,640	433	55,636	7,619	32,019	280	1,027	429	14,262	135,242	16,906	37,931	33
38,133	1,229	10,393	163,842	21,759	72,189	3,315	4,081	1,878	60,620	409,102	25,700	164,145	34
35,788	1,459	5,117	177,436	30,359	63,843	1,133	3,375	3,450	75,276	376,369	16,338	129,006	35
23,467	708	467	59,881	2,679	5,407	188	402	44	51,161	162,998	7,100	65,506	36
9,312	1,579	728	41,449	3,989	10,005	.....	711	219	26,525	90,641	5,210	33,683	37
32,971	1,250	1,687	243,083	49,806	144,727	6,721	7,180	3,473	31,176	319,064	17,734	114,522	38
37,102	6,386	3,389	274,662	48,888	141,364	3,374	3,589	9,491	67,956	515,418	9,980	222,103	39
15,783	2,279	1,478	97,029	36,655	47,276	2,572	3,055	1,439	6,032	278,868	6,582	110,890	40
46,120	8,394	2,610	390,939	72,092	261,830	2,527	7,290	14,884	32,316	716,787	34,856	269,268	41
73,013	1,448	17,096	284,746	42,228	143,250	2,205	4,809	3,545	88,709	747,278	21,947	286,237	42
9,385	1,586	1,386	55,327	10,617	37,829	1,013	1,097	571	4,200	110,797	3,969	35,238	43

TABLE 49.—ANALYSIS OF OPERATING

	STATE OR TERRITORY.	TRANSPORTATION—continued. Operation of cars—Continued.							MISCELLANEOUS.		
		Wages of motormen.	Wages of other car service employees.	Wages of car house employees.	Car service supplies.	Miscellaneous car service expenses.	Cleaning and sanding track.	Removal of snow and ice.	Total.	Salaries of general officers.	Salaries of clerks.
1	United States	$24,662,872	$2,595,652	$3,214,605	$1,905,155	$1,924,599	$730,981	$750,959	$25,812,009	$2,993,123	$2,237,723
2	Alabama	112,639	7,439	32,738	8,268	8,293	5,071	.....	124,105	24,701	8,922
3	Arkansas	44,175	1,188	14,687	1,700	982	639	3	33,555	9,099	5,502
4	California	1,187,715	103,147	81,333	66,925	30,826	36,585	601	609,016	105,628	94,947
5	Colorado	231,261	3,888	16,624	12,332	15,079	9,672	1,798	208,680	38,813	30,189
6	Connecticut	442,425	32,096	57,614	16,067	29,186	28,604	34,925	419,887	127,904	44,372
7	Delaware	60,080	4,934	3,973	1,450	882	361	1,431	94,178	6,400	5,181
8	Florida	37,851	1,656	11,081	2,418	1,332	2,430	.....	62,139	18,398	11,752
9	Georgia	170,243	17,304	24,162	5,320	8,549	6,671	.....	218,135	46,222	22,677
10	Illinois	2,094,870	302,081	353,302	147,441	263,683	102,580	27,271	2,819,259	237,995	164,765
11	Indiana	364,174	9,725	56,123	21,357	18,884	13,572	4,210	408,474	93,060	46,184
12	Iowa	230,912	16,505	45,349	12,502	9,673	3,284	4,681	259,804	47,738	24,734
13	Kansas	53,381	2,843	4,413	5,324	1,686	2,062	673	50,053	16,590	3,630
14	Kentucky	288,499	28,914	23,244	72,591	74,510	7,352	1,290	318,510	44,832	15,914
15	Louisiana	351,266	18,886	63,990	9,569	20,017	11,459	.....	221,128	53,567	23,927
16	Maine	142,135	10,593	16,968	4,463	27,594	2,290	13,460	197,793	22,998	20,896
17	Maryland	446,404	17,980	32,000	31,231	13,845	3,679	3,669	422,437	40,909	61,654
18	Massachusetts	2,711,885	372,823	419,198	55,799	289,900	95,241	197,523	2,933,327	266,635	248,465
19	Michigan	631,592	68,555	117,433	41,790	45,196	10,418	13,151	657,699	125,835	78,296
20	Minnesota	294,234	29,231	75,107	26,870	21,401	12,915	4,118	327,960	43,234	36,996
21	Mississippi	17,351	.....	3,727	1,185	758	1,120	.....	49,362	12,959	4,640
22	Missouri	1,100,274	61,838	183,694	60,425	71,066	43,461	2,999	1,179,639	136,140	85,021
23	Montana	51,886	150	5,980	15,456	2,263	5,342	669	76,738	11,150	7,175
24	Nebraska	119,695	11,597	5,134	4,955	168	527	1,462	83,372	17,007	7,728
25	New Hampshire	67,630	3,645	7,197	2,736	963	180	5,332	95,299	9,088	4,978
26	New Jersey	753,769	108,906	95,787	69,409	48,562	12,759	16,762	804,551	107,036	64,824
27	New York	5,796,023	1,001,318	619,944	873,777	556,546	72,320	250,285	6,632,892	428,451	539,651
28	North Carolina	29,762	6,619	3,023	4,396	600	1,004	400	57,135	14,275	7,424
29	Ohio	1,761,552	136,863	281,003	82,773	87,762	71,511	12,713	1,553,649	269,697	150,200
30	Oregon	126,626	7,456	9,383	6,991	1,695	4,045	937	87,588	20,733	14,910
31	Pennsylvania	3,080,059	76,240	290,284	145,273	97,860	103,546	120,614	2,707,610	223,299	220,163
32	Rhode Island	300,305	21,438	68,672	22,770	11,456	16,027	16,518	306,309	25,777	15,356
33	South Carolina	38,277	4,956	11,154	2,722	20,903	2,365	28	68,416	17,260	4,609
34	Tennessee	176,851	6,223	11,954	13,340	6,288	4,464	137	237,734	32,075	14,673
35	Texas	182,270	10,047	18,744	6,604	6,073	7,249	38	218,290	56,623	15,914
36	Utah	75,059	.....	5,705	2,129	4,790	1,907	802	38,204	9,900	2,440
37	Vermont	34,109	5,049	6,106	1,812	2,158	230	2,284	22,201	6,046	1,967
38	Virginia	114,326	16,749	15,594	15,184	22,739	1,906	310	204,951	42,152	15,676
39	Washington	222,087	10,368	24,308	3,434	15,849	2,429	4,860	311,290	50,775	35,095
40	West Virginia	118,573	4,037	7,034	4,011	23,790	2,422	1,529	106,707	26,284	13,173
41	Wisconsin	310,462	4,437	45,474	11,600	27,492	10,517	2,681	307,023	53,591	25,847
42	All other states and territories	290,185	47,928	45,365	10,756	33,300	10,765	795	281,910	52,247	37,256
43	Hawaii and Porto Rico	58,257	1,222	3,887	2,079	826	4,319	.....	95,366	8,959	14,098

EXPENSES, BY STATES AND TERRITORIES: 1902—Continued.

MISCELLANEOUS—continued.												Wages, supplies, and expenses incidental to electric service not elsewhere included.	
Printing and stationery.	Miscellaneous office expenses.	Storeroom expenses.	Stable expenses.	Advertising and attractions.	Miscellaneous general expenses.	Damages.	Legal expenses in connection with damages.	Other legal expenses.	Rent of land and buildings.	Rent of track and terminals.	Insurance.		
$496,381	$666,997	$229,237	$1,430,000	$1,122,816	$2,061,821	$7,529,946	$1,865,599	$1,017,854	$608,344	$1,471,293	$2,080,875	$2,188,753	1
3,896	4,850	3,040	6,832	11,078	10,966	31,054	6,266	1,100	3,473	355	7,572	153,650	2
620	510	617	3,838	569	5,636	2,976	387	593	202	.....	3,006	1,555	3
12,053	25,143	21,763	32,956	35,547	26,578	130,769	52,707	14,045	2,100	3,299	51,481	.....	4
3,682	5,394	5,645	3,419	32,959	20,952	36,340	8,557	5,102	5,240	.....	12,388	4,270	5
7,615	10,139	2,922	9,235	47,336	28,454	46,856	8,989	30,327	4,002	5,283	46,453	182,344	6
1,616	1,137	150	888	12,412	3,863	16,772	3,700	253	99	34,035	7,672	.....	7
1,356	1,867	684	1,012	8,025	8,499	3,514	1,680	1,682	.....	.....	3,670	62,524	8
6,128	2,751	1,957	3,597	28,297	9,548	62,080	5,660	7,336	4,567	3,495	13,820	284,698	9
28,933	45,934	23,435	95,424	28,645	226,542	913,117	275,468	173,202	55,228	463,528	87,043	52,768	10
8,913	11,134	9,624	7,716	31,887	51,013	59,839	13,283	14,962	8,668	31,606	20,585	99,404	11
7,765	4,952	3,081	5,750	40,183	35,388	38,498	8,821	9,495	6,925	6,005	20,469	78,372	12
1,593	340	.....	4,511	3,454	2,490	7,340	5,269	590	858	100	3,288	6,279	13
8,838	9,041	20,036	4,088	14,344	84,324	60,759	9,691	13,507	3,355	6,600	18,181	27,771	14
4,407	5,627	3,846	13,882	13,109	26,096	38,270	200	13,137	931	820	23,309	3,797	15
4,642	4,015	.....	4,776	45,130	32,128	25,629	1,376	880	8,662	5,596	21,065	49,228	16
11,096	8,006	110	14,694	2,216	45,401	164,913	11,344	5,499	451	200	55,944	6,907	17
111,795	71,325	10,882	34,459	92,324	203,366	664,562	195,160	53,609	139,111	366,935	474,699	42,763	18
21,597	29,188	6,258	5,828	56,524	92,871	121,038	16,733	27,596	16,920	17,663	41,357	11,764	19
6,429	4,971	10,188	4,644	6,195	56,710	106,669	18,227	8,750	4,265	.....	20,682	29,797	20
1,187	2,014	.....	1,181	2,567	3,461	12,509	2,615	1,447	2,023	.....	2,759	8,660	21
16,517	12,829	14,786	24,704	50,227	97,304	568,369	51,415	37,218	5,454	7,617	72,038	26,379	22
413	1,286	25	120	39,150	6,707	3,456	100	2,500	2,442	.....	2,214	21,740	23
4,587	461	.....	1,205	.....	9,109	30,040	2,500	2,400	.....	.....	8,335	.....	24
4,456	6,928	128	3,637	16,288	8,527	12,113	2,588	419	7,665	36	18,448	2,487	25
38,335	19,379	12,650	22,585	15,660	23,378	318,119	45,352	39,849	12,958	30,488	53,938	11,479	26
54,275	137,944	37,015	1,008,873	111,378	325,300	2,173,259	831,019	232,655	120,749	205,935	426,388	181,692	27
1,742	2,935	560	510	13,133	2,809	5,059	949	2,472	400	687	4,180	49,721	28
36,343	36,743	15,785	24,334	58,975	201,350	340,695	102,110	65,468	50,946	92,899	108,104	100,501	29
4,089	5,023	.....	2,888	2,310	5,571	10,381	3,840	5,201	1,810	5,073	5,759	8,027	30
48,733	146,883	3,274	41,238	191,976	248,862	894,338	115,915	128,745	23,555	156,225	264,404	2,352	31
122	4,867	.....	532	733	12,200	165,357	450	21,313	32,955	.....	26,597	.....	32
632	2,584	1,718	1,872	11,122	9,228	12,478	1,020	399	642	.....	4,852	79,977	33
4,716	3,180	1,738	6,631	4,010	18,849	58,203	10,165	12,421	60,501	.....	10,572	45,473	34
5,541	5,770	1,585	8,724	14,927	12,452	62,481	13,260	7,248	3,350	1,111	9,304	.....	35
2,689	1,455	.....	1,630	981	3,326	7,454	3,121	1,000	.....	.....	4,208	.....	36
533	446	.....	2,704	3,629	3,275	387	100	445	746	.....	1,923	.....	37
4,717	7,363	2,948	525	24,531	17,577	23,676	4,380	17,004	5,672	16,647	22,083	49,894	38
1,859	9,352	3,275	268	32,957	25,565	89,989	15,062	18,410	5,815	1,389	21,479	152,396	39
930	1,623	.....	450	1,715	14,482	28,004	1,060	6,294	1,342	.....	11,350	72,643	40
5,758	5,735	5,158	9,132	6,359	19,330	99,605	9,933	14,826	2,338	.....	49,411	277,641	41
5,233	5,873	4,354	8,713	9,904	22,334	82,979	5,127	18,455	1,924	7,666	19,845	.....	42
1,861	344	903	54,142	3,018	3,225	1,570	1,453	1,983	624	.....	3,186	20,384	43

Table 50 shows, for all companies, the percentage which each subdivision of operating expenses bears to the total operating expenses.

TABLE 50.—*Percentage distribution of operating expenses of operating companies: 1902.*

ITEM OF EXPENSE.	Percentage of total operating expenses.	ITEM OF EXPENSE.	Percentage of total operating expenses.
Aggregate	100.0	Car service supplies	1.3
Maintenance of ways and structures, total	8.5	Miscellaneous car service expenses	1.4
Track and roadway	5.7	Cleaning and sanding track	0.5
Electric, cable, etc., lines	2.1	Removal of snow and ice	0.6
Buildings and fixtures	0.7	Miscellaneous, total	18.1
Maintenance of equipment, total	11.7	Salaries of general officers	2.1
Steam plant	0.9	Salaries of clerks	1.6
Electric, cable, etc., plant	0.6	Printing and stationery	0.3
Cars	5.4	Miscellaneous office expenses	0.5
Electric, cable, etc., equipment of cars	3.7	Storeroom expenses	0.2
Miscellaneous	0.5	Stable expenses	1.0
Miscellaneous shop expenses	0.6	Advertising and attractions	0.8
Operation of power plant, total	16.2	Miscellaneous general expenses	1.4
Wages	3.2	Damages	5.3
Fuel	9.0	Legal expenses in connection with damages	1.3
Water	0.5	Other legal expenses	0.7
Lubricants and waste	0.4	Rent of land and buildings	0.4
Miscellaneous supplies and expenses	0.4	Rent of track and terminals	1.0
Hired power	2.7	Insurance	1.5
Operation of cars, total	43.9	Wages, supplies, and expenses incidental to electric service not elsewhere included	1.6
Superintendence of transportation	1.8		
Wages of conductors	16.9		
Wages of motormen	17.3		
Wages of other car service employees	1.8		
Wages of car house employees	2.3		

It will be seen that almost exactly one-fifth of the total operating expenses were devoted to the maintenance of ways and equipment, while the operation of the power plant, of which cost of fuel is the most important item, required one-sixth of the total expenditure. A considerable number of street railways hire their electric current, either from other street railways, or, more often, from electric light companies, while, in a few instances, steam power is similarly hired. The aggregate expenditure for hired power in 1902 was about one-sixth of the expenditure of all companies for power. By far the most important class of expenditures is that designated as for "operation of cars," which amounted to 43.9 per cent of the total. The wages of conductors and motormen constituted more than one-third of the entire cost of street railway operation. The item "superintendence of transportation" can not, in the case of some railways, be accurately separated from the item "salaries of general officers and clerks," but these instances are not of sufficient importance to affect materially the totals for the country.

A considerable part of the expenditure under the head "advertising and attractions" consists of the cost of maintaining parks and other places of amusement. The revenue derived by street railway companies from such enterprises has been deducted and the item, therefore, represents only net expenditure. The most important of the miscellaneous expenses is that for damages, mostly in personal-injury cases. No less than $7,529,946 was paid by street railway companies for damages in 1902, while the legal expenses connected with claims and suits for damages raised the total expense to $9,395,545, which was one-fifteenth of the total operating expenses of all street railway companies. The companies very generally complain that the public and the courts treat them unfairly in the matter of claims and suits for damages. They allege that there is too general a readiness to blame the railways for injuries which are due wholly or largely to the carelessness of the injured person, and that juries are prone to assess damages at an unreasonable figure.

The item "wages, supplies, and expenses incident to electric service" was not reported in a uniform manner by all companies. It is intended to represent the expense peculiar to the production and distribution of electric current for light and power, as distinguished from expenses of the railway business proper. Some companies which sell light and power undertake to distinguish that part of their fuel and other power plant expenses, which is attributable to the lighting and power service, from that which is properly attributable to the railway operation. Other companies do not make such a segregation, but place under the last subdivision in the account only such expenses as are connected strictly with the distribution of current for light and power, excluding those due to its generation.

Operating expenses of companies, classified according to power.—Tables 51 and 52 present for the groups of railway companies, classified according to power used, the amount and percentage, respectively, of operating expenses falling under the six main divisions. In considering these statistics, it should be remembered that the ratio of operating expenses to operating earnings differs materially in the various groups of railways.

TABLE 51.—OPERATING EXPENSES OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Number of companies	799	556	112	57	52	5	14	3
Operating expenses, total	$142,312,597	$118,236,568	$12,834,941	$1,439,174	$1,077,786	$8,151,926	$552,812	$19,440
Maintenance of ways and structures	12,118,296	10,290,505	1,035,566	107,028	50,723	567,689	62,570	4,215
Maintenance of equipment	16,676,532	14,443,364	1,115,583	143,375	68,366	848,272	53,740	3,832
Operation of power plant	23,062,328	18,199,604	2,487,822	325,991	.....	1,937,877	108,609	2,425
Operation of cars	62,454,679	53,398,930	4,066,636	534,287	432,978	3,750,119	265,749	5,980
Miscellaneous	25,812,009	21,846,383	2,018,893	307,963	525,669	1,047,909	62,144	2,988
Wages, supplies, and expenses incidental to electric service, not elsewhere included	2,188,753	57,782	2,110,441	20,530	.....	.....	.....	.....

[1] Exclusive of reports for 18 companies which failed to furnish this information.

TABLE 52.—PERCENTAGE DISTRIBUTION OF OPERATING EXPENSES OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Operating expenses, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Maintenance of ways and structures	8.5	8.7	8.1	7.4	4.7	7.0	11.3	21.7
Maintenance of equipment	11.7	12.2	8.7	10.0	6.3	10.4	9.7	19.7
Operation of power plant	16.2	15.4	19.4	22.7	.....	23.8	19.7	12.5
Operation of cars	43.9	45.2	31.7	37.1	40.2	46.0	48.1	30.7
Miscellaneous	18.2	18.5	15.7	21.4	48.8	12.8	11.2	15.4
Wages, supplies, and expenses incidental to electric service, not elsewhere included	1.5	(1)	16.4	1.4	.....	.....	.....	.....

[1] Less than one-tenth of 1 per cent.

Animal power railways show the lowest proportion of expenditure for maintenance of ways and structures. This is due in part to the relatively simple construction and equipment of such lines and the low degree of wear and tear on them; in part, perhaps, to the disposition to let such properties, which are becoming anachronisms, run down rather than to maintain them.

The expense for the operation of power plant is naturally greater among electric railways which have commercial lighting plants than among those which do not, since the cost of producing current constitutes a greater proportion of the total operating expense in the lighting business than in the railway business. The large proportion of the expenditure of elevated railroads for operation of "power plant" is partly explained by the fact that the Manhattan Elevated Railway was largely operated by steampower during the census year, the fuel consumption of the locomotives being far greater proportionately than that of powerhouse engines. The company has since changed its motive power, and the report of the company for the year following that of the census inquiry shows a remarkable decrease in operating expenses per car mile and in the ratio of expenses to earnings. Animal power railways present no item for power plant expenses, the stable expenses being included under the "miscellaneous" group, which is thus made relatively very much greater for such railways than for other classes.

The statistics of the three ordinary cable railways in San Francisco present a decidedly different distribution of expenses from that of the inclined planes which are combined with them in the foregoing tables. For the ordinary cable railways the proportions of the various classes of expense to the total operating expenses were: Maintenance of ways and structures, 11.25 per cent; maintenance of equipment, 11.15 per cent; operation of power plant, 13.13 per cent; operation of cars, 54.94 per cent; and miscellaneous expenses, 9.53 per cent.

Operating expenses of companies, classified according to population.—Tables 53 and 54 show the amount and percentage of the six main classes of operating expenses for all railway companies in the various urban and interurban groups. Similar statistics for full-time electric surface railway companies not furnishing commercial lighting are presented in Tables 55 and 56.

TABLE 53.—OPERATING EXPENSES OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	799	65	47	83	312	53	239
Operating expenses, total	$142,312,597	$67,300,048	$27,308,769	$13,480,577	$8,088,172	$6,076,983	$20,058,048
Maintenance of ways and structures	12,118,296	5,126,079	2,520,809	1,362,758	710,918	541,414	1,856,318
Maintenance of equipment	16,676,532	8,599,760	2,886,438	1,390,604	796,703	753,184	2,249,843
Operation of power plant	23,062,328	9,641,891	3,863,120	2,176,316	1,984,154	1,339,441	4,057,406
Operation of cars	62,454,679	31,099,653	13,087,521	5,516,299	2,744,297	2,064,552	7,942,357
Miscellaneous	25,812,009	12,832,665	4,668,998	2,344,988	1,294,532	1,242,492	3,428,334
Wages, supplies, and expenses incidental to electric service, not elsewhere included	2,188,753	.....	281,883	689,612	557,568	135,900	523,790

[1] Exclusive of reports for 18 companies which failed to furnish this information.

TABLE 54.—PERCENTAGE DISTRIBUTION OF OPERATING EXPENSES OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Operating expenses, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Maintenance of ways and structures	8.5	7.6	9.2	10.1	8.8	8.9	9.3
Maintenance of equipment	11.7	12.8	10.6	10.3	9.9	12.4	11.2
Operation of power plant	16.2	14.3	14.2	16.2	24.5	22.0	20.2
Operation of cars	43.9	46.2	47.9	40.9	33.9	34.0	39.6
Miscellaneous	18.2	19.1	17.1	17.4	16.0	20.5	17.1
Wages, supplies, and expenses incidental to electric service, not elsewhere included	1.5	.....	1.0	5.1	6.9	2.2	2.6

TABLE 55.—OPERATING EXPENSES OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	556	47	38	66	165	40	200
Operating expenses, total	$118,236,568	$58,089,586	$24,684,272	$9,366,539	$4,388,638	$4,579,621	$17,127,912
Maintenance of ways and structures	10,290,505	4,506,096	2,306,248	1,016,903	437,370	422,570	1,601,318
Maintenance of equipment	14,443,364	7,686,901	2,648,411	1,019,386	476,065	607,826	2,004,775
Operation of power plant	18,199,604	7,665,085	3,457,884	1,519,183	996,542	1,034,890	3,526,020
Operation of cars	53,398,930	26,936,798	11,963,891	4,153,625	1,798,273	1,556,444	6,989,899
Miscellaneous expenses	21,846,383	11,294,706	4,307,888	1,657,442	680,388	957,891	2,948,118
Wages, supplies, and expenditures incidental to electric service, not elsewhere included	57,782	.....	.....	.....	.....	.....	57,782

[1] Exclusive of reports for 16 companies which failed to furnish this information.

TABLE 56.—PERCENTAGE DISTRIBUTION OF OPERATING EXPENSES OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Operating expenses, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Maintenance of ways and structures	8.7	7.8	9.3	10.9	10.0	9.2	9.4
Maintenance of equipment	12.2	13.2	10.7	10.9	10.8	13.3	11.7
Operation of power plant	15.4	13.2	14.0	16.2	22.7	22.6	20.6
Operation of cars	45.2	46.4	48.5	44.3	41.0	34.0	40.8
Miscellaneous	18.5	19.4	17.5	17.7	15.5	20.9	17.2
Wages, supplies, and expenditures incidental to electric service, not elsewhere included	(1)	.....	.....	.....	.....	.....	0.3

[1] Less than one-tenth of 1 per cent.

Tables 55 and 56, applying to a more homogeneous class of railways, are more significant than Tables 53 and 54, and the following discussion is accordingly confined to them. These tables reveal considerable differences among the population groups in the distribution of operating expenses. The expense of maintaining ways and structures is relatively least in urban centers of more than 500,000 inhabitants, as might be expected from the small proportion of trackage in such centers to the total amount of traffic. For the same reason, on the other hand, the largest cities, in which, presumably, cars see more and harder service than in small towns, show a greater proportion of expenditure for maintenance of equipment than appears in any other group except the fast, long interurban railways, on which, by reason of the high speed maintained, cars are subjected to severe wear and tear.

In the case of full-time electric surface railways without lighting plants there is a progressive increase in the proportion of expenses for the operation of power plant as we descend the scale of population of urban centers served. Other things being equal, the greater the density of traffic and the larger the scale on which the power plant is constructed, the lower will be the cost of power per unit of traffic. The fact that the proportion of expenses for power plant in the case of all classes of companies combined, is higher in the urban centers of the first group than in those of the second is due to the presence of elevated railways in the largest cities. That the expense for the operation of cars, which consists chiefly of wages, is a smaller proportion of the total in urban centers of less than 100,000 inhabitants than in larger urban centers is due chiefly to the lower rates of wages paid in the smaller towns. The higher proportion of miscellaneous expenses in urban centers of more than 500,000 inhabitants as compared with the other urban groups is chiefly attributable to the heavier damage expenses in such cities.

Operating expenses of 17 selected companies in the largest cities.—Since peculiar interest attaches to the operations of street railways in large cities, Table 57 has been prepared, which shows by percentages the distribution of operating expenses in detail for a group of 17 selected companies, situated in 10 of the largest urban centers in the United States. The companies included in the table are as follows: Boston Elevated Railway Company; Cleveland Electric Railway Company; Cleveland City Railway Company; Interurban Street Railway Company and Third Avenue Railroad Company, of New York; Brooklyn Rapid Transit Company; United Railways and Electric Company, of Baltimore; St. Louis Transit Company; Union Traction Company, of Philadelphia; Chicago City Railway Company; Chicago Union Traction Company; International Railway Company and Crosstown Street Railway Company, of Buffalo; Cincinnati Traction Company; United Railroads of San Francisco; Jersey City, Hoboken and Paterson Street Railway Company; and North Jersey Street Railway Company, of Jersey City, Newark, and vicinity. The aggregate operating expenses of these 17 companies were $56,809,980, or about two-fifths of the total for the United States.

TABLE 57.—*Percentage distribution of operating expenses for 17 selected electric surface railway companies in the largest cities: 1902.*

Percentage of total operating expenses assignable to:	
Maintenance of ways and structures, total	8.1
Track and roadway	5.2
Electric, cable, etc., lines	2.2
Buildings and fixtures	0.7
Maintenance of equipment, total	12.8
Steam plant	0.9
Electric, cable, etc., plant	0.8
Cars	6.2
Electric, cable, etc., equipment of cars	3.8
Miscellaneous equipment	0.5
Miscellaneous shop equipment	0.6
Operation of power plant, total	12.7
Power plant wages	2.7
Fuel for power	7.2
Water for power	0.5
Lubricants and waste for power plant	0.2
Miscellaneous supplies and expenses of power plant	0.3
Hired power	1.8
Operation of cars, total	47.3
Superintendence of transportation	2.4
Wages of conductors	18.8
Wages of motormen	18.6
Wages of other car-service employees	2.1
Wages of car-house employees	2.2
Car service supplies	0.9
Miscellaneous car-service expenses	1.3
Cleaning and sanding track	0.4
Removal of snow and ice	0.6
Miscellaneous expenses, total	19.1
Salaries of general officers	1.1
Salaries of clerks	1.4
Printing and stationery	0.3
Miscellaneous office expenses	0.4
Storeroom expenses	0.2
Stable expenses	1.4
Advertising and attractions	0.1
Miscellaneous general expenses	1.3
Damages	7.8
Legal expense in connection with damages	2.3
Other legal expenses	0.7
Rent of land and buildings	0.3
Rent of track and terminals	0.6
Insurance	1.2

A comparison of the distribution of expenses for these companies with that for all companies reveals a number of points of difference which are significant.

IV.

ANALYSIS OF INTEREST AND DIVIDENDS.

Detailed analysis for all companies.—Table 93 shows for each street railway company the rate and amount of dividends declared during the census year upon its common or preferred stock or both, and the rate of interest on its funded debt. The table also shows the total dividends by states. The amount of interest accrued is shown by states in Tables 38 and 39. The data for the United States are summarized in Table 58, both operating and lessor companies being included.

TABLE 58.—*Interest and dividends of operating and lessor companies combined: 1902.*[1]

Number of companies	957
Funded debt, total amount[2]	$992,709,139
Interest accrued on funded debt	$43,578,961
Ratio of interest to funded debt, percentage	4.5
Preferred stock, amount	$127,930,179
Number of companies having preferred stock	85
Number of companies declaring dividends on preferred stock	40
Dividends declared on preferred stock	$4,301,284
Ratio of dividends to total preferred stock, percentage	3.47
Amount of preferred stock on which dividends were declared	$83,869,055
Ratio of dividend-bearing preferred stock to total preferred stock, percentage	67.7
Ratio of dividends to dividend-bearing preferred stock, percentage	5.1
Common stock, amount	$1,187,642,781
Number of companies declaring dividends on common stock	258
Dividends declared on common stock	$28,737,887
Ratio of dividends to total common stock, percentage	2.46
Amount of common stock on which dividends were declared	$560,326,121
Ratio of dividend-bearing common stock to total common stock, percentage	47.9
Ratio of dividends to dividend-bearing common stock, percentage	5.1
Both classes of stock, amount	$1,315,572,960
Total number of companies declaring dividends	286
Total dividends declared	$33,039,171
Ratio of total dividends to total capital stock, percentage	2.6
Total amount of stock on which dividends were declared	$644,195,176
Ratio of dividend-bearing stock to total capital stock, percentage	49.8
Ratio of total dividends to total dividend-bearing stock, percentage	5.1

[1] Exclusive of 30 companies which failed to furnish this information and which issued $17,325,000 bonds, $4,000,000 preferred stock, and $18,937,745 common stock.

[2] The amount of funded debt, interest on which was charged to the income account, is not reported, but is equal to nearly the total amount.

The amount of interest accrued on funded debt and charged to the income account during the census year was $43,578,961, which was equal to a rate of 4.5 per cent on the outstanding funded debt. An examination of the rates of interest for individual companies, stated in Table 93, shows that by far the most common rate is 5 per cent. Many of the more recent bond issues, however, and especially those of the largest companies, have been placed at 4.5 per cent, or even at 4 per cent. A large number of companies still have bonds bearing 6 per cent interest, and a few 7 per cent, most of these bonds having been issued at a comparatively early period. The average ratio of interest accrued to the total funded debt, as shown in Table 58, is slightly lower than it would have been had not a few companies in bankruptcy failed to charge interest in the income account, and had not several other companies, very recently completed, charged interest for the census year to the cost of construction rather than to income. As shown elsewhere, however, the amount of interest accrued on funded debt somewhat exceeds the amount actually paid. (See page 56.)

For all street and interurban railways the ratio of total dividends declared to total capital stock is decidedly low—only 2.6 per cent in 1902. Less than one-third of the companies declared any dividends whatever during the census year, and these paid dividends on a little less than one-half of the total outstanding stocks. Even of companies having preferred stock, less than half were able to pay dividends at all, and they paid on about two-thirds of the total amount of such stock for all companies. In judging the significance of these figures, however, the possibility that the companies as a whole may be overcapitalized must be borne in mind.

The dividends of operating street and interurban railway companies represent a smaller percentage of their capitalization than the dividends of lessor companies. The dividends declared by operating companies, which amounted to $15,882,110 in 1902, were equal to 2.1 per cent of the total stock of such companies ($761,705,842) and to 4.6 per cent of their stock that paid dividends ($348,796,456). For lessor companies the dividends average 3.2 per cent of the total capital stock ($530,929,373) and 5.8 per cent of the dividend-bearing stock ($295,398,872). This difference between operating and lessor companies is due to the fact that a considerable part of the most profitable railway trackage, lying in large cities, is held under lease, and that the rentals, which constitute the dividends of the lessor companies, are usually, and naturally enough, fixed so as to absorb nearly the full earning capacity of the leased system at the time when it is taken over by the operating company. When, therefore, as often happens, the operating company has little or no property except what it leases, the additional securities which it may issue must rest chiefly on the anticipation of future increase in earnings, and as a large proportion of the street railway leases have been effected very recently, comparatively little net profit is left at present in such cases for the operating companies.

Interest and dividends of companies, classified according to population.—Table 59 shows in condensed form the interest accrued and dividends declared by street and interurban railway companies in the various urban and interurban groups. The statistics are for both operating and lessor companies considered as one system.

TABLE 59.—INTEREST AND DIVIDENDS OF OPERATING AND LESSOR COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000	Under 25,000.	Fast, long.	Other.
Number of companies	957	138	56	99	314	60	290
Interest accrued	$43,578,961	$21,460,962	$8,366,503	$3,598,997	$1,732,822	$2,598,438	$5,821,239
Ratio of interest to funded debt, percentage	4.5	4.4	5.0	4.6	4.5	3.8	4.3
Number of companies having preferred stock	85	11	9	17	16	11	21
Number of companies declaring dividends on preferred stock	40	7	7	9	3	7	7
Number of companies declaring dividends on common stock	258	80	27	37	37	8	69
Total number of companies declaring dividends	286	82	31	45	40	14	74
Total dividends declared	$33,039,171	$20,958,959	$7,344,007	$1,650,123	$311,575	$315,224	$2,459,283
Ratio of dividends to capital stock, percentage	2.6	3.1	3.1	1.5	0.6	0.4	1.7
Amount of stock on which dividends were declared	$644,195,176	$370,763,110	$168,513,240	$35,137,910	$6,536,410	$9,401,975	$53,842,531
Ratio of dividend bearing stock to total stock, percentage	49.8	54.9	71.4	32.6	13.4	12.0	36.9
Ratio of dividends to dividend-bearing stock, percentage	5.1	5.7	4.4	4.7	4.8	3.4	4.6

[1] Exclusive of reports for 30 companies which failed to furnish this information.

The rate of interest is highest in urban centers of from 100,000 to 500,000 population, and does not differ materially among the other three urban groups. The fact that the average rate of interest on funded debt of interurban railways of both classes is lower than on urban railways is due in part to the modern origin of interurban companies, most of them having been organized since the fall in the prevailing rate of interest on securities generally. But it is also due in part to the fact that several new companies in this group charged interest during the census year to cost of construction and equipment.

As might be expected, street railways in cities of more than 100,000 population declared dividends on a much larger proportion of their stock, and showed a higher ratio of dividends to total capital stock, than those in smaller cities or than interurban lines. The average ratio of dividends to total capital stock was 3.1 per cent in each of the first two groups; but as a larger proportion of stock declared dividends in urban centers of the second group than in those of the first, the average rate of dividends on stock that bore dividends was lower in the second group of cities.

In none of the other four groups did the ratio of dividends to total capital stock rise even to 2 per cent, and in none of them, except the "other" interurban group, did more than one-third of the capital stock bear dividends. The ratio of dividends to the capital stock that bore dividends was lowest in the case of the fast, long interurban lines, and highest in the case of companies in urban centers of the first group. The differences in these ratios may not, and probably do not, correctly represent the differences in actual profitableness of the several classes of railways, since the street railway companies in smaller towns and the interurban railways are probably somewhat more conservatively capitalized than those in the largest urban centers. In the case of many of the newer companies the absence of dividends is due to their policy of putting surplus earnings into improvements and extensions. It is true, however, beyond question, that in the smaller towns and rural districts a large number of railways have been established which must look to the future for any possible dividends on their stock.

Dividends of leading individual companies.—An examination of the statistics of dividends for individual companies in Table 93 reveals the widest differences even among railways operating under roughly similar conditions of traffic. These differences are partly due to the variations in the absolute earning capacity of the companies, but they are also partly due to other factors, such as the varying proportion of total capital represented by funded debt, the varying proportion of the income of operating companies going as rental to lessor companies, and the varying proportion between capitalization and actual cash investment. Many companies in the large cities, and even some of the most important ones, declare no dividends, but usually an explanation of that fact may be found in some of the circumstances just mentioned. Thus the United Railways and Electric Company of Baltimore, Md., which paid no dividends in 1902, has a funded debt of three and one-third times the amount of its stock. The Brooklyn Rapid Transit Company, of New York, which paid no dividends, not only has a funded debt considerably greater than its stock, but, in addition, paid 10 per cent from its earnings on $12,000,000 of the stock of a lessor company, a fact which is significant because, as previously suggested, the capitalization of an operating company which holds most of its trackage under lease is often based chiefly on expectation of future earnings. Indeed in several instances—e. g., the Interurban Street Railway Company of New York, and the Pittsburg Railways Company, of Pittsburg, Pa.—the operating companies have a very small amount of capital stock as compared with the lessor companies which they control. Among other important companies which declared no dividends in 1902 may be mentioned the Third Avenue Railroad Company, of New York, which has a funded debt nearly three times as great as its stock; the Chicago Union Traction Company, of Chicago, Ill., and the Union Traction Company, of Philadelphia, Pa., both of which have exceedingly heavy rental payments; and the leading operating companies in St. Louis, Mo., Milwaukee, Wis., and Indianapolis, Ind., which also have heavy fixed charges.

Of the $15,882,110 of dividends declared by all operating companies, $11,667,726, or 73.5 per cent, was paid by 22 large companies, each of which declared dividends of $200,000 or more. The rates of dividends of these 22 companies were as follows: The United Railroads of San Francisco, Cal., declared 2.25 per cent on its one class of stock. The Capital Traction Company, of Washington, D. C., the South Side Elevated Railway Company, of Chicago, Ill., the Detroit United Railways Company, of Detroit, Mich., the Louisville Railway Company, of Louisville, Ky., the Twin City Rapid Transit Company, of St. Paul and Minneapolis, Minn., the Manhattan Railway Company, of New York city, the Omaha Street Railway Company, of Omaha, Nebr., and the Cleveland Electric Railway Company, of Cleveland, Ohio, each declared dividends of 4 per cent on its common stock. Of these companies, the Twin City Rapid Transit Company and the Louisville Railway Company also reported preferred stock, the former declaring a dividend of 7 per cent and the latter 5 per cent on such stock. The Wilkesbarre and Wyoming Valley Railway Company, of Wilkesbarre, Pa., declared 4.25 per cent, and the International Railway Company, of Buffalo, N. Y., 4.8 per cent on the single class of stock issued. The rate of dividends was 5 per cent in the case of the Old Colony Railway Company, of eastern Massachusetts, the Metropolitan Street Railway Company, of Kansas City, Mo., the United Traction Company, of Albany

and Troy, N. Y., and the Cleveland City Railway Company, of Cleveland, Ohio, none of which reported preferred stock. The Boston and Northern Street Railway Company, of eastern Massachusetts, and the Boston Elevated Railway Company, of Boston, each declared 6 per cent; the Union Street Railway Company, of Providence, R. I., 8 per cent; the Chicago City Railway Company, of Chicago, 9 per cent; and the Coney Island and Brooklyn Railroad Company, 16 per cent, all of these companies having a single class of stock only. The Metropolitan West Side Elevated Railway Company, of Chicago, declared 3 per cent, and the Milwaukee Electric Railway and Light Company, of Milwaukee, 6 per cent on their preferred stock, but paid nothing on their common stock.

Dividends, by states.—An examination of the statistics in Table 93 will show wide differences in the ratio of dividends to capital stock among the states. One of the conspicuous features of the table is the relatively high average rate paid by Massachusetts companies, as compared with those in other leading states. The dividends on common stock in Massachusetts averaged 5 per cent for operating and lessor companies together, and while only 27 out of 75 operating companies declared dividends, these comprised most of the large companies. The one company in this state which had preferred stock, a lessor company, declared an 8 per cent dividend. In New York state, on the other hand, only 9 of the 96 operating companies declared dividends on common stock, and the average rate on the common stocks of operating and lessor companies combined was only 2.5 per cent. The amount of preferred stock in the state was small and the average rate of dividends on such stock very low. In Pennsylvania only 18 of the 98 operating companies declared dividends on their common stock; and the average rate of dividends for operating and lessor companies was 3.8 per cent on common stock and 4.8 per cent on preferred stock, which was about one-tenth as much in amount as the common. In nine states and territories, most important among which are Indiana and Tennessee, no companies declared dividends on common stock. The only states in which the average rate of dividends on common stock exceeded 2 per cent are Colorado, District of Columbia, Florida, Illinois, Kentucky, Massachusetts, Minnesota, Nebraska, New York, Ohio, Pennsylvania, and Rhode Island.

V.

GENERAL RESULTS OF OPERATION.

In many respects the most interesting information relating to the street railway industry is that which shows the relation of traffic, receipts, and expenditures. Statistics of this character may be regarded as presenting the general results of street railway operation.

General results of operation of companies, classified according to power.—Table 60 presents, for all street railways of the United States and for groups of companies classified according to the power used, the percentage which operating expenses bear to operating earnings, or "operating ratio;" the amount of operating earnings per mile of track and per car mile, respectively; the total operating expenses per car mile, together with the expenses per car mile for power plant and for operation of cars; the amount of operating expenses per fare passenger; the amount of passenger earnings per fare passenger; and the net earnings per mile of track.

TABLE 60.—GENERAL RESULTS OF OPERATION, ALL COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time only.				
Number of companies	799	556	112	57	52	5	14	3
Ratio of operating expenses to earnings, percentage	57.49	57.94	58.11	58.14	73.02	49.71	53.97	122.65
Operating earnings per mile of track constructed	$11,152	$11,045	$8,978	$2,978	$9,454	$71,889	$30,937	$1,314
Operating earnings per car mile	0.2187	0.2168	0.2597	0.1901	0.2603	0.1960	0.3258	0.1464
Operating expenses per car mile, total	0.1257	0.1256	0.1509	0.1105	0.1901	0.0975	0.1758	0.1795
Power plant	0.0204	0.0193	0.0293	0.0250	.....	0.0282	0.0345	0.0224
Operation of cars	0.0552	0.0567	0.0478	0.0410	0.0764	0.0448	0.0345	0.0552
Operating expenses per fare passenger	0.0301	0.0294	0.0420	0.0381	0.0821	0.0259	0.0285	0.1144
Passenger earnings per fare passenger	0.0494	0.0493	0.0493	0.0621	0.0432	0.0508	0.0488	0.0458
Net earnings per mile of track	4,741	4,646	3,761	1,247	2,550	36,151	14,241	[2]298

[1] Exclusive of reports for 18 companies which failed to furnish this information.

[2] Deficit.

Attention should be called at the outset to the fact that several of the items in this table for electric railway companies operating commercial lighting plants can not properly be compared with similar items in the other columns, since the total operating expenses and earnings, including those for the lighting business, enter into the computation. A fairly correct idea of the earnings of such companies from the railway business alone may be obtained from the income account by omitting therefrom the income from the sale of current for light and power, although the resulting figures are not quite comparable with those of electric railway companies which do not operate commercial lighting plants, since they also derive a small incidental revenue from the sale of current. With the deduction indicated, companies with commercial lighting plants had

operating earnings of $6,358 per mile of track and 18.39 cents per car mile. Instead, therefore, of having earnings greater per car mile than companies without commercial lighting plants, as the crude figures might imply, they really had railway earnings considerably less per car mile, as might be expected in view of the fact that most of these companies are in the smaller towns. For purposes of rough calculation and comparison it may be assumed that the operating expenses of companies having lighting plants are divided between the railway business and the lighting business in the same proportion in which the earnings are divided. On this assumption the "railway" operating expenses of such companies would be 10.69 cents per car mile and 2.97 cents per passenger. The expense per car mile would thus appear somewhat less than for companies without lighting plants, and such a showing may be accounted for, at least in part, by the fact that the companies with lighting plants, operating in the small towns, have smaller cars and pay lower wages than do companies of the other group. Their operating expenses per passenger, on the other hand, are apparently somewhat greater for the companies with lighting plants.

There is, of course, no one standard by which to judge the success of railway operations. Street railway men themselves, in considering the question, are perhaps most likely to base their conclusions on the percentage which operating expenses bear to operating earnings—the operating ratio, as it is called. Generally speaking, a low ratio of expenses to earnings is regarded as an indication of good management. This, however, is not always the case. It is quite conceivable that a company would be able to earn a higher return on its investment by increasing the amount of its traffic, through a lessening of fares or otherwise, even though the percentage of operating expenses to earnings should be slightly raised as a result. Again, a low ratio of operating expenses to earnings may mean merely that the fares are higher or the service less satisfactory than elsewhere, rather than that the company is peculiarly economical in its operating methods. Conversely, where fares are low the ratio of operating expenses to earnings may be high, while the cost of operation per car mile or per passenger is exceptionally low. Given cars of similar size and character and given similar general conditions of operation, the truest test of the success of railway operations is in the amount of expenses per car mile operated and per passenger carried. Finally, it may be noted that a low ratio of operating expenses to operating earnings is often made possible only by heavy capital investment. Indeed, it is sometimes the case that costly improvements, which materially lessen the expenses of transportation, are not strictly profitable from the standpoint of the investor.

As appears from Table 60, the operating expenses of all street and interurban railway companies in the census year 1902 amounted to 57.5 per cent of their operating earnings. The gross earnings, including those from sale of current and other sources, were equal to $11,152 per mile of track, and to 21.87 cents per mile run by cars of all classes. The passenger earnings per passenger car mile, not shown in the table, averaged 21.14 cents. The average fare, obtained by dividing the passenger earnings by the number of fare passengers, was 4.94 cents, and the total operating expenses per fare passenger—which slightly exceed the expenses properly chargeable to passenger traffic—were 3.01 cents. The average net earnings per mile of track for all companies were $4,741. The ratio of operating expenses to operating earnings is much lower on the street and electric railways of the country as a whole than on the steam railways, which spent 64.7 per cent of their earnings for operation in the year ending June 30, 1902, and in the previous year 64.9 per cent.[1] It is possible that the comparison thus made is not altogether a just one, since 41.4 per cent of their expenses was incurred by steam railways in 1902 for the maintenance of ways and structures, while street and interurban railway companies assigned to maintenance of ways and structures only 8.5 per cent of their operating expenses.[2] Beyond question it costs relatively less to maintain a street railway than a steam railway, since the former has much less track to keep up in proportion to the amount of its earnings. Moreover, the speed of electric cars is less than that of steam trains, and the wear and tear, as well as the injury to property from accident, is therefore less on electric than on steam railways. Again, the roadbed and equipment of most of the electric railways are comparatively new, and they may therefore require less repair and renewal at present than will be necessary later on.[3]

However this may be, it is probable that, with all possible allowances for the difference in conditions and policy with respect to expenditures for maintenance, the proportion of operating expenses to earnings would still be found lower on street and electric railways than on steam railways. Such a difference might be attributable to relatively higher charges for transportation on the electric lines. On the other hand, it is to be remembered that a relatively low operating ratio might be secured at the expense of a relatively heavy capital investment. Now the amount of capital liabilities is decidedly greater in proportion to the operating earnings in the case of street railways than in the case of steam railways. In the absence, however, of definite knowledge as to the actual cash investment in either class of railways, it is impossible to

[1] Report of Interstate Commerce Commission on Statistics of Railways, 1902, page 91.

[2] Ibid., page 81.

[3] For a discussion of the subject of allowances for depreciation and renewal, see page 57.

decide to what extent the lower ratio of operating expenses to earnings on electric lines may actually be due to the heavier investment of capital.

For the purpose of further considering the ratio of expenses to earnings for the different classes of railways, the averages shown in Table 60 have been supplemented by the following table, showing the number of companies which have operating ratios falling within specified limits. In studying this table the differences in the importance of the individual companies should be borne in mind.

TABLE 61.—*Distribution of railway companies in the several groups, classified according to power, with respect to their operating ratio: 1902.*[1]

PERCENTAGE OF OPERATING EXPENSES TO EARNINGS.	NUMBER OF COMPANIES.							
	Total.	Electric surface.			Animal.	Steam and electric elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Total	799	556	112	57	52	5	14	3
Under 50	73	43	12	9	3	1	5	.....
50 but under 60	169	120	29	7	7	3	3	.....
60 but under 70	216	159	33	14	7	1	2	.....
70 but under 80	121	90	18	3	8	.....	2	.....
80 but under 90	92	64	13	7	6	.....	1	1
90 and over	128	80	7	17	21	.....	1	2

[1] Exclusive of reports for 18 companies which failed to furnish this information.

Electric surface railways without commercial lighting plants, the most important class, show an average operating ratio of 57.9 per cent. It is seen in Table 61 that 43 of the 556 companies of this class devote less than 50 per cent of their earnings to operating expenses, while on the other hand 80 such companies devote more than 90 per cent of their earnings to expenses. The largest group is that of companies that have an operating ratio of between 60 and 70 per cent, but they operate much less track than companies with a ratio of from 50 to 60 per cent.

That a considerable degree of economy is secured by combining light and power plants with railways in towns of smaller population may probably be deduced from the fact that the average operating ratio for companies having commercial lighting plants—58.1 per cent—was practically the same as that for electric companies without such plants, in spite of the fact that the former are for the most part situated in towns of moderate size where the railway traffic is comparatively small. The operating ratio for companies with lighting plants is indeed considerably lower than that for those without such plants in cities of corresponding size, for it will be noted that much more than half of the business of companies of this group is done in places of less than 100,000 inhabitants; and, as appears in Table 63, the operating ratio for full-time companies without lighting plants in towns of less than 25,000 inhabitants is 68.8 per cent, and in urban centers of from 25,000 to 100,000 inhabitants 61 per cent.

The lowest operating ratio, 49.7 per cent, was that of elevated railways. As only one of the five companies had an operating ratio below 50 per cent, while three reported ratios between 50 and 60 per cent, and the fifth reported a ratio between 60 and 70 per cent, the great inequality in the relative importance of the companies is quite evident.

The explanation of the low average operating ratio for elevated railways is to be found in the fact that the operating earnings per passenger were slightly higher than for electric surface railways without lighting plants, while the operating expenses per car mile were about 20 per cent lower. It is, however, impossible to draw from these statistics any satisfactory conclusion regarding the conditions of operation on elevated railways at the present time, because a large part of the traffic of the most important company during the census year was handled by steam power, while since that time steam has been replaced by electricity. The fact that in 1902 the power plant expenses of elevated railways were 2.3 cents per car mile, as compared with only 1.9 cents for electric surface railways without lighting plants, was undoubtedly due chiefly to the higher cost of steam traction, though it was probably also due in some measure to the larger cars and higher speed on elevated railways. On the other hand, large cars and high speed tend to reduce the expenses of running cars, particularly the important item of wages of motormen, or engineers, and gatemen. The practice of running cars in trains also reduces wages of motormen or engineers per car mile, and this saving is not wholly offset by the expenses of maintaining ticket sellers and ticket "choppers" at the stations.

Some idea of the financial advantage of electric traction on elevated railways as compared with steam traction may be gained from a comparison of the annual reports of the Manhattan Elevated Railway Company for the two years ending September 30, 1901 and 1903, respectively. In 1901, when steam was used almost exclusively, the operating ratio was 55.4 per cent; in 1903, when electric power was almost the sole means of traction, the ratio was only 42.9 per cent. The operating expense of this company per passenger was 2.72 cents in 1901 and only 2.12 cents in 1903. The operation of 6-car trains instead of 5-car trains, which was made possible by electricity, contributed materially to this reduction in operating expenses.

Cable and inclined plane railways likewise show a conspicuously low operating ratio. Five of the 14 companies reported a ratio below 50 per cent, and 8 reported a ratio below 60 per cent. The 3 ordinary cable railways show an average operating ratio of 54.7 per cent. The fact that these ordinary cable railways are all in a large city and have very dense traffic makes their results more favorable than would be the case if the conditions

under which they operate were similar to those of the average electric railway. Under similar conditions of traffic electric traction is cheaper than cable traction in the matter of current expenses, to say nothing of the fact that the capital investment per mile in an overhead trolley electric railway is much less than in a cable system. In 1890, when the number of cable railways was considerably greater than at the present time, the operating expenses of such companies, as they were reported for the Eleventh Census, were 65.7 per cent of their operating earnings. The high earnings and high expenses per car mile for the inclined planes are explained by their short tracks, dense traffic, and relatively large capital investment per mile of track.

Animal power railways, as might be expected, present a much less favorable operating ratio, 73.0 per cent, than most other classes shown. Of the 52 companies of this class, 21 report operating expenses exceeding 90 per cent of operating earnings. On the other hand, 10 companies show operating ratios under 60 per cent. The explanation of the high average ratio is found partly in the fact that the average earnings per passenger are lower for animal power railways than for those of any other class, but the explanation lies chiefly in the heavy expense of operation, which amounts to no less than 19 cents per car mile. While the group of animal power railways includes a large number of companies in small towns, where the traffic is very light, the greater part of the earnings and expenses fall to the four companies in New York city, which have very dense traffic; and the averages for the group as a whole are therefore largely determined by the figures for these four companies. When it is remembered that the horse cars are much smaller than the electric cars, the enormous reduction in expenses which has resulted from the introduction of electricity may be appreciated by comparing the operating expenses per car mile for animal power roads with those for electric railways without lighting plants, 12.56 cents.

Effect of change to electric traction on cost of operation.—Interesting conclusions might be drawn from the detailed statistics of leading railway systems, showing the reduction in operating expenses which followed the introduction of electric power. Comparable figures are, however, very difficult to obtain because of changes in the ownership of railways and because of the extension of the old lines. Consolidation of formerly independent lines very often accompanied the change of power, and where this has been the case it is not only hard to obtain comparable statistics, but it is also impossible to distinguish economies due to change of power from those due to consolidation.

The "electrification" of the street railway lines of Philadelphia took place about 1894, much the greater part of the trackage before that time having been operated by animal power. In 1893 the operating expenses of all the lines of the city, $5,322,734, were 63.1 per cent of the operating earnings. In 1895 the ratio fell to 59.7 per cent; in 1896 to 52.5 per cent; and in 1898 to 41 per cent. In the last-named year the expenses were only $4,608,163, or more than 10 per cent less than in 1893, while earnings had increased one-third. Combination also contributed to the economy in Philadelphia.[1]

Another example of the economy of electric traction may be taken from the West End Street Railway Company of Boston, now controlled by the Boston Elevated Railway Company. In the year ending September 30, 1889, this company was just beginning to install electric traction. Its earnings were $5,204,512; its operating expenses, exclusive of taxes and rentals, $4,098,533, the operating ratio being 78.7 per cent. The conversion to electric traction had largely been accomplished by the end of 1894, nearly three-fourths of the track being then operated exclusively by electricity. For that year the operating earnings were $6,823,879; the expenses $4,805,605; the operating ratio 70.4 per cent. The marked increase in traffic indicated by the figures of earnings was in considerable measure attributable to improvement in the service, as there had been comparatively little addition to the trackage of the company.[2]

The Third Avenue Railroad Company of New York had precisely the same length of track (directly operated) ten years ago that it has to-day. In the year ending June 30, 1892, its main line was operated by animal power, although it had two shorter branches with cable traction. In that year the earnings were $1,741,072; the operating expenses $1,184,804; the operating ratio 68 per cent. The traffic was very dense, and there were probably fewer long-distance passengers in 1902. Under cable traction, which was introduced in 1894, the expenses were materially reduced in proportion to the traffic. Apparently a still further reduction has been accomplished by the recent change to electricity. It is impossible to speak with certainty, because the financial difficulties of the Third Avenue Railroad and its transfer to the Metropolitan Street Railway Company have made satisfactory comparison of the cost of operation in recent years impracticable. According to the report of the company for the year ending June 30, 1901, the operating expenses for a greatly increased traffic were less than in 1892, and the operating ratio was only 49.6 per cent. In 1902 there were heavy expenditures for maintenance and for damages, but the operating ratio rose only to 61.3 per cent, which was still decidedly lower than the ratio under horse traction.[3]

General results of operation of companies classified according to population.—The results of the operations

[1] Compiled from Street Railway Investor's Guide.
[2] Compiled from Reports of Massachusetts Railroad Commissioners, 1889 and 1894.
[3] Compiled from the Reports of the New York Railroad Commissioners, 1892, 1899, 1902.

of street railways classified according to population of urban centers served, and of the two classes of interurban railways, are summarized in Table 62, which includes the same items as were presented in the corresponding table for companies classified according to power. More instructive is Table 63, which presents similar data for full-time electric surface railways without commercial lighting plants. The following discussion is based chiefly upon the data presented in Table 62.

TABLE 62.—GENERAL RESULTS OF OPERATION OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	799	65	47	83	312	53	239
Ratio of operating expenses to earnings, percentage	57.49	55.69	53.54	59.31	68.09	59.80	64.83
Operating earnings per mile of track constructed	$11,152	$24,360	$14,329	$8,009	$5,440	$3,673	$5,253
Operating earnings per car mile	0.2187	0.2318	0.2119	0.2036	0.1891	0.2197	0.2075
Operating expenses per car mile, total	0.1257	0.1291	0.1134	0.1207	0.1287	0.1314	0.1345
Power plant	0.0204	0.0185	0.0160	0.0195	0.0316	0.0289	0.0272
Operation of cars	0.0552	0.0597	0.0544	0.0494	0.0437	0.0446	0.0533
Operating expenses per fare passenger	0.0301	0.0274	0.0275	0.0323	0.0422	0.0547	0.0355
Passenger earnings per fare passenger	0.0494	0.0482	0.0493	0.0478	0.0483	0.0809	0.0504
Net earnings per mile of track	4,741	10,793	6,658	3,259	1,736	1,477	1,847

[1] Exclusive of reports for 18 companies which failed to furnish this information.

TABLE 63.—GENERAL RESULTS OF OPERATION OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	556	47	38	66	165	40	200
Ratio of operating expenses to earnings, percentage	57.94	56.45	54.14	60.99	68.81	59.94	65.33
Operating earnings per mile of track constructed	$11,045	$21,982	$14,021	$7,348	$4,872	$3,533	$5,261
Operating earnings per car mile	0.2168	0.2376	0.2064	0.1865	0.1662	0.2115	0.2008
Operating expenses per car mile, total	0.1256	0.1342	0.1118	0.1138	0.1144	0.1267	0.1312
Power plant	0.0193	0.0177	0.0157	0.0185	0.0260	0.0286	0.0270
Operation of cars	0.0567	0.0622	0.0542	0.0504	0.0469	0.0431	0.0535
Operating expenses per fare passenger	0.0294	0.0276	0.0274	0.0307	0.0351	0.0555	0.0342
Passenger earnings per fare passenger	0.0493	0.0479	0.0494	0.0485	0.0483	0.0845	0.0498
Net earnings per mile of track	4,646	9,572	6,429	2,866	1,519	1,415	1,824

[1] Exclusive of reports for 16 companies which failed to furnish this information.

The great advantage which the street railways in the large cities have over those in smaller towns is conspicuous in the above tables. The amount of earnings per mile of track for electric surface lines having no lighting plants, which in urban centers of more than 500,000 inhabitants is $21,982, decreases steadily with decreasing population of the centers served, an average of only $4,872 per mile of track being shown for companies in centers of less than 25,000 inhabitants. The amount of net earnings per mile of track decreases even more sharply, being $9,572 for electric railways without lighting plants in urban centers of the first group and only $1,519 in centers of smallest population.

The differences among the groups in the ratio of operating expenses to operating earnings are also marked. In urban centers of more than 500,000 inhabitants railways of all classes combined spent for operation only 55.7 per cent of their operating earnings, and the electric surface railways not furnishing commercial lighting in such centers show a ratio of expenses to earnings only slightly higher. In urban centers of from 100,000 to 500,000 inhabitants the operating ratio is even lower than in the largest cities. On the other hand, in places of from 25,000 to 100,000 inhabitants the operating expenses amounted to 59.3 per cent of operating earnings for all companies combined, and to 60.99 per cent for electric surface companies without commercial lighting plants. In centers of less than 25,000 inhabitants the corresponding operating ratios are 68.1 per cent and 68.8 per cent, respectively. The fast, long interurban railways present quite favorable operating results. The other group of interurban railways on the other hand, including many railways that closely resemble the railways in the smallest towns, spent 64.8 per cent of their earnings for operation.

The differences among the various population groups as regards the ratio of operating expenses to earnings are further indicated in Tables 64 and 65, which show for all railways, and for electric surface railways without commercial lighting plants, respectively, the number of companies falling within stated limits of operating ratios.

TABLE 64.—*Distribution of railway companies in the several urban and interurban groups, according to their operating ratios: 1902.*[1]

PERCENTAGE OF OPERATING EXPENSES TO OPERATING EARNINGS.	NUMBER OF COMPANIES.						
	Total.	Urban centers, population.				Interurban railways.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Total	799	65	47	83	312	53	239
Under 50	73	9	10	8	16	8	22
50 but under 60	169	16	23	28	48	15	39
60 but under 70	216	14	6	31	84	17	64
70 but under 80	121	12	5	12	49	7	36
80 but under 90	92	5	.....	1	47	2	37
90 and over	128	9	3	3	68	4	41

[1] Exclusive of reports for 18 companies which failed to furnish this information.

TABLE 65.—*Distribution of full-time electric surface railway companies, without commercial lighting, in the several urban and interurban groups, according to their operating ratios: 1902.*[1]

PERCENTAGE OF OPERATING EXPENSES TO OPERATING EARNINGS.	NUMBER OF COMPANIES.						
	Total.	Urban centers, population.				Interurban railways.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Total	556	47	38	66	165	40	200
Under 50	43	5	6	4	6	6	16
50 but under 60	120	9	21	20	27	11	32
60 but under 70	159	11	6	27	48	12	55
70 but under 80	90	10	3	11	27	6	33
80 but under 90	64	4	.....	1	27	2	30
90 and over	80	8	2	3	30	3	34

[1] Exclusive of reports for 16 companies which failed to furnish this information.

It will be observed from Table 65 that in urban centers of more than 500,000 inhabitants only 5 out of the 47 electric surface railways without commercial lighting plants had operating ratios under 50 per cent. Four of these 5 companies, however, operate great railway systems, and the 5 companies together control an aggregate trackage of 1,289.02 miles, which is 27.5 per cent of the total of 4,680.96 miles reported for all electric surface railways in centers of this size. Of the 9 companies in urban centers of more than 500,000 inhabitants that show an operating ratio of from 50 to 60 per cent, 3 have more than 300 miles of track each, and 2 others operate large systems. The total trackage of the 14 companies that show operating ratios under 60 per cent is 2,641.45 miles, or 56.4 per cent of the total trackage for centers having more than 500,000 inhabitants. On the other hand, most of the 22 electric railway companies in the largest centers that show an operating ratio over 70 per cent are small concerns in the outskirts and suburbs. The average operating ratio for the group thus represents pretty closely the conditions for the more important street railway systems of the great centers.

In urban centers of from 100,000 to 500,000 inhabitants 21 of the 38 electric surface railway companies not furnishing commercial lighting reported operating expenses between 50 and 60 per cent of earnings, and 6 companies, with 630.17 miles of track out of a total of 3,251.54 miles for the group, reported a ratio under 50 per cent. Only 5 companies in centers of this size had an operating ratio of 70 per cent or higher. This apparently more favorable distribution of companies in centers of the second rank, as compared with the largest centers, is largely explained by the fact that consolidation has gone so far in the second group that very few small railways, such as exist in some of the centers of the first group, now remain in operation.

In centers of from 25,000 to 100,000 inhabitants only a small proportion of the electric railway companies have an operating ratio of less than 50 per cent, while the largest group is that of companies whose expenses are between 60 and 70 per cent of their operating earnings.

Still less favorable were the conditions shown for the smallest centers, where only one-fifth of the electric railway companies reported an operating ratio under 60 per cent. The largest single group in such centers was that of companies with from 60 to 70 per cent; but more than half of the whole number of companies reported a ratio of 70 per cent or higher, and 30 out of the 165 companies spent more than 90 per cent of their earnings for operation.

The distribution of fast, long interurban railway companies without commercial lighting plants shows a rather wide variation in the proportion of expenses to earnings. Twenty-three of the 40 companies have an operating ratio between 50 and 70 per cent. Of the other interurban railways, almost exactly one-half had an operating ratio of 70 per cent or higher, though the largest single group of companies reported from 60 to 70 per cent.

Relation of operating ratio to density of traffic.—Table 66 classifies full-time electric surface railway companies without commercial lighting according to the number of fare passengers per mile of track and the ratio of operating expenses to operating receipts. The fast, long interurban railways are omitted from the table because the number of fare passengers on such railways can not properly be compared with those on other classes of electric railways. The table, however, includes those interurban railways that have been classed under the head of "other" in this report.

TABLE 66.—*Distribution of full-time electric surface railways, without commercial lighting, according to number of fare passengers carried per mile of track operated and according to operating ratio: 1902.*[1]

NUMBER OF FARE PASSENGERS CARRIED PER MILE OF TRACK OPERATED.	NUMBER OF COMPANIES REPORTING OPERATING RATIO.						
	Total.	Under 50 per cent.	50 per cent but under 60 per cent.	60 per cent but under 70 per cent.	70 per cent but under 80 per cent.	80 per cent but under 90 per cent.	90 per cent and over.
Total	514	35	109	147	84	62	77
Under 25,000	54	5	3	7	12	6	21
25,000 but under 50,000	72	2	8	14	10	14	24
50,000 but under 100,000	177	6	30	53	32	33	23
100,000 but under 200,000	145	9	45	52	23	8	8
200,000 but under 300,000	34	5	11	11	6	.....	1
300,000 but under 400,000	15	4	7	4	.....	.....	.....
400,000 and over	17	4	5	6	1	1	.....

[1] Exclusive of reports for 2 railways carrying freight only, for 16 which failed to furnish this information, and for 40 fast, long interurbans.

In judging these statistics the fact that companies differ materially in importance must be borne in mind. The table shows clearly that an increase in the density of traffic per mile of track is usually accompanied by a reduction of the ratio of operating expenses to earnings. This is due chiefly to the fact that heavy traffic per mile of track is usually accompanied by heavy traffic and earnings per car mile. Proceeding from the group showing the least number of passengers per mile of track to the group showing the greatest number, the number of companies having low operating ratios increases. Nearly two-fifths of the 54 companies reporting less than 25,000 passengers per mile of track showed a ratio of expenses to earnings of 90 per cent or higher, while only 5 had an operating ratio of less than 50 per cent. On the other hand, among the 15 companies reporting between 300,000 and 400,000 passengers per mile of track, there is none with an operating ratio exceeding 70 per cent, and only 4 have a ratio of 60 per cent or more. Similarly, of the 17 companies having more than 400,000 passengers per mile of track, 4 had an operating ratio of less than 50 per cent and 9 a ratio of less than 60 per cent, while only 2 showed a ratio of 70 per cent or higher.

Table 67 classifies full-time electric surface railways without commercial lighting plants, other than fast, long interurban lines, according to the number of passengers per car mile and the ratio of operating expenses to operating earnings.

The close connection between a high number of passengers per car mile and a low operating ratio appears clearly from this table. Of the 198 companies reporting less than 3 passengers per car mile, 88 show an operating ratio of 80 per cent or more, and only 30 had a ratio less than 60 per cent. On the other hand, of the 92 companies with from 4 to 5 passengers per car mile, only 8 present an operating ratio of 80 per cent or higher, and 35 reported a ratio under 60 per cent. Of the 60 companies with 5 or more passengers per car mile, only 16 had an operating ratio of 70 per cent or more, while more than one-half show a ratio under 60 per cent, and one-sixth of them show a ratio less than 50 per cent.

TABLE 67.—*Distribution of full-time electric surface railways, without commercial lighting, according to number of fare passengers carried per car mile and according to operating ratio: 1902.*[1]

NUMBER OF FARE PASSENGERS CARRIED PER CAR MILE.	NUMBER OF COMPANIES REPORTING OPERATING RATIO.						
	Total.	Under 50 per cent.	50 per cent but under 60 per cent.	60 per cent but under 70 per cent.	70 per cent but under 80 per cent.	80 per cent but under 90 per cent.	90 per cent and over.
Total	514	35	110	146	84	62	77
Under 2	64	4	4	8	10	8	30
2 but under 3	134	4	18	40	22	27	23
3 but under 4	164	5	43	54	29	19	14
4 but under 5	92	12	23	32	17	4	4
5 but under 6	38	6	18	6	3	2	3
6 but under 7	14	2	2	4	1	2	3
7 and over	8	2	2	2	2	.....	.....

[1] Exclusive of reports for 2 railways carrying freight only; for 16 which failed to furnish this information, and for 40 fast, long interurbans.

Causes affecting the operating ratio.—The causes which contribute to keep the operating ratio of street railways in large cities lower than in the smaller towns may be clearly discerned by a consideration of the other items in Tables 62 and 63. The difference is not due to higher fares in the great cities. It appears that the average fare collected per passenger on electric surface railways without lighting plants does not differ very materially as among the four urban groups, ranging from 4.79 cents to 4.94 cents. It is, however, largely the fact that the average passenger earnings per passenger are highest in urban centers of the second group, which makes the operating ratio for the companies of this group slightly lower than for those in the largest centers.

It is also clear that the low ratio of operating expenses in the first two groups of urban centers is not due to the low cost of operating cars. In fact, the average cost of operation per car mile for railways without lighting plants, 13.42 cents, is about one-seventh higher in centers of more than 500,000 inhabitants than in any of the other classes of urban centers; while the other three groups of urban centers differ very little among themselves in the amount of operating expenses per car mile. It is probable that the cars in the great cities average somewhat larger than those elsewhere, but they can scarcely exceed in size the cars in centers of from 100,000 to 500,000 inhabitants by as great a proportion as the expenses per car mile exceed those in the second group of centers.

One reason, perhaps the chief reason, why it costs more to operate cars in the largest cities than elsewhere

is found in the higher rates of wages. It is possible, too, that on account of the obstructions to traffic the average rate of speed of surface cars is less in large cities than elsewhere, so that a larger amount of wages must be paid to conductors and motormen for covering a given distance, even if time wages were not higher. The expense of "operating cars," which consists chiefly of the wages of conductors and motormen, amounts to 6.2 cents per car mile on electric surface railways without lighting plants in the largest centers as against 4.7 cents in centers of the smallest size. One might reasonably expect, however, that the large scale on which the street railway business is conducted in great cities would result in material economies with regard to the power plant; and as a matter of fact, as shown by Table 63, the power plant expenses per car mile in the greatest centers, though they slightly exceed those in centers of the second group, are less than in centers of from 25,000 to 100,000 inhabitants, and decidedly less than in the smallest centers.

Other causes having been excluded, the reason why the operating ratio is lower in the largest cities than elsewhere is necessarily found to lie in the great density of traffic per car mile. It will be recalled that the average number of passengers carried per car mile on electric surface railways without commercial lighting plants, in centers of more than 500,000 inhabitants, was 4.92 in 1902, while in the smallest centers it was only 3.26. The table at present under consideration shows that the operating earnings of electric surface companies without lighting plants amount to 23.76 cents per car mile in centers of more than 500,000 inhabitants, as compared with 20.64 cents in centers of the second group, and with only 16.62 cents in places of less than 25,000 inhabitants. Notwithstanding the fact that in all probability the rides taken by passengers in the greatest cities average longer than elsewhere, the cars in such cities are so much larger and so much better filled that they earn more for each mile traveled than in any of the other urban groups. The passengers who stand are those who make the greatest profit for the railway company.

The figures which show the average operating expenses per fare passenger on electric surface railways without lighting plants indicate the effects of these differences in the density of traffic and in the amount of earnings per car mile. They range from 2.76 cents for the largest centers to 3.51 cents for the smallest. A fraction of the operating expenses represents the cost of other branches of service besides passenger traffic, but in the case of electric surface companies without lighting plants this fraction is so small as to be negligible.

The fact that the operating expenses of fast, long interurban railways, despite the decidedly larger size of their cars, are not materially greater per car mile than in those of the last three urban groups is attributable partly to the high rate of speed maintained, which reduces the outlay for conductors and motormen. The power plant expenses of such railways, on the other hand, as might be expected, are heavier per car mile than for any class of urban railways. The comparatively unfavorable operating results of other interurban lines are shown primarily in their high operating expenses per car mile. These companies also have low earnings per mile of track; but against this must be set the fact that the cost of construction and equipment per mile for many of these railways is much less than in the case of the railways in large cities. The finances of fast, long interurban railways are discussed in greater detail in Part I, Chapter VII.

VI.

BALANCE SHEET.

Detailed analysis for all companies.—Table 68 presents for the United States and for each state a summary of the balance sheets of both operating and lessor street railway companies. Besides the 18 companies mentioned on page 54, as reporting no financial statistics, it was found impossible to obtain balance sheets for the Denver, Lakewood and Golden Railroad Company, which has 6 miles of track, and for one lessor company, the Pittsburg and Charleroi Street Railway Company, which has 4.6 miles of track. Moreover, the data for the balance sheets of a number of other lessor companies had to be drawn from the reports of the controlling operating companies, from various financial reports and other sources, it being impossible to obtain returns directly from the companies, as some of them have virtually ceased to keep financial accounts.

TABLE 68.—BALANCE SHEET FOR OPERATING

	STATE OR TERRITORY.	Number of companies.	ASSETS.								
			Total.	Cost of construction and equipment.[2]	Other permanent investments.	Cash on hand.	Bills and accounts receivable.	Supplies.	Sundries.	Profit and loss deficit for companies reporting deficit.	Net deficit for states showing deficit.
1	United States	967	$2,545,132,305	$2,167,634,077	$152,518,997	$28,021,853	$22,448,700	$10,610,928	$152,617,703	$11,285,047	$1,123,330
2	Alabama	9	15,451,927	13,999,633	949,116	78,370	94,304	38,101	278,765	13,638	.....
3	Arkansas	7	2,501,330	2,207,346	40,486	27,268	6,106	11,149	208,975	.....	.....
4	California	35	82,602,550	74,624,168	1,805,168	1,186,782	515,963	832,641	3,632,077	5,751	.....
5	Colorado	7	16,820,646	16,174,735	210,062	149,637	39,298	115,097	121,850	9,967	.....
6	Connecticut	25	45,645,833	42,482,731	2,121,530	300,733	72,907	191,509	371,430	104,993	.....
7	Delaware	3	5,289,910	5,104,476	.....	71,386	40,860	47,361	7,977	17,850	.....
8	Florida	6	3,822,637	3,710,728	.....	47,861	32,994	23,453	7,601	.....	.....
9	Georgia	10	27,056,898	26,157,673	134,800	196,523	212,437	142,571	212,894	.....	.....
10	Illinois	56	284,953,125	225,507,387	40,237,103	1,819,913	1,123,128	899,638	12,432,930	2,933,026	826,030
11	Indiana	26	43,454,495	39,420,184	10,435	371,275	107,448	170,915	3,241,044	133,194	.....
12	Iowa	22	19,977,660	18,035,123	47,704	243,518	226,522	80,498	1,214,397	129,898	.....
13	Kansas	11	3,318,649	3,089,321	.....	14,622	2,942	14,379	190,206	7,179	6,655
14	Kentucky	12	25,239,786	22,850,276	40,928	333,415	43,307	139,698	1,810,241	21,921	.....
15	Louisiana	8	24,084,087	14,282,507	.....	243,853	97,891	103,969	9,329,908	25,959	.....
16	Maine	20	12,476,227	11,176,556	559,960	86,503	69,716	55,567	209,555	318,370	.....
17	Maryland	12	69,710,668	68,711,891	30,000	187,137	22,735	131,666	522,807	104,432	.....
18	Massachusetts	92	121,627,650	109,782,044	212,011	3,302,901	1,387,588	1,451,677	5,085,058	406,371	.....
19	Michigan	24	66,227,886	55,582,232	2,068,542	330,675	531,320	174,632	7,416,002	124,483	.....
20	Minnesota	5	40,016,285	39,273,860	.....	477,935	4,862	101,286	147,242	11,100	.....
21	Mississippi	5	1,444,119	1,268,084	114,196	11,196	5,928	2,890	40,540	1,785	.....
22	Missouri	17	149,060,520	117,628,659	24,379,270	1,053,495	299,330	445,988	4,743,535	510,243	.....
23	Montana	5	3,748,096	3,228,532	.....	46,521	37,782	22,589	347,107	65,565	.....
24	Nebraska	4	8,807,086	8,599,242	.....	100,961	9,175	19,209	76,654	1,845	.....
25	New Hampshire	13	4,435,194	4,118,457	.....	177,579	108,629	6,636	20,163	3,730	.....
26	New Jersey	29	132,029,283	126,589,270	880,908	439,114	278,001	338,461	2,549,375	954,154	134,148
27	New York	119	643,014,844	521,942,957	36,751,267	11,859,612	8,815,728	2,116,654	58,140,377	3,388,249	.....
28	North Carolina	7	4,430,976	2,408,661	639,690	24,076	89,318	36,408	1,198,720	34,103	16,814
29	Ohio	66	181,414,088	169,058,687	1,147,336	1,705,688	2,320,577	664,396	6,291,536	225,868	.....
30	Oregon	6	6,563,793	6,235,570	.....	89,601	8,680	89,341	118,864	21,737	.....
31	Pennsylvania	195	314,258,454	246,118,011	31,568,967	1,307,980	3,454,432	1,061,225	29,899,316	848,523	.....
32	Rhode Island	7	24,488,395	23,871,751	.....	38,443	147,373	160,607	1,589	268,632	.....
33	South Carolina	7	6,689,525	4,523,752	1,730,000	8,244	58,631	45,693	316,961	6,244	.....
34	Tennessee	8	18,142,307	16,931,576	582,015	64,557	491,804	62,046	9,187	1,122	.....
35	Texas	17	16,465,080	15,755,440	140,000	231,886	31,141	65,784	240,029	800	.....
36	Utah	3	6,224,674	4,314,156	1,682,600	145,123	.....	50,795	32,000	.....	.....
37	Vermont	9	3,203,339	2,850,460	.....	20,477	10,506	6,041	292,989	22,866	.....
38	Virginia	16	19,773,297	15,414,124	3,284,535	236,557	598,200	30,732	151,552	57,597	.....
39	Washington	8	20,043,826	18,574,439	191,793	406,694	234,894	274,026	361,980	.....	.....
40	West Virginia	8	10,005,352	9,039,281	244,819	106,805	5,976	4,529	601,492	2,450	.....
41	Wisconsin	17	31,334,728	29,359,238	708,756	225,314	333,118	338,740	367,214	2,348	.....
42	All other states and territories.[3]	11	29,277,080	27,630,859	.....	251,623	477,149	42,831	375,564	499,054	139,683
43	Hawaii and Porto Rico	5	3,502,875	2,181,593	332,314	102,950	64,868	31,950	778,161	11,039	.....

[1] Exclusive of reports for 20 companies which failed to furnish this information.
[2] Includes electric light plants owned by companies reporting.
[3] Includes states and territories having less than 3 companies, in order that the operations of individual companies may not be disclosed. These companies are distributed as follows: Arizona, 1; District of Columbia, 2 (8 reports); Idaho, 1; New Mexico, 1.

AND LESSOR COMPANIES, BY STATES AND TERRITORIES: 1902.[1]

LIABILITIES.										
Total.	Capital stock.	Funded debt.	Bills and accounts payable.	Interest due.	Dividends due.	Sundries.	Profit and loss surplus for companies reporting surplus.	Net surplus for states showing surplus.	Cost of construction during the year.[2]	
$2,545,132,305	$1,266,883,289	$974,112,422	$101,704,634	$14,497,670	$2,543,823	$133,399,308	$51,991,159	$41,829,442	$126,682,478	1
15,451,927	7,696,900	6,678,500	599,152	133,272	2,000	48,343	293,760	280,122	1,329,516	2
2,501,330	885,300	1,058,000	180,425	32,590	.....	242,025	102,990	102,990	82,272	3
82,602,550	46,022,099	30,529,500	1,650,635	538,108	116,953	1,934,206	1,811,049	1,805,298	2,164,805	4
16,820,646	7,362,804	8,295,560	418,881	239,493	.....	138,848	365,060	355,093	402,023	5
45,645,833	25,211,640	17,433,500	1,984,704	128,330	.....	298,491	589,168	484,175	1,333,893	6
5,289,910	2,264,990	2,424,000	523,953	10,920	.....	30,408	35,639	17,789	1,045,456	7
3,822,637	1,949,400	1,531,000	84,309	112,412	600	16,693	128,223	128,223	97,467	8
27,056,898	12,957,600	13,081,500	163,931	54,943	.....	127,358	671,566	671,566	673,406	9
284,953,125	158,713,616	97,885,267	8,766,905	2,084,693	300,673	15,094,975	2,106,996	.....	13,670,690	10
43,454,495	16,635,028	21,550,760	3,091,924	102,640	8,015	1,664,308	401,820	268,626	1,891,946	11
19,977,660	10,541,200	6,770,333	1,338,918	73,101	1,616	62,956	1,189,536	1,059,638	1,578,741	12
3,318,649	2,162,000	1,115,000	37,332	1,416	.....	2,377	524	.....	36,933	13
25,239,786	11,330,900	12,204,300	284,044	294,275	77,250	168,027	880,990	859,069	371,058	14
24,084,087	12,484,900	10,010,000	291,257	289,200	114,203	259,547	634,980	609,021	490,546	15
12,476,227	5,053,055	6,155,000	746,799	60,967	.....	80,499	379,907	61,537	1,181,015	16
69,710,668	16,036,006	52,359,194	251,557	533,628	.....	339,084	191,199	36,767	1,492,101	17
121,627,650	59,378,602	37,966,942	16,241,821	251,987	337,736	5,066,355	2,384,207	1,977,836	12,821,331	18
66,227,886	29,033,100	32,596,800	2,838,408	539,992	132,234	113,384	973,968	849,485	1,750,484	19
40,016,285	23,280,000	13,226,000	122,908	229,928	300,200	67,639	2,789,610	2,778,510	1,044,300	20
1,444,119	626,500	644,000	134,628	8,212	.....	8,070	22,709	20,924	311,417	21
149,060,520	68,234,100	71,474,816	5,760,149	948,259	206,621	1,868,298	568,277	58,034	2,167,875	22
3,748,096	2,045,613	1,275,000	984	134,750	.....	124,556	167,193	101,628	65,320	23
8,807,086	6,012,125	2,395,000	127,436	.....	59,205	21,000	192,320	190,475	211,689	24
4,435,194	2,333,200	1,556,000	275,582	4,096	.....	174,207	92,109	88,379	226,423	25
132,029,283	69,333,440	57,490,750	2,994,778	409,014	4,827	976,468	820,006	.....	9,437,053	26
643,014,844	276,209,172	252,929,378	23,423,952	3,798,284	318,151	69,296,706	17,039,206	13,650,957	36,278,382	27
4,430,976	1,995,625	1,880,500	392,630	60,730	.....	84,202	17,289	.....	258,248	28
181,414,088	108,638,650	60,942,000	6,441,750	450,290	175,353	2,349,156	2,416,889	2,191,021	11,962,321	29
6,563,793	2,788,550	2,737,000	214,452	26,890	.....	142,536	654,865	632,628	330,939	30
314,258,454	183,429,124	75,563,700	11,876,058	2,019,582	185,086	30,802,698	10,382,206	9,533,683	11,093,181	31
24,488,395	16,375,000	6,221,200	1,265,385	60,857	.....	6,492	559,461	290,829	1,675,228	32
6,689,525	2,589,400	3,336,000	445,384	29,737	.....	213,538	75,466	69,222	308,214	33
18,142,307	8,160,400	8,686,400	908,620	31,620	.....	88,991	266,276	265,154	1,173,083	34
16,465,080	9,150,900	3,952,900	2,958,926	90,873	6,291	10,247	294,843	294,043	588,397	35
6,224,674	3,110,000	2,800,000	251,279	.....	.....	.....	63,395	63,395	168,355	36
3,203,339	1,835,100	931,600	66,201	23,313	1,650	310,621	34,854	11,988	72,392	37
19,773,297	7,277,000	11,919,314	889,005	118,043	18,069	242,225	209,641	152,044	605,059	38
20,043,826	10,636,400	7,747,813	845,156	121,355	.....	137,717	555,385	555,385	3,299,615	39
10,005,352	4,273,600	5,308,400	262,527	12,301	.....	12,752	135,772	133,322	734,039	40
31,334,728	15,178,600	13,058,350	1,100,953	204,298	69,667	589,926	1,132,934	1,130,586	1,826,050	41
29,277,080	17,651,650	9,291,150	1,450,936	233,271	107,423	183,279	359,371	.....	437,210	42
3,502,875	2,021,340	1,163,800	55,276	20,146	2,899	109,083	130,331	119,292	810	43

The methods of street railway companies in preparing their balance sheets are not uniform, and, although every effort has been made by the Bureau of the Census to bring the items to a comparable basis, it has been impossible in some cases to do so. Moreover, certain headings on both sides of the balance sheet represent such a variety of items that the national and state totals for these headings do not give a precise idea of the financial situation of street railways.

The total assets and liabilities, as shown in the table, have been obtained by adding all assets and liabilities reported by individual companies without setting off the profit-and-loss surplus of some of the companies against the profit-and-loss deficit of others. The aggregate surplus reported by 463 companies was $51,991,159, and the aggregate deficit reported by 225 companies was $11,285,047, while 279 companies reported neither surplus nor deficit. The latter are largely lessor companies which have no current transactions, their income being directly disbursed to their stockholders and bondholders by the operating companies. The net surplus for the United States, obtained by deducting the deficits from the gross surplus, was $40,706,112. If the deficits were similarly deducted from total assets and liabilities they would be reduced to $2,533,847,258. The table also shows for each state the net surplus or deficit obtained by combining the figures for companies showing a surplus with those for companies showing a deficit.

More than five-sixths of the reported assets of the street railway companies are placed under the head "cost of construction and equipment." It should be distinctly understood that this figure gives no indication of the actual cash which has been invested in tracks, appliances, and equipment. The Bureau of the Census undertook to secure an itemized statement of cost of construction from each company in accordance with the form prescribed by the American Street Railway Accountants' Association. Many companies furnished satisfactory returns, but many others were entirely unable to do so. The most important of the considerations that make the figures of cost in the balance sheet unsatisfactory is that a large proportion of the railway mileage, particularly of that which has had the highest valuation placed upon it, has changed hands during recent years, usually through the process of consolidation, but sometimes through reorganization after bankruptcy or otherwise. Where this has occurred, the new company has, naturally enough, treated as the "cost of construction and equipment" the amount which it has actually paid in cash or securities for the assets of the old company or companies, as "going" concerns—an amount which may be much more or much less than their original cost or the cost of duplicating them to-day. The new companies would seldom be able, even if they desired, to ascertain from the records of the old companies the amounts originally invested, either by items or as a whole. Another reason for inability to present itemized construction accounts is found in the common practice of letting contracts for the entire construction and equipment of railways at a lump sum. Such contracts are sometimes given to a construction company which is composed largely or wholly of the same men who are promoting the street railway company itself.

The item "other permanent investments" is variously interpreted by individual companies in making up their balance sheets. Some of them are disposed to put the value of their franchises under this head. The Bureau of the Census has sought to secure uniformity in the classification presented in this report, and has included under "other permanent investments" only the value of investments outside of street railways and lighting plants directly owned by the reporting companies which amounted to $152,513,997. The most important form of such investments consists of the stocks and bonds of other street railway companies, which were usually wholly or partly controlled by the companies holding such securities, but which still maintained an independent existence and made an independent report to the Bureau of the Census. To the extent that securities of reporting railway companies are held by other reporting companies there is a duplication of both assets and liabilities. In cases where an operating company has completely taken over the business of a subsidiary company, which made no separate return to the Bureau of the Census, the value of the securities held has been treated as part of the cost of construction of the parent company. The cost of electric lighting plants and of parks or other real estate used in direct connection with the street railway business is also included with "cost of construction and equipment." On the other hand, investments in other forms of real estate, in water plants, ice plants, or other industrial enterprises, or in securities of any sort, are covered by the second head of the balance sheet. In some cases the cost of such outside properties is so closely interwoven with the cost of street railways that the segregation is based on estimates rather than on precise bookkeeping accounts. Some companies reported their own stocks and bonds held in the treasury as an asset, but in making up the table such securities have uniformly been treated as though not issued and have been omitted from both sides of the balance sheet.

The sundry assets, $152,617,703, includes a variety of items. In a number of cases companies reported the value of franchises—corresponding practically to the difference between their reported cost of construction and other permanent investments on the one hand and the amount of stocks and bonds issued, on the other—as a separate item, and this has been included here rather than under "cost of construction" or "other permanent investments." It must not be supposed, however, that the total value of all street railway franchises, as distinct from their cash cost, is shown under "sundry assets." Advances made by controlling companies to their sub-

sidiary companies for improvements on their lines or other purposes are also placed under this head. It is probable, however, that a part of the item "bills and accounts receivable" also represents advances of this sort that have not been specifically indicated as such by the companies. The balance sheet totals involve duplication to the extent of such advances from one company to another; the expenditures made out of them appear, usually as "cost of construction and equipment," among the assets of the subsidiary companies, and the obligations to the controlling companies appear among their liabilities.

The items "capital stock" $1,266,883,289, and "funded debt" $974,112,422, in the balance sheet are somewhat smaller than the amounts of securities reported as issued in Table 93, which were $1,315,572,960 and $992,709,139, respectively. Some of the operating companies which reported capital stock and funded debt did not present balance sheets. Again the capital stock of some other companies was not paid up in full, only the amount paid being treated as a liability in the balance sheet. If the par value of such stock were taken, it would be necessary to offset the part not paid in by an item "sundry assets" on the assets side, representing, presumably, real or anticipated franchise value. The practice of issuing stock without full payment is most conspicuous in Pennsylvania, where the total par value of stocks issued by operating and lessor street railway companies was reported at $211,728,495, while the amount appearing in the balance sheet as paid in was $183,429,124, a difference of $28,299,371. . In Philadelphia many of the lessor companies have had only a fraction of their stock paid in. Treasury stocks and bonds are excluded from liabilities as from assets.

The item "bills and accounts payable" is a large one, $101,704,634. A considerable number of companies, particularly in Massachusetts, seem to have adopted the policy of carrying permanently a heavy floating debt, the proceeds of which have been used in construction and equipment. In other cases new companies that have not yet completed their entire road, or that have only recently done so, are indebted to the contractors for nearly or quite the full cost of construction and have as yet floated no securities. There are a few cases also in which controlling companies not reporting to the Bureau of the Census have made advances to the companies which they control and which did report.

The amount of "interest due" represents in part that which has accrued but is not yet payable; in part that which is payable but for which coupons have not yet been presented; but it apparently represents chiefly interest which the companies have been unable to pay.

Under "sundry liabilities," which aggregated $133,399,308, the most important single item consists of the obligations of the subsidiary companies to controlling companies.

Cost of construction during the year.—An additional column on the same page with the balance sheet shows the cost of new construction and equipment charged to the capital account during the census year, as reported by street railway companies. It does not include the cost of railways under construction but not yet in operation. It has been sought also to omit expenditures which merely represented the purchase of old companies by new ones. The complications in the construction accounts of new railway companies, particularly where settlements have not yet been made with contractors, are such that the figures for cost during the year can not be altogether correct. They serve, however, to give a rough idea of the rapidity with which new construction and improvement are taking place. . The total cost of construction during the year amounted to $126,682,473, or about 6 per cent of the aggregate cost of construction and equipment, as stated in the balance sheet at the end of the year.

CHAPTER VI.

EMPLOYEES, SALARIES, AND WAGES.

Totals for the United States and for states.—Table 92 shows for the United States as a whole and for each of the states the average number of salaried officials and clerks and of wage-earners of different classes, employed by street and electric railways during the census year 1902, together with the total amount of salaries and wages paid to each class. The table includes the figures for 797 of the 817 operating companies. The nonoperating lessor companies have no wage-earners; and, while they maintain a formal organization and have certain officers, these, in most cases, receive no compensation. The 20 companies that failed to report statistics of employees and wages include the 18 companies mentioned on page 54 as making no financial returns. In addition to these the Los Angeles Traction Company, with 26 miles of track and 5,040,154 passengers, and the Punxsutawney (Pa.) Street Railway Company, with 12.13 miles of track and 988,555 passengers, failed to report employees and wages. The total trackage of the companies not covered by the statistics on this subject was 417.03 miles.

In accordance with the practice adopted by the Bureau of the Census for the investigation of manufactures,[1] the average number of employees as stated in Table 92 is computed, not on the basis of the actual time the street railways were in operation, but on the assumption of continuous operation for all companies throughout the year. Thus a company operating six months and employing 30 men during that time is credited with 15 men employed for twelve months. The aim is to show the equivalent of the actual work done during the census year, or, in other words, the number of employees which would be necessary to perform that work if all of them worked the full year.

The average time of operation of the 57 companies which operated less than the full year was about six and two-thirds months. The number of employees of such companies, as calculated according to the method described, was only 2,066. If the full number had been counted, regardless of the length of their employment, it would not have increased the total number of employees of all companies combined, or the number of most of the classes of employees, by 2 per cent. In some other cases companies operated part of their trackage during only a fraction of the year; but, all things considered, the average number of employees for all railways, as calculated on the basis of an assumed full year of operation, is not materially less than the number actually employed at any given time during the year.

Table 92 shows that the average number of salaried officials and clerks employed by the street railways of the United States in 1902 was 7,128 and the average number of wage-earners of all classes 133,641, a total of 140,769 employees. The salaries paid amounted to $7,439,716 and the wages to $80,770,449, a total of $88,210,165 for salaries and wages. The wages alone, exclusive of salaries, were 56.8 per cent of the total operating expenses of the street railway companies. By far the most important groups of employees are conductors and motormen. These two classes, which are approximately equal in number and in wages received, together constitute about three-fifths of the total number of wage-earners, and their aggregate wages are equal to more than one-third of the operating expenses of street railway companies. Road and track men and mechanics are the next most important classes of employees.

Employees, salaries, and wages of companies classified according to power.—Table 69 shows for all companies combined and for the various groups of companies classified according to power, the number and compensation of salaried officials and clerks; the number and wages of all wage-earners and of conductors and motormen, respectively; and the relation of certain of these statistics to the length of track, to car mileage, and to the number of fare passengers carried.

[1] See Twelfth Census, Vol. VII, page cvi.

TABLE 69.—EMPLOYEES, SALARIES, AND WAGES OF COMPANIES, CLASSIFIED ACCORDING TO POWER: 1902.[1]

	Total.	ELECTRIC, SURFACE.			Animal.	Steam and electric elevated.	Cable, surface, and inclined planes.	Steam, surface.
		Without commercial lighting.	With commercial lighting.	Part time.				
Number of companies	797	554	112	57	52	5	14	3
Salaried officials and clerks:								
Average number	7,128	5,617	990	184	44	250	39	4
Per mile of track	0.322	0.305	0.402	0.221	0.282	1.096	1.178	0.332
Per 100,000 car miles run during the year	0.631	0.598	1.164	1.413	0.776	0.299	1.240	3.693
Per 100,000 fare passengers carried during the year	0.151	0.140	0.324	0.488	0.131	0.079	0.201	2.354
Salaries	$7,439,716	$5,950,926	$998,460	$121,124	$27,927	$298,137	$40,622	$2,520
Wage-earners:								
Average number	133,641	111,044	12,498	1,882	992	6,768	441	16
Per mile of track	6.031	6.022	5.080	2.264	6.354	29.671	13.319	1.327
Per 100,000 car miles run during the year	11.830	11.826	14.696	14.455	17.497	8.091	14.026	14.774
Per 100,000 fare passengers carried during the year	2.829	2.768	4.087	4.987	2.956	2.148	2.278	9.415
Wages	$80,770,449	$67,904,546	$6,741,201	$698,667	$576,285	$4,512,338	$330,795	$6,617
Per mile of track	$3,645	$3,683	$2,740	$841	$3,691	$19,782	$9,991	$549
Per 100,000 car miles run during the year	$7,150	$7,232	$7,927	$5,366	$10,164	$5,394	$10,521	$6,110
Per 100,000 fare passengers carried during the year	$1,710	$1,692	$2,204	$1,851	$1,717	$1,432	$1,709	$3,894
Conductors:								
Average number	40,141	34,222	3,090	548	297	1,823	159	2
Wages	$24,025,204	$20,981,435	$1,545,874	$198,109	$164,894	$1,015,888	$118,044	$960
Motormen:								
Average number	40,003	34,458	3,235	590	348	1,228	140	4
Wages	$24,617,155	$21,288,717	$1,680,086	$213,814	$188,303	$1,137,951	$105,629	$2,655

[1] Exclusive of reports for 20 companies which failed to furnish this information.

Very significant differences in these relations appear among the different classes of companies, although the differences are probably due not so much to diversity in the methods of traction as to variation in the density of traffic among the several classes. For all classes of railways combined the number of salaried employees was 0.322 per mile of track, 0.631 per 100,000 car miles run during the year, and 0.151 per 100,000 fare passengers carried during the year. The number of wage-earners was 6.031 per mile of track, 11.830 per 100,000 car miles, and 2.829 per 100,000 fare passengers. These figures exceed slightly the averages for the most important class of companies, full-time electric surface railways without commercial lighting. The annual wages paid by all companies were $3,645 per mile of single track, $7,150 per 100,000 car miles, and $1,710 per 100,000 fare passengers. As might be expected, the companies furnishing commercial lighting, part of whose employees are engaged in the lighting branch of the business, show relatively more salaried employees, wage-earners, and wages, in proportion to the car mileage and passengers, than companies without commercial lighting. The large number of wage-earners in proportion to car mileage shown for animal power railways is chiefly due to the slow speed of the cars. Elevated railways, with their extremely dense traffic, naturally show a much larger proportion of employees per mile of track than other classes of railways; but, on the other hand, the density of traffic and the high speed of elevated railways resulted in their showing a relatively small number of employees and a relatively small amount of salaries and wages in proportion to car mileage and to fare passengers carried. The number of wage-earners per 100,000 fare passengers for the cable roads was less than for any other group except the elevated roads. The inclined plane roads had 2.107, and the ordinary cable roads 2.320 wage-earners per 100,000 fare passengers.

Employees, salaries, and wages of companies classified according to population.—Table 70 presents for all railways classified according to population the same data as are presented in Table 69. The corresponding figures for full-time electric surface railways without commercial lighting are shown in Table 71.

TABLE 70.—EMPLOYEES, SALARIES, AND WAGES OF COMPANIES, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	797	65	46	83	312	53	238
Salaried officials and clerks:							
Average number	7,128	2,549	1,211	703	888	482	1,345
Per mile of track	0.322	0.514	0.343	0.248	0.384	0.174	0.229
Per 100,000 car miles run during the year	0.631	0.489	0.507	0.630	1.334	1.042	0.904
Per 100,000 fare passengers carried during the year	0.151	0.104	0.122	0.169	0.438	0.434	0.239
Salaries	$7,439,716	$2,720,425	$1,465,045	$829,372	$686,253	$477,601	$1,261,020
Wage-earners:							
Average number	133,641	61,699	27,604	13,458	7,279	5,764	17,837
Per mile of track	6.031	12.438	7.811	4.742	3.333	2.084	3.035
Per 100,000 car miles run during the year	11.830	11.837	11.558	12.053	11.586	12.461	11.988
Per 100,000 fare passengers carried during the year	2.829	2.516	2.790	3.229	3.802	5.186	3.167
Wages	$80,770,449	$39,181,336	$17,201,939	$7,626,882	$3,727,549	$3,155,616	$9,877,127
Per mile of track	$3,645	$7,899	$4,868	$2,688	$1,707	$1,141	$1,680
Per 100,000 car miles run during the year	$7,150	$7,517	$7,203	$6,831	$5,933	$6,822	$6,638
Per 100,000 fare passengers carried during the year	$1,710	$1,598	$1,739	$1,830	$1,947	$2,839	$1,754
Conductors:							
Average number	40,141	18,897	8,645	4,083	1,849	1,351	5,316
Wages	$24,025,204	$11,860,269	$5,244,932	$2,247,928	$911,899	$735,181	$3,024,995
Motormen:							
Average number	40,003	17,867	8,786	4,242	2,360	1,424	5,324
Wages	$24,617,155	$11,813,620	$5,384,432	$2,358,346	$1,186,679	$788,645	$3,085,433

[1] Exclusive of reports for 20 companies which failed to furnish this information.

TABLE 71.—EMPLOYEES, SALARIES, AND WAGES OF FULL-TIME ELECTRIC SURFACE RAILWAY COMPANIES, WITHOUT COMMERCIAL LIGHTING, CLASSIFIED ACCORDING TO POPULATION: 1902.[1]

	Total.	URBAN CENTERS, POPULATION.				INTERURBAN RAILWAYS.	
		500,000 and over.	100,000 but under 500,000.	25,000 but under 100,000.	Under 25,000.	Fast, long.	Other.
Number of companies	554	47	37	66	165	40	199
Salaried officials and clerks:							
Average number	5,617	2,259	1,026	457	438	356	1,081
Per mile of track	0.305	0.483	0.318	0.219	0.385	0.165	0.217
Per 100,000 car miles run during the year	0.598	0.522	0.469	0.555	1.141	0.985	0.830
Per 100,000 fare passengers carried during the year	0.140	0.107	0.114	0.150	0.351	0.432	0.216
Salaries	$5,950,926	$2,390,778	$1,293,521	$537,295	$340,658	$371,944	$1,016,730
Wage-earners:							
Average number	111,044	53,957	24,649	8,709	4,008	4,329	15,392
Per mile of track	6.022	11.527	7.642	4.167	3.062	2.002	3.096
Per 100,000 car miles run during the year	11.826	12.461	11.260	10.577	10.445	11.980	11.819
Per 100,000 fare passengers carried during the year	2.768	2.566	2.747	2.852	3.210	5.249	3.082
Wages	$67,904,546	$34,094,449	$15,325,583	$5,256,287	$2,163,300	$2,432,536	$8,632,391
Per mile of track	$3,683	$7,284	$4,751	$2,515	$1,653	$1,125	$1,737
Per 100,000 car miles run during the year	$7,232	$7,874	$7,001	$6,384	$5,637	$6,732	$6,628
Per 100,000 fare passengers carried during the year	$1,692	$1,621	$1,708	$1,721	$1,733	$2,949	$1,729
Conductors:							
Average number	34,222	16,765	7,847	2,821	1,165	998	4,626
Wages	$20,981,435	$10,670,686	$4,745,919	$1,697,605	$619,268	$552,534	$2,695,423
Motormen:							
Average number	34,458	16,338	8,060	2,959	1,421	1,049	4,631
Wages	$21,288,717	$10,509,465	$4,903,873	$1,790,580	$764,662	$583,345	$2,736,792

[1] Exclusive of reports for 18 companies which failed to furnish this information.

It appears from Table 71 that the number of wage-earners per mile of track, on railways of the more typical class, is greatest in urban centers of the first group, and that the number decreases rapidly with decreasing population of urban centers. An even greater decrease is shown in wages per mile of track. The explanation is found obviously in the declining density of traffic with decreasing population. The ratio of wage-earners and wages to car miles run during the year also decreases with population, though in a much less marked degree. In explanation of the fact that the number of employees per 100,000 car miles is greater in large cities than in smaller towns, it may be said that certain classes of men, such as starters, switchmen, transfermen at junction points, and the like are not required in the smaller towns. In some small towns a single person serves both as conductor and motorman.

On the other hand, the density of traffic per car mile increases, broadly speaking, with population, and we find accordingly that the ratio of the number of employees to the number of fare passengers carried during the year decreases with increasing population. However, on account of the general tendency of the rate of wages to increase with population, there is less difference in the ratio of wages to passengers among the four urban groups than in the ratio of wage-earners to passengers. The ratio of wage-earners to passengers carried is larger in the group of fast, long interurban railways than in any of the urban groups, because of the long distance traveled by passengers.

Relation of employees to trackage and traffic in the ten largest cities.—Table 72 shows the number of salaried employees and the number of wage-earners on the surface railways, including electric, animal, and cable lines,[1] in the ten largest cities of the United States, together with the relation between these numbers and the traffic. It should be noted that, in some cases, the area and population of the cities as covered by this table do not correspond exactly with the area and population of the "urban centers," of which these cities are the chief part.

[1] The Brooklyn and Boston companies which operate elevated as well as surface tracks are included in the table.

TABLE 72.—WAGE-EARNERS AND SALARIED EMPLOYEES OF SURFACE RAILWAYS, IN THE TEN LARGEST CITIES: 1902.

CITY.	Number of miles of track.	Total car mileage.	Number of fare passengers.	SALARIED OFFICIALS AND CLERKS.				WAGE-EARNERS.			
				Number.	Per mile of track.	Per 100,000 car miles per year.	Per 100,000 fare passengers per year.	Number.	Per mile of track.	Per 100,000 car miles per year.	Per 100,000 fare passengers per year.
New York, N. Y	1,103.45	136,179,817	718,278,032	614	0.556	0.451	0.085	20,627	18.693	15.147	2.872
Chicago, Ill.[1]	886.86	74,011,090	805,905,617	283	0.319	0.382	0.093	7,426	8.373	10.034	2.428
Philadelphia, Pa	517.53	61,521,375	331,304,685	258	0.499	0.419	0.078	6,980	13.487	11.346	2.107
St. Louis, Mo	360.89	29,602,974	122,063,877	138	0.382	0.466	0.113	2,438	6.756	8.236	1.997
Boston, Mass	406.13	45,999,999	222,484,811	450	1.108	0.978	0.202	6,769	16.667	14.715	3.042
Baltimore, Md	365.12	23,876,837	96,763,878	139	0.381	0.582	0.144	2,762	7.565	11.568	2.854
Cleveland, Ohio	237.04	18,768,515	81,370,202	95	0.401	0.506	0.117	2,104	8.876	11.210	2.586
Buffalo, N. Y	320.48	17,486,012	74,136,881	105	0.328	0.600	0.142	2,259	7.049	12.919	3.047
San Francisco, Cal	276.50	20,620,581	117,357,877	102	0.369	0.495	0.087	2,957	10.694	14.340	2.520
Pittsburg-Allegheny, Pa	410.01	33,067,964	161,436,822	155	0.378	0.469	0.096	4,016	9.795	12.145	2.488

[1] One company failed to furnish this information.

Marked differences appear among the cities in the ratio of wage-earners to track mileage. This ratio is particularly affected by the density of traffic, being high where the number of car miles operated per mile of track is great. Much less marked are the differences in the ratio of the number of wage-earners to the number of car miles run during the year. The highest ratio appears in New York, where there were 15.147 wage-earners per 100,000 car miles. Boston and San Francisco show nearly as large a proportion. The lowest ratio of wage-earners to car mileage is found in St. Louis and Chicago. As regards the relation of the number of employees to the number of fare passengers carried during the year, Buffalo and Boston present the highest ratio, both cities having more than 3 wage-earners per 100,000 passengers carried annually. The lowest ratio of wage-earners to fare passengers carried appears in St. Louis and Philadelphia.

Method of presenting wage statistics.—In the investigation of the wages of street railway employees the same methods have been followed that were adopted in the special investigation on employees and wages in manufacturing industries published by the Bureau of the Census in 1903.[1] The number of wage-earners whose wages fall within specified limits has been ascertained and presented.

As more fully shown in the Report on Manufactures (Vol. VII, page ccxv), great caution must be exercised in making calculations of the annual average earnings of wage-earners from the statistics of aggregate wages and average number employed. This caution applies with full force to the statistics presented in this report. The number and complexity of the other necessary inquiries in the street railway schedule precluded the use of such exhaustive methods of securing wage returns as were employed in the special investigation on employees and wages in the manufacturing industries. The companies were, therefore, asked to compute directly the number of wage-earners in the different classes receiving stated rates of pay, and the special agents of the Bureau of the Census consulted pay rolls only incidentally and by way of verification.

Classified wages for all electric surface railways.—Table 73 shows for all wage-earners on electric surface railways, and for the leading classes separately, the number receiving stated rates of daily wages within 25-cent limits. It shows also the percentage which the number falling within each wage group bears to the total number of wage-earners of the class, together with cumulative percentages.

[1] For fuller description of these methods see Twelfth Census Report on Employees and Wages, 1903, pages xxiv–xxviii.

TABLE 73.—DISTRIBUTION OF WAGE-EARNERS OF ALL ELECTRIC SURFACE RAILWAY COMPANIES ACCORDING TO DAILY WAGES RECEIVED: 1902.

[Each cumulative percentage shows the proportion of the total number receiving a wage as great as, or greater than, the lowest rate of the given wage group.]

RATE PER DAY (DOLLARS).	ALL CLASSES.			CONDUCTORS.			MOTORMEN.			ROAD AND TRACK MEN.		
	Number.	Percentage.		Number.	Percentage.		Number.	Percentage.		Number.	Percentage.	
		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.
Total	94,874	100.0	.....	31,869	100.0	.....	32,412	100.0	.....	9,926	100.0	.....
Less than 1.00	656	0.7	100.0	50	0.2	100.0	23	0.1	100.0	473	4.7	100.0
1.00 to 1.24	2,719	2.9	99.3	899	2.8	99.8	884	2.7	99.9	477	4.8	95.3
1.25 to 1.49	4,468	4.7	96.4	1,046	3.3	97.0	1,123	3.5	97.2	1,368	13.8	90.5
1.50 to 1.74	15,431	16.3	91.7	3,983	12.5	93.7	3,374	10.4	93.7	4,505	45.4	76.7
1.75 to 1.99	15,213	16.0	75.4	5,426	17.0	81.2	5,481	16.9	83.3	1,280	12.9	31.3
2.00 to 2.24	39,603	41.8	59.4	17,059	53.5	64.2	16,665	51.4	66.4	1,229	12.4	18.4
2.25 to 2.49	10,421	11.0	17.6	3,124	9.8	10.7	4,325	13.4	15.0	384	3.9	6.0
2.50 to 2.74	3,262	3.4	6.6	192	0.6	0.9	291	0.9	1.6	162	1.6	2.1
2.75 to 2.99	1,045	1.1	3.2	17	0.1	0.3	7	(1)	0.7	8	0.1	0.5
3.00 and over	1,996	2.1	2.1	73	0.2	0.2	239	0.7	0.7	40	0.4	0.4

RATE PER DAY (DOLLARS).	ENGINEERS.			FIREMEN.			MECHANICS.			ALL OTHER CLASSES.		
	Number.	Percentage.		Number.	Percentage.		Number.	Percentage.		Number.	Percentage.	
		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.
Total	1,534	100.0	.....	2,344	100.0	.....	6,753	100.0	.....	10,036	100.0	.....
Less than 1.00	3	0.2	100.0	16	0.7	100.0	21	0.3	100.0	70	0.7	100.0
1.00 to 1.24	5	0.3	99.8	76	3.2	99.3	83	1.2	99.7	295	2.9	99.3
1.25 to 1.49	39	2.5	99.5	135	5.8	96.1	195	2.9	98.5	562	5.6	96.4
1.50 to 1.74	104	6.8	97.0	469	20.0	90.3	896	13.3	95.6	2,100	20.9	90.8
1.75 to 1.99	89	5.8	90.2	637	27.2	70.3	1,062	15.7	82.3	1,223	12.2	69.9
2.00 to 2.24	295	19.2	84.4	770	32.8	43.1	1,707	25.3	66.6	1,953	19.5	57.7
2.25 to 2.49	187	12.2	65.2	171	7.3	10.3	1,017	15.1	41.3	1,213	12.1	38.2
2.50 to 2.74	274	17.9	53.0	48	2.1	3.0	936	13.9	26.2	1,359	13.5	26.1
2.75 to 2.99	115	7.5	35.1	1	(1)	0.9	427	6.3	12.3	470	4.7	12.6
3.00 and over	423	27.6	27.6	21	0.9	0.9	409	6.0	6.0	791	7.9	7.9

[1] Less than one-tenth of 1 per cent.

The statistics of classified wage-earners presented in this and the following tables are confined to electric surface railways (including those with and without commercial lighting), because the occupations for other classes of railways differ so much in character as to render comparison misleading. Even of the electric surface railway companies, 54 failed to report in full regarding classified wages of their employees and have been omitted from the classified figures. The most important of the omissions are the Chicago City Railway Company, the United Railways and Electric Company of Baltimore, the Boston Elevated Railway Company, the St. Louis Transit Company, the Cleveland Electric Railway Company, the Columbus Railway Company, and the Union Railroad Company of Providence.

In the above table the heading "all other classes" includes foremen; inspectors; starters; watchmen; switchmen; hostlers, stablemen, etc.; linemen; dynamo and switchboard men; electricians; and lamp trimmers. The schedule did not call for classified wages of a few other minor groups of wage-earners, and they accordingly do not appear in the table.

The total number of wage-earners covered by Table 73 is 94,874, which is 71 per cent of the average number of wage-earners for all street and electric railways and 75.6 per cent of the average number of wage-earners on all electric surface railways.

The cumulative percentages in the table indicate the proportion of the total number of wage-earners of the different occupations who receive not less than the lowest rate defining the given wage group. Thus for all wage-earners combined the cumulative percentage opposite the group of $1.75 to $1.99 per day indicates that 75.4 per cent of the total number receive $1.75 or more per day. The "percentage of total" opposite the same wage group indicates that 16 per cent of all wage-earners received between $1.75 and $1.99, thus leaving 59.4 per cent who receive more than $1.99, which is the cumulative percentage for the next higher wage group.

Table 74 shows, for the same wage-earners who are covered by Table 73, the median groups of wages for different occupations, the percentage of the total number within each occupation who receive wage rates falling within the median group, and the percentages above and below the median rates.

By a median rate of wages is meant the rate of the employee who stands halfway between the lowest paid and the highest paid employee in the class under consideration; in other words, an absolutely precise median would be a rate such that equal numbers of employees receive wages respectively higher and lower than the rate named. For the purpose of permitting the medians to be calculated closely, the schedule called for a classification of wage-earners by their precise daily rates of pay. In tabulation, however, the employees have necessarily been grouped according to certain limits, and the median in each case accordingly appears not as a single rate, but as a group, with upper and lower limits 5 cents apart. It follows that the median group itself covers a considerable number of employees and that the number above and below the median group can not, in any case, be exactly equal.

TABLE 74.—*Median rates of wages and percentage of wage-earners receiving median rates, and rates above and below median rates, on electric surface railways: 1902.*

CLASS.	Median rate (dollars).	PERCENTAGE OF WAGE-EARNERS RECEIVING—		
		Median rate.	Above median rate.	Below median rate.
All classes	2.00 to 2.04	32.7	26.7	40.6
Conductors	2.00 to 2.04	40.6	23.6	35.8
Motormen	2.00 to 2.04	39.2	27.2	33.6
Road and track men	1.50 to 1.54	40.4	36.3	23.3
Engineers	2.50 to 2.54	13.6	39.4	47.0
Firemen	1.80 to 1.84	3.2	47.6	49.2
Mechanics	2.00 to 2.04	23.2	43.4	33.4
All other classes	2.00 to 2.04	16.9	40.8	42.3

Tables 73 and 74 show that there is not a wide variation in the wages of most employees on electric surface railways. Of all wage-earners on such railways, 32.7 per cent received between $2 and $2.04 per day, which is the median group, while 68.8 per cent received between $1.75 and $2.49 daily. The rate of $2 per day is more common than any other and is probably the precise median for all classes combined.

There is less variation in the wages of conductors and motormen than in the wages of all wage-earners combined. The median group for each of these classes is $2 to $2.04, and about two-fifths of each class are included in that group. More than four-fifths of all the conductors and five-sixths of all motormen received $1.75 or more per day, while less than 2 per cent of either class received $2.50 or more per day.

The median group for road and track men, who are practically all unskilled laborers, is $1.50 to $1.54, and more than two-fifths of all such employees fall within that wage group. The engineers are the best paid wage-earners, while the mechanics present the widest range of wages.

Classified wages for electric surface railways in cities of more than 100,000 inhabitants.—Tables 75 and 76 present in the same manner as in the preceding tables the classified wage statistics of wage-earners on electric surface railways in cities of more than 100,000 inhabitants. It will be recalled that the statistics for important companies in Chicago, Baltimore, Boston, St. Louis, Providence, Cleveland, and Columbus are omitted, but it is not probable that this omission seriously affects the distribution of the wage-earners throughout the scale.

TABLE 75.—DISTRIBUTION OF WAGE-EARNERS OF ELECTRIC SURFACE RAILWAYS IN CITIES OF 100,000 POPULATION AND OVER, ACCORDING TO DAILY WAGES RECEIVED: 1902.

[Each cumulative percentage shows the proportion of the total number receiving a wage as great as, or greater than, the lowest rate of the given wage group.]

RATE PER DAY (DOLLARS).	ALL CLASSES.			CONDUCTORS.			MOTORMEN.			ROAD AND TRACK MEN.		
	Number.	Percentage.		Number.	Percentage.		Number.	Percentage.		Number.	Percentage.	
		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.
Total	56,399	100.0	.....	20,376	100.0	.....	20,063	100.0	.....	4,694	100.0	.....
Less than 1.00	50	0.1	100.0	.....	.....	.....	.....	.....	.....	14	0.3	100.0
1.00 to 1.24	241	0.4	99.9	25	0.1	100.0	15	0.1	100.0	82	1.8	99.7
1.25 to 1.49	1,118	2.0	99.5	265	1.3	99.9	263	1.3	99.9	270	5.8	97.9
1.50 to 1.74	6,455	11.4	97.5	1,676	8.2	98.6	810	4.1	98.6	2,288	48.7	92.1
1.75 to 1.99	7,772	13.8	86.1	2,840	14.0	90.4	2,595	12.9	94.5	676	14.4	43.4
2.00 to 2.24	27,813	49.3	72.3	12,653	62.1	76.4	12,002	59.8	81.6	872	18.6	29.0
2.25 to 2.49	8,668	15.4	23.0	2,771	13.6	14.3	3,979	19.8	21.8	333	7.1	10.4
2.50 to 2.74	2,162	3.8	7.6	125	0.6	0.7	216	1.1	2.0	137	2.9	3.3
2.75 to 2.99	775	1.4	3.8	.....	.....	0.1	.....	.....	0.9	6	0.1	0.4
3.00 and over	1,345	2.4	2.4	21	0.1	0.1	183	0.9	0.9	16	0.3	0.3

RATE PER DAY (DOLLARS).	ENGINEERS.			FIREMEN.			MECHANICS.			ALL OTHER CLASSES.		
	Number.	Percentage.		Number.	Percentage.		Number.	Percentage.		Number.	Percentage.	
		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.		Of total.	Cumulative.
Total	435	100.0	.....	1,161	100.0	.....	4,241	100.0	.....	5,429	100.0	.....
Less than 1.00	.....	.....	.....	.....	.....	.....	3	0.1	100.0	33	0.6	100.0
1.00 to 1.24	.....	.....	.....	4	0.4	100.0	55	1.3	99.9	60	1.1	99.4
1.25 to 1.49	.....	.....	.....	10	0.9	99.6	96	2.3	98.6	214	3.9	98.3
1.50 to 1.74	15	3.4	100.0	99	8.5	98.7	453	10.7	96.3	1,114	20.5	94.4
1.75 to 1.99	5	1.1	96.6	346	29.8	90.2	601	14.2	85.6	709	13.1	73.9
2.00 to 2.24	42	9.7	95.5	490	42.2	60.4	828	19.5	71.4	926	17.1	60.8
2.25 to 2.49	38	8.7	85.8	157	13.5	18.2	702	16.5	51.9	688	12.7	43.7
2.50 to 2.74	63	14.5	77.1	42	3.6	4.7	764	18.0	35.4	815	15.0	31.0
2.75 to 2.99	36	8.3	62.6	1	0.1	1.1	369	8.7	17.4	363	6.7	16.0
3.00 and over	236	54.3	54.3	12	1.0	1.0	370	8.7	8.7	507	9.3	9.3

TABLE 76.—*Median rates of wages and percentage of wage-earners receiving median rates, and rates above and below median rates, on electric surface railways in cities of 100,000 population and over: 1902.*

CLASS.	Median rate (dollars).	PERCENTAGE OF WAGE-EARNERS RECEIVING—		
		Median rate.	Above median rate.	Below median rate.
All classes	2.00 to 2.04	34.2	38.1	27.7
Conductors	2.00 to 2.04	41.2	35.2	23.6
Motormen	2.00 to 2.04	39.7	41.9	18.4
Road and track men	1.50 to 1.54	43.5	48.6	7.9
Engineers	3.00 to 3.04	15.6	38.7	45.7
Firemen	2.00 to 2.04	40.6	19.8	39.6
Mechanics	2.25 to 2.29	16.0	35.9	48.1
All other classes	2.00 to 2.04	14.2	46.6	39.2

A comparison of the figures in these tables with those for the employees of all electric surface railways combined shows, as might be expected, that there was a somewhat higher range of wages in the large cities. The difference would be still greater and more striking if the wages of employees in the cities of 100,000 and more inhabitants were compared directly with the wages in smaller places. It must be borne in mind that the statistics in Tables 73 and 74 are themselves very greatly influenced by the statistics for wage-earners in cities of more than 100,000 inhabitants. The median rates for all wage-earners combined, and severally for conductors, motormen, road and track men, and miscellaneous employees, are the same for the largest cities as for the United States as a whole, though in every case a larger proportion of the wage-earners received more than the median rate in the great cities than in the entire country. For engineers, firemen, and mechanics the median was higher in cities of more than 100,000 inhabitants than for the country as a whole.

Classified wages for electric surface railways, by states.—Table 98 shows by states, for electric surface railways, the number of wage-earners of all occupations, and separately those of each important occupation, whose daily wages fall within stated 25-cent limits, together with the 5-cent group within which the median wage falls in each case. The statistics for Illinois, Maryland, Massachusetts, Missouri, and Rhode Island are seriously affected by the omission of important companies.

The highest wages were found in Montana, where the median for all classes of wage-earners on electric surface railways was $3.50 to $3.54. The only other states in which the median for all wage-earners combined exceeded $2.10 per day are California, Colorado, Oregon, and Rhode Island. In eleven of the states named in the table the median group for all employees was $2 to $2.04, and these states include several of the most im-

portant. The median for all wage-earners was below $1.50 in Alabama, Arkansas, Georgia, North Carolina, and Tennessee.

The median rate of wages for conductors, which corresponded closely with that for motormen, was $2 to $2.04 in several of the leading states. Only in California, Colorado, Illinois, Michigan, Montana, Oregon, and Rhode Island was the median above this figure. In five Southern states the median for conductors was below $1.50 per day. For road and track men several states have a median of $1.50 to $1.54. Of the states in which the wages of road and track men were comparatively high, the most important are California, Colorado, Massachusetts, Minnesota, Montana, New York, Oregon, Utah, Washington, and Wisconsin. The median for this class of wage-earners was less than $1 per day in four Southern states, where negro labor is largely employed.

Classified wages for fast interurban railways.—The following table presents classified wage statistics for leading classes of employees on fast, long interurban railways, by states:

TABLE 77.—DISTRIBUTION OF WAGE-EARNERS OF FAST, LONG INTERURBAN RAILWAYS, ACCORDING TO DAILY WAGES RECEIVED: 1902.

	Total.	Less than $1.00.	$1.00 to $1.24.	$1.25 to $1.49.	$1.50 to $1.74.	$1.75 to $1.99.	$2.00 to $2.24.	$2.25 to $2.49.	$2.50 to $2.74.	$2.75 to $2.99.	$3.00 and over.	Median rate (dollars).
All classes	6,836	8	51	666	1,567	1,354	2,491	370	178	43	108	1.90 to 1.94
Conductors	1,849	.....	16	59	239	467	990	77	.....	1	.....	2.00 to 2.04
Motormen	1,931	.....	16	97	227	490	1,007	93	.....	1	.....	2.00 to 2.04
Road and track men	1,131	.....	3	428	586	77	10	19	2	1	5	1.50 to 1.54
Engineers	190	.....	.....	1	5	13	48	20	52	12	39	2.50 to 2.54
Firemen	208	.....	1	8	92	63	39	3	.....	.....	2	1.75 to 1.79
Mechanics	535	7	4	19	128	94	161	66	31	9	16	2.00 to 2.04
All other classes	992	1	11	54	290	150	236	92	93	19	46	1.85 to 1.89
All classes by states: United States	6,836	8	51	666	1,567	1,354	2,491	370	178	43	108	1.90 to 1.94
Illinois	446	.....	.....	56	60	56	212	17	25	6	14	2.00 to 2.04
Indiana	901	2	4	162	267	248	165	27	18	1	7	1.75 to 1.79
Michigan	1,933	6	6	31	365	159	1,184	115	27	10	30	2.10 to 2.14
New York	671	.....	.....	170	139	140	128	42	27	4	21	1.75 to 1.79
Ohio	2,358	.....	35	128	667	581	707	129	70	15	26	1.90 to 1.94
All other states	527	.....	6	119	69	170	95	40	11	7	10	1.80 to 1.84
Conductors by states: United States	1,849	.....	16	59	239	467	990	77	.....	1	.....	2.00 to 2.04
Illinois	139	.....	.....	25	12	7	95	.....	.....	.....	.....	2.00 to 2.04
Indiana	197	.....	.....	.....	34	89	74	.....	.....	.....	.....	1.95 to 1.99
Michigan	583	.....	.....	.....	43	5	518	17	.....	.....	.....	2.10 to 2.14
New York	136	.....	.....	.....	25	63	30	18	.....	.....	.....	1.80 to 1.84
Ohio	683	.....	16	29	115	233	255	34	.....	1	.....	1.90 to 1.94
All other states	111	.....	.....	5	10	70	18	8	.....	.....	.....	1.80 to 1.84

It will be seen that the median wage for all employees of the fast, long interurban railways is $1.90 to $1.94, or somewhat less than the median for all classes of railways combined. The median rate for conductors and motormen on such interurban railways, however, is $2.00 to $2.04, the same as in cities of more than 100,000 inhabitants; and the general distribution of wage rates for these two classes of employees is nearly the same as in the cities of more than 100,000 inhabitants. The work of conductors and motormen on fast, long interurban railways is somewhat different in character from that of similar classes of employees in cities. On account of the high speed maintained by their cars their positions are, in some respects, more difficult and responsible. Signals and telephone dispatches directing the movements of cars must be carefully attended to. On the other hand, the freedom from crowded streets relieves the motorman, and to a less extent the conductor, on the fast interurban cars from some of the continuous strain that is felt by the city employee. Many of the employees of interurban railways live in small towns and have the benefit of the fact that the cost of living is less than in the cities. Perhaps it may be concluded that the advantages of the employees of interurban railways, as compared with those on railways in the largest cities, are about offset by the disadvantages, as is indicated by the comparative wages.

CHAPTER VII.

INTERURBAN RAILWAYS—ECONOMIC, FINANCIAL, AND SOCIAL FEATURES.

I.

GENERAL DEVELOPMENT AND EXTENT.

Difficulties of definition and classification.—The conditions of business of the typical modern interurban railway differ so greatly from those of the ordinary street railway as to require special discussion. This subject has a peculiar interest because of the fact that the interurban business is of recent development, most of the faster and longer lines having been constructed within the past five years. The changes now taking place are so rapid that the census statistics covering the year ending June 30, 1902, will soon be out of date. Many new interurban railways were indeed under construction during the census year.

As already indicated (see page 5), many of the railways combine urban with interurban characteristics and traffic in such a way as to make attempts to classify them unsatisfactory. Such railways in their returns made no distinction between their strictly urban business and their interurban and suburban business, and in every case they have necessarily been treated as a unit and classed either as urban or interurban. In making this classification, therefore, it has been necessary to adopt more or less arbitrary rules. It will be recalled that the general rule followed in this respect has been to consider as interurban any railway which has more than one-half of its trackage outside the limits of incorporated municipalities; and to consider as a "fast, long" interurban any railway more than 15 miles in length, which has two-thirds or more of its trackage outside the limits of municipalities and which operates cars at a maximum speed of 20 miles or more per hour. On the basis of these rules, various companies have been classed as interurban the urban traffic of which might perhaps be found, if the information were at hand, to exceed somewhat their interurban traffic. The railways classed as "other" interurban railways are, however, much more heterogeneous in character than the "fast, long" interurbans, though even among the latter there are several which have a considerable amount of strictly urban traffic.

On account of its extensive urban traffic the Detroit United Railways Company, which operates some of the most progressive interurban lines, has been classed necessarily with the miscellaneous group rather than with the group of typical fast interurban railways.

It would be interesting, if possible, to distinguish more specific classes among the interurban railways. For instance, a distinction might be drawn between interurban lines proper and suburban lines, between companies which do a considerable proportion of their business within the limits of cities and those which do only a small proportion within such limits; and between lines which depend largely upon seasonal traffic and those which have traffic fairly well distributed throughout the year. The different railways grade into one another so imperceptibly in these respects, however, that, in the absence of more detailed information regarding the nature of the business of each company, such classification has been deemed impracticable, and it has been found necessary to group together all interurban railways except those of the special class of fast, long lines above defined.

Statistics of trackage outside the limits of incorporated cities and towns.—Because of the necessary imperfection of the classification of interurban lines adopted in the tables and general discussion, it is worth while, in order to get another view regarding the development of interurban railways, to consider the statistics of Table 94, which shows the amount of trackage lying outside the limits of incorporated cities and towns. This distinction is also an imperfect one, for the reasons that the limits of an incorporated place are often not identical with the limits of the area of dense population, and that there are many essentially urban communities, especially in New England, which are not incorporated. In order to avoid the second of these difficulties, some of the railway companies, in reporting their statistics of trackage, adopted more or less arbitrary limits to distinguish urban from rural districts in unincorporated places. In Massachusetts, however, where so many essentially urban communities are not politically separated from the unincorporated towns in which they lie, a large proportion of the companies were unable to make a satisfactory classification of their trackage, and the statistics of urban and nonurban trackage for the entire state have therefore been omitted in making up the totals for the country.

Despite these qualifications, however, the statistics of trackage lying outside the limits of incorporated places or other essentially urban communities, as shown in Table 94, undoubtedly show fairly well the amount of track which is extraurban, and thus throw an interest-

ing light on the extent to which suburban and interurban railways have been developed. Out of a total trackage of 20,063.82 miles exclusive of Massachusetts, 6,855.58 miles, or 34 per cent, were reported as lying outside municipal limits or the limits of urban communities as determined by certain companies. This item obviously has no direct relation to that of the total trackage of those railway companies which the Bureau of the Census has classed as interurban, although it so happens that the two are nearly the same.

An approximate indication as to the relative extent of interurban railways in the several states may also be gained from the figures for trackage without municipal limits in Table 94. For the reason just indicated, the returns from the New England states are less exact than those from the other parts of the country.

The states which have the largest amount of electric railway mileage outside of municipal limits are Connecticut, with 338.83 miles, or about three-fifths of the total trackage in this state;[1] Indiana, with 278.34 miles, or 43 per cent of the total trackage; Maine, with approximately 200 miles, or about three-fifths of the total; Massachusetts, with probably two-thirds of the total of 2,525.65 miles extraurban (exact figures not available); Michigan, with 558.62 miles, or 54.6 per cent; New Hampshire, with 85.99 miles, or 51.3 per cent; Ohio, with 1,278.55 miles, or 54.3 per cent; Pennsylvania, with 1,113.54 miles, or 44.9 per cent; and Virginia, with 197.89 miles, or 55.1 per cent. New York and Illinois have also large absolute amounts of electric railway trackage outside of municipal limits, but their urban railways are so extensive that the proportion of the total trackage which lies outside of municipal limits is comparatively small.

Leading centers of interurban railway development.—The conditions which favor the development of interurban railways may be considered from the standpoint of amount of traffic and from that of cost of service. From the standpoint of traffic the favoring conditions are (1) a comparatively dense population, arising from many and populous towns and villages; (2) connection with a large city, which attracts travel from the smaller towns and rural districts, and from which also summer traffic may be carried to resorts and rural districts; (3) general material prosperity and intelligence. From the standpoint of cost the important consideration is that the territory to be served shall be comparatively level, and otherwise free from physical obstacles to economical construction and operation.

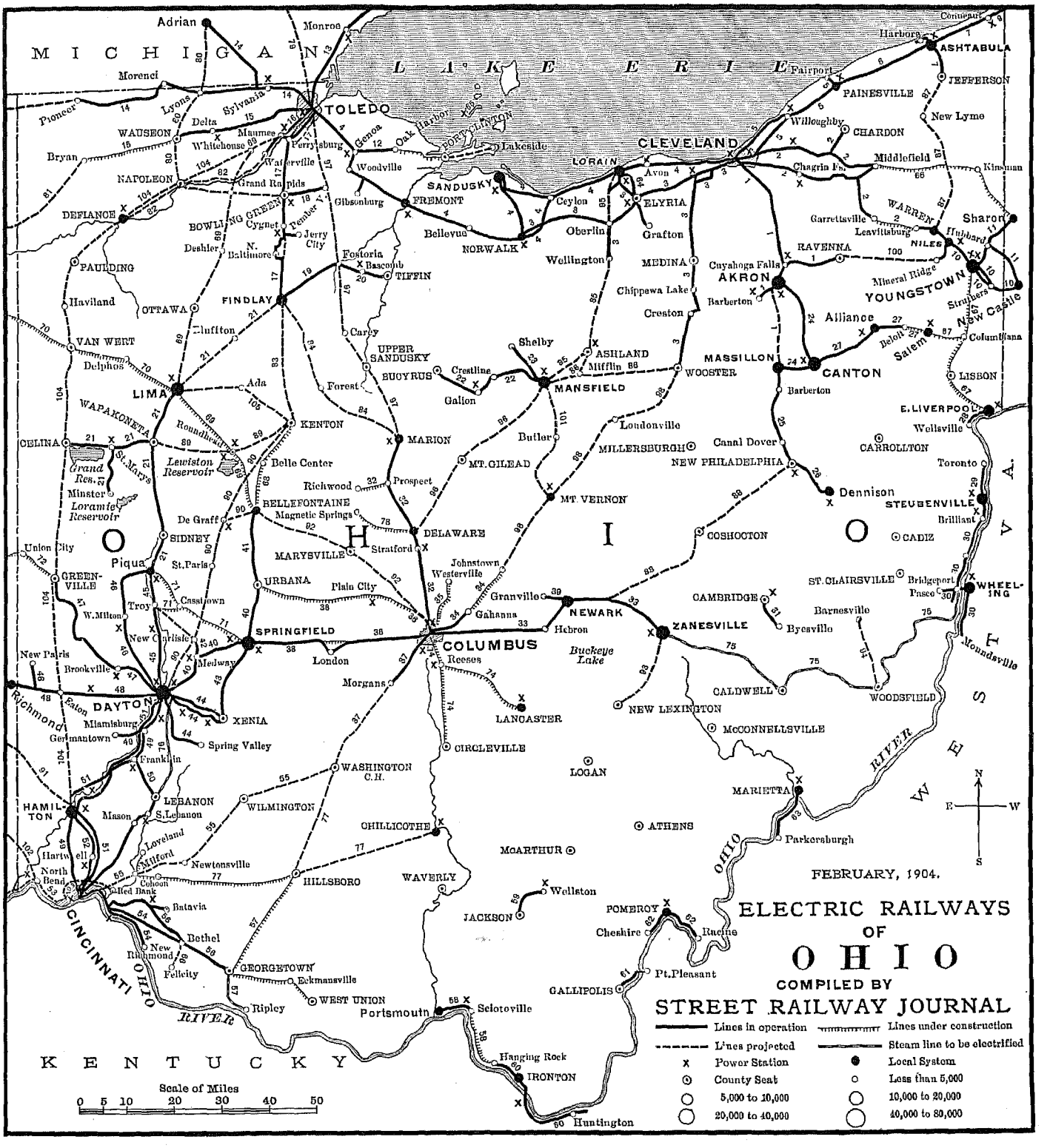
It will be found by detailed study of the existing interurban railways that in sections where they are most conspicuously developed several or all of these conditions are present.

In proportion to its area, Massachusetts has much more electric railway mileage than any other state. The 2,525.65 miles of electric road in that state represent on an average about one-third of a mile of track for each square mile of area. Except for the Boston system, nearly all the railway companies in this state are classed as interurban, according to the rules adopted by the Bureau of the Census; although several of those which are so classed, because more than half of their trackage lies in essentially rural districts, probably carry more than half of their passengers within urban communities. The cities of Massachusetts lie so near together that it was a natural process for the street railways already existing in them to reach out and become united, and then to extend to the many prosperous villages in the vicinity. The agricultural population of Massachusetts, however, is comparatively sparse and has not contributed materially to the patronage of the electric railways. It is now possible to traverse the whole length and breadth of this state on trolley cars or to go from any important town to almost any other in this way. The cars operated on the interurban lines in Massachusetts are for the most part similar in size, motive power, and speed to those used in the cities. Table 97 shows that a large majority of the interurban companies of the state reported a maximum speed outside municipal limits of not more than 15 miles per hour. There is, however, an increasing tendency in Massachusetts, as elsewhere, toward the adoption of improved methods of interurban service, and several companies now operate cars which attain a maximum speed of from 25 to 35 miles per hour.

What is true of the interurban railways in Massachusetts is largely true also of those in Connecticut and Rhode Island, and of those in the more densely populated parts of New Hampshire and Maine, particularly along the coast where summer traffic is an important element. Pennsylvania is another state in which there has been extensive interurban development, but in which many railways show no sharp distinction between urban and interurban business. The rich agricultural and manufacturing regions in the east and southeast, the anthracite mining regions in the northeast, and the densely populated valleys of the western part of the state are the chief centers of interurban railway development. A few of the lines in Pennsylvania are equipped for heavy traffic at high speed. In New York interurban electric railways are found chiefly in the upper Hudson valley, in the Mohawk valley, and in the vicinity of Buffalo. High-speed electric cars now operate from Hudson to Albany, and from Albany north through Saratoga and Glens Falls to Warrensburg, a total distance of nearly 150 miles. Plans are on foot, which will probably soon be realized, to connect the existing interurban lines running out from the large cities in the middle of this state into a chain reaching from Albany to Buffalo.

The Central states, Ohio, Michigan, Indiana, and Illinois, possess the most extensive and efficient high-

[1] The Connecticut figures, however, are not exact, as several companies failed to make the distinction.


ELECTRIC RAILWAYS OF OHIO
COMPILED BY
STREET RAILWAY JOURNAL
FEBRUARY, 1904.
Lines in operation
Lines under construction
Lines projected
Steam line to be electrified
Power Station
Local System
County Seat
Less than 5,000
5,000 to 10,000
10,000 to 20,000
20,000 to 40,000
40,000 to 80,000
Scale of Miles
0 5 10 20 30 40 50
MICHIGAN
LAKE ERIE
INDIANA
KENTUCKY
WEST VIRGINIA
OHIO RIVER
CINCINNATI
TOLEDO
CLEVELAND
COLUMBUS
DAYTON
SPRINGFIELD
ZANESVILLE
NEWARK
MANSFIELD
LIMA
FINDLAY
SANDUSKY
FREMONT
NORWALK
ELYRIA
LORAIN
AKRON
YOUNGSTOWN
CANTON
MASSILLON
ASHTABULA
WHEELING
STEUBENVILLE
MARIETTA
CHILLICOTHE
HAMILTON
XENIA
MARION
KENTON
ASHLAND
WOOSTER
MT. VERNON
COSHOCTON
LANCASTER
CIRCLEVILLE
PORTSMOUTH
IRONTON
Huntington
Adrian
Monroe
Toledo
Lakeside
Genoa
Oak Harbor
Port Clinton
Perrysburg
Waterville
Grand Rapids
Whitehouse
Maumee
Delta
Sylvania
Lyons
Pioneer
Morenci
Bryan
Wauseon
Napoleon
Defiance
Bowling Green
Cygnet
Tenmile
Jerry City
Deshler
N. Baltimore
Gibsonburg
Woodville
Fostoria
Bascomb
Tiffin
Bellevue
Ceylon
Oberlin
Grafton
Wellington
Avon
Willoughby
Chardon
Chagrin Fs.
Middlefield
Kinsman
Fairport
Painesville
New Lyme
Jefferson
Conneaut
Harborc
Garrettsville
Leavittsburg
Hubbard
Sharon
Niles
Ravenna
Cuyahoga Falls
Mineral Ridge
Strubers
New Castle
Columbiana
Alliance
Beloit
Salem
Lisbon
E. Liverpool
Wellsville
Carrollton
Toronto
Dennison
Brilliant
Cadiz
St. Clairsville
Bridgeport
Pasco
Barnesville
Byesville
Woodsfield
Moundsville
Caldwell
Cambridge
Coshocton
Mt. Gilead
Millersburg
New Philadelphia
Canal Dover
Barberton
Medina
Chippewa Lake
Creston
Loudonville
Mansfield
Shelby
Mifflin
Crestline
Galion
Bucyrus
Upper Sandusky
Carey
Forest
Ada
Roundhead
Lewiston Reservoir
Grand Res.
St. Marys
Minster
Loramie Reservoir
Celina
Van Wert
Delphos
Ottawa
Haviland
Paulding
Belle Center
Richwood
Prospect
Bellefontaine
Magnetic Springs
De Graff
Sidney
Piqua
St. Paris
Union City
Greenville
Troy
Casstown
W. Milton
New Carlisle
Medway
New Paris
Brookville
Eaton
Richmond
Miamisburg
Germantown
Franklin
Spring Valley
Urbana
Plain City
Marysville
Stratford
Delaware
Johnstown
Westerville
Granville
Gahanna
Hebron
Buckeye Lake
Reeses
London
Morgans
Lancaster
New Lexington
McConnellsville
Logan
Athens
Parkersburg
Wellston
Jackson
Pomeroy
Cheshire
Racine
Pt. Pleasant
Gallipolis
Sciotoville
Hanging Rock
Ripley
Eckmansville
West Union
Georgetown
Felicity
New Richmond
Bethel
Batavia
Red Bank
Cohoon
Milford
Loveland
Newtonsville
Hillsboro
Wilmington
Washington C.H.
Waverly
McArthur
Mason
S. Lebanon
Lebanon
Hartwell
North Bend

speed interurban railways in the country, and illustrate most clearly the future possibilities of this method of transportation. Here coexist all the circumstances already mentioned which contribute to favor the development of such railways. In these states a clear distinction usually appears between urban and interurban lines, and, as a rule, the two classes of railways are controlled by different corporations. The fast interurban railways of these states are tending more and more to compete with steam railways for passenger traffic, even for rides of considerable length. The electric lines have been and are still being constructed with a view to ultimate combination into extensive systems. While the links have usually been built only where the local business itself was expected to prove profitable, the possibilities of through service have always been kept in mind. Already, in several places, the meeting of such shorter electric lines has made it possible to take long journeys by electric cars, in some cases without the necessity of change. Combination of detached lines into systems is being found, as was the case with steam railways, to bring many advantages to the public in the way of through cars and well-adjusted schedules, as well as to the owners in the way of economical operation.

By the courtesy of the Street Railway Journal, a map showing the electric railways of Ohio—as completed, under construction, and projected—is here presented.

The southern shore of Lake Erie is skirted by electric lines from the northeast corner of Ohio to Toledo, and a line which was under construction during the census year now connects Toledo with Detroit. The system from Cleveland to Toledo, which is now controlled by the consolidated Lake Shore Electric Railway Company, has 155 miles of main track. From Cleveland several other important electric railways radiate to the southeast, south, and southwest for distances of 50 miles or more, and it is expected that these lines will soon be extended to Pittsburg and Columbus. A group of four connecting trolley roads reaches from Toledo, through Findlay, Lima, Dayton, and Hamilton, to Cincinnati. The two longest links of this chain are controlled by a single syndicate, and it is probably only a question of time when the others will fall into the same hands.

Another important group of railways controlled by a single syndicate extends from Columbus to Springfield and Dayton, and is expected soon to reach Cincinnati, and, by connections with other roads, Toledo also. A steam railway between Wheeling, W. Va., and Zanesville, Ohio, is now being equipped for electric operation, and when this is completed a chain of electric railways will extend from Wheeling, W. Va., through Columbus and Dayton, to Indianapolis, a distance of about 365 miles.

The railways radiating from Detroit are likewise extensive and highly efficient in organization and operation. One line reaches west to Jackson, another northwest to Flint, and a third extends northeast to Port Huron, skirting Lake St. Clair. Each of these lines is more than 75 miles long, and with their interlacing branches they make an elaborate system. Another railway west from Jackson was opened in 1903, and this connects at Battle Creek with a line reaching nearly across the state. Probably within a short time connections will be made with Grand Rapids and with the two systems which extend from there to Lake Michigan.

Indiana rivals Ohio in the extent of its interurban railways. The map herewith presented, also prepared by the Street Railway Journal, shows the lines that were open, under construction, and projected at the close of 1903.

It will be seen that no less than nine interurban lines radiate from Indianapolis, and that three others are under construction. Some of these lines run 75 miles or more. Perhaps the most extensive interurban railway system in the country is that of the Union Traction Company, which extends northeast from Indianapolis to Muncie and Marion and north to Kokomo and Logansport. Additional lines connecting the present systems by direct routes with Chicago, Toledo, Cincinnati, and St. Louis are projected.

Several important electric railways also radiate from Chicago. One of these, the Aurora, Elgin and Chicago, which uses the third-rail system, is conspicuous for its heavy construction and its high speeds. Considerable progress has also been made in the construction of fast, long electric railways in eastern Wisconsin, in parts of Iowa, in eastern Missouri in the vicinity of St. Louis, in the neighborhood of Los Angeles, Cal., and elsewhere.

II.

TRAFFIC AND EARNINGS OF INTERURBAN RAILWAYS.

Because of differences in the length of journeys on the longer interurban railways, there is much less significance in the statistics of the number of passengers carried and the relation of that number to trackage and car mileage than in the case of urban railways. Few, if any, interurban railways have as yet adopted the practice of steam railways in recording the distances traveled by passengers. The results of operation of fast, long interurban lines can, therefore, be satisfactorily studied only through financial data. Financial statistics can not be presented for companies by name. However, averages or totals for states or for the country as a whole, such as have been presented in the tables of Part I, Chapter V, correspond so little with the actual conditions on many individual railways that it has been considered desirable to present certain financial data for specific companies, omitting the names and other means of identification. Table 78 includes 53 of the fast, long interurban lines that reported financial data. The companies with commercial lighting, and those in operation only part of the census year, are distinguished

from the other companies. It should be noted that two or three companies of the larger group did not have all of their trackage in operation during the whole of the census year, but inasmuch as the companies themselves were in operation during the entire year, they have been included in the group of full-time lines. The table shows, per mile of track, the total operating earnings, earnings from strictly railway business (i. e., from passengers, chartered cars, freight, mail, and express), passenger earnings, and combined freight, mail, and express earnings, all of these ratios being based on the total trackage operated, including that under trackage rights. Earnings from the sale of current for light and power, or from miscellaneous sources, do not appear as a separate item, but are equal to the difference between the first column and the second. The table presents likewise the total railway earnings per mile run by cars of all classes, and the total passenger earnings per passenger-car mile. It is impracticable to present the statistics of earnings from freight, mail, and express business per mile operated by cars devoted exclusively to this business, because of the character of the reports on this point, and because of the frequent practice of handling such traffic in passenger cars. Finally, the table indicates the total amount of operating expenses per car mile for all classes of cars, and the ratio of total operating expenses to total operating earnings.

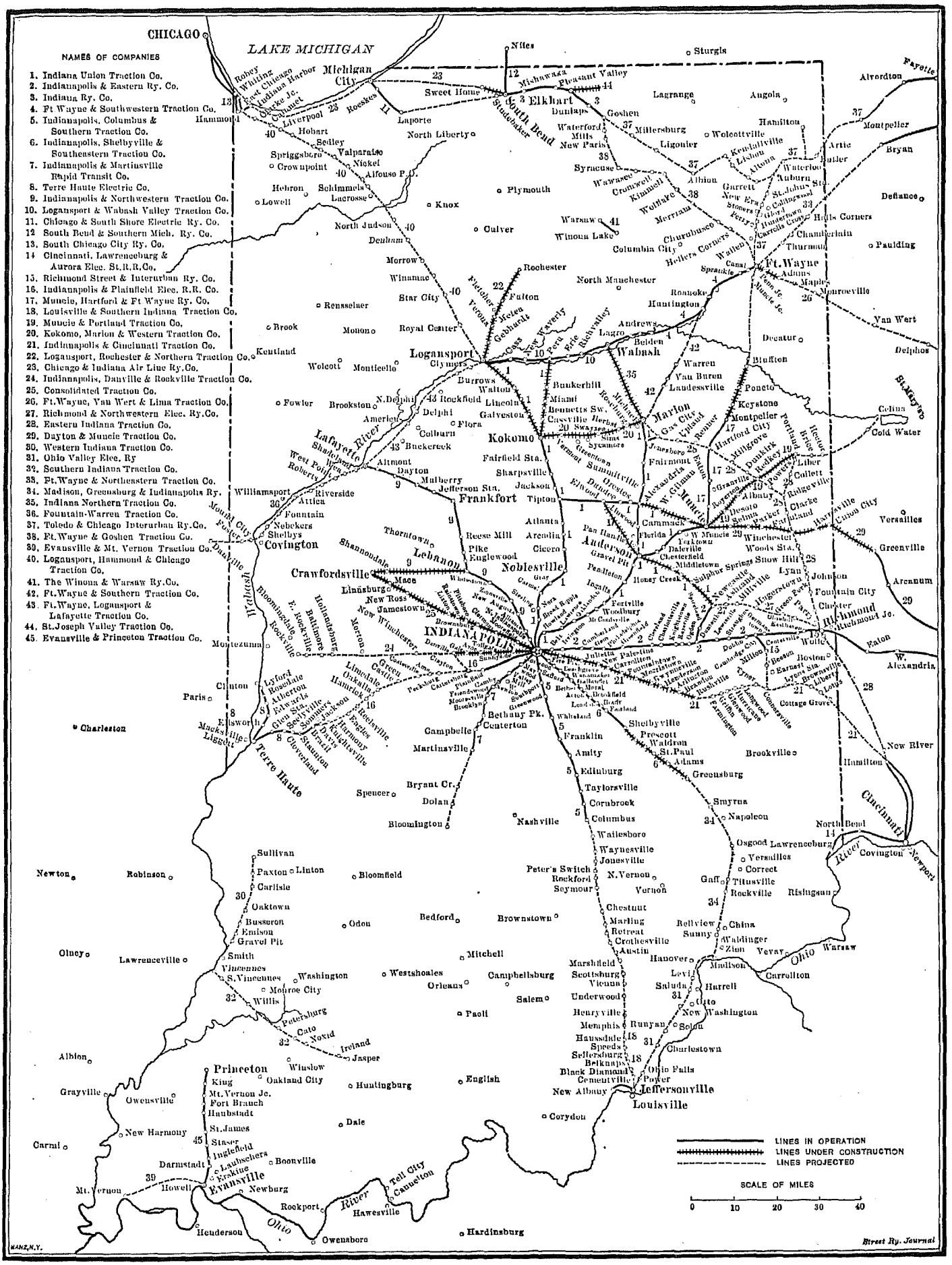
TABLE 78.—GENERAL RESULTS OF OPERATION OF 53 FAST, LONG INTERURBAN RAILWAY COMPANIES: 1902.

CLASS.	EARNINGS PER MILE OF TRACK.				Railway earnings proper per car mile.	Passenger earnings per passenger car mile.	Operating expenses per car mile.	Percentage of operating expenses to operating earnings.
	Total	From railway operation proper.						
		Total.	From passengers.	From freight, mail, and express.				
Full-time railways without commercial lighting:								
Average for all companies...	$3,308	$3,217	$3,032	$185	$0.201	$0.197	$0.124	59.9
Individual companies...	4,153	4,060	3,968	92	.159	.155	.069	42.4
	3,566	3,542	3,537	5	.165	.165	.095	57.2
	4,148	4,138	4,037	101	.205	.207	.125	61.2
	3,091	3,091	2,848	243	.237	.235	.146	61.7
	5,582	5,541	5,393	148	.203	.202	.147	72.1
	5,754	5,680	5,580	100	.220	.220	.119	53.5
	1,589	1,480	1,480	.....	.084	.084	.092	103.1
	3,052	2,895	2,892	3	.182	.185	.133	69.3
	3,955	3,936	3,764	172	.189	.181	.094	49.5
	3,054	3,030	2,575	455	.223	.197	.125	55.7
	3,495	3,434	3,151	283	.197	.193	.098	48.5
	2,069	2,069	1,870	199	.166	.179	.121	73.2
	3,412	3,410	3,149	261	.235	.236	.179	76.3
	2,664	2,379	2,354	25	.193	.209	.137	63.5
	2,265	2,264	1,959	305	.273	.262	.202	74.0
	3,815	3,730	3,711	19	.202	.201	.176	85.0
	2,371	2,367	2,294	73	.242	.234	.127	52.3
	676	658	658	.....	.144	.144	.127	85.5
	5,405	3,363	3,357	6	.113	.113	.109	60.0
	5,384	5,324	5,250	74	.192	.196	.100	51.7
	2,872	2,872	2,872	.....	.180	.180	.080	44.4
	3,258	3,207	3,037	170	.207	.206	.120	56.9
	1,842	1,826	1,183	643	.267	.173	.181	66.9
	4,624	4,373	4,111	262	.243	.228	.144	56.0
	1,357	1,357	1,357	.....	.403	.424	.268	66.5
	3,498	3,498	3,261	237	(1)	(1)	(1)	56.1
	2,275	2,265	2,152	113	.141	.142	.080	56.8
	1,743	1,743	1,697	46	.190	.185	.201	105.7
	3,799	3,754	3,677	77	.233	.229	.092	39.1
	1,383	1,358	892	466	.239	.208	.148	61.0
	2,409	2,351	2,199	152	.176	.174	.118	65.3
	2,854	2,827	2,814	13	.171	.199	.132	76.3
Full-time railways without commercial lighting—Continued.								
Average for all companies ..	$5,903	$5,815	$5,766	$49	$0.275	$0.275	$0.186	66.5
Individual companies ..	6,608	6,581	6,352	229	.249	.243	.127	51.3
	4,125	4,089	3,513	576	.289	.280	.138	47.4
	5,649	5,460	5,408	52	.208	.207	.121	56.4
	1,625	1,508	1,504	4	.133	.133	.168	116.7
	2,221	2,131	1,739	392	.280	.229	.198	68.1
	1,937	1,900	1,790	110	.238	.224	.145	60.0
	1,968	1,937	1,937	.....	.120	.120	.091	74.7
Full-time railways with commercial lighting:								
Average for all companies...	5,815	4,572	4,416	156	.206	.203	.153	58.4
Individual companies...	6,060	5,176	5,142	34	.189	.188	.123	55.5
	4,752	3,673	2,778	895	.242	.201	.246	74.1
	9,900	6,828	6,753	75	.259	.261	.261	69.6
	5,463	4,689	4,581	108	.178	.180	.100	48.3
	3,827	2,692	2,681	11	.257	.256	.197	54.1
Part-time railways:								
Average for all companies...	2,016	1,936	1,864	72	.212	.218	.137	61.9
Individual companies...	4,032	3,881	3,838	43	.214	.217	.139	62.6
	2,084	2,024	1,989	35	.203	.199	.115	55.3
	1,207	1,204	1,157	47	.190	.210	.111	58.4
	914	912	902	10	.295	.292	.286	96.7
	1,931	1,921	1,757	164	.160	.161	.101	63.1
	935	735	735	.....	.235	.235	.197	66.0
	1,257	1,204	1,204	.....	.281	.281	.097	33.2
	2,731	2,557	2,365	192	.265	.245	.195	68.7

[1] Car mileage not reported.

Earnings per mile of track.—Confining attention to full-time companies without commercial lighting plants, the average earnings from all sources per mile of track for all companies are $3,308, of which $3,032 is derived from passengers and $185 from freight, mail, and express. Of the 40 companies in this class 9 earn less than $2,000 per mile of track. At least 6 of these, however, did not have all their trackage in operation throughout the whole census year. Nine companies earned from $2,000 to $3,000 per mile of track; 11, the largest group, from $3,000 to $4,000; 4 from $4,000 to $5,000; and 7 more than $5,000 per mile. While some of the companies with high earnings per mile of track derived a considerable part of their revenue from passengers carried within the limits of cities, others that earned $4,000 or more per mile derived much the greater part of their earnings from strictly interurban business.

Nearly all of the earnings of the first group of railways shown in the table are from strictly railway business. The 5 companies that operate lighting plants, the second group in the table, have a considerable revenue from that branch of the business, but their railway earnings proper are larger per mile of



ELECTRIC RAILWAYS OF INDIANA.

track than those of most of the companies without lighting plants. Two or three of the 5 companies do an important urban as well as interurban business. The earnings per mile of track of companies operating during only part of the year vary greatly because of the difference in the length of time that they were operated.

The freight, mail, and express business of the interurban railways shows such widely differing stages of development that an average for all companies is not significant. Eight of the 53 companies shown in the table have earnings from these sources equal to more than one-tenth of their earnings from passengers, and of these 8 companies 3 have freight, mail, and express earnings equal to more than one-third of their revenue from passengers. All of the 4 companies in Michigan operating the entire year do an important freight and express business, and the same is true of the interurban lines of the Detroit United Railway Company, which is not included in the table. Among other companies whose freight and express business is important may be mentioned the Indianapolis and Eastern Railway Company, the Eastern Ohio Traction Company (Cleveland to Garrettsville, etc.), the Cleveland, Painesville and Eastern Railroad Company, the Dayton, Springfield and Urbana Electric Railway Company, the Toledo and Western Railway Company (Toledo to Adrian, Mich.), the Mahoning Valley Railway Company (Youngstown, Ohio, to Newcastle, Pa.), the Los Angeles Pacific Railroad Company, the Erie Traction Company (Erie to Cambridge Springs, Pa.), and the Albany and Hudson Railway and Power Company.

Earnings per car mile.—The ratio of earnings to car mileage on interurban railways is much more nearly uniform than the ratio of earnings to trackage. Moreover, this figure furnishes a basis for comparison of the financial operations of part-time and full-time roads which the ratio of earnings to trackage did not permit. The total railway earnings of the three groups of interurban companies in Table 78 are equal to 20.6 cents per car mile and the passenger earnings are equal to 20.3 cents per car mile. No great difference appears in these ratios as among the three groups of companies. Of the 52 companies for which car mileage was reported, 6 have railway earnings of less than 15 cents per car mile, 16 have earnings of from 15 to 20 cents, 19 from 20 to 25 cents, 10 from 25 to 30 cents, and 1 more than 40 cents per car mile.

Operating expenses.—The operating expenses per car mile for full-time interurban railways without commercial lighting average 12.4 cents, and those for companies operating only part of the year, most of which do not furnish commercial lighting, 13.7 cents. Some of the companies report remarkably low ratios of operating expenses, 10 showing less than 10 cents per car mile. Only 9 of the full-time companies without commercial lighting have operating expenses exceeding 15 cents per car mile, and several of these cases are easily explained by temporary or exceptional causes. The total operating expenses of companies which do an extensive lighting business are naturally relatively high per car mile.

The average ratio of operating expenses to operating earnings for the 53 fast, long interurban railways in Table 78 is 59.8 per cent. For full-time companies without commercial lighting the ratio of expenses to earnings is 59.9 per cent. Much the greater proportion of the companies have operating ratios between 50 and 70 per cent, but 8 report a ratio of less than 50 per cent and 13 a ratio exceeding 70 per cent. The financial results of interurban railway business must be considered on the whole very satisfactory.

Growth of traffic.—Several interurban companies, in response to the request of the Bureau of the Census for additional information, presented statistical comparisons showing the growth of their earnings. None of the companies has been in operation more than a few years, but in several instances a marked increase of earnings has taken place within that time. Thus the Eastern Ohio Traction Company states that its passenger earnings were 24 per cent greater in 1902 than in 1901. The Detroit, Ypsilanti, Ann Arbor and Jackson Railway in 1901 had, with the same trackage, about 20 per cent more passenger earnings in 1901 than in 1898. Much more remarkable has been the growth of freight traffic on some of the lines. The report of the railway last mentioned shows that freight earnings are increasing by from 20 to 30 per cent each year. The Schenectady Railway (Schenectady to Albany, N. Y.), during the twelve months from July 1, 1902, to June 30, 1903, earned about three and one-half times as much from freight and express as during the six months immediately preceding.

Relation between earnings and population served by fast, long interurban railways.—Much interest attaches to the question of the relation between the amount of earnings on interurban railways and the population served. Only rough approximations can be made on this subject. Conditions peculiar to each railway make it impossible to draw from its experiences definite conclusions that can be regarded as typical. The greatest difficulty is found in determining the extent of the population which is to be considered as tributary to a given railway.

For example, where an interurban railway connects a group of small towns with a large city, the resident population of the small towns usually furnishes much more traffic in the aggregate than the resident population of the city, although the inhabitants of the city may greatly outnumber those of all the other towns. The latter contributes some traffic, but it would be obviously improper to combine the population of the large city with that of the small towns in calculating the per capita traffic. Where two large cities are connected by an electric railway, which also serves inter-

mediate towns, the traffic furnished by the cities is likely to be somewhat greater than where only a single city is served. The amount of traffic will depend largely upon the distance between the two cities and the comparative speed and charges of the electric and steam service. But even where two cities are connected in this manner it would likewise be improper to count the population of the cities in the same way as that of the smaller towns in determining the relation of traffic to population. In other cases interurban railways connect only towns of medium or small size. There is ordinarily less to attract travel on such a railway, and the ratio between earnings and population served may be expected to be lower than the ratio in the case of railways connecting with large cities.

It is quite impossible from the available statistics of population to determine the number of the inhabitants of rural communities who can be considered as tributary to an interurban railway. Ordinarily the township, which is the unit for reporting the population, is of such large area that only a small portion of its inhabitants have access to a railway running through it. In some cases, to be sure, interurban lines draw a considerable proportion of their traffic from the farming class. Usually, however, much the greater part of the traffic is furnished by the inhabitants of towns.

Table 79 shows the relation between operating earnings and population for 16 selected fast, long interurban railways. The population is that of the census of 1900, while the operating earnings are for the census year 1902. The population taken as a basis in each case includes only incorporated places, and does not include large cities serving as termini, which are for convenience designated as "city termini." Of the railways under consideration 8 are in Ohio, 5 in Michigan, and 1 each in Indiana, Illinois, and Missouri.

TABLE 79.—*Relation of trackage and operating earnings to population served in the case of selected fast, long interurban railways: 1902.*

NUMBER OF COMPANY.	Population of incorporated places, not including city termini, per mile of track operated.	Annual operating earnings per inhabitant served.	NUMBER OF COMPANY.	Population of incorporated places, not including city termini, per mile of track operated.	Annual operating earnings per inhabitant served.
1	493	$6.61	9	816	$4.29
2	259	[1]11.80	10	181	9.66
3	558	6.39	11	350	6.89
4	278	14.20	12	557	9.66
5	494	[2]7.74	13	1,009	3.98
6	570	6.13	14	1,618	3.49
7	230	14.83	15	2,044	2.89
8	270	3.96	16	696	1.73

[1] Freight earnings more than one-seventh of total.
[2] Operates a lighting plant.

The first 10 railways referred to in the table all connect towns of small or medium size with a single large city, Dayton, Ohio, with a population of 85,333, being the smallest "city terminus" in the group. Number 1 serves 8 towns of between 1,000 and 20,000 inhabitants, with a total population of nearly 40,000. The largest town served has also another important interurban railway connection. Number 2 serves 5 small towns and 1 of about 20,000 inhabitants, situated at one end of the line. The total population of these towns is between 30,000 and 40,000. Number 3 connects 1 large town and 4 towns of less than 3,000 inhabitants each with a city, the total population of the 5 towns being about 35,000. Number 4 connects 4 small towns with a large city, the aggregate population of these towns being less than 8,000. Presumably, a considerable amount of traffic is in this last case furnished by rural communities, while some may possibly come from beyond the terminus of the railway. Number 5 has as one of its termini a town of more than 15,000 people, and serves 4 intermediate places of smaller size, the total population of these 5 towns being between 25,000 and 30,000. Number 6 serves 3 towns of considerable size and 5 smaller towns, their combined population being more than 50,000. The town population directly served by number 7 is very small, and it probably carries a considerable number of passengers to a connection with the steam railroad at its terminus. Number 8 connects 3 small towns with a large city. Number 9 serves 1 city of more than 30,000 people and 2 or 3 smaller towns, the total population served being more than 40,000; the larger town mentioned has also electric railway connections in other directions. Number 10 serves less than 10,000 people directly, these being mostly confined to the town at its terminus. Presumably, a considerable amount of traffic is due to steam railroad connections.

Numbers 11 and 12 each connect 2 large cities at considerable distances from one another. Probably, however, much the greater part of the traffic is furnished by the intermediate towns, which, in the one case have an aggregate population of more than 40,000 and in the other case of more than 60,000.

Numbers 13, 14, and 15 do not reach large cities, but in each case have as their termini medium-sized towns with population ranging from 10,000 to 45,000. They are all lines of considerable length and serve 2 or more minor towns in addition to their termini. Number 16 connects 4 towns of between 5,000 and 25,000 population, and also serves several smaller places. It will be observed that, as might be expected, the ratio of traffic to population is lower in the case of the last 4 railways than in most of the other cases. The "city terminus" has a strong tendency to attract travel on the part of the inhabitants of the neighboring smaller towns.

Most of the railways covered by Table 79 are highly prosperous. More than half of them report a ratio of operating expenses to earnings below 60 per cent, and only 3 have a ratio exceeding 75 per cent.

III.

CHARACTERISTICS AND SIGNIFICANCE OF INTERURBAN SERVICE.

In discussing the broader questions regarding the social and economic significance of interurban railway traffic, it is difficult to avoid entrance into the domain of prophecy. Some of the electric railways have already made such progress in methods that certain prophets look forward to the complete superseding of steam traction by electric traction. However this may be, it is evident that, even if the electric railways confine themselves to the methods already widely prevalent, they are bound to become a social and economic factor of enormous importance. Remarkable benefits have already been realized from the existing interurban lines, and the extension of such railways to a large proportion of our more prosperous communities seems but a matter of a short time.

As a means of studying more specifically the nature of the traffic of modern fast interurban railways, the Bureau of the Census addressed a special schedule of inquiries to a number of typical lines, most, but not all, of which are of the class designated as fast, long lines. Below is presented a tabulation, for individual companies, of the replies received, so far as they relate to traffic. Several of the railways enumerated are thoroughly typical modern interurban railways. The blanks represent in most cases inability or failure of the company to furnish the desired information.

Traffic of selected

[Prepared from replies to a

	STATE.	Name of railway.	Length of track (miles).	AVERAGE SPEED OF CARS IN MILES PER HOUR. Entire trip.	Outside of town limits.	Frequency of passenger cars on main lines.	Estimated average distance traveled by each passenger, in miles.	Estimated average fare per mile (cents).
1	New York	Schenectady Railway Company	36.12	15 to 16	20	1 hour		
2	Pennsylvania	Lehigh Traction Company	20.09	12		30 minutes		
3		Wilkesbarre and Hazelton Railroad Company	28.00	30		1 hour		2.25
4	Ohio	Youngstown-Sharon Railway and Light Company	42.25	16 to 20	20 to 25	30 minutes and 1 hour.		0.8-1.04
5		Stark Electric Railroad Company	26.97	23		1 hour		
6		Western Ohio Railway Company	77.97	20		1 hour		
7		Cincinnati, Dayton and Toledo Traction Company	78.35			30 minutes		
8		Columbus, Buckeye Lake and Newark Traction Company	43.50			1 hour	16	1.4
9		Eastern Ohio Traction Company	90.00	20		1 hour	10	2
10		Dayton and Xenia Transit Company	50.12	16		45 minutes		1.33
11	Michigan	Detroit, Ypsilanti, Ann Arbor and Jackson Railway	91.42	20		30 minutes and 1 hour.	13	1.125
12		Detroit, Monroe and Toledo Railway Company (Toledo and Monroe).	29.92	21		1 hour		
13	Indiana	Indianapolis, Columbus and Southern Railroad Company (Indianapolis, Greenwood and Franklin).	19.00	18	22	1 hour	11	1.4
14		Richmond Street and Interurban Railway Company	30.50	18 to 24		1 hour		1.5
15		Indianapolis and Eastern Railway Company	18.04	20		1 hour		
16	Illinois	Peoria and Pekin Terminal Railway Company	8.68	15		20 to 30 minutes	5	
17		Chicago and Joliet Electric Railway Company	62.89	20		30 minutes and 1 hour.		1.5
18	Iowa	Waterloo and Cedar Falls Rapid Transit Company	40.00	12 to 20		1 hour		

[1] Included in preceding.

[2] Summer resort increases travel 50 per cent during the season.

interurban railways.

special schedule of inquiries.]

Estimated proportion of passengers who are carried—			Percentage of total steam and electric traffic carried by electric lines.	Effect on local business of steam railways.	Proportion of earnings from freight, mail, and express to total revenue, approximate (percentage).	Character of freight and express carried.	Remarks regarding freight and express.	
Wholly within towns (percentage).	Between towns (percentage).	Between town and country (percentage).						
75	25	(1)	95	Decreased 80 per cent; fares unchanged.	4.5	Groceries and provisions, small farm products, dry goods.	Will handle greater part of high-class goods ultimately.	1
Few.	Nearly all.	Few.	99	Practically all taken away; trains taken off.	1	Packages	Mining region	2
	97.5	2.5	80 to 90	Reduced greatly; trains taken off.				3
10	75	15		Round-trip fares reduced		Just beginning	Is creating much new business; expects much express.	4
	Nearly all.		75 to 90	Local business reduced, but long-distance travel created.		Undeveloped		5
0.5	94.5	5	Much greater part	Reduced slightly		Fruits, produce, groceries	98 per cent is between towns	6
30	65	5		Little effect		Mostly merchandise in packages.	Express handled by separate company; heavy freight not sought.	7
	[2]85	15	90	Much reduced	6	Express		8
				No direct competition	25	General	Handles cars from steam roads	9
			95			Groceries, beer, fruits, merchandise.		10
15	75	10	65	Little reduction	9	Farm produce, groceries, dry goods, light merchandise.		11
					8			12
3	77	20	98	Reduced		Milk; beginning only		13
40	40	20	Practically all					14
								15
5	90	5	80	Steam fares reduced one-half			Handled by steam locomotives.	16
20	70	10	60, of through business.	Affected smaller stations only		Produce, groceries, milk, beer.		17
30	60	10	95	No effect	25	General; rapidly growing	Interchange with steam roads; uses steam in part.	18

The electric interurban railways possess, in contrast with steam railroads, several peculiar characteristics which directly affect their methods of operation, and these in turn determine the amount and character of their traffic.

Small units and frequent service.—The greatest difference between the electric and the steam railway lies in the fact that the former operates cars each of which has its own motors, supplied with energy from a single distant source, while the cars of the latter are moved by a separate locomotive which generates its own power. The economy of large scale power production is secured by the electric railway through the construction of a central station. It is, therefore, practically as cheap to run electric cars separately as to run them in trains. On the other hand, the cost of operating a steam railway is greatly reduced by increasing the size of engines and the length of trains. Steam operation, therefore, tends to infrequent service, while electric operation lends itself to frequent service.

The preceding tabular presentation of replies shows that in the Middle West, where the interurban railways usually connect rather small and quite widely separated towns with one another or with larger cities, the passenger cars run, as a rule, once each hour, though sometimes more frequently. The steam trains which actually stop at these minor towns number ordinarily not more than four or five each way per day. The very smallest country villages on the steam roads often have still less frequent train service. Where, as in the more densely populated parts of Massachusetts, the urban communities connected by electric lines are larger and nearer together, the frequency of the electric service is often much greater than that in the Middle West, and such frequency of service means great convenience and saving of time to patrons.

Frequency of stops.—The fact that single units of comparatively light weight are operated upon electric railways permits stops to be made much more quickly than with heavy steam trains, and likewise permits a much more rapid acceleration after the start. Acceleration is also favored by the nature of electric power and motors. It is, therefore, possible for interurban cars to make comparatively frequent stops while maintaining a high average speed. This fact also tends greatly to increase patronage.

Cost of operation and fares lower than for steam railways.—For reasons which need not be taken up here electric traction is cheaper for short distances and light traffic than steam traction. Interurban electric railways have, therefore, found it possible to charge fares materially below those of the steam railways, and as a result have not merely taken away traffic from the latter, but have developed traffic which otherwise would not have existed at all. The relation between low fares and low operating expenses is reciprocal. Low operating costs make low fares possible, and on the other hand the reduction of charges stimulates traffic and thereby reduces operating costs and still more fixed charges per passenger.

The replies of interurban railways above presented indicate, in some cases by rather rough estimates, the average rate of fare per mile on typical interurban lines. Most of these lines approximate the steam railways closely in the quality and speed of their local service. The fare is usually from 1¼ to 2 cents per mile, 1½ cents representing a rough average. Frequently some reduction is made for return trips. In most sections of the country the local fares of steam railways for one-way tickets are about 3 cents per mile. On many electric railways, which connect closely neighboring cities and towns and which have dense traffic, the charges per mile are materially less than those above indicated. This is true, for instance, in Massachusetts.

A prominent steam railway company, operating in several states, submitted to the Bureau of the Census a detailed list of all towns connected both by its lines and by electric railways, with the respective rates of fare in each case. The fares of the steam road for one-way tickets were from one and one-half to five times as much as those of the parallel electric roads. Broadly speaking, the steam railway fares averaged about double those of the electric lines.

The following is a specific comparison of some of the rates of fare on steam and fast electric railways in Ohio:

Comparative fares of steam and electric railways in Ohio.

JOURNEY.	DISTANCE (MILES).		FARE, ONE WAY.		FARE, ROUND TRIP.	
	Steam.	Electric.	Steam.	Electric.	Steam.	Electric.
Cleveland to Ravenna	57	45	$1.15	$0.70	$2.07	$1.10
Cleveland to Akron	38	36	1.00	.60	1.80	1.00
Canton to Akron	23	21	.70	.35	.83	.65
Massillon to Uhrichsville	35	37	1.05	.55	1.89	1.00
Cleveland to Creston	49	49	1.50	.85	2.70	1.45
Columbus to Newark	33	37	1.00	.60	1.80	1.00
Newcastle, Pa., to Youngstown, Ohio	21	18	.65	.30	1.17	.60

Operation in the streets of towns and cities.—By running upon the public streets when they enter a city or town, and by making frequent stops within municipal limits, electric railways become usually much more accessible to passengers than steam railroads, which, as a rule, have only a single station in a town, and that, perhaps, at some distance from its business center. The electric railway is also able to create in addition to its interurban traffic a considerable amount of new traffic within the limits of towns. On the other hand the electric car suffers a considerable disadvantage in the eyes of through passengers, because of the necessity of reducing its speed while passing through municipalities. This matter is less serious in the small towns, but in the larger cities the speed of cars is so much reduced, and the distances to be covered at a slow pace are so great, that the duration of the journey of many inter-

urban passengers is materially augmented. Ultimately many interurban railways will probably secure entrance into cities on private rights of way, or on elevated or underground tracks, but the heavy expense involved will delay the adoption of this policy.

Other advantages of electric lines for interurban service.—Other peculiarities of interurban railway service, although they are of less importance, may be mentioned. One of these is the fact that the electric car can surmount grades and pass curves more readily than a steam train. This enables electric railways often to take shorter routes than the steam roads, and sometimes to reach villages or rich rural sections not considered accessible by the steam railways. Again electric railways, being capable of earning a profit from purely local business, are often built to connect towns directly, where it was formerly possible to travel from one to the other only by a roundabout journey and a change of cars. The freedom from smoke is a material advantage of electric over steam railways. This advantage is particularly appreciated in the summer, when it permits the electric lines to operate open or semiconvertible cars, giving the patrons the pleasure of a fast open-air ride.

Nature and social advantages of passenger traffic.—The importance of the advantages possessed by electric railways for local traffic is sufficiently shown by the extent of their business and by the financial results, which have already been discussed. The interurban railways have greatly increased the aggregate amount of travel in those sections where they exist, the number of passengers carried by the electric lines being usually materially greater than the number formerly carried between the same points by the steam railways. Several of the replies received by the Bureau of the Census from interurban railway companies emphasize this point. The president of the Detroit, Ypsilanti, Ann Arbor and Jackson Railway Company said: "The increased travel is new business developed by the electric road from the population that very seldom travel by steam." The representatives of an important company in Ohio said they were informed that, before the electric railway was built between two particular cities of medium size, the steam railroad did a business between them of about $2,000 per month. The electric railway now does three times that amount of business with a very much lower rate of fare, while the steam railroad seems to be handling about the same volume of business as before. Several of the officers of steam railways who reported to the Bureau of the Census regarding electric competition also dwelt upon the large new traffic created by the electric lines. (See page 117.)

A part of this new passenger traffic represents the patronage of farmers and their families. To the agricultural population as such the steam railways offer no special conveniences. The farmer must go to town to take the train. If he lives on an electric railway, the car may stop at his very door. As appears from the tabulation on page 109, most of the interurban companies which reported on rural patronage estimated that from 5 to 20 per cent of their traffic was from the rural population. That the proportion is not larger is due chiefly to the fact that farm dwellings are so widely scattered. A system of interurban railways connecting all the towns and villages in a given section would be conveniently accessible to only a fraction of the agricultural community.

The importance of the service of the electric railway to such of the rural population as come within its reach can scarcely be overestimated. The farmer and the members of his family can go to the neighboring village at the time most convenient to them, and far more quickly, cheaply, and comfortably than by team. In many cases they even become accustomed to make frequent trips to larger cities at a greater distance. The contact with town and city life which is thus made possible contributes greatly to the breadth of view, culture, and happiness of the farm family. The accessibility to markets and shops improves the table and dress and increases the comforts of the home. The social life, the amusements, and the varied interests of the town are made accessible to the country dweller as never before. The children are enabled readily to avail themselves of the superior school facilities of the town. In fact, the electric railway has doubtless contributed materially toward the advancement of the modern movement for the consolidation of rural schools.

Even more important has been the new traffic created by the trolley railway from among the inhabitants of small and medium-sized towns. The greater part of the traffic of most interurban railways either moves between such towns or between them and larger cities. The increased accessibility of the cities to village dwellers is one of the most important services of interurban railways. Many of the interurban lines of the miscellaneous group connect smaller towns only, but it has been found by experience that those lines which reach large cities are the most profitable. In such cities the shopper finds greater variety and often lower prices than at his home town. There the pleasure seeker finds opportunities for enjoyment vastly superior to those in the small towns. Some interurban electric railways have adopted the practice of running special theater cars.

The convenience of the electric service has greatly increased the amount of travel for purposes purely of pleasure and of social intercourse. From the social standpoint it is probably safe to say that these railways have proved a greater benefit to the women of the communities they serve than to the men. The trolley railway widens the circle of acquaintanceship. Not infrequently special cars are chartered by parties for picnics or for some other social object. Interurban

railways likewise offer facilities for travel, both from the small towns and from the large cities, to outing places and other pleasure resorts, such resorts being maintained in a number of instances at the expense of the interurban companies themselves.

The influence of electric railways in fostering suburban life has already been pointed out in another connection. (See page 28.) It is worthy of note here that some of the longer interurban railways are seeking to develop a form of long-distance suburban traffic—that is, the traffic of persons who go every day to their business in the city and live in the small town. One method adopted to further this object is that of the operation of "limited" cars on a fast schedule on several railways. Thus there is a "limited" service between Cleveland and Painesville, which permits business men to live in the smaller town and yet to reach their offices in the city, 25 miles away, within an hour. Three "limited" cars are also run each way daily between Toledo and Cleveland.

Nature of freight and express traffic.—The method of conducting freight and express business on interurban railways is discussed in Part II, Chapter IV. The nature of this traffic varies considerably on different railways, as may be seen from the statements, tabulated on page 109, regarding the leading articles carried by several important lines. Generally speaking the traffic consists of light weight commodities.

The significance of the electric railway as a factor in the transportation of commodities lies chiefly in two directions. In the first place it carries considerable quantities of goods between town and country. This transportation business it has largely created, for it either carries goods which were not carried at all before, or else it carries goods previously transported by wagon rather than by steam railway. The farmers who live within a reasonable distance of the electric line can send their milk, butter, provisions, vegetables, and fruits to market far more promptly and easily than before. In this way the nature of farm industry has been materially affected in some communities where the freight business of the electric railways has been highly developed. Moreover, the farmer can get groceries, meats, dry goods, and other light articles from the town much more easily than before the advent of the railway. In the second place, the electric railway furnishes much more frequent and prompt service between small towns, and between these towns and large cities, than is furnished by the steam railways. This is the case not only as compared with the light freight traffic on steam lines but even as compared with their express traffic.

People living in the small towns served by electric railways can now obtain packages of merchandise from the cities more cheaply and promptly than ever before. Local merchants are already making extensive use of the interurban lines to obtain smaller consignments of merchandise.

The electric railways have in most instances not yet attempted to carry heavy freight. They usually do no carload business and have no arrangements for exchanging freight with the steam railways. It has been held by the New York courts that a steam railway, as a common carrier, is bound to exchange freight with electric lines and to furnish the same facilities for doing so that it furnishes to steam railways. Many representatives of the interurban roads express the opinion that the business of handling express and light freight may be greatly developed, but that there is little to be gained by entering the field of general freight traffic. The cases where electric lines have undertaken a general freight business are usually explained by exceptional local conditions.

Influence of interurban railways on local retail business.—At this point the question arises as to the economic effect of electric interurban railways upon the business of small towns. The class most likely to be affected in its economic interests is that of the local merchants. It scarcely seems probable that the location of manufacturing industries can be materially affected by interurban railways. These railways doubtless tend in some measure to increase local population in cases where the town is near enough to a great city, or to a small industrial center undesirable for residence purposes, to draw as residents people who are engaged in business elsewhere. For example, part of the recent increase in population in Elyria, Ohio, consists of those employed in the new steel and other industries at Lorain, a few miles distant. The small town may also draw some permanent residents from the agricultural sections, who, because of the improved methods of transportation, can reach their farms easily. Increased population, of course, benefits retail trade and local economic interests generally. On the other hand, the railway may tend to take away some of the former patronage of retail merchants, not merely because of the convenience with which customers can go to the larger cities to buy goods, but also because of the convenience with which goods ordered by mail can be delivered. The competition is likely to be felt most keenly by merchants who handle the most valuable and least perishable classes of commodities. But even if there were a net economic injury to the local merchants, the economic advantage to the buyers of goods would probably more than offset the injury, and, from the broad social standpoint, may properly be considered as more important.

In order to ascertain the opinions of merchants themselves regarding the effects of electric railways, the Bureau of the Census addressed schedules of inquiry to prominent dealers in numerous towns that are connected with larger cities by fast and efficient interurban roads.

These schedules were sent chiefly to dealers in dry goods, clothing, and general merchandise. A considerable number of replies were secured, mostly from towns of between 3,000 and 20,000 inhabitants. The gist of these replies is presented in the statement below, which distinguishes the towns of less than 5,000 inhabitants from those of larger size. Four of the most important questions contained in the schedule were as follows:

Have you observed any decline in your trade because people of the town take advantage of the electric railway to go to the larger city to buy goods?

Have you observed an increased patronage from farmers and their families as a result of the development of the electric railway?

What is the general feeling among merchants and business men in your town as to the advantage or disadvantage to them from the construction of interurban electric railways?

Has the interurban railway facilitated your business in any other way, as by enabling you to get goods from the city more promptly, to go to the city to make wholesale purchases, or otherwise?

The answers to these questions are presented in the last four columns of the statement, the last column containing in addition certain other general remarks of a pertinent character which accompanied the answers.

Effect of electric interurban railways

[Replies of local merchants to a

A.—TOWNS OF LESS

Number.	LARGE CITIES WITH WHICH CONNECTED.	Name of town reporting.	Population.	Approximate distance from city (miles).	Merchants' class of business.
1	Philadelphia and Allentown, Pa	Quakertown, Pa	3,014	40-15	General merchandise
2	Erie, Pa	Cambridge Springs, Pa	1,495	25	General merchandise
3	Cleveland, Ohio	Chagrin Falls, Ohio	1,586	20	Dry goods
4	Cleveland, Ohio	Oberlin, Ohio	4,082	30	Clothing
5	Cleveland and Akron, Ohio	Kent, Ohio	4,541	30-10	General merchandise
6	Cleveland and Akron, Ohio	Ravenna, Ohio	4,003	35-15	Dry goods
7	Toledo, Ohio	Perrysburg, Ohio	1,766	10	Dry goods and clothing
8	Toledo, Ohio	Perrysburg, Ohio	1,766	10	Groceries and provisions
9	Dayton, Ohio	Franklin, Ohio	2,724	15	General merchandise
10	Dayton, Ohio	Miamisburg, Ohio	3,941	15	Dry goods
11	Cincinnati, Ohio	Harrison, Ohio	1,760	20	General merchandise
12	Youngstown, Ohio, and Newcastle, Pa	Hubbard, Ohio	1,230	8-15	General merchandise
13	Detroit, Mich	Marine City, Mich	3,829	40	Dry goods and carpets
14	Los Angeles, Cal	Santa Monica, Cal	3,057	15	Dry goods
15	Indianapolis, Ind	Greenfield, Ind	4,489	20	General merchandise

B.—TOWNS OF MORE

16	Albany and Troy, N. Y	Glens Falls, N. Y	12,613	45-40	Dry goods
17	Albany and Troy, N. Y	Cohoes, N. Y	23,910	10-5	Dry goods
18	Cleveland, Ohio	Elyria, Ohio	8,791	25	Dry goods
19	Cleveland, Akron, and Canton, Ohio	Massillon, Ohio	11,944	50-20-10	Dry goods
20	Toledo, Ohio	Bowling Green, Ohio	5,067	25	Dry goods and clothing
21	Toledo, Ohio	Adrian, Mich	9,654	30	Dry goods
22	Dayton, Ohio	Xenia, Ohio	8,696	15	General merchandise
23	Dayton, Ohio	Greenville, Ohio	5,501	35	General merchandise
24	Dayton, Ohio	Troy, Ohio	5,881	20	Dry goods
25	Youngstown, Ohio	Warren, Ohio	8,529	15	Dry goods
26	Detroit, Mich	Jackson, Mich	25,180	70	Dry goods
27	Detroit, Mich	Flint, Mich	13,103	60	General merchandise
28	Detroit, Mich	Mt. Clemens, Mich	6,576	20	Dry goods
29	Detroit, Mich	Ypsilanti, Mich	7,378	35	Dry goods
30	Grand Rapids, Mich	Holland, Mich	7,790	25	Furniture
31	St. Louis, Mo	Belleville, Ill	17,484	15	Dry goods
32	St. Louis, Mo	East St. Louis, Ill	29,655	.....	Dry goods
33	Fort Wayne, Ind	Peru, Ind	8,463	55	General merchandise
34	Chicago, Ill	Evanston, Ill	19,259	15	General merchandise
35	Chicago, Ill	Joliet, Ill	29,353	35	Dry goods

upon retail business in small towns.

special schedule of inquiries.]

THAN 5,000 POPULATION.

Effect of railways on sales to people in town.	Effect on sales to farmers and people from smaller villages.	General opinion of merchants as to effect of railways.	Remarks.	Number.
Decrease	Some increase	Harmful	Trade about 6 per cent less in 1903 than in 1902	1
No effect	Increase, especially in bad weather.	No harm	Smallest towns suffer	2
Many go to city	No effect	No reply	"Bleeding us and feeding cities"	3
No effect	Increase	Merchants about evenly divided		4
Our trade increased	Increase in rainy weather	Majority think beneficial	Sales increased about 40 per cent since 1896	5
No injury	Increase	Beneficial	Can get goods more promptly	6
No injury	Little effect	Beneficial	Increased facilities for going to market and transporting merchandise.	7
No injury	No effect	Beneficial	Convenience in getting goods at short notice	8
Decrease	No effect	No reply	"Big city will swallow"	9
Checks increase	Decrease	Harmful	If 20 miles away from city would be all right	10
Decrease	No effect	Harmful	Better class of trade goes exclusively to large town	11
No injury	Increase	Beneficial	Increase of population using interurban cars to go to work	12
No injury	Increase	All think beneficial	Increase of trade about 18 per cent in four years	13
Takes away certain classes of trade.	No effect	Great benefit	Sales rapidly increasing; country prospering; aid in getting of goods.	14
Decline in clothing	Increase	Very beneficial	Easier to get goods; carry less stock	15

THAN 5,000 POPULATION.

Increase	Decided increase	Great advantage	Sales have increased over 50 per cent in five years	16
No decrease	No effect	Somewhat injurious		17
No decrease	Increase	Indifferent		18
No decrease	Increase, especially in bad weather.	Beneficial	Social benefits generally	19
No decrease	Increase	Formerly opposed, now favor		20
Little decrease	No reply	No reply	Town of this size can hold its own	21
Marked decrease	Decreased; take cars to Dayton.	No reply	Cash stores suffer most	22
No decrease	Increase	Beneficial	Our own town is county seat; will draw business	23
Little change	Increase	No fear		24
No decrease	None	No reply		25
No decrease	Increase	Beneficial	Small towns also benefit	26
No decrease	Increase	Beneficial		27
Decrease	None	Disadvantage	Concentrates business in cities	28
Checks increase	None	Great detriment	Concentrates business in cities	29
Some decrease	None	Varying		30
No decrease	Increase	Beneficial	This is a growing town	31
Decrease	Increase	No reply	Reduced fare to city injurious	32
No decrease	Marked increase	Very beneficial		33
Decrease	No farm trade	Injurious		34
Decrease	Increase	Beneficial	Sales increased 15 per cent since road was completed	35

A marked diversity of opinion appears among these replies. Doubtless the differences are partly due to the "personal equation," but in part they must represent differences in actual conditions. Whether the effect of the opening of an electric railway between a town and a large city will be beneficial or injurious to the town merchants depends upon the size of the town, upon its distance from the city, upon the comparative excellence of the shops, upon the character of the rural population surrounding the town and the extent to which that population is served by the railway, and upon other similar causes.

Of the merchants in towns of less than 5,000 inhabitants, 5 express in one form or another the opinion that the interurban railway has been detrimental to their interests, 8 hold that they have been benefited, 2 are indefinite, and 2 do not reply. In most cases the persons who reply think that the general opinion of merchants agrees with their own.

Five merchants in the 20 towns of more than 5,000 inhabitants declare that they have suffered injury from the electric railway. One of these towns, Evanston, however, is essentially a suburb. The merchants of Ypsilanti and Mt. Clemens are particularly emphatic. These towns lie 20 miles or more from Detroit, but they have highly efficient electric service. They are in a rich agricultural region, and one might expect some increase in trade from farmers who patronize the electric railway, but such increase is denied in these reports.

A majority of the merchants of this group, however, assert that the local retailers have derived a benefit. Several of the replies, however, come from towns of considerable size, situated at some distance from any large city. The new railways naturally bring trade to such towns from the smaller villages. Several of the dealers of this group, especially in the larger and more distant towns, emphasize that point strongly. Numerous dealers in towns of less than 5,000 inhabitants, as well as in the larger towns, report an increase in their country trade as the effect of the trolley lines, three referring particularly to the advantage in this respect during inclement weather. Several merchants also speak of the advantage which the railway has conferred in enabling them conveniently to go to the city to make wholesale purchases, and also in enabling them, through the express and freight service, to get goods delivered more promptly, thus avoiding the necessity of keeping large stocks or of disappointing customers.

Some of the replies from merchants are very suggestive. One from Massillon, Ohio, says:

> Complaints are occasionally heard from merchants and dealers in small places and country towns that the interurban lines would carry their trade to the larger places, but I think in most cases they have been more than compensated by the extra number of people coming in and going out all the time and, as a rule, are very well satisfied after the lines are established. The old idea of carrying off trade and scaring the horses is dying out, and we predict that before long the electric lines will be carrying the bulk of the farmers' produce to market.

The following is from a large concern in Jackson, Michigan.

> We anticipate that trading centers, both large and small, will be considerably benefited by the extension of electric car service. If we lose by customers going to the larger city in some instances, we gain by an increased number coming from smaller places to us, and smaller towns will benefit by the ease with which farmers can get to them.

In opposition to the opinions of these two merchants as to the benefit derived from the electric railway by the smallest towns should be noted two or three replies from towns which have experienced a benefit, in which the opinion is expressed that retail trade in smaller towns has suffered. Had more numerous replies been secured from towns of less than 2,000 inhabitants, it is possible that the proportion of unfavorable opinions would have been larger.

There can be little doubt that more people than formerly go from the small towns reached by electric railways to the cities to buy certain classes of goods. In some, and possibly a majority of instances, this loss to the local merchant is more than offset by the increased population of the town and by the increased patronage from the farming classes. That the merchants in the large cities served by interurban railways have profited to some extent is beyond question. The Bureau of the Census, in fact, received replies to its schedule of inquiries from a number of merchants in such towns as Akron, Dayton, and Syracuse, which asserted that trade had been materially increased by the interurban lines. The electric railway not merely creates new passenger traffic but it creates at the same time a new demand for goods and augments the total retail trade of the sections served.

IV.

INFLUENCE OF INTERURBAN ELECTRIC RAILWAYS ON STEAM RAILWAYS.

The frequent service, convenient stops, and low fares of interurban electric railways have, in many instances, seriously affected the local traffic of steam railways connecting the same towns, this being specifically asserted in many of the replies from interurban railways presented on page 109.

It is probable that the increase in the average length of journeys on steam railways, as revealed by the official statistics, is in part attributable to the relative decline of local traffic through electric competition. During the five or six years prior to 1897 the average length of passenger rides on the steam railways had not increased by more than 5 per cent. On the other hand, the average ride increased from 25.04 miles in 1897 to 30.3 miles in 1902, or 21 per cent.[1]

[1] Statistics of the Railways of the United States, 1902, page 64.

There is considerable difference of opinion as to whether, in general, electric railway competition up to the present time has been injurious to the interests of the steam railways. In order to ascertain the views of railroad officials themselves on this subject, inquiries were addressed to the traffic officers of the leading railroads in the Northern and Eastern states. Replies were received from 14 of these companies, namely: The Baltimore and Ohio; Boston and Albany; Boston and Maine; Chicago, Cincinnati, and Louisville; Erie; Flint and Pere Marquette; Lake Erie and Western; Lake Shore and Michigan Southern; Lehigh Valley; New York, Chicago and St. Louis; New York, New Haven and Hartford; Pennsylvania; Toledo, St. Louis and Western; and the Wabash. The substance of these replies is presented in the tabular statement below, the names of the individual companies being omitted. The first 7 companies in the table are situated, in whole or in part, in the seaboard states, while the last 7 are situated in the North Central states. The most important questions in the schedule were as follows, the questions corresponding in order to the columns in the statement:

To what extent, if at all, has the local passenger traffic of your company been reduced by the competition of these lines?

To what extent, if at all, has long-distance traffic on your railroad been created by the conveniences offered by electric railways for reaching the steam road?

Has your company, as the result of electric railway competition, (*a*) Reduced fares? (*b*) Increased or decreased the number of trains? (*c*) Otherwise changed or improved its local service?

Do you anticipate such further extension or improvement of interurban lines as to render them more serious competitors for either local or long-distance passenger traffic?

Replies of steam railroads regarding the effect of electric railway competition.

Number.	EFFECT OF ELECTRIC LINES IN DECREASING TRAFFIC BETWEEN COMPETING POINTS.	Effect on long-distance traffic.	EFFECT ON PRACTICE OF STEAM LINES.		Ultimate and general effect on steam lines.
			Fares.	Number of trains.	
1	For distances of 15 miles or less; proportion lost varies.	Inappreciable	Reduced on one branch.	Increased by 11	Do not anticipate greater competition; can not tell.
2	90 per cent	No reply	Reduced in a few cases.	None	Will become more serious competitors in long-distance travel.
3	Considerable	No reply	None	Trains and stops reduced; better service for longer rides.	No reply.
4	10 miles or less, decrease 90 per cent; 10 to 50 miles, 50 to 75 per cent.	None	None	Decreased to minimum.	Will cut into business up to 50 miles.
5	Decreased for distances to 25 miles.	None	No reply	No reply	Steam lines can not overcome loss of business by lowering fares.
6	Material	No reply	No reply	No reply	No reply.
7	Enormous	No reply	No reply	No reply	No reply.
8	Some	Cross lines serve as feeders.	None	None	Beneficial; creating long-distance travel.
9	75 per cent	None	Reduced slightly	None	No immediate change anticipated.
10	Practically all business done by electric line.[1]	No reply	None	None	Serious where lines are parallel, at least on local business.
11	About 25 per cent	Will finally increase it	Reduced	None	Beneficial; increasing long-distance travel.
12	25 to 75 per cent	None	None	None	Will take away more business by extension.
13	Increase checked	Increased at one or two points.	Reduced	None	Not serious; probably creates freight business to suburbs.
14	25 to 75 per cent	None	None	None	New lines will cut further into local traffic.

[1] Electric railway built before steam road.

Of the 14 replies in the table, one states that increase in local steam railway traffic between points served by the electric railways has been checked, while all the rest say that local traffic has been reduced, in most cases very sharply. The distance within which electric competition is at present effective naturally varies with the efficiency of the electric service.

Statistics showing the effect of interurban competition have been published in various railroad and other periodicals. Thus, one journal states that on the Lake Shore and Michigan Southern Railroad the number of local passengers carried between Cleveland and Oberlin and intermediate points fell from 203,014 in 1895 to 91,761 in 1902, and the number carried between Cleveland and Painesville fell from 199,292 to 28,708. On the New York, Chicago and St. Louis Railroad the passengers between Cleveland and Lorain fell from 42,526 in 1895 to 9,795 in 1902.[1]

Some of the representatives of interurban railways assert that whatever loss the steam railways suffer in local traffic is offset by the gain in long-distance traffic induced by the electric lines. The fact is pointed out that much of the passenger traffic on the electric railways is new traffic. It is suggested that the habit of traveling is being developed among people who formerly seldom traveled at all, and that this fact, combined with the fact that steam railways have been made more accessible through connection with electric lines, leads to the conclusion that steam railway systems will ultimately be benefited, if they are not already deriving benefit. An official of a prominent eastern steam road recently asserted that the electric roads take away about 65 per cent of the local business, but in a year or two new through business, more profitable than that lost, comes to the steam railway through the aid of its competitor. Three of the officials of steam railways, replying to questions of the Bureau of the Census, take somewhat the same position. One says, "I myself do not view competition as being detrimental to the interests

[1] Railroad Gazette, January 22, 1904.

of this company. Am of the opinion that interurban lines, as a whole, will finally work out to the good of the public and induce long-distance travel by people who have heretofore been indifferent to things that were not purely local." This official, however, does not claim that the benefit mentioned has been as yet definitely experienced.

A majority of the replies from officers of the steam lines, however, deny that there has been an increase in long-distance travel as a result of the electric railways, and several assert that they expect still more serious injury in the future from the increase in the number and length of electric lines and the improvement of their facilities. The consensus of opinion seems to be distinctly hostile to the electric railways. Doubtless the time has been too short to enable steam railway officials to reach final conclusions on this subject, and it is perhaps natural that they should at first be more suspicious and hostile than the ultimate effects of electric competition would justify.

The policy of steam railways with regard to meeting electric competition varies greatly and is much affected by the local conditions. Five of the 14 replies above tabulated state that local fares have been reduced, at least in some cases, but 6 assert definitely that this has not been done. Another company says that because of the other advantages possessed by electric railways the loss of business can not be overcome by lowering the fares on the steam railways. This appears to be the general view of steam railway men.[1] Two of the companies report that they have been forced to reduce the number of local trains on account of inability to compete with electric lines. One company, on the other hand, apparently as a competitive measure, has increased to some extent its local train service.

As an illustration of a policy which is probably pursued by a considerable number of companies, the following more extended quotation from the reply of a prominent traffic official may be given:

> It has been the policy of this company not to meet trolley competition by a reduction in rates, for the reason that this action on one division of our system would create jealousy on the part of people living in other suburban territory, and is likely to result in similar reductions on all branches in suburban districts.
>
> Our experience has taught us that the electric railway, in being able to take the passenger from his house direct to his office at a nominal rate, eventually gets enough of the steam line's traffic to eat up all its profit and it can not be covered by any reduction in rates. We have therefore followed the method employed by [certain other lines], viz, to take off stops at near-by points most affected by trolley competition, thus giving patrons at stations farther away from the terminal quicker and better service, and wait for the overflow travel served by the trolley lines in the outlying districts, which seeks the railroads in bad weather and eventually increases to some extent its aggregate of business.
>
> The open trolley cars in warm weather are particularly attractive to the suburbanite, as is shown by a comparison of the earnings of our * * * branch during the month of August as compared with November, aggregating about $5,590 in the former and $11,700 in the latter.

[1] See, e. g., editorial in Railroad Gazette, January 22, 1904.

The suggestion in this letter that the reduction of certain kinds of suburban service on the steam railways permits improvements in other parts of the service, is one which has been brought out at various times by other representatives of the steam railways. Some few have gone so far as to hold that the benefit resulting from the reduction of the local service was greater than the injury suffered. A writer in a prominent railway journal has even claimed that suburban service is usually unprofitable to the steam railways and that it interferes very seriously with their through traffic.[2] Evidently what would hold true of some railways would not hold true of others. Some companies have derived a large part of their revenue from local passenger traffic, and have built branches primarily to accommodate such traffic. It is probably a fair conclusion from experience that a main line may gain traffic by being paralleled by an electric railway, but that a branch line is almost sure to lose.

Two or three of the important steam railways which have been most affected by electric competition have sought to meet it by themselves introducing electric service between certain points. As far back as 1895, the New York, New Haven and Hartford Railroad Company equipped its Nantasket Beach system with electricity, and later three other branch lines were so equipped. The most important of these branches is that between Providence and Fall River. The fare between these points was reduced from 50 to 20 cents, and the frequency of service greatly increased. More recently, the Boston and Maine Railroad has built an electric line for heavy service between Concord and Manchester, N. H., and it also controls an electric system in Maine. The Pennsylvania Company has an electric system along the seashore in southern New Jersey. The Long Island Railroad has a stretch of track along the seashore which it has equipped with overhead trolley wires. Local electric cars and steam trains covering longer journeys operate over the same track. Such a combination has at the present stage of development many advantages, but the conditions of traffic are not always adapted to it.

In several instances electric traction has been applied to entire railways which were formerly operated by steam, or has been combined with steam traction on new lines. In most such cases, freight traffic is hauled by steam locomotives. Among railways of this type are the Cincinnati, Georgetown and Portsmouth, the new line between Bellaire and Zanesville, Ohio, the Peoria and Pekin Terminal Railway, and the Waterloo and Cedar Falls Railway (Iowa).

In two or three instances, steam railways have permitted separate companies to equip a part of their tracks

[2] Quoted in Street Railway Journal, August 23, 1902; compare Railroad Gazette, January 22, 1904.

with electricity for the handling of local traffic. Such an arrangement exists on the line of the Northern Pacific Railway between Everett and Snohomish, Washington.

It is very probable that steam railways will, to an increasing extent, equip existing tracks with electricity for the hauling of a part or all of their traffic, or will build new electric lines at least for suburban passenger service. While the main purpose of the New York Central and Pennsylvania railways in introducing electric traction at their New York termini is to promote safety in the tunnels, they will gain also in the greater attractiveness, frequency, and cheapness of the suburban service which they furnish. In the case of the New York Central, at least, suburban trains will be operated to their destination by electricity. Two serious difficulties are, however, encountered by steam railways in attempting to use electricity for suburban trains. In the first place, it is hard to carry the electric current through the complicated switch tracks in the terminal yards. In the second place, if trains are run often enough to compete with those of the purely electric railways, they are likely to interfere with through passenger and freight trains. Indeed, the suburban service of a large city, whether conducted by steam or electricity, can be made thoroughly satisfactory only where it uses its own tracks, completely separated from the tracks devoted to through traffic.

This last consideration also bears on the question of the general future development of electric railways. It is not likely that interurban electric lines of the present type, even though they may be extended into long systems, can handle satisfactorily and on a large scale both local and through passenger and freight business. Even if single tracks be replaced by double tracks there is apt to be great interference between these different classes of traffic as soon as the aggregate business becomes heavy. The advantage of the local service of the interurban lines consists in its frequency and its numerous stops. Local cars are very likely, therefore, to get in the way of fast through trains; while on the other hand the slower through freight trains will tend to impede the local passenger cars. It has been suggested that freight trains might be broken up into separate units. This would largely do away with the necessity of switching, which is one of the chief causes of the delay in handling steam railway freight, and would thus increase the speed of through freight service. But to do this would so greatly multiply the number of moving units on lines with an extensive business that a single track could not possibly accommodate all the traffic in one direction.

These same considerations also cast doubt upon the possibility of so revolutionizing the working of the more important of the present steam railways, by the partial or complete introduction of electric power, as to enable them to perform both their present functions and the added functions of the interurban lines. Wherever traffic is very dense two distinct railway systems seem desirable—one for local traffic, both passenger and freight, and the other for through traffic. Both of these systems may ultimately be operated by electricity. Both kinds of railways in a given section may finally fall under the same ownership. Cooperation between them would afford many conveniences and economies. But the public will gain if these two conflicting kinds of traffic are handled on separate tracks. Where, however, the aggregate traffic is comparatively light, much would doubtless be gained if the present steam railways, following the example of the interurban railways, would increase the frequency and convenience of their local freight and passenger service by the use of single cars operated by electricity on their existing tracks.

CHAPTER VIII.

CONSOLIDATION OF STREET RAILWAYS.

General tendency and its results.—One of the most important factors in street railway progress has been the combination of formerly independent railways into great systems. Fifteen or twenty years ago most of our large cities were served by several separate animal-power railways. Many of the old companies operated one line only, occupying either a single street or a few streets connecting with one another, and furnishing transportation to a single section of the city. There was usually no competition between these independent companies in the matter of fares. In many instances, indeed, the opportunity for competition was slight, the areas served by the different companies overlapping but little; yet in some cases, as in New York, parallel lines existed which, to a limited extent, competed for traffic by improvements in service.

The introduction of mechanical traction, especially of electric traction, developed a much stronger tendency toward consolidation than existed before. One motive for combination was doubtless a desire to eliminate competition, for the cheapening of the cost of operation by the new method tended to increase the number of competing lines. By combination also unnecessary duplication of trackage was avoided. Even more important was the desire to reduce operating expenses. So long as each car had possessed its independent source of power, as was the case with animal traction, there was, after the system had reached a limited size, little saving in cost through doing business on a larger scale. Cable or electric power could be much more economically furnished by power plants of great capacity, capable of operating several railway lines. By consolidation, moreover, it was possible to locate the power houses in such a way as to reduce the amount of electrical or cable equipment necessary for the distribution of power, and also to save in the expense of bringing coal to the plant. A further advantage from operation under unified control was found in such instances as frequently arise in the business centers of cities, where a single track is used for cars of several different lines. If these lines were operated by separate companies it became necessary, with electric traction, either to maintain several overhead wires or to enter into complicated agreements for the assignment of the cost of power from a single wire. If operated by a consolidated company the power furnished by a single set of wires would serve, without elaborate calculations, for the operation of all the lines. Other minor economies of a like character secured by combination do not call for discussion.

The greatest advantage of consolidation was one which accrued both to the users of the service and to the street railways themselves. The establishment of a unified system made it possible to carry passengers more nearly where they wanted to go and to carry them longer distances. In many cases these advantages were secured by modifying and extending the routes covered by single cars; in other cases transfers to connecting lines were given.[1] So long as connecting lines were operated by different companies, the use of transfers involved complication and difficulty and was rarely known. The lengthening of the possible trips, which increased the attractiveness of the street railway, so augmented the traffic that it proved decidedly profitable to the companies.

So great were these various advantages from combination found to be, that in almost every great city of the United States all, or nearly all, of the formerly independent companies have been gradually brought together into one system during the past ten or fifteen years. This has been true in Brooklyn, Baltimore, Boston, Philadelphia, Buffalo, Cincinnati, Pittsburg, Cleveland (since the census year), Detroit, St. Louis, in the urban center consisting of Jersey City, Newark, Paterson, and smaller towns, in Minneapolis and St. Paul, in New Orleans, Louisville, Milwaukee, Denver, Omaha, and in several other large cities.

In several of these cities one or more minor lines, mostly of a suburban character, are still outside the consolidation. In Manhattan and Bronx boroughs of Greater New York a single company now operates the surface railways, while another company controls all the elevated railways as well as the subway system. The greater part of the street railway traffic of San Francisco is carried by a single company recently consolidated, although several independent companies of some importance still exist. Combination has been effected to a considerable extent in Chicago, but that city still has two extensive systems of surface railways and several minor systems, as well as four elevated railways which are independent of the surface railways and

[1] See discussion of transfers, page 41.

of one another. These various lines, however, largely serve separate sections of the city. In Washington two important companies are still in independent existence.

Elsewhere has been pointed out the increase in the average importance of the individual railway companies in operation in 1902 as compared with 1890, an increase due largely to the process of consolidation. This increase in the importance of companies is still further brought out by the following table, which, for 1890 and 1902, classifies the operating companies according to the number of miles of line operated (first main track, not all tracks), and also indicates the total length of line owned by companies falling within the various groups. The figures for 1890 include only the companies for which precise returns of trackage were made.

TABLE 80.—*Distribution of operating companies according to length of line: 1902 and 1890.*

LENGTH OF LINE (MILES).	1902		1890	
	Number of companies.	Length of line, miles.	Number of companies.	Length of line, miles.
Total	817	16,651.58	691	[1] 5,119.53
Under 10	394	1,957.16	557	2,304.49
10 but under 20	219	3,148.94	99	1,358.42
20 but under 30	76	1,878.54	16	400.39
30 but under 40	34	1,197.83	7	251.74
40 but under 50	25	1,117.05	4	178.04
50 but under 60	16	892.86	2	101.57
60 but under 70	12	785.22	2	130.33
70 but under 80	7	532.46	1	76.48
80 but under 90	6	515.30	1	84.42
90 but under 100	3	277.12	.....	.....
100 and over	25	4,349.10	2	238.65

[1] Exclusive of 663.94 miles, estimated, in 1890.

It will be seen that in 1890 more than three-fourths of all the companies had less than 10 miles of line each, and the total line of such companies was more than two-fifths of the total for the United States. In 1902, on the other hand, less than one-half of the companies were of this small size and their total length was only about one-eighth of that for the country. In 1890 there were only 8 companies with more than 50 miles of line, while in 1902 there were 69 companies of this size. In 1890 only 2 companies had more than 100 miles of line and their length was less than one-twentieth of the total. In 1902, 25 railways were more than 100 miles long and their aggregate line was considerably more than one-fourth of the total for the United States.

Methods of combination.—The three leading methods of consolidation in the street railway business have been:

(1) Merger. The properties of the former companies are bought outright, for cash or for shares of the new corporation, and the old corporations go out of existence.

(2) Lease. The controlling company takes over the entire operation of the system of the lessor, often for nine hundred and ninety-nine years, and agrees to pay a definite rental to the lessor company, the latter continuing at least nominally in existence.

(3) Stock ownership. Purchase of all, or of a controlling interest in, the stocks of companies, which continue in existence and may even continue to maintain nominally independent operation.

In several cities, two or even all three of the above-mentioned methods of combination have been employed, more or less indiscriminately, in bringing together a single street railway system. In others, one method of combination has been followed exclusively or has predominated. State laws or municipal charters and franchises have sometimes been the determining factor as to the form of combination used.

Probably the greater number of the street railway consolidations have been effected through merger. This was the form of combination employed in most medium-sized cities. It was also the form followed, in whole or in part, by the West End Street Railway Company of Boston (which is itself now, however, leased to the Boston Elevated Railway Company), the Detroit United Railway Company, the New Orleans Railways Company, the United Railways and Electric Company of Baltimore, and others.

Consolidation by means of leases[1] is particularly common in New York and Pennsylvania, the laws of the latter state rendering other forms of consolidation less practicable. The operating company or lessee regularly assumes the indebtedness of the lessor company, and guarantees a fixed dividend on its stock, except in cases where stockholders receive no return from any source. It is quite a common arrangement that the rate of dividend guaranteed shall increase year by year from the date of the lease, till, after six, eight, or ten years, a maximum is reached which remains the basis of future payment. In a few instances the lessor companies continue, at least temporarily, to be operated separately, but usually they are as completely united with the controlling company under one management as if they had been merged with it.

The lease is sometimes used where its object is not primarily that of consolidation. Thus, the St. Louis Transit Company, in 1899, acquired by lease the United Railways Company, which had already secured control of all the street railways of the city except two or three suburban lines. So, too, the Cincinnati Traction Company recently leased the lines of the Cincinnati Street Railway Company without increasing the number of companies in the combination. The purpose in such cases may be to facilitate a change in the control of the business; or the lease may be merely a device by which, without any real change in ownership, a large part of the net earnings of the system may be given the appear-

[1] See further on this subject, pages 54, 58, 60, 65, and 80. Table 39 shows the number of nonoperating lessor companies in each state and their financial transactions.

ance of being necessary to meet fixed charges, since the operating company always treats its rentals as such.

The third method of combination, by stock ownership, while found less frequently than either of the others, is being adopted apparently as the favorite method to accomplish the greatest consolidations. Like the lease, it offers the advantage that the original companies maintain their corporate existence, upon which the validity of franchises and privileges sometimes depends. It has the further advantage that a company may be brought into combination merely by the purchase of a majority of its stock without the purchase of its entire property. For this reason this form of combination is sometimes made a preliminary step toward a later combination by merger or lease.

Companies which are already operating railways quite frequently buy a majority or the whole of the stocks of other companies in order to secure control. In such case the subsidiary company may keep up nominally independent operation, but in reality its operations are merged with those of the controlling company to whatever degree the latter desires, for the purpose of effecting economies or for other objects. Thus the Metropolitan Street Railway Company in New York (itself leased to the Interurban Street Railway Company) has for a number of years held a controlling interest in the stocks of three other railways, which it practically operated directly, although separate reports of their business were made.

The latest development in methods of consolidation is the securities company; a corporation which merely holds the stocks of operating street railways and does not itself own any tracks or conduct any operations, but receives its income from the dividends of the corporations whose stocks it holds. This method has been employed, for example, in recent great street railway combinations in New York, Brooklyn, Pittsburg, Buffalo, Minneapolis and St. Paul, and San Francisco. In some cases a holding company of this type leaves all of its subsidiary companies in separate operation, though, of course, their independence is only nominal. In several cities the holding company has placed the entire operation of the plants which it controls in the hands of a single one of the subsidiary companies. Thus the Philadelphia Company, of Pittsburg, which, besides holding practically all the street railways of that city and vicinity by stock ownership or lease, also controls gas, electric light, and other properties in the same way, has handed over the operation of its street railway system to the Pittsburg Railways Company, specially chartered for that purpose. A similar arrangement exists between the International Traction Company of Buffalo, a holding company, and the International Railway Company, which operates its lines. The consolidation in San Francisco took the same form.

An interesting recent development is that of bringing together under common ownership street railway lines widely separated from one another. Comparatively little of the advantage of combination between connecting or competing lines is secured in such case. There may be some slight economy in doing away with unnecessary superior officers, and methods of operation may be improved by reason of the superior capacity and experience of the officers of the central company. The chief object in the formation of such companies, however, is to furnish a convenient form of investment to capitalists. Instead of individually buying the securities of railway companies situated, perhaps, in distant sections of the country, with whose operations they could have little familiarity, investors form a holding company, with officers whose duty it is to represent their interests and watch the management of all the different railways.

Holding companies of this type have been developed to a greater extent in Philadelphia than anywhere else. The Interstate Railways Company, which succeeded the United Power and Transportation Company in 1902, controls about 15 street railway systems in Pennsylvania, New Jersey, and Delaware, together with 2 electric light companies. It has also acquired the stock and franchises of numerous new railway companies. Some of the lines controlled are more or less closely connected, and others may be brought into connection later, but the primary purpose has been, apparently, not so much to make a single great system as to provide a convenient form of investment. The American Railways Company of Philadelphia controls 8 or 9 widely separated street railways and lighting plants in Ohio, Illinois, New Jersey, and Pennsylvania, and also a minority interest in the stock of the Chicago Union Traction Company. The Railways Company General controls stocks of 7 railway lines, and lighting plants in New York, Pennsylvania, and Michigan.

The United Gas Improvement Company, of Philadelphia, has recently extended its investments into the street railway field. This company operates the Philadelphia Gas Works and controls, in one way or another, the gas and electric light properties in more than thirty cities of the United States. One of its subsidiary corporations is the Connecticut Railway and Lighting Company, which in 1900 secured control of street railways serving a dozen different towns and cities in Connecticut, including about 160 miles of track, or more than one-fourth of the entire trackage of the state. The Connecticut Railway and Lighting Company also operates water, gas, and electric light plants. The United Gas Improvement Company in 1902 secured control of almost the entire street railway system of Rhode Island. Its relation to its subordinate companies in that state is peculiarly complicated. A corporation known as the United Traction and Electric Company, chartered in New Jersey, owns the stocks of the three leading street railway companies of Rhode Island. These companies, however, are leased to the Rhode Island Company, an

operating corporation created in 1902 by special act of the Rhode Island legislature, which has agreed to pay a rental sufficient to provide the United Traction and Electric Company with interest on its bonds and 5 per cent dividends on its stock. This rental is guaranteed by the United Gas Improvement Company, which is the promoter of the entire combination. Finally, the stock of the Rhode Island Company is owned by the Rhode Island Securities Company, a New Jersey corporation, through which the United Gas Improvement Company exercises its control. The street railway trackage in this combination amounts to about 270 miles. The Rhode Island Securities Company is also acquiring gas and electric light properties in this same territory. In 1903 a consolidation of nearly the entire gas, street railway, and electric light business of northern New Jersey was effected under the name of the Public Service Corporation, and this company is said to be affiliated with the United Gas Improvement Company.

Centralized ownership of street railway properties has also been brought about in a number of instances without the intervention of formally organized companies. The very wide reaching street railway investments of the so-called Whitney-Elkins-Widener syndicate is the most important instance. A number of banking firms in eastern cities control, in the interest of their clients, several railway and lighting plants in scattered localities.

A combination of somewhat unusual form is that known as the Massachusetts Electric Companies, formed in 1899. This is not an incorporated company, but a voluntary association managed by a number of trustees, who hold title to the stocks of street railways and electric light plants, and who have issued trust certificates, common and preferred, to the amount of about $35,000,000. This association has bought up the securities of thirty or forty companies originally separate and has consolidated most of them into three operating companies—the Boston and Northern Street Railway Company, the Old Colony Street Railway Company, and the Hyde Park Electric Light Company. The street railways controlled have more than 850 miles of track, including nearly all the lines in eastern Massachusetts outside of the city of Boston. This combination has aimed to establish a unified system of transportation out of the formerly disconnected lines. It has been able through combination to realize important economies, as well as to give advantages to the public. The Boston Suburban Electric Companies is a less important combination of the same character.

Street railway consolidation in New York city.—The recent history of the surface railways of New York city illustrates strikingly the strength of the tendency toward consolidation, and likewise furnishes examples of all the different methods of combination which have been described. In 1890 the surface railway business of the present borough of Manhattan was in the hands of about fifteen independent operating companies, no one of which controlled more than 30 miles of track, out of a total length of about 210 miles. Consolidation had begun even before this time, but had not gone far. The Broadway and Seventh Avenue Railway had leased the newly established cable system of the Broadway Surface Railway, and also the South Ferry Railway, so that it had a continuous line on Broadway and Seventh avenue, forming a great central stem to which branch lines could be attached with advantage. The Twenty-third Street Railway had, as far back as 1876, leased the Bleecker Street and Fulton Ferry line. Half a dozen of the great longitudinal avenues of the city, however, were still occupied by as many independent street railway lines.

The first important step toward general consolidation was taken in 1891 by the organization of the Metropolitan Traction Company, which was a stockholding corporation only. Within two years it had secured a controlling interest in the stocks of more than one-half of the surface railway companies. In 1893 the Metropolitan Street Railway Company was organized as an operating company, subordinate to the traction company. This company took over the Houston, West Street and Pavonia Ferry line and the Broadway Surface and South Ferry lines. In the following two years the new cable railways of the Metropolitan Crosstown, the Lexington Avenue and Pavonia Ferry, and the Columbus and Ninth Avenue companies were also absorbed in the Metropolitan Street Railway Company. Meantime, the latter company leased the older lines of the Broadway and Seventh Avenue, the Forty-second Street and Grand Street Ferry, the Central Park, North and East River, the Bleecker Street and Fulton Ferry, the Twenty-third Street, the Ninth Avenue, and the Sixth Avenue companies, whose stocks were said to be largely owned by the traction company. By 1895 the system controlled by the Metropolitan Traction Company included 132 miles of track out of an entire trackage of surface railways in Manhattan borough of 286 miles. It owned all the important longitudinal railways except those on Second, Third, Fourth, and Eighth avenues.

The progress of consolidation for some years after 1894 was less rapid. In 1896 the street railway lines of the New York and Harlem Railroad Company (Fourth and Madison avenues), and the Eighth Avenue line, and in 1898 the Second Avenue Railway, were leased to the Metropolitan Street Railway Company. Several new railways were constructed during these years, separate charters being taken out for the purpose of securing the franchises. The stocks of the corporations operating these new lines—the Twenty-eighth and Twenty-ninth Streets Crosstown, the Thirty-fourth Street, the Thirty-fourth Street Ferry and Eleventh Avenue, and the Fulton Street Railway companies—were all held by the Metropolitan Traction Company. In 1897 the traction company bought control

of the Central Crosstown Railroad Company, to which the Christopher and Tenth Street line had previously been leased. Four of these last-mentioned companies have continued to operate separately. In 1898 the Metropolitan Traction Company, having fulfilled its object of securing control by stock purchase, was dissolved, and the securities held by it became the property of the operating company, the Metropolitan Street Railway Company.

At the beginning of 1900 this company found only one important competitor still in existence, the Third Avenue Railroad Company. As far back as 1895 the Third Avenue Company had begun to realize that to maintain its position it must secure branch and connecting lines. It accordingly bought a controlling interest in the extensive Forty-second Street, Manhattanville and St. Nicholas Avenue Railway in the upper west side of the city. In 1897 it similarly obtained control of the Dry Dock, East Broadway and Battery Company, with an extensive system of horse lines in the lower part of the island. In the next year the Third Avenue Railroad bought a majority of the stock of the Union Railway Company, which had grown up by the gradual consolidation of a dozen or more companies and which operated 50 miles of track in Bronx borough and the adjacent parts of Westchester county. In 1899 the Third Avenue Company bought up the Tarrytown, White Plains and Mamaroneck Railway and the Yonkers Railroad, which added a large amount of track to its system in Westchester county.

At the beginning of 1900 the Third Avenue Railroad Company controlled more than 200 miles of track, or nearly as much as that of the Metropolitan Street Railway system. Considerably less than half of this trackage, however, was in Manhattan borough, while nearly all that of the Metropolitan system was included within that borough. With the adoption of underground electric traction the Third Avenue system seemed likely to become a very serious competitor of the older combination. The officers of the Metropolitan Street Railway Company took advantage of a heavy fall in the stocks of the Third Avenue Company, due to difficulty in meeting the wasteful expense connected with its installation of electric traction, to buy in open market a controlling interest in the stock of its rival. Soon thereafter the Metropolitan took over the Third Avenue Company by lease, but for the time being it has maintained the separate operation of the lines of that company and of those of each of its subsidiary corporations, paying them the amount of their net earnings as a rental.

In 1902 a still further combination was effected. The Interurban Street Railway Company[1] had been formed in 1901 to construct new trolley lines in the borough of Bronx and in Westchester county, for which it held extensive franchise rights. This company now leased the entire Metropolitan Street Railway system, assuming all the indebtedness and agreeing to pay a rental of 7 per cent on the $52,000,000 of stock. At the same time the Metropolitan Securities Company was formed, under the business-corporation law of New York. This holding company owns all of the shares of the Interurban Street Railway Company, and thus has ultimate control of the entire surface railway system of Manhattan and Bronx boroughs and the adjacent territory. For a long time to come by far the greater part of the profits of the street railways in this combination will be devoted to rental payments on the immense amount of stock and bonds of the various lessor and sublessor companies.

No form of combination has yet been effected between the elevated railways and the surface lines of Manhattan borough; although several years ago the Third Avenue Railroad entered into an operating agreement with the Manhattan Railway (elevated) by which, on payment of 3 cents in addition to the regular fare, a passenger on either system could transfer to the other. It is significant, however, that in 1903 the elevated railway company was merged with the company which constructed the new underground transit system, the Interborough Rapid Transit Company. The elevated system itself is the result of a consolidation of three companies.

The process of consolidation in Brooklyn has paralleled that of Manhattan. By merger, lease, and ownership of securities, both the elevated and the surface lines have been brought together under the Brooklyn Rapid Transit Company, which controls at present more than 500 miles of track.

The process of consolidation in Greater New York has been contemporaneous with great changes and improvements in methods of operation. It is therefore impossible to judge from statistics the degree to which consolidation has increased traffic or reduced operating expenses. That it has done much in both directions is beyond question. The changes in the routing of cars and the extension of the transfer privilege have materially increased the attractiveness of the service.

Street railway consolidation in Philadelphia.[2]—The process of street railway combination in Philadelphia began earlier and was completed earlier than in New York. During the period from 1857 to 1874 about 40 separate companies were given charters in Philadelphia. In 1876 there were in existence 17 separate companies, operating altogether 289 miles of track. It appears that from 1859 on the companies had largely acted in harmony so far as the fixing of fares and the like were concerned, through an organization known as "The Board of Presidents of City Passenger Railway Companies." In 1879 and 1880 the process of combination began by the lease

[1] The name of this company has since been changed to New York City Street Railway Company.

[2] Based largely on the monograph, The Street Railways of Philadelphia, by F. W. Spiers, published by Johns Hopkins University.

of two or three extensive lines to the Union Passenger Railway Company. In the next year three other roads were brought together into the People's Passenger Railway Company. These two systems carried about two-fifths of the entire number of passengers in the city. In 1883 the Philadelphia Traction Company was formed by men who have since extended their street railway interests into many cities of the United States. This company never owned any track, but gradually extended its control by means of leases. The Union system, already described, was the first to be leased to the Philadelphia Traction Company. In 1887 an act was passed by the state legislature for the purpose of facilitating the combination of street railways, which provided special powers for what were legally known as "traction companies." The People's Traction Company, which was soon organized under this act, leased the People's Passenger Railway Company, as well as a number of other formerly independent railways. The Philadelphia Traction Company continued to absorb additional lines. The movement was favored by the change from horse to electric power. By 1895 practically all the street railways of the city had been brought together into four systems. The Philadelphia Traction Company controlled 203 miles of track; the Electric Traction Company, 130 miles; the People's Traction Company, 73 miles; and the Hestonville, Mantua and Fairmount Passenger Railway Company, 24 miles.

The time had now arrived for complete consolidation. The new Union Traction Company, under sanction of the act already mentioned, took over all of the stock of the Electric Traction Company and the People's Traction Company, issuing in exchange therefor trust certificates bearing 4 per cent interest. It also took over by lease the Philadelphia Traction Company, and, in 1898, the Hestonville, Mantua and Fairmount Passenger Railway Company. The lines of the Electric Traction Company and the People's Traction Company were also leased to the Union Traction Company, thus giving a double form of control.

In 1901, by special act of the state legislature and by ordinance of the Philadelphia city council, a large number of interrelated franchises were granted to a new syndicate, which proceeded under them to organize various companies to construct surface, elevated, and underground railways. It was the intention that these new lines should constitute a competing system. In 1902, however, the Philadelphia Rapid Transit Company was organized, which acquired all of the stock and franchises of the new companies, and also took over by lease the entire existing system of the Union Traction Company, agreeing to pay therefor a rental on the par value of its $30,000,000 of stock (of which only $10,500,000 was paid in). This rental was 3 per cent at the beginning, and is to increase by 1 per cent every two years until 6 per cent is reached. The Philadelphia Rapid Transit Company has also secured control of the Doylestown and Willowgrove Railway Company, operating in the suburbs of Philadelphia, and it is quite possible that further consolidation with suburban companies may take place in the future.

The complexity of the process of consolidation in Philadelphia may be seen from the list, on page 264, of companies united under the Union Traction Company. Thirty-nine companies altogether are enumerated in this list, and their relations to one another are shown by the degree of indentation. The form of combination universally employed is the lease, though in many cases it is supplemented by ownership of part or all of the shares of the lessor company by the controlling company. The table shows, for example, that the Philadelphia and Darby Railroad Company was leased to the Philadelphia City Passenger Railway Company. The latter was subsequently leased to the West Philadelphia Passenger Railway Company, which became later a lessor to the Philadelphia Traction Company. The last-named company was leased to the Union Traction Company, which, as already stated, is now a lessor to the Philadelphia Rapid Transit Company, thus making six stages in the process.

CHAPTER IX.

FRANCHISES, PUBLIC REGULATION, AND PUBLIC OWNERSHIP.

During recent years widespread and active interest has been manifested in the relations between street railway companies and the local governments representing the interests of the people. Two peculiarities of urban railways bring this relation into special prominence and justify reasonable public regulation. The first is the fact that the railway in urban communities usually occupies public streets and ways. The second is the tendency of the street railway business toward monopoly, a tendency which has been abundantly demonstrated by experience. With the growth of population a constantly increasing proportion of the people in the cities are forced to patronize the railways, and the need of protection against the possible abuse of monopoly power correspondingly increases.

The actual regulations in force with regard to the operation of street railways differ widely among the different states. Indeed, they vary almost as widely among different companies in the same state or even in the same city. For the purpose of ascertaining more fully the provisions of state and local legislation with respect to street railways, the Bureau of the Census included in its general schedule addressed to the street railway companies several questions regarding their franchises. It also addressed inquiries to the mayors of a large number of municipalities, including one or more in every state and all the largest cities. Much valuable information was received in response to these inquiries, especially from the mayors. Copies of city charters and of franchise ordinances were furnished in many instances. It was impracticable to attempt to learn in detail the provisions of every local franchise, as many consolidated companies are operating under a score or more of separate grants with widely varying terms. In the detailed presentation by states in the latter part of this chapter the aim has been to set forth the present policy of leading states and cities, as shown in existing statutes and in recently granted franchises, while only more general statements are made in relation to earlier franchises which are still in force. In this presentation only questions bearing upon the fundamental relations between the street railway companies and the governing authorities or the people are taken up. The most important subjects covered are the methods of granting franchises and their duration, the regulation of fares, and the requirements regarding compensation for franchise privileges. No attempt is made to present the less essential features of the law regarding the organization, management, and powers of street railway companies, or the details of local ordinances regarding car schedules, methods of construction, safety regulations, and the like.

I.

METHOD OF GRANTING FRANCHISES.

Authority of state and municipal governments.—Street railway companies, like other corporations, derive their charters, which give them the right to exist and which regulate in a general way their internal government, from the state, either through general or special statute. The privilege of occupying a specific street or highway usually requires further authorization, and it is this authorization which is designated by the term "franchise" in the more limited sense. In some state constitutions the legislature is expressly prohibited from granting the use of the streets and highways without the consent of the local governing authorities, while in nearly all other states the practice of the legislature is to give the local governments control in this respect. This control involves ordinarily the right of the local authorities to impose such conditions as they may see fit at the time the franchise is granted. In the detailed presentation of street railway law in section VII only deviations from this rule are mentioned.

So far as recent practice is concerned, such deviations are mostly confined to the New England states, where a large proportion of the street railway companies have been chartered by special acts of the legislature. Many of these charters have given to companies the use of the streets with no provision for interference by the local authorities further than was necessary to regulate the details of construction and make them conform to the grade and surface of the streets. This policy has been particularly common in Connecticut and Rhode Island. In Massachusetts the railroad commission must approve all grants of franchises by local authorities; moreover, where a street railway is designed to serve several towns or cities, those towns which favor a franchise may appeal to the state board of railroad commissioners if any one of the local governments withholds its consent. This latter proviso was inserted in the law

on the recommendation of a special committee on the relations between cities and towns and street railways, which reported to the Massachusetts legislature in 1898.[1] In New York, Connecticut, Rhode Island, Maine, New Hampshire, and one or two other states the state railroad commission has also some control over the construction of street railways, but this control is of a less thorough character than in Massachusetts.

It is quite common for the state, by general or special statute, and sometimes by its constitution, to regulate the procedure which must be followed by the local governments in granting franchises to street railway companies. Often these regulations apply to other classes of public utilities also. The corruption which has often characterized the action of municipal authorities in bestowing franchises has been one of the motives for the adoption of safeguards concerning procedure.

In many cases a larger proportion of the city council, or other local governing body, is required to pass a franchise ordinance than to pass ordinances on most other subjects. Provisions of this character are so common that, with a few exceptions, they have been omitted in the detailed statement in another part of this chapter. One of the most stringent regulations concerning the procedure in granting franchises is found in the New York city charter. Not only is the vote of three-fourths of all the members elected to the city council required, but the grant must also be approved by the board of estimate and apportionment, a small body chiefly composed of executive officials, which has the main control over the city's finances. This board is directed particularly to inquire into the value of the privileges conferred and the adequacy of the compensation offered for them. A precisely similar method is prescribed in the charter of the city of Baltimore.

In most states the law does not distinguish between ordinary urban street railways and interurban electric lines, either as to the methods of securing privileges or as to the general regulation of business. In those states where interurban railways are most highly developed, however, they have either been placed under the same laws as steam railways or under special laws more akin to those governing steam railways.

Consent of voters or of abutting owners.—The movement in favor of "direct legislation" has led to the requirement, in various states and cities, that franchises shall be submitted to popular vote, either in all cases, or on petition of a certain proportion of the voters. Such use of the referendum is most common in the Western states. In Colorado, South Dakota, and Utah, for example, all municipal ordinances are subject to the referendum on petition, or the optional referendum, as it is commonly called. The same requirement is found in the San Francisco charter, and in the charters of various other cities. In Nebraska and Arizona all public franchises in cities must be submitted to popular vote; in Montana and Colorado to the vote of the taxpaying electors. In Iowa one-fifth of the voters in any city may require any franchise to be submitted to popular vote. The optional referendum with reference to franchises exists in incorporated towns in Indiana, in Parkersburg, W. Va., by its new charter, and in various other places. In Detroit a local ordinance provides that proposed franchises shall be submitted to popular vote, but such vote is purely advisory, not binding. Provisions for popular vote on franchise grants are for the most part of recent origin, and there is comparatively little experience as to their practical working. The fear has sometimes been expressed that the people will be unduly hostile to the corporations, and will ignorantly deprive themselves of needed facilities by refusing franchises altogether, or by insisting upon impossible conditions.

Somewhat similar to the requirement of a popular vote for the grant of street railway franchises is the provision in a number of states that the consent of the owners of abutting property shall be secured. Usually the provision is that the owners of more than half of the frontage must give their consent. This is true, for example, of all cities in Colorado, Missouri, Nebraska, New Jersey, and Ohio, and of cities of more than 40,000 inhabitants in Kansas. The same requirement existed in Illinois prior to 1899. In Louisiana one-half in number of the owners of abutting property and the owners of one-half in value of the property must consent to the construction of the railway. In New York the owners of one-half in value of the property must consent, but there is a proviso that if the necessary consent can not be obtained appeal may be taken to the courts, which shall decide whether there is public necessity for the railway. This proviso was enacted in recognition of the fact that the rights of the people, as a whole, are paramount to those of the property owners upon the streets directly concerned. In some cases, moreover, the owners of property, particularly if the streets were peculiarly desirable or necessary for the construction of a general railway line, or of a connecting link in a system, might take unfair advantage of their position to demand excessive compensation from the railway company as a condition of their consent. This does not imply that any compensation whatever would necessarily be excessive, for it is entirely proper that a railway company should compensate property owners for actual damage to their property or decrease in its value, and provisions of this sort are almost universally found in state laws or in local

[1] Report of the special committee appointed to investigate the relations between cities and towns and street railway companies, 1898. This report presents, among other valuable matters, a summary of the legislation regarding street railways in the various states and of the franchise provisions in the leading cities. It is frequently referred to in the following discussion, being cited, for convenience, as "Massachusetts Report."

ordinances and franchises. In Massachusetts the rights of owners of abutting property are protected by provisions for appeal to the state railroad commission.

Competitive bidding for franchises.—During recent years it has become quite common, with a view to obtain more favorable terms, to offer franchises at public competition. This requirement often applies to other classes of public utilities as well as to street railways. In California, Nevada, Kentucky, and Virginia the general state laws require competitive bidding, but contain no provision specifying the character of the bids, which apparently might, at the discretion of the local authorities, be either in the form of lump sums or of annual payments. In New York and Louisiana the bids must be on the basis of a percentage of the gross annual earnings. In Ohio the franchise must be granted to the bidder offering the lowest rates of fare. A similar method is required by the individual charters of certain cities, and in a few others it has been adopted voluntarily by local authorities. The city ordinarily reserves the right to reject all bids. In Virginia the local authorities may, if for any reason they deem it to be for the interests of the people, grant the franchise to some other than the highest bidder, but they must give their reasons for the grant in the franchise ordinance.

In most states there has been as yet comparatively little experience with the working of the method of competitive bidding for public franchises. The method has, however, been employed long enough in California, New York, and Ohio to afford a fair basis for a judgment as to its success. In two or three instances there has been active competition for street railway franchises in New York city, but for one reason or another the franchise grants made as a result of high bids have been set aside or the railways authorized have never been built.[1] In one case the bids for a certain extension were run up until seventy times the total gross receipts of the proposed new line were offered in payment for the franchise. This absurd procedure, which was obviously not in good faith, was stopped by an injunction. Finally the franchise was sold for 100 per cent of the gross receipts, but the road has not yet been constructed. In fact the highest compensation which has actually been paid to the city treasury as the result of competitive bids for street railway franchises is 8 per cent of the gross receipts.[2] It is probable that competition had something to do with enabling the city of Columbus to obtain unusually low fares as a condition precedent to the extension of the franchise of the leading railway in that city.

Generally speaking, however, there has been little or no competition for franchises, and the local governments have obtained no more favorable terms than were prescribed as a minimum by state or local legislation. The reason is obvious. The proposed franchise is almost invariably petitioned for in the first instance by a duly organized corporation, which asks the right to occupy specifically named streets and which has carefully considered, in advance, construction plans and probable financial results. Even when a considerable period of time is allowed for others to investigate the proposed plan and to estimate the value of the franchise, these possible competitors are at a great disadvantage as compared with the original promoters. It often happens that there are few people in a city who are familiar with the street railway business and at the same time in command of the necessary capital. Effective competition is still less likely when the proposed railway is in the nature of an extension or outlying line, the success of which will depend almost wholly upon cooperation with existing lines. The process of consolidation among street railways has gone so far in most large cities that there is only one important system in existence with which a new railway can be connected.

The method of competitive bids is apt to prove of greater value when applied to renewals of the franchises of existing railway systems. It has already been so applied in a few instances, and under existing laws will apply to many such renewals in the future. Of course the old corporation has a great advantage in the competition for a renewal of the franchises; but the value of the privilege is so much better appreciated and so much more easily measured than in the case of a new railway that other capitalists will often stand ready to offer such competition as will at least compel the present owners to make important concessions to the people. The best results, however, are secured where the system of competitive bids is supplemented by careful bargaining on the part of the local authorities. This method is provided for in the charter of New York city. If the board of estimate and apportionment receives no satisfactory bid for a franchise, it becomes its duty to seek better terms by negotiation. In two or three cases the efforts of the board have resulted in securing a compensation for street railway franchises considerably in excess of that originally offered.[3] The New York system in this respect has been copied by Baltimore.

II.

DURATION OF FRANCHISES.

State constitutions or laws usually, though by no means always, limit the duration of corporate charters of all classes. Such limitations, however, are ordinarily of a formal character, and unless some action to the contrary is taken by the state legislature at the

[1] See G. Myers, in "Municipal Affairs," March, 1900, page 150 ff.

[2] For the Metropolitan Crosstown Railway. See Report of the Comptroller of the City of New York, 1902; Myers, loc. cit., page 162.

[3] Myers, loc. cit., page 155.

time of expiration, a charter can usually be renewed by a simple procedure on the part of the stockholders of the corporation. Nevertheless, the limitation on the duration of the charter offers to the state the possibility of imposing new restrictions if it so desires.

Most states, including those which limit the duration of corporate charters, provide in their constitutions that the legislature shall have the right to repeal or amend any general or special incorporation law if passed subsequent to the adoption of the constitution. This provision has been inserted in view of the judicial doctrine announced in the famous Dartmouth College case that, in the absence of such provision, an act conferring privileges upon a private corporation constitutes a contract on the part of the state. It is probably safe to say that nearly all important street railway companies in the United States hold charters, which are either limited in duration or subject to amendment or repeal by the state legislature. In case of such amendment or repeal, however, the courts are disposed to require that regard be given to vested property rights, and the legislature is subject to limitations in those states whose constitutions prohibit special and local legislation, and in which, accordingly, changes must apply to an entire class.[1]

Limitations on the duration of local franchises are another matter. State constitutions or laws seldom reserve to the state or local authorities the right to terminate a franchise, or to revise its provisions during the prescribed term, nor have the local authorities in granting franchises ordinarily reserved this right.

The most important exception to the statement just made is found in Massachusetts. For a long time it has been the policy in that commonwealth to grant street railway and other franchises for an indefinite term, subject to revocation either by the state or by the local governments. The Massachusetts committee on street railways of 1898, whose report has already been referred to, characterized this system as utterly illogical in principle; but asserted that, because of the conservatism of the governing authorities in the state, it had not resulted, as might have been expected, in hindering the development of public service corporations. The committee found, on the contrary, that the street railway companies preferred this plan to one by which their franchises would be terminated after a period of years. The law was, however, amended on the recommendation of the committee, so as to require the approval of the railroad commission for the revocation of a "location."

Many street railway franchises, particularly those of early date, are perpetual, and there is no state or local provision under which they can be revoked or amended. Where, however, a corporation whose charter is subject to revocation or amendment holds such an unlimited franchise, the state legislature can virtually annul it, or change the terms of the franchise, through its control over corporate existence. Even if both the charter and the franchise of a public service company are unlimited in duration, the state may, subject perhaps to certain self-imposed limitations, exercise, directly or through local governments, its right of eminent domain to purchase the property for public use. The payment in such a case would ordinarily include not merely the tangible value but the full franchise value. Several state constitutions contain clauses providing that the public authorities shall always reserve the right of eminent domain over the property and franchises of corporations. Such provisions, however, merely declare a generally recognized principle. A constitutional amendment in Colorado, adopted in 1902, confers upon municipalities the right of eminent domain over "public utilities," and similar provisions are found in the statutes of a few states.

Franchises which are perpetual, and not subject to modification by the local authorities, are still permitted by the state laws of New York (except as regards certain cities), New Jersey, Pennsylvania, Missouri, Indiana, all of the New England states, and a few others. Many of the most important franchises in the largest cities of the country are perpetual, and can not be modified by the local governments. In a majority of states the present policy is to limit the duration of street railway franchises by state law. The limit of life is ninety-nine years in Louisiana (the law applying only to parishes), fifty years in Arizona, Idaho, and second-class cities of New York, and by special act (the constitutionality of which is in litigation) in Cincinnati, Ohio; thirty years in Michigan, Virginia, Alabama, and Florida; twenty-five years in Ohio, Iowa (in cities under special charters), San Francisco, Cal., St. Paul, Minn., and Portland, Oreg.; twenty-years in Illinois, Kentucky, Nevada, South Dakota, and Montana; and ten years in Wyoming. There is apparently a tendency to shorten the duration of franchises, the more recent enactments usually prescribing the shorter periods. In many cases cities have limited the life of franchises where no state restriction existed, or have fixed terms shorter than those prescribed by state law.

One modification of the limited franchise is that which contains in the original instrument provision for renewal with revised terms. By the charter of New York city and that of Baltimore, the original grant of a franchise, which is limited to twenty-five years, may provide for renewal for a further period not to exceed twenty-five years, with a readjustment of the conditions of the contract, to be made by bargaining or by appraisal. In Cincinnati the fifty-year franchise, passed under authority of the act above mentioned, permits the city to change the fares after twenty years and again fifteen years later, but at no other times. Such an arrangement increases the security of the street railway com-

[1] Central Trust Company *v.* Citizens Street Railway Company, 82 Fed. Rep., 1.

pany and renders it more willing to introduce the best and most expensive construction and equipment.

Ordinarily, the local authorities are permitted to renew franchises at their expiration by the same procedure as is required for original grants.

Usually the laws limiting the term of franchises contain no provision regarding the disposition of the tangible property of the holder of the franchise at its expiration. Most franchises for street railways also have no provision on this subject, except the requirement that at the expiration of the franchise the company shall remove its tracks from the streets. In practice, such an arrangement has less of a tendency to check improvements than might be expected. Before the expiration of the old franchise the local authorities very frequently make new grants to existing companies, and the compensation demanded for these grants has not, as a rule, been excessive. Corporations have often anticipated such liberal treatment and have made improvements in their property even near the close of the term of the franchise. In some cases, where changes in methods of traction, consolidations, or extensions of existing railway lines have been desired, the local governments have granted new franchises long before the expiration of the old ones. By the laws of a few states the extension or renewal of franchises is not permitted until within a short time before the expiration of the existing grant. This restriction is designed to prevent corruption, but it would seem the part of wisdom to modify it in such a way as, under careful restrictions, to permit new grants when necessary to take advantage of improved methods or to secure needed extensions.

The difficulties growing out of limited franchises have led to the adoption in several recent statutes of provisions for compensating the holders for the value of their tangible property at the expiration of the franchise term. Such an arrangement seems the more desirable in cases where local governments are by law prohibited from granting renewals of franchises directly to the existing companies, and are either required to take over the property or to dispose of the franchises by competitive bids. In Indianapolis, Ind., Baltimore, Md., Portland, Oreg., and elsewhere, municipal charters, or other state laws, provide that if the city takes possession of a street railway at the end of its franchise it must pay the appraised valuation of the tangible property, but must pay nothing for the franchise itself. By general law in Virginia and by the Greater New York charter it is provided that the original franchise must specifically state whether, at its expiration, the city shall pay for the tangible property or shall receive it without compensation. In San Francisco, on the other hand, the city charter requires that the property of all corporations to which franchises shall hereafter be given shall revert to the city without compensation at the end of the prescribed period. In Indianapolis, Ind., and Portland, Oreg., where competitive bidding for the renewal of franchises is required, it is specifically provided that, if the grant is made to another person or corporation, the new grantee must buy the tangible property of the former holder at its appraised valuation. The same requirement is probably intended in the Virginia law and in the Baltimore charter, by which competitive bidding is also required. An arrangement of this sort has the great merit that it largely removes the discouragement to improvements which is otherwise characteristic of limited franchises.

III.

REGULATION OF STREET RAILWAY FARES.

In a considerable number of states the legislature has enacted laws limiting the fares of street railways throughout the state or in individual cities. With few exceptions the maximum fare thus fixed is 5 cents. Thus, in New York no railway built after 1884 may charge more than 5 cents for a ride over its lines within the boundaries of any municipality, a provision which is held to require the issue of transfers on its lines wherever they are necessary to reach the desired destination. In nearly all local franchises limitations are imposed in advance upon the fares. Usually neither the state nor the local government reserves the right to change these limitations during the term of a franchise. This is so generally true that in the detailed presentation by states only departures from this rule are noted. In a large majority of cases the maximum fare provided in local franchises is 5 cents, and it has not been deemed necessary to mention the limitations unless lower fares are prescribed.

Several states, by constitution or statute, have reserved to themselves the right to regulate street railway fares at any time. This is true in New York as regards all railways built since 1884. Moreover, it is generally held that unless the state clearly waives or limits this power, the general authority to regulate common carriers and their charges gives the state this power over street railways in any case. The general municipal corporations act of Illinois confers the power to regulate hackmen, truckmen, and "all others pursuing like occupations." This has been held by the supreme court of Illinois to permit cities to fix street railway fares, and Chicago and several other cities have accordingly done so. (See page 42.) Provisions of somewhat similar character are found in the special or general municipal laws of various other states, but they have not usually been interpreted as applying to the street railways.

The cities of Nebraska and the cities of more than 100,000 inhabitants in Missouri, by the general laws of these states, and the city of San Francisco by its municipal charter, have the right to regulate railway fares at any time. All these cities, however, with the excep-

tion of San Francisco, where such waiver is expressly prohibited, could probably waive the right at the time that the franchise is granted.

In Massachusetts the city council or board of selectmen of a town may petition the state board of railroad commissioners to revise the fares of any company, but it may not reduce them below the average fare charged by other companies in the state operating under similar conditions. With the aid of the reserve power of the legislature in this state it is possible that, at some future time, fares may be reduced either generally or in individual cities; but as yet there have been no important instances of the exercise of this authority.

In Part I, Chapter III, will be found a summary of the facts with regard to street railway fares in the United States. In many, if not in most instances where a fare of less than 5 cents is found, it has been secured by the action of the local governments, usually being demanded as a condition precedent to the grant of franchises, renewals, or additional privileges. In some instances, however, companies have voluntarily reduced their fares, and often they have, on their own initiative, granted or increased transfer privileges. The situation regarding fares in Columbus and Cleveland, Ohio, and Detroit, Mich., more fully described on pages 142 and 145, illustrates particularly the activity of local governments in seeking to reduce fares.

IV.

COMPENSATION FOR FRANCHISE PRIVILEGES.

The growing recognition of the value of the privileges conferred upon street railway companies, particularly in the larger cities, is manifested in the many recent laws and franchises which require special payments to the local governments. Payments which are distinctly designed as a compensation for the peculiar privileges bestowed are in principle sharply differentiated from ordinary taxes upon the property or business of street railways, which seek merely to obtain from them a contribution equivalent to that demanded from other forms of property and business. Taxes in the strict sense are imposed by virtue of sovereign power and are independent of the terms of charters and franchises; while, generally speaking, payments for franchise privileges rest upon contract with the corporations. It may readily happen, however, that the ordinary taxes on street railways in some cities represent a relatively heavier burden than the taxes and the franchise payments combined in other cities.

It is not the purpose of this report to enter fully into the complex subject of general taxation as applied to street railway corporations. In view of the interest which attaches to the methods of taxing such corporations in Massachusetts and New York, however, a brief description of them is given elsewhere (pages 141 and 144). In Part I, Chapter V, will be found general statistics showing the contributions of railways to the state and local governments, but these statistics do not distinguish between taxes proper and special franchise payments.

A considerable difference of opinion prevails as to whether a local government more truly promotes the public welfare by obtaining from street railway corporations, in return for franchise privileges, low rates of fare for railway patrons or larger cash payments into the city treasury which will reduce the burden of general taxation. The same question arises in fixing the charges of a public utility of any class which is operated by a municipality directly. The opinion seems to be gaining ground, as is seen in various laws and franchises of recent date, that the social benefits which accrue from low fares on street railways are so great that the public interest is better served by seeking reductions in charges than by seeking high financial compensation. As a matter of fact, in most of the important cases where special franchise payments of significant amount are required from street railways, the fare charged is 5 cents, while in the cities where lower fares are found, compensation for franchises is seldom paid to the public treasury.

The authority of the state or local government with regard to special franchise payments rests on essentially the same principles as the authority with regard to fares, and is more fully discussed below. However, the power is not usually reserved, either by state law or by the terms of franchises, to change the requirements concerning compensation during the life of the grant.

Car licenses.—The statement just made does not always hold true with regard to license fees, the local authorities being sometimes empowered to collect such fees at rates which they may prescribe from time to time. License fees are usually a fixed amount per car, sometimes per pole or per mile of track. The theory is that the license fee, like that, for example, on hackmen, hucksters, and those pursuing similar occupations, is intended for regulation rather than for revenue.[1] Presumably the courts would not uphold a municipality in an attempt to impose an exceedingly heavy fee. Indeed, the state law or the local franchise ordinance often limits the amount of the license fee.

License fees of one kind or another are collected from street railway companies in a large number of cities. They are particularly common in the Southern states, where licenses are commonly employed as a method of taxing all kinds of occupations. In New York, Chicago, and Philadelphia the car licenses are $50 yearly and in St. Louis $25. In most other important Northern cities the fees are lower. In Cincinnati, at least formerly, and in one or two other places the license is based, not on the number of cars, but on the total length of the cars used, the idea being that a large

[1] See, for example, the New Jersey law referred to on page 143.

car should properly pay more than a small one. In some cases car licenses are based on the total number of cars owned, in others on the average number in use daily during the year. The latter method would seem to be preferable, especially where a different type of car is used for summer travel, since such cars lie idle for a good portion of the year. An objection to car licenses lies in the possibility that they may reduce the number of cars operated, to the disadvantage of the patrons of the railway.

In a few states it is common for local governments to charge an annual license fee on the poles of trolley railways. This practice exists, for example, in several cities of Pennsylvania.

Paving and care of streets.—It is an almost universal practice to require street railway companies to bear the expense of paving or surfacing the space between their tracks in a manner corresponding to the rest of the street or highway. Usually the company must also pave a certain space outside of its tracks, ranging from 9 inches to 2 feet. Where such requirements exist, the railways are generally obliged also to maintain the pavements in repair. In many instances, moreover, the railway company is compelled to clean the street space occupied, to remove snow and ice from it, and sometimes to sprinkle it. All of this work is often done by the local authorities, the expense being collected from the corporations. Provisions regarding the paving and care of the street surface occupied are so common and so nearly uniform that they are not ordinarily mentioned in the detailed presentation in section VII of this chapter.

The most important deviations from the ordinary practice in relation to the paving and care of streets are found in Massachusetts and Philadelphia. The Massachusetts statute of 1898 abolished all former requirements in this respect, and substituted for them an annual tax on gross receipts, payable to the local authorities. In Philadelphia the street railway companies are obliged to pave and maintain, though not to clean, the entire surface of the streets which they occupy. The companies have spent several millions of dollars in paving, and the interest charges on these investments, together with the cost of maintenance of the pavements, represent virtually a larger compensation for franchise privileges than is required in most other American cities.

Occasionally small towns require street railway companies to furnish free street lights, and it is quite common to require free transportation for policemen or other classes of municipal employees.

Percentage of gross receipts.—The most common form of special compensation for franchise privileges, aside from car licenses and paving requirements, is the percentage of gross receipts. Apart from those cases in which the law provides for the sale of franchises to the bidder offering the largest percentage of gross receipts, there are many others in which street railway companies are obliged by state law, or by local franchise ordinances, to make such payments. Thus in New York city, by state law, all surface railways built after 1884 must pay at least 3 per cent of their gross receipts to the city during the first five years of their franchises, and at least 5 per cent thereafter. The rate of 5 per cent is found also in Richmond, Va., Providence, R. I., Newark, N. J., and one or two other cities. In Cincinnati, Ohio, the company pays 6 per cent of its gross receipts into the city treasury, and in Baltimore, Md., no less than 9 per cent, the rate in this city having been originally 20 per cent. In Buffalo the leading company pays 3 per cent. In St. Louis, Mo., varying percentages are required by different franchises and the total revenue derived by the city is considerable. In most other cities and towns which have adopted this method the percentages actually received in addition to the ordinary taxes are less than 3 per cent, but in some places recent charters or ordinances require larger payments for franchises hereafter granted.

Other forms of payment.—Quite frequently, either as the outcome of competitive bidding or of bargaining with a single corporation, cities have obtained lump payments as compensation for new franchises or additional privileges. In other cases, railway companies have been compelled to pay fixed annual sums prescribed in advance in the franchises.

Occasionally a provision is found for an annual payment based on profits rather than on gross business. Thus, in the state of Massachusetts and in the city of Philadelphia, railway companies are required to pay a certain proportion of the excess of their dividends if the latter exceed a fixed rate. In Des Moines, Iowa, a percentage of net earnings is demanded, and in Topeka, Kans., one-tenth of the excess of net earnings over 10 per cent on the investment. In none of these cases is any important revenue derived by the local governments. The mayor of Des Moines states that the railway claims never to have had any net earnings. In fact, as has been often the experience of states in levying taxes based on net earnings or dividends, this method, which is the most just in principle, is very hard to apply satisfactorily in practice, because of the difficulty of correctly ascertaining the net earnings. Payments based on dividends, particularly if they aim only at the excess of dividends above a certain rate, are unsatisfactory unless the issue of bonds and of stocks be properly regulated.

V.

GENERAL CONSIDERATIONS REGARDING THE REGULATION OF FARES AND COMPENSATION.

The foregoing shows in street railway legislation of recent date a growing feeling manifested that it is essential to the protection of the public interests that local governing authorities should retain some control

over the fares of street railways, or over their financial obligations to the public treasury, which is capable of exercise either continuously or at frequently recurring intervals. It is argued that increase in population, or improvements in methods, may render a fare or compensation which is reasonable to-day unreasonable in the future, and that the conditions may change even within a comparatively short time. It is admitted that companies often find it necessary, through extensions of their lines or otherwise, to increase constantly the quantity and quality of the service which they offer to the passenger; but it is maintained that, even so, it may happen that the profits of the business, under prevailing terms, become excessive.

It would seem, however, that, if the authority to regulate the fares and the payments of street railways is to be thus retained, the practice should be guarded by certain well-defined rules which will protect the interests of the railway companies as well as those of the people. Not only is the street railway company justly entitled to legitimate return on its investment, but in the long run the city will deprive itself of the best service unless it permits such a reasonable return. Such rules need to be applied both where continuous or recurrent regulation is attempted, and where new franchises or extensions of old franchises are granted. As already suggested, provision for competitive bidding in granting franchises can not always be relied upon to secure reasonable terms. The city must be prepared to bargain with the street railway company, and to do this satisfactorily its officers must possess proper knowledge and must properly recognize the rights of both parties.

Publicity of accounts.—It has been repeatedly urged that a fundamental prerequisite to the intelligent and just regulation of street railways, whatever be the procedure by which such regulation is attempted, is an accurate knowledge of the financial conditions of the business, both as to cost and value of property and as to operating expenses. The legislature of Ohio recently enacted a statute of great significance in this connection. It requires uniform methods of accounting and publicity of accounts, both on the part of local governments of all grades and on the part of local public service corporations.[1] The recent charters of San Francisco, Cal., and of Portland, Oreg., likewise demand complete publicity of the financial affairs of corporations holding municipal franchises, and some measure of publicity with regard to such corporations is demanded in a few other less important instances.

Regulation of capitalization.—Closely allied with publicity is the regulation of the issue of capital stock and bonds by public service companies. A considerable proportion of the income derived from the charges of street railways must always go to interest and dividends, and the public has a right to demand that these returns should be based on a reasonable capitalization. While this result can be secured in some measure through publicity in construction and equipment accounts, the actual limitation of stocks and bonds is simpler and more effective. The legislation of Massachusetts on this subject has attracted much attention. In that state, no securities may be issued by a street railway company (or by steam railways), except on the approval of the board of railroad commissioners. Only such amounts may be issued as the board may declare reasonably requisite for the specific purposes set forth in the application of the company, and these purposes must be stated in detail in the resolution of the commissioners authorizing the issue. A further provision declares that, when new stocks are issued by an existing company, they must be offered to the present stockholders, not at their par value, but "at not less than the market value thereof at the time of the increase," as determined by the railroad commissioners, "taking into account previous sales of stock of the corporation and other pertinent conditions."[2] In other words, the state undertakes to provide that the corporation shall get as much money for its shares as they may be expected to be worth on the market, and to guard against the distribution of stock dividends. When a consolidation of street railways is made, the same painstaking care is used to prevent the issue of securities in excess of the actual value of the property. Similar provisions are found in Massachusetts with regard to other classes of public service corporations. In Rhode Island, also, the issue of stocks and bonds by street railway companies is subject to the control of the railroad commission. In most states and cities, however, no attempt has been made to restrict the capitalization of street railways.

Sliding scale systems.—Sliding scale devices of various sorts are sometimes introduced into street railway laws and franchises for the purpose of securing an automatic adjustment of fares, or more commonly, of compensation for franchises, so that the people shall share in the advantages of an increase in earnings or a reduction in operating expenses. A greater degree of stability is thus assured to the corporations than they would possess if the public authorities reserved the unrestricted right to revise fares or franchise compensation at any time.

A rough form of the sliding scale which is quite often found, requires the fares to be reduced, or the compensation to the local government to be increased, by prescribed amounts, at certain intervals of time. This is based on the assumption that gross earnings and net profits will increase with the lapse of time. The requirement regarding franchise payments in the new San Francisco charter is a prominent illustration.

[1] Laws of Ohio, 1902, page 511.

[2] Acts of Massachusetts, 1894, chapters 462, 472.

Another form of sliding scale is based on the contingency of an increase in the gross receipts of the railway, either as a whole or per mile of track. Thus, by the franchise of the Columbus Railway Company, fares must be reduced materially when the gross receipts reach $1,750,000 annually. By state law in Wisconsin, and by some of the franchises in New York city and elsewhere, the percentage payable to the city increases as the gross receipts increase. In other countries more elaborate regulations of this sort are found than in the United States. For example, by the franchise of the Montreal Street Railway Company, granted in 1892 for thirty years, the company is required to pay to the city annually 4 per cent of its gross earnings up to $1,000,000; 6 per cent on earnings in excess of $1,000,000 but less than $1,500,000; 8 per cent on earnings from $1,500,000 to $2,000,000; 10 per cent on earnings from $2,000,000 to $2,500,000; 12 per cent on earnings from $2,500,000 to $3,000,000; and 15 per cent on all earnings over $3,000,000. Toronto has a very similar arrangement.[1] The arrangement in these cities, by which the higher rate is applied only to the excess above the specified amount of earnings, serves to remove the strong incentive which might otherwise exist to keep down earnings, at least for a time.

The assumption underlying a sliding scale of this sort, that, as the gross receipts of a railway system increase, the rate of profit on capital invested increases correspondingly, is not always a correct one. Even an increase in gross earnings per mile of track may result from a corresponding increase of investment in improving trackage or equipment. It would seem that, if a sliding scale regulation of charges or franchise compensation on the basis of gross earnings is to be attempted, a proper adjustment should be made whenever the railway company extends its lines or otherwise increases its investments materially.

It requires no argument to show that the theoretically ideal basis for the determination of just fares or franchise compensation is the net profits of the business rather than the gross earnings. If the actual profits could be correctly ascertained, a sliding scale based upon them would furnish the simplest and most satisfactory method of adjusting fares and payments to the city. Any other method of automatic adjustment must be largely arbitrary and is bound to work some injustice either to the people or to the corporations.

As far as can be ascertained there is no instance in the United States where a franchise provides for a reduction of street railway fares as profits increase. The most familiar example of such a sliding scale in Europe is found in the franchise of a leading London gas company, which is required to reduce the price charged as the rate of profit increases, with the result that the people share with the corporation in the gain due to added consumption or reduced operating costs. In a few cases in this country a sliding scale based on net profits or dividends has been adopted to determine the compensation to be paid to local authorities for franchise privileges.

The most conspicuous illustration is the Massachusetts act of 1898, by which any street railway company which has from the beginning of its corporate existence paid in the aggregate dividends equal to 6 per cent on its capital stock, and which is now paying more than 8 per cent, is required to pay a tax, which should more properly be called a franchise payment, equal in amount to the excess of the dividends above that rate. In other words, when the profits exceed 8 per cent the excess must be equally divided with the municipality. In view of the careful restrictions upon capitalization in Massachusetts it is quite possible that this arrangement may ultimately result in considerable revenue to the local governments, though it has so far brought little or nothing. It was urged by the special committee on whose recommendation this law was enacted that the provision for a division of the excess of profits between the corporations and the government was "not subject to the criticism, which appears to be sound, that a limitation of dividends hampers enterprise and improvement. Where a corporation is not limited in the amount of dividend it may earn, but is simply required to pay over a sum equal to the excess of dividends actually paid, over a fixed and reasonable percentage on its capital stock, it will be constantly spurred to render such service that its profits will increase. Being a public service corporation, owned and operated for private profit, it seems just, and in accordance with sound principles, that when the private ownership has received a reasonable return upon its investment, the public should share, through a form of special taxation, in the increment of profit, provided it can do so without the danger of offering an inducement to those in control of the property to stint or conceal their profits."[2]

Foreign municipalities have often adopted sliding scales based on net profits for determining the compensation to be paid by street railways for franchise privileges. In Berlin the leading company, besides paying 8 per cent of its gross earnings to the city, divides evenly with it whatever net profits exceed 12 per cent on the capital stock which was outstanding at the time the franchise was granted and 6 per cent on shares thereafter issued. A more complicated arrangement is found in Hamburg. The street railway company pays about 10 per cent of its gross receipts to the city in lieu of charges for paving, cleaning streets, and the like. In addition it pays to the city 25 per cent of its profits above 6 per cent on its capital stock, if the dividend rate is between 6 and 7¼ per cent; 30 per cent of the excess

[1] Massachusetts Report, pages 134 and 135.

[2] Massachusetts Report, page 38.

above 6 per cent if the dividend is between 7¼ and 8 per cent, and so on until if the dividend exceeds 10¼ per cent, the city receives 50 per cent of the profits above 6 per cent. In foreign cities where such provisions exist the capitalization of the corporations is carefully regulated.[1]

VI.

MUNICIPAL OWNERSHIP.

Legislation permitting municipalities to own and operate street railways has recently been enacted in a number of states. As yet, however, there is no instance in the United States of municipal operation of a street railway. The leading instances of municipal ownership and private operation are the subways in Boston and New York. It was only, however, after private capital had declined to make the necessary investment that the city of New York undertook the financial responsibility for its present subway. The contract between the city and the Interborough Rapid Transit Company (successor to the Rapid Transit Subway Construction Company) required the latter to build the subway and the tracks therein at a cost to the city of $35,000,000, aside from certain expenses for terminals and from the payments for damages to private property. The company then received a lease of the property for fifty years, with the privilege of renewal under modified terms for twenty-five years longer. The lessee was required to equip the system with electric apparatus, cars, etc., and to pay interest on the bonds issued by the city, and, subject to certain limitations, 1 per cent on such bonds annually as a sinking fund. It is expected that the city will ultimately own the subway free of debt, and it will probably then be in a position to lease it at much more favorable terms. The lease of the Boston subway is for twenty years only. The disposition of the majority of the people, both in New York and Boston, appears to be in favor of municipal ownership of subways hereafter constructed, with operation by private companies under lease.

The Massachusetts committee on the relations between cities and towns and street railway companies expressed itself strongly in favor of municipal ownership, but it was still more strongly opposed to municipal operation. "The essential point to which the committee desires to call attention is the distinction here drawn between the ownership of the pavement, and consequent full control of the street, and the running of the vehicle." The committee thought it would be desirable to provide in all future franchises for a reversion of the tracks to the public authorities. It also considered it feasible to take over the property of existing companies under the right of eminent domain, if authorized by statute. The assumption of ownership of the tracks by the local government was not itself, however, to terminate the right of the street railway company to continue operation under lease. The proposal of the committee has never been carried out in actual legislation in Massachusetts.[2]

The principle that the city should at least own, if not operate, its public utilities was adopted by the special commission which framed the present charter of New York city. That law provides that hereafter every franchise for the use of the streets for railway or other purposes must be limited in duration, and that at its expiration the property in the streets shall revert to the city, which is not permitted to dispose of it, but must either operate or lease it. A similar provision is found in the San Francisco charter. In that city all the existing street railway franchises are limited, so that municipal ownership on a large scale seems likely to become an accomplished fact. The San Francisco charter, indeed, specifically declares that it is the purpose of the city ultimately to own all its public utilities, and provides in detail the procedure by which this may be accomplished. There is, however, no specific provision for taking the property of existing corporations by eminent domain, although the city by threatening the construction of competing plants might bring pressure to bear to compel the sale of the existing properties at a moderate price. At a recent election in San Francisco a majority of the voters favored the acquisition of a certain railway, but the two-thirds vote required to authorize the issue of bonds was not secured.

Many other laws authorize municipal ownership and operation of street railways, either in general, or under certain limited conditions. Thus by statute it is often optional for a local government, at the expiration of a franchise, to take over the property. In some, though not in all, laws of this sort, the municipality may operate a railway so acquired. In a number of states the local authorities are empowered to construct or purchase railways, and also, as a rule, other public utilities, and to operate them. For example, this is true generally, or in the case of certain classes of cities, in Illinois, Indiana, California, Oregon, Minnesota, Colorado, and Washington. In Colorado a recently adopted constitutional amendment gives cities specifically the power of eminent domain over existing "public utilities." In some instances where municipal ownership is authorized, a popular vote is required by the statute to secure permission for actual construction, acquisition, or operation. In Illinois an important additional provision is that the fares under municipal operation must be high enough to pay operating expenses, interest, and sinking fund charges on bonds issued for the purpose of acquisition. Systematic methods of keeping accounts are also required by the law of Illinois, the purpose being to make the people acquainted with the cost of operating the railway, and thus give them the power

[1] Massachusetts Report, pages 162 to 183.

[2] Massachusetts Report, pages 30 to 32.

to prevent the public utility from becoming a public burden. The people of Chicago, by a large majority, have voted in favor of acquiring the street railways in that city, and active steps toward accomplishing this object are being taken.

Municipal operation of street railways has become very common in Great Britain and in Germany and is rapidly extending in both these countries. (See pages 150 and 153.) It is probably too soon to express judgment regarding the success of the policy abroad, nor would success there be conclusive evidence of the wisdom of municipal operation in the United States. The street railway service in England and Germany is undoubtedly inferior to that in American cities, but there has been an enormous improvement in the past few years, during which time electricity has been rapidly superseding horse and steam traction. It can not at once be concluded that the inferiority of European railways is due wholly or largely to municipal ownership or even to the strict limitations upon private corporations operating street railways. Probably, however, the limitations put upon private corporations have tended to hamper development much more than municipal ownership has. Even where there is no important public regulation, private enterprise in European countries is often far behind that in the United States, especially as regards technical methods. The density of urban population, particularly on the Continent, where large tenement houses are almost universal in cities, makes street railway transportation less important than in American cities. To be sure, the crowding together is itself in some measure due to the lack of satisfactory street railway facilities, but other more important historical causes have contributed to it.

VII.

CONDENSED DIGEST OF STATE LAWS AND LOCAL FRANCHISE REGULATIONS IN LEADING STATES.

California.—Under a recent general state law all local franchises must be sold to the highest bidder, apparently cash payment being intended, though probably the city could provide for annual payments or percentages. The law requires that sealed bids must first be made, but it permits the highest bids to be raised by an additional oral bid, with an advance of not less than 10 per cent, and so on.[1] Special provisions regarding franchises are also found in the individual charters of certain cities, particularly in those charters which have been prepared and adopted locally, as permitted by the California constitution. Thus the San Francisco charter of 1899[2] requires the sale of any street railway franchise to the bidder offering the highest percentage of the gross receipts. By this charter also 15 per cent of the voters of the city may, by petition, require the submission of the franchise ordinance to popular vote.[3]

The general state law limits the duration of charters of all classes of corporations, and that of franchises of street railways, to fifty years. A large majority of the franchises reported to the Bureau of the Census run for fifty years, but several are for twenty-five years and a few for other periods. The San Francisco charter declares that no future street railway franchise shall be granted for more than twenty-five years, and that at the expiration of the franchise the plant must become the property of the city, which may lease but not sell it.

A general law of the state limits street railway fares in cities of the first class (over 100,000 population) to 5 cents.[4] The new San Francisco charter provides that the local government shall have the power, under franchises hereafter granted, at all times to regulate rates of fare.[3]

The general state law, in addition to the above provision for the sale of franchises, requires that every street railway shall, after five years of operation, pay 2 per cent of its gross receipts to the local government.[5] Many of the earlier franchises in existence, however, require no special payment. The San Francisco charter provides that the minimum payment to the city on franchises hereafter granted shall be 3 per cent of the gross receipts during the first five years, 4 per cent during the next ten years, and 5 per cent during the last ten years of the grant.[3] Oakland apparently receives no annual compensation, but the city recently sold a franchise for $500 in cash. The mayor of Los Angeles reported that the city had received about $125,000 from street railways during the census year. The state law also requires all street railways to pay car license fees and limits the fee which may be imposed by local authorities to $50 in San Francisco and $25 elsewhere.

The San Francisco charter, besides the above-mentioned provision that street railways established under future franchises shall become the property of the city at the expiration of twenty-five years, further declares that it is the purpose and intention of the people of the city that its "public utilities" shall be gradually acquired and ultimately owned. To this end the city supervisors must, from time to time, obtain estimates of the actual cost of different classes of enterprises. The supervisors shall then enter into negotiations for permanent acquisition, by original construction, condemnation, or purchase, of such public utilities as they may think most important, but they must first consider offers for the sale to the city of plants already existing.

Moreover, 15 per cent of the voters of the city, if at

[1] California Statutes and Amendments to Codes, 1901, page 265; 1903, page 90.
[2] Ibid., 1899, page 242 ff.
[3] San Francisco Charter, article 2, chapter 2.
[4] Civil Code, section 501.
[5] Statutes of 1901 and 1903, above cited.

any time they desire any given public utility to be owned by the municipality, may, by petition, require the supervisors to submit to a general vote of the people a plan for accomplishing the desired object. The adoption of such a measure requires only a majority vote, unless the plan involves a bond issue, in which case approving votes must be cast by two-thirds of those voting.[1]

A vote was recently taken in San Francisco on a proposal to acquire one of the street railway lines, and a majority of the voters were recorded in favor of the proposal; but as the plan involved a bond issue, and less than two-thirds of the votes were cast in favor of it, the proposal was not carried.

Colorado.—The general state law requires the written consent of the owners of more than one-half of the frontage on the street concerned before a street railway can be constructed. An amendment to the state constitution (1902) provides that in Denver, or in any other city adopting the provisions of the amendment, franchises of all sorts shall be granted only by a vote of the taxpaying electors.[2]

Several of the earlier franchises granted in Denver are unlimited, but other franchises in this city, and all those elsewhere in the state, are limited to periods of from twenty-five to ninety-nine years.

The laws of Colorado contain no provisions regulating fares or special compensation for franchises, and no important provisions on these subjects appear in local franchise ordinances.

The above-mentioned constitutional amendment of 1902 provides that in Denver, or in any city adopting the provisions thereof, the local government may construct or acquire street railways or other public utilities, and may exercise the right of eminent domain for the acquisition of existing properties. The issue of bonds for this purpose requires a majority vote of the taxpaying electors.

Connecticut.—In Connecticut, somewhat exceptionally, all street railways receive from the state legislature not only their corporate charters, but also, by special act in each case, their rights to occupy the streets. Ordinarily the local authorities have no control over the matter, except with regard to the details of adjustment of the tracks to the street grade and other matters of this sort, and even as to these details the railway company may appeal from the decision of the local authorities to the state board of railroad commissioners. The general statute relating to street railways gives the local governments no authority to regulate fares or impose other conditions.[3]

The legislature has made it a practice, in chartering individual street railway companies, to grant them perpetual rights, but under the state constitution corporate charters are subject to amendment or repeal by the legislature.

There is in the state law no general provision as to fares and the special acts for individual railways ordinarily contain no unusual restrictions in this respect.

In Bridgeport, New Haven, and Hartford, the only cities in Connecticut from which reports on this point were received, there is no special compensation to the city for street railway franchises, and the general laws of the state contain no provision on this subject.

Georgia.—The legislature of Georgia has provided a general incorporation law for street railways, but the state also grants special charters. Under the general law, the consent of the local authorities is required for the laying of tracks in the street.[4]

The general state law limits the life of street railway charters to thirty years, but the reports of the companies show that the local franchises vary widely in duration. Two franchises, including that of the company in Savannah, are perpetual; two run for twenty years only; while several range from fifty years, or longer periods, up to ninety-nine years.

The general street railway law contains no provision as to fares, and the prevailing rate is 5 cents.

There are no general provisions of law with regard to compensation for franchise privileges. In Atlanta, however, the consolidated railway is required, by the terms of a city ordinance of 1902, to pay to the city 1 per cent of its gross earnings during the first three years, 2 per cent during the next twenty years, and 3 per cent thereafter till the expiration of the various franchises. These percentage payments are in lieu of license taxes, but the company pays the ordinary property taxes. A cash payment of $50,000 was also made to the city at the time of the consolidation.[5] Savannah, in addition to the property tax, requires the payment of a fee of $25 per year on each car and of $100 on each mile of track. These payments, however, do not indicate any policy of securing special compensation for franchise privileges. They are merely part of a general licensing policy which is applied to all classes of business in most of the Southern states.

Illinois.—The constitution of 1870 prohibits the legislature from granting the right to use the streets of a city to a street railway company without local approval. The general state law before 1899 provided that local authorities could grant franchises to street railways only upon petition of the owners of one-half of the frontage on the streets concerned. By legislation in 1899 this provision was omitted as regards surface railways, though apparently it is still in force as regards elevated railways.[6]

Corporate charters of all classes are limited to ninety-

[1] San Francisco Charter, article 12.
[2] Mills's Annotated Code, 1891, section 4, page 403; Session Laws of Colorado, 1901, chapter 46.
[3] General Statutes of Connecticut, 1902, chapter 217.
[4] Code of Georgia, section 2, page 180.
[5] Commercial and Financial Chronicle, Vol. 74, page 377.
[6] Myers's Authorized Statutes, 1898, chapter 66 and section 321; Laws of Illinois, 1899, page 331.

nine years and may be amended or repealed by the legislature. The state law of 1874 limited franchise grants to twenty years, though some earlier grants were for longer periods and some were even perpetual. In 1897 the limit was extended to fifty years, and it was also provided that cities might grant extensions of existing franchises for the same period of time. No franchises were granted or extended in Chicago under these laws because of opposition from the citizens. In 1899 the act of 1897 was repealed and the twenty-year limit was again imposed.[1]

A large majority of the existing franchises in Illinois are limited to twenty years, but a considerable number exist with limits of twenty-five, thirty-five, forty, and fifty years.

The date of the expiration of the more important street railway franchises in Chicago has been a matter of much dispute and litigation. These grants were originally made by the city government in 1858, 1859, and 1861, and were limited to twenty-five years. In 1865 the state legislature passed an act extending the corporate charters of the railway companies holding these franchises so as to make their total duration ninety-nine years. This act sought also to extend the local franchises for a corresponding period of time, but the right of the legislature to do so was later disputed by the city authorities. When the question arose in 1883, at the expiration of the period fixed in the ordinances of 1858, its settlement was postponed by agreement, and the city passed a new ordinance extending all the existing franchises for twenty years. This extension expired July 30, 1903, but the companies claimed rights for important parts of their trackage under the ninety-nine-year act of 1865. This contention was upheld by the Federal circuit court in May, 1904, despite the argument that the act of 1865 related to horse railways only, and appeal from this decision is now pending. Meanwhile, however, various franchises granted after 1865 have expired and the city is moving to oust the companies from the trackage covered. There have been many negotiations between the companies and the city with reference to an extension of the franchises, but no agreement has yet been reached as to terms, and apparently a large majority of the people are determined not to permit such an extension under any conditions, but to insist on municipal ownership, if not also municipal operation.

A general provision of the municipal corporations law of Illinois authorizes cities to license and regulate hackmen, draymen, and "all others pursuing like occupations." This provision has been interpreted by the state supreme court as empowering the cities to regulate fares on street railways, and under it Chicago has fixed the maximum fare within the city limits at 5 cents, requiring that transfers be given to passengers who have paid cash fares at any connecting point on the lines of any single company.[2] In Peoria the street railway is required to sell 12 tickets for 50 cents or 100 for $4, and in Rockford and Springfield 25 tickets must be sold for $1, but elsewhere in the state there has been little attempt to reduce fares below 5 cents.

Under the general provision mentioned above, authorizing cities to license those engaged in local transportation, Chicago and Peoria both require street railways to pay a license fee of $50 per car. No other special compensation is at present obtained from the street railways in either of these cities, nor, so far as has been ascertained, in any other Illinois city.

In 1903 the state legislature passed a law which may be adopted by any city on popular vote. If adopted the city may construct street railways and acquire them by purchase, but without the exercise of the power of eminent domain over existing lines. A majority vote of the people is required for the authorization of each acquisition, and before the city can itself operate a railway the approving vote of three-fifths of the electors voting on the question must be secured. The issue of bonds or other obligations also requires a separate popular vote. The charges under public operation must be high enough to provide operating expenses, interest, and sinking fund for bonds issued. The bonds may be issued as a general obligation of the city, or they may be secured by mortgage of the street railway property only.[3] No city owning a railway may lease it for a period of five years or longer without having given opportunity for a protesting petition, which, if signed by a specified proportion of the electors, makes necessary the submission of the matter to popular vote.

In April, 1904, the people of Chicago, by a large majority, adopted this law, and by a separate vote of 120,744 to 50,893 favored the acquisition of all the street railway lines in the city. In view of the complications and litigation regarding the expiration of the franchises of the existing lines it will presumably be some time before the acquisition can be accomplished, and it is possible that a compromise may be effected by which private operation, or even private ownership, may be continued.

Indiana.—In cities having boards of public works this body must act in connection with the city council in granting franchises. In incorporated towns 40 per cent of the voters may by petition require any proposed franchise grant to be submitted to popular vote.[4]

The duration of corporate charters of street railway companies under the state law is unlimited, and that of franchises granted by local authorities is not limited by statute; but, with few exceptions, the franchises reported to the Bureau of the Census are limited. The most common period is fifty years, but many have a

[1] See Myers's Authorized Statutes, 1898, chapter 66; Laws of Illinois, 1897, page 282; Laws of 1899, page 331.

[2] See Part I, Chapter III, page 43.

[3] Laws of Illinois, 1903, page 285.

[4] Laws of Indiana, 1899, page 131.

shorter duration. A recent state law authorized Indianapolis to extend the charter of the street railway company in that city for not more than thirty-four years. At the end of that period the city may purchase the lines at an appraised valuation, or may open the franchise to competition for an extension of not more than thirty years. In the latter case the successful bidder, if it is not the existing company, is required to buy the lines of that company at an appraised valuation.[1]

The general street railway law authorizes the companies to fix fares, but this does not preclude the local government from regulating fares by the terms of franchise grants. In various instances local authorities by the terms of franchises have required 6 tickets to be sold for 25 cents. Several years ago a state law[2] was passed establishing a 3-cent fare in Indianapolis, and this was held constitutional by the supreme court of the state under the general power of the legislature to regulate common carriers.[3] But the Federal district court declared that, under the clause of the state constitution forbidding special legislation, the general street railway law, which authorized the corporations to fix fares, could not be amended except by a statute which should apply to all companies.[4] The later law above mentioned, which authorized an extension of the franchise in Indianapolis, required 6 tickets to be sold for 25 cents, or 25 for $1.

There is no general state provision on the subject of compensation to cities for franchise privileges. The extended franchise of the Indianapolis Street Railway Company, granted in 1899, required it to pay to the city $30,000 yearly up to 1925 and $50,000 yearly thereafter. In Evansville the local franchise requires the company to pay 2 per cent of its gross receipts for the first twelve and one-half years and a gradually increasing percentage thereafter up to 4 per cent for the last twelve and one-half years of the fifty-year grant. The payment to the city during the census year was $3,485. In Fort Wayne the company is required by its franchise to pay 2 per cent of its gross receipts and $1 annually on each pole. The receipts are about $8,000 per year. In Terre Haute the company recently paid $78,000 for a fourteen-year extension of its franchise.

Several of the classes of cities distinguished by the state laws of Indiana are authorized to purchase, erect, and operate street railways, but no details as to procedure or other matters appear in these statutes, and there is no instance of municipal ownership.[5]

Iowa.—By a general state law of Iowa a popular vote may, on petition of citizens, be required for the granting of a franchise that involves the use of a city's streets by a public service corporation. Interurban railways have the same power that is granted to steam railway corporations for condemning land, but the use of the public highways requires the consent of the county authorities.[6]

The present statute limits grants of franchises, by cities under special charter, to twenty-five years, but no such limitation appears in the general municipal corporations law.[7] The majority of the franchises in the state are for twenty-five years, but several are for fifty years, two or three are for other periods of time, and four or five are perpetual.

The state laws are silent on the subject of fares, but the franchises granted in a number of cities and towns require tickets to be sold at a reduced price, usually 6 for 25 cents.

The general laws of Iowa have no provision on the subject of special compensation to cities for franchises. In Des Moines the railway pays 5 per cent of its gross earnings from mail, express, and freight traffic, and is also supposed to pay a certain percentage of its entire net earnings in lieu of other taxes. The company has always denied that it had any net earnings, and has paid the ordinary property tax only. In Sioux City there is a car license fee of $25. In Davenport and Dubuque no special payments are required from street railways.

Kentucky.—By the Kentucky constitution, which dates from 1891 (section 164), local franchises of all sorts must be sold to the "highest and best bidder."

The present state constitution also limits the duration of local franchises to twenty years. Several railways, however, hold part or all of their lines under earlier grants, some of which are perpetual and others for periods ranging from thirty to ninety-nine years.

The state laws do not regulate fares, but the local franchise ordinances in some of the smaller cities require tickets to be sold at a price somewhat less than 5 cents each.

The mayors of Lexington, Covington, and Frankfort reported that no annual payments as compensation for franchises are received, and the same seems to be true in most, if not all other cities of Kentucky; but in Frankfort a franchise was recently sold, apparently for a cash payment.

Louisiana.—Recent state laws in Louisiana, applying to New Orleans and to all parishes, provide that street railway franchises may be granted only to the bidder offering the highest percentage of the gross receipts. The general state law regarding franchises in parishes further requires a petition of a majority in number and amount of the abutting property holders.[8] As most cities have special charters, they do not make uniform

[1] Laws of Indiana, 1899, chapters 150 and 180.
[2] Laws of 1897, chapter 132.
[3] Indianapolis *vs.* Navin, 151 Ind., 139.
[4] Central Trust Company *vs.* Citizens' Street Railway Company, 82 Fed. Rep., 1.
[5] Burns's Annotated Indiana Statutes, 1901, sections 3830, 3963, 4117.
[6] Code of Iowa, sections 779 and 956.
[7] Code, sections 767 and 955.
[8] Laws of Louisiana, 1896, chapter 45, section 87; 1902, chapter 188.

requirements as to franchises; nor is the subject covered by the general municipal corporations law of 1898.

All corporate charters are limited by the constitution to ninety-nine years, and the recent law mentioned above establishes the same maximum limit for local franchises in parishes; nearly all existing franchises in cities, however, are for shorter periods. Most of the franchises of the consolidated street railway system in New Orleans expire between 1950 and 1960.

The state laws contain no general provisions as to fares, and the prevailing rate on all lines is 5 cents.

Few, if any, franchises have ever been granted under the recent laws requiring competition. In New Orleans the street railways make no special franchise payments.

Maine.—Some railways in Maine are incorporated under a general state law, but others have obtained their charters by special act. Under the general law (as well as ordinarily under special acts) the consent of the local authorities is required for the use of the streets, but appeal may be taken by a railway from the action of the local authorities to the supreme judicial court, and the approval of the state railroad commissioners is also necessary.[1]

There is no general restriction on the duration of franchise grants. Most of those reported are perpetual, but several are limited to from twenty to fifty years.

The general law is silent as to fares, and no unusual provisions appear in special acts or franchises.

On the subject of special compensation to cities the general state law has no requirement. Augusta and Portland reported that they received no special compensation under the franchises granted by them.

Maryland.—There is no uniform municipal law or street railway law in Maryland. The companies in Baltimore have been incorporated by special statutes, but their right to use the streets has been granted by local authorities. By the new Baltimore charter[2] the granting of a franchise requires not only favorable action by the city council, but also the approval of the board of estimates, a body composed of 5 officials and having general control of the city finances. This board is directed by the law to inquire diligently as to the money value of the franchise; and while the law provides that future franchises shall be first offered at competitive bidding, the board is supposed to supplement this method, when necessary, by careful bargaining.

The greater proportion of the existing street railway franchises in Baltimore and elsewhere in Maryland are perpetual, but under the constitution the charters of the companies may be amended or repealed by the legislature. The present charter of the city of Baltimore (section 9) limits future franchises to twenty-five years, but the grant may provide in advance for extensions not exceeding in the aggregate twenty-five years, at a fair revaluation. At the expiration of the grant the city may renew it, in accordance with the original procedure for an equal period or the city may take over the plant, either without compensation or at a valuation to be fixed by appraisal (without allowance for value of franchise), as may have been provided in the original ordinance.

The only instance in Maryland in which a city fare of less than 5 cents for adult passengers has been reported is in Cumberland, where 6 tickets must be sold for 25 cents.

Baltimore is quite exceptional in having from the first introduction of street railways insisted upon a large payment to the city for the privilege of using the streets, the city ordinances making the first extensive grants, which date from about 1860, requiring the companies to pay 20 per cent of their gross receipts to the city. Subsequently the payment was reduced by state law to 9 per cent, which is at present required from all the railways in the city. The companies also pay a low car license fee.[3] These special payments—the percentage tax and the license fees—amounted in the census year to $324,398.

The Baltimore charter (section 9) permits the city, at the expiration of the franchise of any public service corporation, to become the owner of the plant and either to operate or lease it.

Massachusetts.—The state of Massachusetts is peculiar and interesting in its policy with regard to public service corporations generally. The present state law regarding street railways,[4] which was adopted in 1898, after a careful investigation by a special commission, headed by Charles Francis Adams, jr., conforms in general to the earlier policy, but it contains some important modifications. Many street railways obtain their charters by special law, although a general incorporation law has been in existence for some time. By the act of 1898, as was ordinarily true before, the consent of the local governing authorities is required for the use of the streets, and they may impose such restrictions at the time of the grant as they see fit. The law, however, provides that, on appeal by the owners of more than one-half in value of the abutting property, or by ten owners of such property, the action of the local authorities in granting a franchise is subject to revision by the state board of railroad commissioners, and a later law has required that all "locations" of street railways shall be approved by that board.[5] Where a railway seeks to operate in several towns or cities, part of which have granted a location, appeal may be taken to the railroad commissioners from the refusal of another city or town. In granting to any company the right to extend its railway lines the local

[1] Revised Statutes, 1903, chapter 53; Massachusetts Report, page 96.
[2] Laws of Maryland, 1898, chapter 123, section 37.
[3] See Massachusetts Report, pages 96 and 114.
[4] Acts of 1898, chapter 578.
[5] Acts of 1902, chapter 399.

authorities are prohibited from imposing restrictions or obligations not contained in the original franchise.

All state charters in Massachusetts are perpetual, but are subject to repeal or amendment by the legislature. The state law also permits the local authorities to make perpetual franchise grants, and, without exception, the existing franchises reported are perpetual. The state has, however, reserved to the local authorities the right to revoke the "location" at any time; but under the law of 1898 the board of railroad commissioners must approve such revocation if the company opposes it. The franchises for elevated lines in Boston are not, however, subject to revocation.

The general policy in Massachusetts has been to reserve to the public authorities a continuous control over street railway companies, this control being enforceable by the right to revoke the charter or the franchise. Under the law of 1898 the local governments can not directly change any important provision in a street railway franchise, but they may petition the board of railroad commissioners, which, after a due hearing, may regulate fares. Fares shall not, however, without the consent of the company, be reduced below the average rate charged by other companies for similar service under substantially similar conditions. This last provision would seem in considerable measure to destroy the effectiveness of the regulation of fares. It would be impossible to lower the fares of any railway at all, however excessive they might be, if all companies similarly situated happened to charge equally excessive fares. As yet there has been no important instance of the exercise of this power to regulate fares. The fare for ordinary passengers is almost universally 5 cents.

A Massachusetts law which is very important in its bearing upon charges requires that all issues of stocks and bonds by steam and street railway corporations shall be approved by the board of railroad commissioners, and that they shall not exceed in par value the necessary cost of construction, stock dividends and other methods of stock watering being prohibited. This law has been carried out with considerable vigor, and as a result the street railways are much more conservatively capitalized than those of most other states.[1]

As far as can be ascertained, the earlier franchises and laws in Massachusetts did not ordinarily require special compensation to the local governments for the use of the streets by railway companies, nor have requirements additional to those imposed by general law been inserted in more recent franchises. Massachusetts has for a long time, however, taxed corporations of all classes more effectively than most states. The general tax on street railway companies is based on the value of the track and franchise in excess of the value of machinery, buildings, and other locally assessed property. This "corporate excess" value is determined by the state tax commissioner, and is ordinarily based on the market value of the company's securities. The tax rate on the value thus ascertained is equal to the average rate upon other forms of property in the state as a whole. The tax collected, which is in lieu of all taxes upon the shareholders in the street railway companies, is divided among the local governments throughout the state in proportion to the street railway mileage lying within their limits. This arrangement results in giving to cities and towns within which lie the less profitable street railways an amount greater than they would be able to obtain if they collected a tax directly from the local companies.

In addition to this general tax, the law of 1898 provided a form of special franchise taxation which is quite unusual in this country. Any company that shall have paid dividends since the date of its organization averaging 6 per cent yearly on its capital stock, and that now pays more than 8 per cent on such stock, is required to contribute to the state annually a sum equal to the excess of its dividends above that rate; in other words, to divide its excess profits evenly with the public. The same provision appears in the Boston Elevated Railway charter of 1897.[2] The receipts from the special franchise tax are also to be divided among the localities in proportion to the street railway mileage lying within their limits. As yet no companies in the state pay more than 8 per cent on their capital stock, but several have attained that rate, and the Boston Elevated and several other leading companies already pay 6 per cent. In view of the careful restriction of capitalization, it is probable that as railway profits increase considerable sums may ultimately be received from some of the railways under this provision.

Still another tax in Massachusetts is peculiar in its purpose. In most states the street railways are required to pave the space covered by their tracks and to keep it in repair, sweep it, and remove the snow. In lieu of this requirement Massachusetts has provided a tax on the gross earnings of street railway companies, as recommended by the special commission of 1898. This varies by gradual steps from 1 per cent for railways whose earnings per mile of track are $4,000 or less to 3 per cent for those whose earnings per mile are $28,000 or more. On petition of the company or the local government these payments are subject, at three-year intervals, to revision by the railroad commissioners so as to correspond to the actual average cost of caring for the street surface occupied.

The various taxes and other payments made by the street railway companies of Massachusetts to the public authorities in 1902 were equal to nearly 7 per cent of their gross receipts—a larger proportion than in most other states. Probably about one-fifth of the amount

[1] Acts of Massachusetts, 1894, chapter 462.

[2] Acts of 1897, chapter 500.

paid represents the commutation of the requirement to pave and care for the street surface occupied.

The state laws of Massachusetts do not authorize municipal ownership of street railways. The subway in Boston,[1] however, was constructed and is owned by the city. It is leased to the Boston Elevated Railway Company for twenty years at a rental equal to 4⅞ per cent on the city's investment. The railway company has sought to secure the right to construct and own other subways, but the city has insisted on retaining its control and has defeated the proposed legislation. It is expected that the city will accordingly construct the other proposed subways and lease them.

Michigan.—In the cities of Michigan a vote of two-thirds of all the aldermen is required to grant a franchise.[2] In one or two cases in Detroit an unofficial vote of the people has been taken on franchise questions. Such a vote, according to a letter from the mayor's secretary, "was supposed to have a moral effect upon the aldermen." In fact, a recent ordinance of the city requires that future franchises shall be submitted to popular vote, if demanded by 18 members of the city council or by 5 per cent of the voters; but such a vote is purely advisory.

For interurban railways the consent of two-thirds of the owners of property abutting on the roadbed is required,[3] but there is no such provision for urban railways.

Corporate charters of street railway companies under the general state law are limited to thirty years, and the charter may be amended or repealed by the legislature.[4]

There is no state restriction on the duration of local franchise grants, but most of the franchises are for the period of thirty years. Several companies, however, report part or all of their franchises as having a shorter duration. In Detroit the policy in recent years has been to grant franchises for track extensions only until the date of expiration of the franchise for the main system.

As to the question of fares the state law merely provides that there shall be no revocation during the term of its franchise of rights once granted a street railway.[5] About 40 miles of track were constructed by the Detroit Street Railway Company under a franchise granted about 1896 which required that 8 tickets be sold for 25 cents. The older company for a time met the competition of this new railway by a 3-cent fare. Finally a combination of the two companies was effected and the fare on the older lines was raised again to 5 cents (except at rush hours, when tickets sold at the rate of 6 for 25 cents may be used). The city attempted to fix the fares on all lines at 3 cents, but its right to do so was denied by the courts. In several of the smaller cities of Michigan the local franchise ordinances require tickets to be sold at a reduced rate, usually 6 for 25 cents.

In the absence of any state provision in regard to special compensation to cities, the requirements depend wholly on local franchise ordinances. No special payment for franchise privileges, aside from ordinary taxes, is required in Grand Rapids or Saginaw. In Detroit the lines of the Detroit Street Railway Company were not only not required to pay any special taxes on earnings, but they were not even required to pave and maintain the surface between the tracks. Several of the other franchises in Detroit require the payment of from 1 to 2½ per cent of the gross receipts, the leading lines paying 2 per cent. The total amount received by the city of Detroit from this source in 1902 was $30,823.

In 1899 a law was passed authorizing Detroit to construct or acquire and to operate street railways, but this act was held invalid by reason of the clause in the constitution prohibiting the state or its subdivisions from taking part in works of internal improvement. A movement is now on foot to secure an amendment to the constitution which shall permit municipal ownership of street railways.[6]

Minnesota.—In the legislation of Minnesota the only provision of importance as to the method of granting franchises is in the new charter of St. Paul, adopted in 1900, which requires a three-fourths vote of each body of the city council.

All corporate charters are limited to fifty years, but with provision for renewal; they may be amended or repealed by the legislature. The general state laws do not limit the duration of local franchises, but the new St. Paul charter restricts the duration of street railway franchises to twenty-five years. Several of the earlier franchises in St. Paul and Minneapolis are perpetual, and most of the others throughout the state are for fifty years.

The general laws of Minnesota contain no provisions as to fares or as to special compensation for franchises. The new charter of St. Paul requires railways hereafter authorized to pay at least 5 per cent of the gross receipts to the city; but nothing is received by the city at present, the existing lines operating under old franchises.

As far back as 1893 the Minnesota legislature enacted a law permitting any city or village at the expiration of five years from the time of granting a franchise to any public service corporation, or at the expiration of any five-year period thereafter, to buy out the plant at an appraised valuation. The approving vote of two-thirds of the electors voting thereon is required to authorize such a purchase.[7] No action has yet been taken by any city under this law.

[1] For description of this subway, see page 37.
[2] Compiled Laws of Michigan, section 3111.
[3] Public Acts of 1901, chapter 238.
[4] Compiled Laws, section 6436.
[5] Ibid., section 6447.
[6] Proceedings of Detroit Conference of National Municipal League, 1903, page 136.
[7] Statutes of Minnesota, 1894, section 2592.

Missouri.—The state constitution of Missouri prohibits the legislature from granting the right to use the streets of a city without the consent of the local authorities.[1] A law of 1899 requires, before the granting of a franchise, a petition of the owners of more than half of the frontage on streets which are to be occupied by the street railway;[2] this provision formerly existed only for certain classes of cities. A general law also permits the local authorities in cities of more than 100,000 inhabitants to require competitive bidding for franchises, but this method has not heretofore been pursued, at least in St. Louis or St. Joseph.[3]

There is no state provision on the subject of duration of corporate charters or franchises. The actual franchises reported vary greatly in duration, even within the city of St. Louis. The most common period is fifty years, but several franchises are for twenty years only; none are perpetual.

Cities of more than 100,000 inhabitants, designated by Missouri laws as first-class cities, are given the continuous right to regulate fares on railways now built or hereafter to be built.[4] Other classes of cities are not given this power. In St. Joseph the street railway is required to sell 100 tickets for $4.

The law for cities of the first class permits them to impose, at the time of granting the franchise, taxes on passengers, cars, or gross receipts. Other classes of cities are granted authority to levy license fees on cars.[5] Various requirements of percentage payments exist in St. Louis franchises. According to the report of the mayor, the ordinary tax receipts from street railway property were supplemented, in the census year, by $105,858 from special percentage taxes, and by $24,750 from car license fees, at $25 per car.

New Jersey.—The general law of New Jersey provides that no company may be permitted to construct street railways without the consent of the local authorities and of the owners of one-half of the street frontage affected.[6]

The state law contains no restriction on the subject of duration of franchises. Seventeen companies report that all of their franchises are perpetual, and several others report that a part of their franchises are perpetual. Some companies, however, have franchises limited to periods varying from thirty-five to ninety-nine years.

The state laws do not regulate fares, and the prevailing limit fixed by local franchises is 5 cents.

By a state law any city of over 100,000 inhabitants may impose license taxes on street railways for the purpose of regulation, but not for the purpose of taxation or for the purpose of preventing the use of the franchise. This law, however, does not hinder a city from making such requirements as it sees fit when it first grants the franchise. In Newark the street railway companies are required to pay 5 per cent of their gross receipts and a license fee of $10 per car. The receipts from street railways, aside from ordinary taxes, were $86,797 in the census year. In Paterson there is a special payment of 2½ per cent of the gross receipts, which amounted to $14,636 in the census year.

New York.—A constitutional amendment in New York, passed in 1875, provides that no surface or elevated railway may be constructed in the public streets without the consent of the local authorities and of the owners of one-half, in value, of the abutting property. If such consent be refused, an appeal may be taken to the courts, which are required to investigate through three commissioners the public necessity of the railway.[7] By statute the consent of the owners of two-thirds, in value, of the abutting property is required for constructing a railway in an unincorporated town.[8] By other laws, originally enacted in 1884 and applying only to New York city, but since extended to all cities of over 50,000 inhabitants, street railway franchises must be sold, by competitive bidding, to the corporation offering the highest percentage of gross receipts.[9] By the New York city charter[10] it is further provided that no franchise grant of any sort shall be made except on terms deemed satisfactory by the board of estimate and apportionment, a small body composed mainly of executive officers, which has the chief control over the finances. The board is directed to make careful inquiry as to the value of the proposed privileges, and is supposed thus to supplement competition by careful bargaining. A vote of three-fourths of the members of the board of aldermen is also required. In cities of the second class, with from 50,000 to 250,000 inhabitants, the approval of a similar board of estimate and apportionment must be given subsequent to the auction sale.

Under the street railway law there is no general restriction on the duration of charters or franchises, but charters may be amended or repealed at any time by the legislature. By the New York city charter no franchise for any public utility shall be for a longer period than twenty-five years, but it may contain a provision for renewal, for not to exceed twenty-five years, upon a fair revaluation (section 73). In cities of the second class—from 50,000 to 250,000 inhabitants—franchises are limited to fifty years (section 19). The more important franchises in most of the cities of the state, including New York city, are perpetual, having been granted before the passage of restrictive laws. Seventy companies report that all of their franchises are perpetual, and others report that part of their franchises

[1] Article xii, section 20.
[2] Laws of Missouri, 1899, page 105.
[3] Revised Statutes, 1899, section 5438.
[4] Ibid., 1899, section 5439.
[5] Ibid., 1899, sections 5438, 5508, 5857, and 5978.
[6] General Statutes of New Jersey, 1895, pages 3231 and 3247.
[7] See Constitution of 1895, article iii, section 18.
[8] Railroad Law of New York, section 91.
[9] Railroad Law, section 93; charter of second-class cities, Laws of 1898, chapter 182, section 19.
[10] Laws of 1901, chapter 466, section 74.

are perpetual. There are, however, a considerable number of limited franchises, usually ranging in duration from fifty to ninety-nine years, with a few of nine hundred and ninety-nine years' duration.

A general law, enacted in 1884 and applying to all railways constructed after the passage of the act, limits fares to 5 cents for any distance which can be reached by the cars of a single company within the limits of a single city or village. This is held to require practically unlimited transfer privileges over the lines operated by a single company, including the lines which it holds under lease.[1] The right of the state legislature to revise fares on street railways constructed after 1884 is expressly reserved by the law. Local franchise ordinances in several small towns have required tickets to be sold at reduced rates, usually 6 for 25 cents, but Syracuse is the only large city in which a fare lower than 5 cents is required. The law of 1884, which contained the provision for competitive bidding on franchise grants, also provided that in any city of more than 1,200,000 inhabitants, all surface railways thereafter constructed should pay to the city a minimum of 3 per cent of their gross receipts during the first five years and 5 per cent thereafter. Moreover, the general railroad law provides that other cities and villages may, in granting franchises, require an annual percentage payment, not to exceed 3 per cent of the gross receipts.[2]

In New York city a few railway franchises dating back of 1884 require small annual payments to the city, but many of the most important lines are free from such requirements. In the franchises granted since 1884 the minimum percentage required by law has seldom been exceeded through competitive bids, though there are a few instances in which the percentage secured in this way is from one-fourth of 1 per cent to 1 per cent above the statutory minimum, and one in which it is 3 per cent above that minimum. The board of estimate and apportionment has of late favored the policy of demanding a percentage increasing from time to time. Thus the franchises for two extensions on Manhattan Island, granted in 1899, required the payment of 4 per cent of the gross receipts during the first five years, 6 per cent during the next five years, 8 per cent during the next five years, and 10 per cent during the remaining ten years of the grant.[3] New York city also levies a license fee, usually of $50, on cars; but some companies are exempt or have lower rates by the terms of their franchises. The total payments by street railway companies to New York city, aside from ordinary taxes, amounted to $422,177 in 1902.[4]

In Rochester the street railway company pays 1 per cent of its gross receipts to the city, the revenue from this source, together with a small car license fee, being about $30,000 a year. In Buffalo the leading company at present pays 3 per cent of the gross receipts. Formerly one of the leading companies was subject to no such requirement, but it combined with another company which under the plan of competitive bidding had agreed to pay 13¾ per cent of its receipts to the city. A compromise was made with the city by which 3 per cent should be paid on the receipts of the consolidated system. The total payments to the city from this source in the census year were $85,851.[5] In Utica, Binghamton, and Albany no special payment of any importance is made to the city by the street railway companies.

An important state law of 1899[6] requires that the value of "special franchises," including therewith as a single unit the tangible property so far as it occupies public streets and places, shall be assessed to its full amount by the state board of tax commissioners. The assessment is then reported to the local authorities, and the ordinary tax is collected on this basis. Under this law the assessment of street railway companies, particularly in New York city, has been greatly increased. The constitutionality of the law has been upheld by the New York courts.

The charter of New York city (sections 71 and 73) declares that the rights of the city in its streets and public places are inalienable. Every franchise for a public service enterprise may provide that at its expiration the plant shall become the property of the city, either without payment or at an appraised valuation, which shall not include any allowance for the value of the franchise itself. The city may then either operate the plant directly or lease it for not more than twenty years, after competitive bidding.

The new subway in New York city is owned by the city and leased to an operating company under conditions more fully set forth on page 135.

Ohio.—By a general state law of Ohio franchises for street railways may be granted only with the consent of the owners of more than one-half of the frontage of the streets to be occupied. Moreover, franchises must be sold by public competitive bidding to the corporation offering to make the lowest fares.[7]

The general law (with an exception for a limited class of cities) restricts the duration of local franchises to twenty-five years, without special provision regarding renewal.[7] Of the 63 companies reporting on this subject, 41 have all of their franchises limited to twenty-five years, and several others hold part of their system under franchises so limited. A few franchises, dating from an earlier time, are perpetual, and a few others are restricted to other periods of time than the present statutory limit.

[1] Railroad Law, section 101; see also page 42.
[2] Ibid., section 95, as amended.
[3] Myers, in Municipal Affairs, March, 1900, pages 155 and 157.
[4] Annual Report of Comptroller of New York, 1902.
[5] Letter from Mayor; see also Massachusetts Report, page 115.
[6] Laws of 1899, chapter 712.
[7] Revised Statutes of Ohio, sections 2501 and 2502; repeated in New General Municipal Code, Laws of Ohio, special session, 1902, pages 31 and 32.

In 1896 a special act was passed which permitted existing companies in any city to consolidate, and which authorized the city governments in such cases to extend the franchises for fifty years. The terms with regard to fares which should be imposed by the city at the time of such extension were to remain unchanged for twenty years. At the end of the twenty-year period, and again fifteen years later, the city was to have the right to alter the rates of fare. The railway companies of Cincinnati, in whose interest principally the law was passed, consolidated and received an extension of their franchises for fifty years. The act was repealed in 1898, and it has recently been declared unconstitutional by the superior court of Cincinnati. The case is still pending, however, before the state supreme court.[1] The franchise of the Peoples Railway Company of Cleveland, granted in 1902, but held invalid by the courts, authorized the city to take possession of the railway at any time on payment of 10 per cent more than the actual structural value.

The provision that franchises shall be granted in every case to the corporation offering the lowest fares, together with the general feeling of the people in Ohio on this subject, has resulted in the introduction of important limitations in the matter of fares in a number of recent franchise grants. In Columbus the franchise of the Columbus Railway Company, which, in 1901, was extended for twenty-five years, requires that 7 tickets shall be sold for 25 cents, until such time as the gross receipts of the company may reach $1,750,000, when 8 tickets must be sold for 25 cents. The new Central Market Street Railway in the same city is required to sell 7 tickets for 25 cents, and also to pay 2 per cent of its gross receipts to the city. In both cases universal transfers on both cash fares and tickets are required for the lines of the single company, while for a 5-cent fare the passenger must be given a transfer to the lines of the other company.[2] In many of the smaller cities of the state local franchise ordinances have required the companies to sell 6, and in a few cases 7, tickets for 25 cents.

The subject of street railway fares has been a matter of much agitation in Cleveland during recent years. In 1902 a franchise was granted to the Peoples Railway Company to construct certain lines on which a 3-cent fare was to be charged. This franchise covered part of a much more extended system which had been planned by the city, and which was to be restricted to the same fare throughout. This franchise was, however, held invalid by the courts because of technical errors. In September, 1903, another franchise was granted to the Peoples Railway Company, also subject to the requirement of a 3-cent fare, but construction has not yet begun. The city authorities of Cleveland had previously sought to compel the two existing companies to reduce their fare to 3 cents, but in 1904, after protracted litigation, the United States Supreme Court held that the city could not modify the terms of the original grants. Pending the final decision of the court, the two companies consolidated and voluntarily began to sell 6 tickets for 25 cents and to give universal transfers. In 1904, however, the consolidated company raised the price of tickets to 11 for 50 cents, and restricted the transfer privilege somewhat. Various proposals for a zone system of charges have been made, but no agreement could be reached between the city and the company. The subject of fares is therefore still an unsettled one in Cleveland. In Cincinnati the extension franchise of 1896, now under litigation, permitted a 5-cent fare for the first twenty years.

The general law in Ohio authorizes municipalities to levy car license fees, and a recent enactment permits them to agree with any street railway company now paying such fees to substitute therefor a percentage of gross receipts.[3] In Cleveland a car license fee of $10 is imposed, but there is no other requirement of compensation at present. As indicated by the franchise in Columbus, above mentioned, it is feasible under the state law to require a percentage of gross receipts at the time of granting the franchise, notwithstanding the fact that the form of competition provided by law has to do with rates of fare. In Cincinnati the new franchise of 1896 required the railway company to pay 6 per cent of its gross receipts to the city, and the revenue derived from this source is about $200,000 a year. No special payment aside from ordinary taxes is received from the street railway companies in Springfield, Canton, Toledo, or other cities from which reports were received.

Oregon.—There is no general law in Oregon regarding the method of granting local franchises. The new charter of Portland, prepared by a local board and adopted by popular vote in 1902, provides that any ordinance granting a franchise or leasing public property for a period of five years or more must, on petition of 15 per cent of the voters, be submitted to popular vote.[4]

The state laws do not place any general restriction on the duration of franchises. All of the franchises reported to the Bureau of the Census are limited, the most common period being thirty years. The new Portland charter (sections 95 and 96) restricts all future franchise grants to twenty-five years. At the expiration of this time the city may elect to take over the property at an appraised valuation, which shall not include the value of the franchise itself, or it may renew the grant to the same corporation or transfer it to any other company

[1] See street railway section of Commercial and Financial Chronicle, November 14, 1903, page 1918.

[2] Annual Report of City Clerk of Columbus, 1901, pages 22, 23, 43, and 44.

[3] Laws of Ohio, 1902, page 502.

[4] Charter of Portland, section 108.

offering better terms. If the grant is to a new company the grantee must purchase the plant at an appraised valuation.

No general provisions regarding fares appear in the state laws of Oregon. The two companies in Portland are allowed, by their franchise ordinances, to charge 5 cents.

Neither the general laws nor the new charter of Portland contain provisions regarding special compensation for street railway or other franchises. The Portland charter, however, declares that the value of franchises is to be assessed for the general property tax, and it requires all franchise holders to make detailed reports of their business to the city authorities. Shortly before the adoption of the new charter in Portland the city council extended the franchises of the two principal street railway companies for a period of thirty years. In addition to the various requirements regarding the paving of streets and the construction and maintenance of bridges, the city provided that the Portland Railway Company should pay $1,000 yearly for the first five years, and that the rate of compensation should increase gradually until it becomes $5,000 yearly for the last five years of the grant. In the case of the City and Suburban Railway Company the rate of compensation was fixed at $3,000 yearly for the first five years, and the rate is to increase up to $12,000 yearly for the last five years.

The new Portland charter, as above indicated, permits the city to take over a street railway or other public utility at the expiration of its franchise. To do so, however, requires the approval of a popular vote. The question whether the city shall acquire the plant must be submitted to vote, if demanded by petition of 15 per cent of the electors. If the city takes over the property it may either operate it directly or lease it for not more than twenty-five years, or it may at any later time sell the property and franchise to the highest bidder (sections 95 and 96).

Pennsylvania.—The state law contains no provisions regarding the method of granting franchises beyond a requirement that the consent of the local authorities shall be obtained before a street railway is constructed in the public streets or highways. The usual practice of city councils, as reported by the mayors of leading cities, is merely to pass an ordinance on the subject in the same manner as they pass other ordinances.

The state law imposes no restriction as to the duration of charters or franchises, but the constitution gives the legislature the right to amend or repeal the charters of all corporations. Of the 98 companies reporting, 75 have perpetual franchises for all their lines and several others have perpetual franchises for part of their lines. Of the other companies reporting, 9 have franchises for nine hundred and ninety-nine years and only 3 report limits as short as fifty years. All franchises in Philadelphia are perpetual, even those most recently granted.

The state laws do not regulate fares. In most local franchises the restrictions on fares present no peculiar features, although in a considerable number of the smaller cities and towns the local franchise grants have required tickets to be sold, usually at the rate of 6 for 25 cents. The recent franchises for elevated, subway, and surface lines in Philadelphia, which in respect to fares closely resemble those for the many earlier lines, merely provide that the fare for a continuous ride shall not exceed 5 cents within the city limits, no provisions regarding transfers being inserted.[1]

As to special compensation the state law merely provides that cities of the second and third classes may levy license fees on street cars, and that companies in Philadelphia must pay a license fee of $50 per car, which may not be increased by the city authorities in case of companies already chartered at the time the statute was passed.[2] The state itself levies somewhat heavy taxes on the stocks and bonds of street railways and on their gross receipts. In Philadelphia, by virtue of the terms of the various franchise grants rather than by general law, most, if not all, street railway companies are required to pay a tax of 5 per cent upon all dividends in excess of 6 per cent. This provision, for example, is found in the important new franchises granted in 1901. As there is no restriction upon capitalization, this requirement is easily obviated by stock dividends, etc., and hence does not result in much revenue. The car license fees are, however, a somewhat important source of income to the city, amounting to about $100,000 in the census year.

When, about 1892, the street railway companies of Philadelphia desired to change from animal power to electric traction, the city seized the opportunity to require them to pave the entire street surface in the streets occupied and to maintain the pavement in the future. The same provisions were inserted in the new franchises of surface lines granted in 1901. This requirement constitutes virtually a greater compensation to the city than the percentages on gross receipts required in most cities where the street railway company paves only the space between its tracks. The Philadelphia railways have expended several millions of dollars in paving streets, and their annual expenses for maintenance are quite large. The total payments of the Union Traction Company, of Philadelphia, to the state and local authorities, including the expense of maintaining the pavements, have averaged about 7 per cent of its gross receipts during the past three fiscal years. The direct payments for new paving have been made largely out of capital, and the interest on such expenditure is not included in computing this 7 per cent.[3]

Car licenses or pole licenses of moderate amount

[1] In regard to transfers on existing lines in Philadelphia, see page 42.

[2] Public Laws of Pennsylvania, 1868, chapter 849; 1901, chapter 20, article 19, section 3; 1901, chapter 224.

[3] See Massachusetts Report, pages 128 and 129.

are required in a few other cities of Pennsylvania, but aside from these there is little or no payment to the local authorities in addition to the ordinary taxes. Thus there are no special payments, aside from such licenses, in Allentown, Easton, Erie, Pittsburg, Reading, and Scranton. In Harrisburg the street railway company is required to pay 3 per cent of its gross receipts, the revenue to the city from this source being about $2,900 yearly.

Rhode Island.—By the state constitution of Rhode Island[1] street railway charters can be granted only by special acts of the state legislature. In some cases the legislature has also granted the right to use streets, without action of the local authorities; but in other instances—as, for example, in the charter of the Rhode Island Suburban Railway Company—the consent of the local governments has been required, and local self-governing bodies have been permitted to impose reasonable rules and regulations.[2]

The general state laws are entirely silent as to the duration of franchises. According to the reports of the companies, 6 of the 8 have perpetual franchises. The Union Railroad Company, which includes a large proportion of the total trackage in the state, was in 1892 granted by the state legislature a twenty-year extension of its franchises, with exclusive authority to operate in Providence. The franchise of the railway company in Woonsocket has been limited by the city council to twenty years.

The Rhode Island legislature in 1898 passed a very peculiar statute. It applies only to those street railway companies which may indicate their written consent thereto, but in case of consent it becomes binding as between the state and such assenting company, and its terms are not subject to amendment or repeal without the consent of the company. The law imposes a tax for state purposes of 1 per cent upon the gross earnings of assenting companies whose dividends do not exceed 8 per cent on the par value of their capital stock. If the dividends exceed 8 per cent an additional amount equal to such excess also goes to the state as a tax. The issue of capital stock requires the approval of the state railroad commissioner. Companies accepting this act are to have their existing franchises and rights guaranteed in perpetuity regardless of the limits prescribed in their present charters or franchises. Cities and towns are specifically denied the authority to require the removal of the tracks of these assenting companies except for police reasons, and in such cases a substitute location must be provided. The companies assenting, however, are bound to continue to make any payment which they are now making to the local governments, even after the expiration of the existing franchise, unless a new agreement shall be made increasing the obligations of the railway. This last provision seems quite valueless, since no additional requirement could apparently be exacted by the local authorities except as a condition for the granting of additional privileges.[3]

The law of Rhode Island regarding the issue of transfers is summarized on page 43. There is no general law regarding fares, and the special laws and franchises contain no unusual provisions on this subject.

The state law regarding the Union Railroad Company requires it at present to pay 5 per cent of its gross receipts—only the receipts within the city itself—to Providence.[4] This payment in the census year amounted to $66,195. In Woonsocket the local franchise requires the payment of 3 per cent of the gross receipts, and the city received $1,631 from this source in the census year.[4]

Virginia.—The new constitution of Virginia (1902, section 125), and a statute since passed in accordance therewith, require all future grants of municipal franchises to be made by competitive bidding. The franchise must be awarded to the highest responsible bidder, unless, in the opinion of the majority of the members elected to the city council, the public interests will be better served by awarding it to some other bidder, in which case the reason for doing so must be stated in the body of the ordinance. The city may reject all bids.[5]

By the new constitution and statute[6] the duration of future franchises, as well as of leases of public property, is restricted to thirty years. The law requires that every franchise shall provide in advance that at the expiration of the thirty-year period the plant shall become the property of the city, either without compensation or on payment of the appraised valuation exclusive of any allowance for the franchise. A considerable number of earlier street railway franchises in Virginia are perpetual, but the greater number are limited to periods ranging from thirty to fifty-six years.

There is no state law on the subject of fares. In Richmond, Norfolk, Danville, and most of the other cities, however, the local franchises require the street railways to sell 6 tickets for 25 cents. The new constitution of the state declares that "the right of the commonwealth, through such instrumentalities as it may select, to fix and regulate the charges of public service corporations shall never be surrendered or abridged" (section 164).

Aside from the requirement of competitive bidding on franchise grants, the state law makes no provision for special compensation to cities. As in other Southern states, however, the local governments are authorized to levy license taxes. In Richmond there are no car licenses, but the franchise of the leading railway system requires 5 per cent of the gross receipts to be

[1] Article IX of Amendments, section 1.
[2] Acts and Resolves of Rhode Island, May, 1899, page 30.
[3] Public Laws of Rhode Island, 1898, chapter 580.
[4] Massachusetts Report, page 130.
[5] Acts of Assembly, extra session, 1902–3, pages 426, 427.
[6] Ibid., page 425.

paid to the city.[1] The revenue from this source in the census year was $28,121. In Norfolk the franchise of the leading company, dating from 1888, restricted the license taxes on cars for ten years to certain rates, but left the license system thereafter to the discretion of the city. The city now levies on all companies a license tax of 4 per cent of their gross earnings, the revenue from this source in the census year amounting to $12,671.

Washington.—The state law of Washington merely provides that at least 5 members of a city council must vote for a local franchise. The low-fixed number is perhaps explained by the fact that several of the city councils have only 7 members. The practice in Seattle, apparently adopted on the initiative of the city merely, is to sell street railway franchises by competitive bidding to the person or corporation offering to pay the city the highest percentage of the gross receipts.

The state law limits the charters of corporations to fifty years, and they may be amended or repealed by the legislature. There is no general restriction on the duration of local franchise grants. One perpetual franchise is reported, but most of the franchises are limited to from twenty-five to fifty years.

The general laws of Washington do not regulate fares, but by local franchises they are ordinarily limited to 5 cents.

In Seattle, by the local ordinances, street railways are required to pay 2 per cent of their gross receipts to the city, this minimum being fixed when the franchise is opened to competition. The revenue from this source is approximately $20,000 yearly. Spokane and Olympia require no special payment of any importance.

By an act of 1899 municipalities are authorized to construct, purchase, or obtain by condemnation street railways or other public service enterprises, but no detailed provision is made as to the method of acquiring such public ownership.[2]

West Virginia.—There is no general law in West Virginia regarding street railway franchises. Each city is governed by a separate charter. The new charter of Parkersburg requires future franchise grants to be submitted to referendum vote, if demanded by one-fifth of the qualified voters. It further provides that franchises shall be sold to the person or corporation offering the highest compensation to the city, or the lowest fares.[3]

Corporate charters of all classes are limited to fifty years, but there is no general law restricting the duration of local franchises.

The new charter of Parkersburg limits all franchises to thirty years. It further declares that no grant for an extension of a street railway hereafter constructed shall be made for a period exceeding the duration of the original franchise. At the expiration of the franchise, the grantee may be required to sell the property to the city at its appraised valuation independent of its earning capacity. Several of the franchises reported from West Virginia are perpetual, while others are limited to from twenty to fifty years.

The Parkersburg charter provides that no future franchise shall be granted without an annual payment to the city, but it contains no further details as to amount or basis of payment. The franchise recently given by Wheeling for a period of fifty years to the City Railway Company requires the payment of $300 per mile of line for the first twenty years, and $1,000 per mile for the last thirty years of the grant. This franchise also provides that the street railway shall be operated exclusively by union labor.

Wisconsin.—The general state laws of Wisconsin do not contain any provisions regarding the manner of granting franchises.

Though the state law contains no restriction on the duration of local franchises, most of those reported are for shorter periods than fifty years, several are for exactly fifty years, and only one is perpetual.

The state law contains no provision regarding fares. In Milwaukee the companies are required by the terms of their franchises to sell 6 tickets for 25 cents or 25 tickets for $1, and similar provisions are found in the franchises granted by several other cities.

The general state law regarding street railway companies provides that the local authorities may prescribe the payment of license fees. Neither Milwaukee nor La Crosse, however, requires such payment. The law further provides that in lieu of taxes on property, street railway companies shall pay to the local authorities 2 per cent of their gross receipts if the receipts are less than $500,000 per year, and 4 per cent if they are more than $500,000.[4] This constitutes a lighter tax than street railway companies in many other states pay on their property. In La Crosse the company is required by the local franchise to pay 3 per cent of its gross receipts even though they are less than $500,000, but in Milwaukee nothing is paid beyond the 4 per cent provided in the state law.

[1] See Massachusetts Report, page 132.
[2] Laws of Washington, 1899, chapter 128.
[3] Acts of West Virginia, 1903, chapter 66, section 84.

[4] Laws of Wisconsin, 1899, chapter 354, amending earlier statutes which imposed taxes at other rates.

CHAPTER X.

STREET RAILWAYS IN EUROPEAN COUNTRIES.

I.

UNITED KINGDOM.[1]

Comparison with the United States.—The statistics of street railways, or tramways, as they are called in Great Britain, which are published annually, cover practically only urban lines. In addition to these, there are a few interurban electric railways, built under what is known as the light-railways act, the returns for which are included with those of steam railways.

Table 81 shows for the years 1902, 1901, and 1898 the leading statistics of the tramways of the United Kingdom. The figures include only the surface railways.

TABLE 81.—*Trackage, traffic, and financial statistics of tramways in the United Kingdom: 1902, 1901, and 1898.*

[House of Commons Papers, "Returns of Street and Road Tramways," 1902, page 2.]

	1902	1901	1898
Length of line (first main track), miles	[1] 1,484	1,305	1,064
Capital invested [2]	$153,597,772	$130,417,445	$80,262,547
Number of passengers	1,394,452,983	1,198,226,758	858,485,542
Passengers per mile of line	[3] 939,658	918,181	806,847
Gross earnings	$32,504,770	$29,009,508	$22,191,853
Operating expenses and taxes	$23,446,179	$22,021,784	$17,071,171
Ratio of operating expenses and taxes to gross earnings, percentage	72.1	75.9	76.9
Number of cars	7,752	7,184	5,335
Number of horses	24,120	34,422	38,777
Number of steam locomotives	388	527	589
Passenger receipts	$31,465,889	.....	.....
Average fare per passenger	$0.0226	.....	.....
Car mileage	145,127,428	.....	.....
Passengers per car mile	9.61	.....	.....
Gross earnings per car mile	$0.224	.....	.....
Operating expenses per car mile	$0.162	.....	.....

[1] Additional trackage of double tracked railways, exclusive of sidings and switches, 852.7 miles.
[2] Includes expenditure for construction on lines not yet in operation.
[3] Passengers per mile of track, exclusive of sidings and switches, 596,762.

The table indicates that the development is much less marked in the United Kingdom than in the United States. The total length of track in the United Kingdom in 1902 was 2,336.7 miles, exclusive of sidings and switches, or presumably about 2,400 miles if these be included. This is approximately one-ninth of the mileage in the United States. The number of fare passengers carried by the British tramways during 1902 was 1,394,452,983, as compared with more than 4,774,211,904 in the United States. To the British statistics, however, should properly be added the number of passengers carried on the four underground railways in London and on the elevated railway in Liverpool. These aggregated 192,377,288 in 1902, making a grand total of 1,586,830,271, or one-third of the number in the United States. The passengers carried by the omnibuses in London, where surface railways are not permitted in the central portion of the city, number nearly 300,000,000 per year.

In judging of the relative importance of street railway traffic in the two countries the number of urban inhabitants must be taken into account. The total population of the United Kingdom in 1901 was 41,607,552, and the average number of rides on the tramways, underground, and elevated railways was 38 per capita, as compared with 63 in the United States. But the population living in urban communities of more than 3,000 inhabitants in England and Wales and in urban communities of more than 2,000 inhabitants in Scotland and Ireland numbered 29,144,726, the proportion of urban to total population being much greater than in the United States. The number of street railway rides per urban inhabitant is thus 54, as compared with 168 rides per inhabitant of urban communities of more than 4,000 population in the United States. It may be roughly estimated from the statistics of population in incorporated places of from 2,500 to 4,000 inhabitants, that if urban communities of 3,000 to 4,000 were included in the computation of the American ratio it would be reduced to about 160 rides per inhabitant. Such a comparison is necessarily imperfect in many respects, but it gives some idea of the relative development of street railways in the two countries.

The street railway business in the United Kingdom, however, has grown with enormous rapidity during recent years. In 1890 the number of passengers carried on the tramways proper was 526,369,328, the traffic in 1902 thus being more than two and one-half times as great as in 1890. During the four years from 1898 to 1902 the length of line (first main track) of the tramways in the United Kingdom increased about 40 per cent, and the number of passengers on the tramways increased more than 60 per cent. This development has been coincident with a rapid substitution of electric for animal and steam traction, the extent of change being indicated only in part by the figures of the table showing the decrease in the number of horses and of

[1] House of Commons Papers, "Returns of Street and Road Tramways," 1902.

steam locomotives. In 1902, 871 of the 1,484 miles of line were operated exclusively by electricity; 384 miles by animal power; 156 miles by steam; 25 miles by cable; 10 miles by gas motors; and 38 miles by more than one kind of power.

The wide difference between the conditions of street railway operation in Great Britain and in the United States is sharply indicated by the comparison of the car mileage with the number of passengers. The average number of passengers per car mile on the British tramways in 1902 was 9.61, while the corresponding ratio in the United States was only 4.26. This difference probably is not due to greater crowding of cars in the British cities, nor probably is it due in any considerable measure to the use of larger cars, although many of the British cars are double decked. The chief reason for the difference in the number of passengers per car mile is the fact that the distances traveled by passengers in the United Kingdom average much less than in the United States.

Because of this difference in the length of journeys it is scarcely proper to compare street railway fares in the two countries. The receipts from passengers in the United Kingdom in 1902 represent an average fare of 2.26 cents. In practically all English cities street railway fares are graded according to the distance traveled. It is unjust to compare either the minimum or the maximum fare in such a case with the uniform fare, regardless of distance, prevailing in American cities. Probably the lowest scale of fares in Great Britain is found in Glasgow. In that city the lowest rate of fare is 1 cent (½ penny), the average length of the permissible trips at that charge being reported as 0.58 mile. For 2 cents one may ride an average of 2.29 miles; for 4 cents, an average distance of 4.6 miles; for 6 cents, an average of 6.84 miles. The maximum fare is 7 cents. The average fare for all rides in Glasgow in 1902 was about 1.8 cents.[1]

The average gross receipts per car mile for the British tramways, 22.4 cents, are almost exactly the same as the receipts per car mile in the United States. This fact, in conjunction with the fact that the average fare per passenger is so much lower in the United Kingdom than in this country, is another indication of the relative shortness of the rides in the United Kingdom.

The ratio of operating expenses to operating receipts for the tramways of the United Kingdom in 1902 was 72.1 per cent. The British statistics include taxes with operating expenses. If taxes be so included in the statistics for the United States, the ratio of operating expenses to operating earnings becomes 62.8 per cent.

Municipal ownership.—All of the street railways in Great Britain, up to a few years ago, were operated by private corporations, most of which had been organized under an act of 1870, which limited the duration of franchises for the use of the streets to twenty-one years. This act permitted the cities at the expiration of the grants to take over the railways on payment of their appraised value, exclusive of any allowance for the franchise. The shortness of the franchise term doubtless served to hamper the development of the business, as very few of the companies with limited franchises were willing to introduce electric traction, although electricity had already proved its advantages in the United States. Some of the municipalities, however, granted extensions of franchises on condition of installing electric traction. Many of these early franchises have expired during recent years, and in most cases the cities have acquired the plants and have adopted the policy of direct municipal operation. The cities doing so, in most instances, undertook at once a thorough renovation of the system and the introduction of electric power.

In 1902, of the tramway systems in the United Kingdom 118 with 885.5 miles of track were owned by the local authorities, as compared with 115 tramways having 598.5 miles of track owned by private corporations. A few of the publicly owned railways are now operated by private companies under lease, but much the greater number of them are operated by the local authorities directly. The London county council operates part of the lines which it owns and leases others, while there is a considerable amount of trackage in London that is owned by private corporations. The leading system in Manchester is owned and operated by a private corporation, but the city operates the other line. In Birmingham the city owns most of the track, but leases it to a company. Nearly all of the remaining cities of more than 200,000 inhabitants in England and Scotland operate their own railways. There are about 15 private companies, including those which hold municipal plants under lease, whose annual earnings exceed £25,000 each, while about 25 municipal plants report earnings exceeding that sum.

It is scarcely feasible to pronounce a final judgment as to the success of municipal ownership in Great Britain. Because of the restrictions placed upon private corporations which prevent them from adopting improved methods, a comparison of the results of public and private operation in any general way is misleading.

Individual cities.—Table 82 presents the traffic and financial statistics of tramways in the leading cities of the United Kingdom for 1902. The population of the cities is indicated, but in some instances the railways serve also suburban towns, so that the comparison between the population and the trackage and traffic is not altogether exact.

[1] See paper of Robert Donald, Street Railway Journal, January 3, 1903.

TABLE 82.—TRAFFIC AND FINANCIAL STATISTICS OF TRAMWAYS IN LEADING CITIES OF THE UNITED KINGDOM: 1902.

[Compiled from Returns of Street and Road Tramways, House of Commons Papers, 1902.]

CITIES.	By whom operated.	Population, 1901.	Length of line (miles).	Power used.	Number of passengers carried.	Number of rides per inhabitant.	Car mileage.	Passengers per car mile.	EARNINGS. Gross.	EARNINGS. Passenger.	Operating expenses and taxes.	Ratio of expenses to earnings (percentage).
Birmingham[1]	Company mainly under lease.	522,182	27.2	Electric and animal	47,536,078	91	4,746,202	10.0	$1,248,997	$1,202,167	$939,458	75.2
Bradford	City	279,809	39.6	Electric	23,054,400	82	2,141,176	10.8	475,652	467,476	272,612	57.3
Bristol	Company	328,842	28.2	Animal	36,714,906	112	5,462,039	6.7	1,041,270	861,117	698,752	67.1
Leeds	City	428,953	37.9	Electric and animal	48,167,781	112	4,726,043	10.2	1,091,527	1,074,372	696,639	63.8
Leicester	City	211,574	12.1	Animal	10,465,733	49	911,414	11.5	224,769	219,061	190,582	84.8
Liverpool[2]	City	684,947	66.9	Electric	106,024,728	155	11,604,533	9.1	2,418,641	2,388,089	1,620,520	67.0
Manchester	Company	543,969	27.6	Animal	[3]46,674,600	129	[3]7,483,250	6.2	1,930,443	1,892,850	1,385,867	71.8
Manchester	City		55.7	Electric	23,590,288		1,831,126	12.9	452,346	445,864	307,908	68.1
Newcastle	City	214,803	16.9	Animal	12,544,331	58	1,155,837	10.9	275,984	275,984	170,050	61.6
Nottingham	City	239,753	13.4	Animal and electric	16,167,385	67	1,400,923	11.5	383,436	377,767	200,422	52.3
Salford	City	220,956	20.9	Animal	23,099,643	105	2,481,084	9.3	444,311	431,362	432,369	97.3
Sheffield	City	380,717	27.8	Electric and animal	49,176,631	129	3,791,993	13.0	924,966	923,623	600,779	65.0
Glasgow	City	735,906	53.5	Electric	163,678,190	222	12,615,021	13.0	2,990,041	2,982,318	1,426,600	47.7
Edinburgh	Company under lease.	316,479	23.6	Electric and animal	35,150,474	134	3,590,913	9.8	807,289	788,144	548,498	67.9
Edinburgh	Company		5.0	Animal	7,127,383		439,929	16.2	70,297	68,944	67,240	95.7
Dublin	Company	290,638	47.5	Electric	46,307,402	159	6,748,638	6.9	1,206,751	1,151,832	665,216	55.1
Belfast	Company	349,180	33.2	Animal	27,174,714	78	2,962,910	9.2	648,573	630,187	552,679	85.2
London[4]	County council	6,581,375	24.4	Animal	119,880,559	47	10,371,866	11.6	2,248,970	2,137,995	1,993,430	88.6
	Company under lease.		64.5	Animal	160,209,597		16,662,465	9.6	3,782,312	3,674,407	[5]3,737,078	98.8
	Three companies		23.5	Animal	31,649,199		3,092,809	10.2	617,539	599,139	578,500	93.7

[1] Exclusive of two or three suburban lines.
[2] Exclusive of elevated railway, which carried 10,466,726 passengers in 1902.
[3] Includes some omnibus traffic.
[4] Exclusive of omnibus lines and of 4 underground railways, the latter carrying 181,910,562 passengers in 1902.
[5] Includes rental paid to county council; total item of rental, including offices and buildings owned by private persons, $472,352.

This table emphasizes the wide difference between the amount of trackage in British cities and in cities of corresponding population in the United States. A rough estimate of the track mileage may be obtained by adding from 60 to 75 per cent to the figures showing length of line. The greatest proportion of trackage to population is found in Dublin, where some suburban lines are included, and in Manchester, Liverpool, Bradford, and Glasgow. The greater number of the large cities in the United Kingdom (aside from London) have between 0.05 and 0.15 miles of line per thousand inhabitants, while, for the leading American cities, the corresponding figures range from about 0.20 to 0.60.

The number of passengers carried is also decidedly less in proportion to the population served in the United Kingdom than in this country. For most of the cities covered by the table the range is between 75 and 160 rides per capita yearly, as compared with from 200 to 265 in American cities of similar size. The traffic is most highly developed in Glasgow, where the average number of rides per inhabitant is 222 yearly.

In comparing the various tramway enterprises from the standpoint of the ratio of operating expenses to operating earnings, it should be noted that the sums paid by certain private corporations as rental for tracks leased from the municipalities are included with other operating expenses. Thus the North Metropolitan Tramway Company pays for the lines which it leases from the London county council a rental so great, that the net earnings of the company are less than 2 per cent of its gross receipts. The differences in the power used likewise affect the financial results materially. Generally speaking, those cities which have introduced electric traction on an extensive scale seem to show favorable operating results. In Glasgow, which was the first city in Great Britain to undertake municipal operation of street railways, the ratio of operating expenses, which include a considerable amount for taxes, to operating earnings is 47.7 per cent. It is impossible here to enter into the merits of the discussion which has been waged as to the correctness of the accounting methods in connection with municipal street railway operation in this or other British cities. The question as to the financial success of public operation in Great Britain is a disputed one, both in that country and in our own. It is difficult to escape the conclusion, however, that many of the municipal railways are operated efficiently and economically.

The streets in central London are for the most part so narrow and crowded that the operation of surface cars upon fixed tracks would be practically impossible. The more flexible movements of the omnibus give it an advantage, and the tramways are confined to the outlying parts of the city. The limitations on the duration of franchises, together with the uncertainty as to the effect of the competition of new underground railways, have prevented the introduction of electric traction on the London surface tramways. The four underground railways in London furnish a more important means of transportation than the surface tramways, the average ride being much longer on the underground roads. The two steam subways have been in operation for many years, while the two electric subways have only recently been opened. The latter have proven a great success, and plans are on foot for the conversion of the steam underground roads to electric, as well as for the

construction of extensive new electric lines. The Central London Railway, one of the new electric underground roads, popularly known as the "Tuppenny tube" because of its uniform fare of 2 pence, carried 45,305,110 passengers in 1902. The elevated railway in Liverpool is also operated by electricity. It carried 10,466,726 passengers in 1902.

II.

GERMANY.[1]

Comparison with United States.—Table 83 shows for the Kingdom of Prussia, and for the German Empire as a whole, the leading statistics of street railway operation for the year 1901. The statistics, which are secured through a private association, omit about 5 per cent of the trackage operated by companies which make no reports.

TABLE 83.—*Trackage, traffic, and financial statistics of street railways in Germany and Prussia: 1901.*

[Returns of Union of German Street and Light Railway Administrations in Zeitschrift für Kleinbahnen, February, 1903.]

	Germany.	Prussia.
Length of line (first main track), miles[1]	1,867	1,316
Capital investment[2]		$115,045,154
Capital per mile of line		$77,786
Number of passengers	1,191,457,000	799,950,000
Car mileage	[3]217,171,429	[4]140,359,006
Passengers per car mile	5.49	5.70
Gross earnings	[3]$29,535,800	[4]$18,752,258
Operating expenses, excluding taxes	[5]$17,850,000	[6]$11,424,000
Ratio of expenses to earnings, percentage	60.4	60.9
Gross earnings per car mile	$0.136	$0.134
Operating expenses per car mile	$0.082	$0.081
Passenger earnings per passenger	$0.024	$0.022

[1] According to government returns for March 31, 1902, 2,030 miles in Germany and 1,479 miles in Prussia, respectively.
[2] Based on government returns covering 1,479 miles.
[3] On 1,815 miles only.
[4] On 1,283 miles only.
[5] On 1,815 miles only, the expenses for about 4 per cent of which are estimated.
[6] On 1,283 miles only, the expenses for about 4 per cent of which are estimated.

The length of line (first main track) in the German Empire was 1,867 miles in 1901, or about one-ninth the length of line in the United States. The government figures for March 31, 1902, however, report 2,030 miles of line. Since the street railways of Germany are chiefly confined to cities of considerable size, a very large proportion of the lines are double tracked. It is probable that the trackage in Germany is between one-sixth and one-seventh as large as that in the United States.

The number of passengers carried by the German street railways in 1901 was 1,191,457,000, or about one-fourth as many as in the United States. The population of Germany in 1900 was 56,367,178, the average number of street railway rides per inhabitant being 21. A somewhat larger proportion of the German people live in cities than is the case in this country. In 1896 the population living in urban communities of more than 2,000 inhabitants was 49.9 per cent of the entire population. If to the urban population in places of more than 4,000 inhabitants in the United States be added the population of incorporated places of from 2,500 to 4,000 inhabitants we have a total equal to 39.8 per cent of the aggregate population. It is probable that the inhabitants of German urban communities of 2,000 inhabitants and over, as a whole, take on an average about one-fourth as many rides as the inhabitants of urban communities of the same size in the United States. Such comparisons are, however, necessarily very unsatisfactory, because of the difference in method of computing urban population and in its distribution among places of different size, as well as because of differences in the density of population within urban boundaries, and other reasons.

The number of passengers per mile of track is considerably greater in Germany than in the United States and the number of passengers per car mile (5.49) is also greater. The average size of the German cars is less than that of the American cars, and it is believed that the majority of them are not double decked. The large number of passengers per car mile probably means, therefore, that the average length of ride is much less in Germany than in this country. For this reason the fares on the German street railways, which average 2.4 cents per passenger, can not properly be compared closely with American fares.

The financial results of the operation of the German street railways are very favorable. The operating expenses per car mile are much less than in the United States, a fact largely due to the low level of wages. The capitalization of the German street railways is also much less per mile than in the United States.

The street railway business has been very rapidly developed in Germany during the past few years, as the result of the introduction of electric traction. Prior to that time the trackage had been almost wholly confined to a few large cities. Development was doubtless hindered in some measure by the limitations on the duration of the franchises, but the leading German cities wisely showed a disposition to extend grants on condition of the substitution of electric for animal power. At the end of 1901 only 3 per cent of the entire trackage of street railways was operated by animal power exclusively. About 6 per cent of the trackage was still operated by steam, although on some of this track electricity was also used in part. The rapid development of railways has been materially fostered by the manufacturing companies in the electric business, as well as by two or three large investment companies, whose chief object has been the establishment of street railways in various towns. The General Local Street Railway Company, for example, owns 125 miles of track in 11 different places. Siemens & Halske and Schuckert & Company, manufacturing electric concerns which have been combined recently, own several different

[1] Statistics from Zeitschrift für Kleinbahnen, February, 1903.

street railways. Such manufacturing companies are also largely interested in the stock of street railway companies which they do not own entirely.

Municipal ownership.—During the past few years there has been a marked tendency toward municipal ownership of street railways in Germany. The length of lines owned by municipalities was 315 miles in March, 1902, an increase of nearly one-fourth above the amount so owned in March, 1901. The municipalities which own street railways operate them directly in most cases, though in a few instances they are leased. The total number of municipal plants in 1902 was 34, and the most important cities in which they existed were Cologne, Düsseldorf, Munich, Frankfort, Mannheim, Aix la Chapelle, Mülhausen, and Halle. The city of Berlin owns one of the less important systems, about 11 miles in length. The large city of Nuremberg has also recently bought one line from a private company, and the same is true of Dresden, but the leading systems in both these cities are still under private ownership.

Very few of the street railway systems covered by the above table do an interurban business of any importance, although the electric lines reach fairly well the immediate suburbs of the great cities. Germany has a considerable number of light steam railways and some of these are now beginning to install electric traction, about 6 per cent of the "light railways" (Kleinbahnen) now using electric motors in whole or in part. These light railways, unlike American interurban lines, are not intended primarily for passenger traffic. They serve largely for the local transportation of agricultural products. The total length of line for railways of this class was 4,153 miles in 1902.

Individual cities.—Table 84 shows, for the most important cities of Germany, the detailed statistics of street railways.

TABLE 84.—TRACKAGE, TRAFFIC, AND FINANCIAL STATISTICS OF STREET RAILWAYS IN THE LEADING CITIES OF GERMANY: 1901.

[Compiled from Zeitschrift für Kleinbahnen, February, 1903.]

CITY.	Population served.[1]	Length of line (miles).	Length of track (miles).	Length of track per 1,000 population (miles).	Number of passengers carried.	Number of rides per inhabitant.	Car mileage.	Passengers per car mile.	Gross earnings.	Operating expenses, excluding taxes.	Ratio of expenses to operating earnings (percentage).	Passenger earnings per passenger (cents).	Capital invested.
Berlin	2,528,000	217.8	435.5	0.172	329,982,096	130.5	50,840,000	6.5	$7,813,300	$5,073,685	64.9	2.3	$29,916,458
Breslau	423,000	26.9	63.7	.151	31,878,646	75.4	5,072,000	6.3	703,385	435,300	61.9	2.1	3,136,316
Düsseldorf	214,000	40.3	66.6	.311	21,476,768	100.4	3,517,000	6.1	515,270	405,720	78.7	2.2	.....
Nuremberg	261,000	16.2	31.4	.120	17,752,740	68.0	3,343,000	5.3	396,985	208,725	52.6	2.2	1,499,400
Hamburg and Altona	867,000	92.0	174.8	.202	108,325,350	124.9	20,590,000	5.3	2,857,430	1,774,290	62.1	2.6	13,118,322
Hanover and Linden	286,000	99.3	181.2	.634	26,404,834	92.3	5,427,300	4.9	869,176	567,630	65.3	2.6	9,947,296
Leipzig	455,000	63.1	131.8	.290	65,093,043	143.1	12,969,000	5.0	1,432,046	886,550	61.9	2.2	8,098,931
Frankfort	288,000	26.8	53.4	.185	50,422,465	175.1	7,426,000	6.8	1,090,515	676,775	62.1	2.1	2,310,590
Munich	500,000	29.5	67.5	.135	52,590,256	105.2	7,348,000	7.2	1,153,110	732,802	63.6	2.2	2,517,661
Cologne	372,000	34.7	66.5	.179	30,970,673	83.3	4,146,000	7.5	782,934	491,531	62.8	2.5	2,500,601

[1] As stated in Zeitschrift für Kleinbahnen, includes total area served.

The German cities, almost without exception, show a much smaller proportion of track to population than the American cities. In Berlin, for example, the length of track per thousand of population is 0.172 mile, as compared with 0.37 in New York. The Hanover and Düsseldorf systems include a large amount of interurban trackage and can not properly be compared with those in other cities. The lower ratio of trackage to population served is, in considerable measure, attributable to the fact that the German cities are very closely built, a large proportion of the people living in large tenement houses. This condition has, indeed, been caused in part by the inadequacy of transportation facilities, but it is due partly to other causes of an historical character. There is a comparative absence of suburbs and of thinly settled outlying districts within the limits of the leading cities.

The number of passengers carried per mile of track is very large in most of these cities, exceeding the number in cities of corresponding population in the United States. The number of rides per inhabitant, on the other hand, is, in most instances, considerably smaller than in American cities of the same size. The greatest patronage of street railways is found in the wealthy city of Frankfort, where an average of 175 rides is taken yearly by each inhabitant. The number of passengers per car mile is considerably larger in most German cities than in cities of corresponding size in the United States, chiefly because of the fact that the average ride is materially shorter than in this country. The capital invested per mile of track is much less than the net capital liabilities per mile of track in the large cities of America. In Berlin, for instance, the capital per mile of track is $68,695, as compared with $259,542 for the surface railways of New York city. The German city governments exercise the closest supervision over the issue of securities by railway companies as well as over fares and conditions of service.

The average rate of fare in the German cities covered by Table 84 ranges from 2.1 cents to 2.6 cents. To some extent, the German street railways still follow the practice of charging fares according to distance, but the tendency is distinctly toward the substitution of a uniform fare, at least within the limits of the leading municipality served. Thus in Berlin the uniform fare within the city limits is 10 pfennigs, or 2.38 cents.

Even where the system of charging according to distance exists in Germany, it often happens that much the greater proportion of the rides taken are for distances represented by the lowest rate of fare. Thus, on the railway system which serves Hamburg and the adjacent city of Altona, the minimum fare is 10 pfennigs. This covers any two of the established zones, the zones varying in length from about 0.6 mile in the central part of the city to 1.9 miles in the outskirts. For each two additional zones, an extra charge of 5 pfennigs is made, the maximum fare being 30 pfennigs, or a little over 7 cents. In 1900, 70.8 per cent of the passengers on this railway paid the 10-pfennig fare only, and 26 per cent paid 15 pfennigs, while only a little more than 3 per cent of the passengers paid higher fares.[1]

In Chapter IX reference has been made to certain interesting provisions of the street railway franchises in Berlin and Hamburg. Somewhat similar requirements as to compensation to the local authorities for the privileges conferred exist in various other German cities.

III.

FRANCE.

Table 85 presents a summary of the available statistics for French street railways in 1901, and also shows the statistics for the department of the Seine, which includes Paris, and for several of the leading cities of the country.

The French official statistics recognize three groups of tramways. The first group, officially designated as "tramways for passengers and freight," comprises 1,872 miles of line and is not included in the table. The railways of this group are mostly operated by steam and correspond roughly to American narrow gauge steam railways. Railways of the second group are officially designated as "tramways for passengers, baggage, and express," and are similar to American interurban lines. The total length of first main track of this class of railways is only 156.5 miles. The greater part of their business is the carrying of passengers. Somewhat more than half of these companies use steam power, and most of the remainder use electric power with the overhead trolley. The group of street railways proper, "tramways for passengers only," is mostly confined to the large cities and their immediate suburbs. The total length of line for both groups is 1,173.3 miles, or about one-fourteenth of the mileage in the United States. The population of France is about half that of the United States, and the ratio of urban to rural population is roughly the same as in the United States. Nearly one-fourth of the total length of line in France lies in the department of the Seine.

The French street railways report a cost per mile of road of $97,000, which is much less than the capitalization of American railways. Moreover, it should be remembered that the greater part of the trackage in France is located in the larger cities where the cost is higher than in small towns.

The total receipts of the French tramways are $16,963,000, or about one-fifteenth of the receipts of American street and electric railways. The receipts of the Paris companies are greater than those of all the other companies combined, notwithstanding the fact that the omnibuses in Paris carry nearly as many passengers as the tramways. The receipts per mile of line for France as a whole, $14,460, are slightly less than in the United States, where they average $15,103.

[1] Vellguth, "The Street Railway Company of Hamburg," Street Railway Journal, January 4, 1902.

TABLE 85.—TRACKAGE, TRAFFIC, AND FINANCIAL STATISTICS OF STREET RAILWAYS IN FRANCE AND IN LEADING FRENCH CITIES: 1901.

[Statistique des Chemins de fer Français, Documents Divers, 1901.]

	Population, 1901.	Length of line (first main track) constructed, miles.	Length of line operated, miles.	Cost of construction.	Cost per mile of line.	Gross receipts.[1]	Expenses.[1]	Ratio of expenses to receipts (percentage).	Gross receipts per mile of line constructed.
France	38,961,945	1,173.3	1,280.1	$114,218,000	$97,000	$16,963,000	$13,812,000	81.4	$14,460
Tramways for passengers and baggage		156.5	157.8	6,503,000	42,000	795,000	681,000	85.7	5,080
Tramways for passengers only		1,016.8	1,122.3	107,715,000	106,000	16,168,000	13,131,000	81.2	15,900
Department of the Seine	3,669,930	285.1	380.7	46,344,000	163,000	8,230,000	7,218,000	87.7	28,870
Other departments	35,292,015	731.7	741.6	61,371,000	84,000	7,939,000	5,913,000	74.5	10,850
Marseille and vicinity[2]	491,161	53.4	71.4	8,649,000	162,000	1,053,000	866,000	82.2	19,720
Lyon and vicinity[2]	459,099	80.1	87.6	6,414,000	80,000	1,376,000	1,010,000	73.4	17,180
Bordeaux and vicinity[2]	257,638	62.1	52.8	7,108,000	114,000	872,000	637,000	73.1	14,040
Lille	210,696	42.2	55.3	3,057,000	72,000	475,000	347,000	73.1	11,260
St. Etienne	146,559	24.2	24.2	1,115,000	46,000	269,000	205,000	76.2	11,160

[1] The reports do not distinguish between operating earnings and expenses and other receipts and expenses. [2] Population of city named only.

The ratio of expenses to receipts on French tramways for passengers only is 81.2 per cent, apparently a much higher ratio than in the United States. The reports do not show clearly what is covered by the term "expenses," and it is quite probable that they include taxes, and perhaps interest on bonds as well; in which case comparison of the ratio mentioned with that of operating expenses to operating earnings on American railways would be wholly misleading. In the department of the Seine, the ratio of expenses to receipts is

larger still, and the companies in that department complain that their business is scarcely profitable. This is probably due largely to the fact that most of the traffic in the densely populated center of Paris is carried by omnibuses, the street car lines being in the main confined to the outlying districts. Moreover, up to 1901, fully half of the street car lines in Paris were still operated by horsepower, while on most of the others the expensive accumulator system was employed. Paris, indeed, shows probably a greater variety of methods of traction than any other city in the world. The underground trolley is used on a small amount of track; compressed air, ordinary steam locomotives, and locomotives operating with superheated steam without fire are also employed. The more important tramways of Paris belong to the same company which operates the omnibuses. Many new street railway lines were constructed in anticipation of the Exposition of 1900. The subway system of Paris, which is owned by the city, but operated by a private company, is not included in the statistics of tramways. The first line running nearly straight from one end of the city to the other, following the line of the Champs Elysées, was opened in 1899. Other lines are being rapidly constructed. This system is operated by electricity on the multiple-unit plan. It has proved highly profitable, and has cut deeply into the receipts of the tramways.

Recent statistics of the number of passengers carried in Paris are not available. In 1899, the surface tramways in that city carried 173,866,684 passengers. (This figure does not include one company of minor importance.) The number of passengers carried by the omnibus lines was 137,004,054, while the electric subway, which was in operation only part of the year, carried 15,887,873 passengers, making a grand total of 326,758,611.[1] The population of Paris proper in 1901 was 2,714,068. The traffic of the tramways and omnibuses is therefore much less in proportion to population in Paris than in the leading cities of the United States. It should be added, however, that in Paris, as in many other continental cities, there is an immense number of cabs with fares which are but a small fraction of those charged in American cities. A considerable share of the traffic which would here patronize the street cars is carried in cabs in Europe.

The development of street railways in the other leading cities of France is also very much inferior to that in cities of corresponding size in the United States. Most of the tramways outside of Paris, however, are now operated by electricity and very rapid development is taking place. According to L'Industrie Électrique, there were in France, at the beginning of 1903, 1,995 kilometers of line operated by electricity, and 3,004 electric motor cars, as compared with 487.5 kilometers of line and 759 motor cars in 1899. These figures presumably include the trackage of the tramways for passengers and freight which are not covered by the preceding tables.[2]

[1] Annuaire de la Ville de Paris, 1900, page 447.

IV.

AUSTRIA.[3]

The following statement presents statistics relating to the street railway business in Austria for the year 1900:

Length of line (first main track), miles:	
Total	231.5
Electric	158.2
Cable	.6
Horse	72.7
Receipts, total[1]	$2,137,066
Expenditures, total	$1,518,977
Ratio of expenditures to receipts, percentage	71.1
Passengers	74,268,082
Car mileage	11,180,386
Passengers per car mile	6.64

[1] Items included are not indicated.

The most extensive electric system is in Vienna and its environs, which had 37 miles of electric road in 1900, with additional lines under construction. The number of passengers carried in 1900 was 29,382,521, the receipts, $823,410, and the expenses $644,854. As in the case of the statistics for the country as a whole, it is not clear what is included in the item "expenditures," but they apparently include taxes. Vienna has a population of about 1,200,000.

Altogether there are 22 electric railways in Austria, practically all doing an exclusively urban business as distinguished from an interurban business. Private ownership prevails.

V.

HUNGARY.[4]

The following statement shows for 1900 statistics of the Hungarian street railways, which are practically all electric lines operated by private companies:

Length of line, miles	156.5
Number of passenger cars	908
Passengers carried	77,860,372
Passengers per mile of line	497,510
Capital invested	$16,451,181
Receipts	$3,063,493
Expenditures[1]	$1,808,953
Ratio of expenditures to receipts, percentage	59

[1] Items included are not indicated.

Budapest, the capital of Hungary, stands very high among European cities in its street railway enterprise. The total number of passengers carried by the railways in this city in 1900 was 69,875,654. There were 68 miles of line, practically all electric. The leading company has a system 37 miles in length, in which it has invested $7,475,000; the receipts in 1900 were $1,748,000;

[2] Street Railway Journal, November 21, 1903.
[3] Statistik der Electrischen Eisenbahnen, Drahtseilbahnen, und Tramways mit Pferdebetrieb, 1900.
[4] Ungarisches Statistisches Jahrbuch, 1900, page 217.

expenditures, $876,000, showing a ratio of operating expenses to receipts of only 50.1 per cent. Budapest was the first city in the world to use the underground trolley system, her first lines dating from 1889. There is also a subway railroad in this city.

VI.

NETHERLANDS.[1]

In addition to the strictly urban railways in the Netherlands there are numerous steam tramways connecting towns, similar to those in France and Italy. Their statistics are not separable from those of the animal power and electric roads in the cities. The chief business of these interurban lines is the carrying of passengers. The total length of line of all street railways and tramways in 1901 was 983.2 miles; the number of passengers, 65,932,000; and the gross receipts $2,839,700. Private ownership of street railways prevails in the Netherlands.

In Amsterdam there were, in 1899, 21 miles of street railway, partly operated by horses; in 1901 there were 1,422 horse cars and 1,135 electric cars. In Rotterdam there were, in 1899, 73 miles of tramways, but this trackage apparently includes some of an interurban character. In The Hague there were, in 1899, 21 miles, including steam, animal, and electric traction.

VII.

BELGIUM.[2]

In 1901 tramways were found in only 5 Belgian cities, and in only 2 of these, Liege and Verviers, were they operated by electric traction. All the lines are operated by private companies. In Brussels steam traction is used to some extent.

The following statement shows for 1900 the length of line and number of passengers carried in the 4 cities making reports:

CITY.	Length of line (miles).	Passengers.
Brussels	9.50	10,154,000
Liege	18.00	7,792,000
Louvain	.62	383,000
Verviers	7.50	2,492,000

VIII.

SWITZERLAND.[3]

The statistics of Swiss street railways do not include the various cable and rack and pinion railways found in the mountains.

[1] Statistiek van het Vervoer op de Spoorwegen en Tramwegen, 1901; Jaarcijfers voor het Koninkrijk der Nederlanden, 1900, page 219.

[2] Annuaire Statistique de la Belge, 1901, page 385.

[3] Statistisches Jahrbuch der Schweiz, 1901, page 120.

The following statement shows the chief statistics of the Swiss railways for 1899:

Length of line (first main track), miles	109.7
Passengers carried	43,151,680
Car mileage	13,646,182
Passengers per car mile	3.16
Receipts	$1,069,041
Expenditures[1]	$811,383
Ratio of expenditures to receipts, percentage	75.9
Capital invested	$4,609,789

[1] Items included are not indicated.

In 1899 electric traction was employed on 23 of the 27 systems reporting, and horses were employed on 5 of the systems.

The most extensive street railway system is found in Geneva, which has about 13 miles of line, with 6,814,316 passengers in 1899. In Basel there are 7.4 miles of street railway line, and the number of passengers was 7,474,920 in the same year.

IX.

ITALY.[4]

The only available statistics regarding Italian street railways cover those operated by mechanical traction, but not those operated by animal power of which a number exist. They include a considerable number of interurban tramways, operated by steam, which do primarily a passenger business, but also some freight business. The first of these interurban tramways was established in 1878. They are operated for the most part on the public highways.

The total length of line (first main track) of the street railways and interurban tramways operated by mechanical traction in 1900 was 1,930 miles, of which 105 miles only were operated by electricity, practically all the rest being operated by steam. In Rome and its immediate environs there were 30 miles. In the city limits of Milan there were 53 miles, of which 34 were operated by electricity. The street railways of Italy are ordinarily owned by private companies, but those in Milan are owned by the city and leased, on very favorable terms, to an operating company.

X.

SPAIN.[5]

In Spain, as in Italy, there are a considerable number of so-called tramways (tranvia) which operate between cities and towns, and use chiefly steam as the motive power. Street railways proper are found in a number of cities and operate chiefly by animal traction, though electric traction is found in Madrid, Valencia, and two other cities.

The total length of the street railways and tramways in 1900 was 347 miles, of which 23 miles were in Madrid.

[4] Annuario Statistico Italiano, 1900.

[5] Estadistica de las Obras Publicas, 1901, page 375.