

INTERURBAN ELECTRIC RAILWAY ECONOMICS

The gross receipts per mile of track and the gross receipts per inhabitant (or per capita) in the district served are the units generally used in comparison of the earning power of electric roads. To the mind of the banker or financier, the operating expenses are of secondary consideration, because by proper management they can be reduced to a fairly fixed quantity, depending on the service given. But the gross receipts reflect primarily the judgment of the promoters in locating the line and the riding proclivities of the people in the territory through which the road runs.

From statistics, the patronage to be expected by a city railway can be approximated very closely, and it is safe to say that with an interurban railway proposition some rules can be evolved, but the conditions make the process more difficult. Thus in the city property, the rides per inhabitant have been found to increase pretty constantly in a certain ratio, depending on the population, and the figures on population can easily be obtained from the census. With an interurban railway it is safe to assume that the traffic increases with the population served, but it is a very much more difficult undertaking to determine satisfactorily the number of people who are served by the road. The first obstacle is in connection with the terminal city. Most interurban lines have one large community at their termini and this fact has a large influence on the traffic, on account of the people in the country who wish to visit the city and those in the city who ride out into the country. Both statistics and common sense show, however, that it is improper to consider that the entire population of the terminal city is being served by an interurban railway extending from one direction only out of the city, or if so included and counted in the tributary population, they should not be given the same weight as the residents of the smaller communities directly on the line of the road. Again, it is difficult to obtain any exact enumeration of the tributary interurban population. Strictly speaking, the facility with which people living along the line use the road is in inverse proportion to the distance at which they live from the line. Practically the usual way is to include all of the population within 2½ miles of the line. To this there is again a practical obstacle unless a house to house canvass is made, because the population is irregularly distributed throughout the different townships. Part of it is in towns and villages whose population is

given in the governmental census reports, and part of it is in scattered houses of whose inhabitants there is no enumeration outside of those covering the entire township. As a result, a variety of practices is followed among those who, like consulting engineers, have been obliged to make investigations into the probable earning capacity of interurban railways.

None of the largest engineering or financial houses, so far as is known, counts in the entire population of the terminal city invariably in any estimate of the population served. Some include in the entire population of the terminal city if it is below 50,000. Above this figure they credit the terminal city with the number 50,000 plus a gradually decreasing percentage of additional inhabitants. Others follow the same plan but have a different limit. Still others, and these are probably greater in number, seemingly have become so discouraged in endeavoring to find a satisfactory law for the extent to which the terminal city should be included, that they boldly throw out the population of the terminal city altogether. There is, it is true, an argument for this course. Advocates of this plan claim, first, that all interurban roads have a terminal city, so that in one sense a comparison would not be incorrect if the population of this terminal city was ignored. The second point made is that while the terminal city is on the route, the traffic under ordinary conditions comes mostly from the inhabitants along the line visiting the terminal city rather than vice versa. Of course an amusement park on the line of the road would make an important exception, as this park would be visited principally by city residents, but if a special allowance is made for the travel to this park, the ordinary traffic can be figured exclusively from the population along the line.

The interurban electric railways in Ohio and Indiana have been in operation for a longer period than those of any other section of the country, and interurban railroading has received its highest development there. In this form of road Ohio led, and in the early history of interurban railroading it was gravely asserted in many quarters that the conditions for this class of road in Ohio were so peculiarly favorable that a road built in that State would earn from 20 to 25 per cent more per mile than one in the neighboring States of Indiana or Pennsylvania under the same conditions. The reason given was that Ohio was more of a manufacturing State than any of its neighbors, and that its in-

TABLE XII.—SHOWING EARNINGS, ETC., FOR TWENTY OHIO ROADS FOR THE YEARS ENDING APRIL 30, 1905 AND 1906.

COMPANY	Capital Stock (Issued)	Bonded Indebtedness (Issued)	City Mileage	Interurban Mileage	Total Mileage	Passenger Earnings Year Ending April 30, 1905	Passenger Earnings Year Ending April 30, 1906	Freight and Express Earnings, 1905	Freight and Express Earnings, 1906	Other Earnings, 1905	Other Earnings, 1906	Total Earnings, 1905	Total Earnings, 1906	Car Miles
Cincin., Milford & Loveland Trac. Co.	\$1,650,000	\$300,000	7	32	39	.....	.....	.....	.....	\$22,238	\$22,935	\$442,174	\$493,662	.....
City Railway Co., Dayton.....	2,597,100	65,000	28.75	.....	28.75	\$419,936	\$470,727	.....	.....	29,854	58,919	4,895,993	5,517,751	21,832,363
Cleveland Electric Ry.....	23,400,000	8,026,000	235	.....	235	4,838,085	5,425,515	\$28,054	\$33,316	927	84,736	101,504	355,976	.....
Cleveland, Painesville & Ashtabula.....	1,000,000	850,000	2	26	28	83,809	99,387	.....	1,550	927	566	84,736	101,504	355,976
Cleveland, Painesville & Eastern.....	1,606,000	1,402,000	4	41.43	45.43	204,201	223,994	*\$11,003	10,229	15,203	19,511	230,407	253,735	870,786
Columbus Ry. & Light.....	12,400,000	7,479,000	28	79	107	1,366,361	1,487,549	6,209	5,282	344,256	350,754	1,716,826	1,843,585	6,037,949
Dayton, Covington & Piqua.....	1,100,000	510,000	2	32	34	73,675	187,845	11,825	13,674	137	801	85,637	102,324	145,245
Eastern Ohio Traction Co.....	2,500,000	2,500,000	0	82.79	82.79	160,944	163,852	54,047	64,115	6,287	9,853	221,278	237,820	272,000
Lake Shore Electric Ry.....	7,500,000	4,897,000	13	137	150	663,354	770,718	23,559	133,245	12,427	19,647	699,340	823,611	.....
Lorain Street Ry.....	750,000	550,000	.....	.....	10	105,849	132,442	1,441	1,628	950	464	108,240	134,534	.....
Ohio River Elec. Ry. & Power Co.....	300,000	315,000	.....	.....	12.02	38,546	44,325	5,107	5,737	3,611	5,772	47,264	55,836	300,486
Springfield Ry. Co.....	1,000,000	500,000	28.71	.....	28.71	212,002	\$230,539	.....	.....	837	740	212,839	231,280	1,264,441
Springfield & Xenia Ry.....	600,000	.....	1.4	18	19.4	54,425	58,925	1,677	2,370	822	696	56,744	61,991	247,778
Tiffin, Fostoria & Eastern.....	350,000	.....	2	13	15	46,257	49,292	3,108	4,754	760	602	50,115	54,648	.....
Toledo, Fostoria & Findlay.....	450,000	443,000	33	33	33	45,609	58,862	2,038	3,244	1,196	2,951	49,832	65,057	301,323
Toledo & Indiana Ry.....	1,500,000	1,500,000	3	57	60	68,279	151,327	10,472	39,727	45	.....	78,796	191,054	750,000
Toledo Railways & Light Co.....	1,200,000	10,866,000	112.37	.....	112.37	1,215,147	1,337,649	3,605	.....	530,888	588,622	1,749,040	1,926,272	.....
Toledo Urban & Interurban.....	1,000,000	800,000	60	.....	60	.....	240,844	.....	20,349	.....	62,763	323,957	.....	.....
Youngstown Park & Falls Street Ry.....	200,000	194,000	2	1.6	3.6	.....	70,418	.....	.....	.....	1,049	63,908	71,467	300,000
Youngstown & Sharon.....	712,500	662,500	2.2	11.23	13.43	93,901	135,138	6,996	10,093	.....	473	100,897	145,704	436,562

* Net from operating express company. † Year ending June 30. ‡ Include mail earnings. § Including freight and express. ¶ Including 40,012 freight-car-miles.

habitants were more inclined to travel than the agricultural population of Indiana. This idea has disappeared with the rapid development of the Indiana interurban railways, seeming to prove that a prosperous agricultural population is as ready to use transportation as one devoted to manufacturing.

A student of economy values is handicapped in studying electric transportation problems in both of these States, as compared with electric railroading in most of the Eastern States, from the fact that comparatively few of the companies in either State make public their complete annual reports. For a number of years the Ohio railroad companies have been obliged to file with the Secretary of State at Columbus certain figures relating to their gross receipts, but the systematic and itemized statements required by the Railroad Commissioners in such States as the New England States, New York and Pennsylvania are not obligatory. The fiscal year for these Ohio reports hitherto required is that ending April 30. During the past year, however, a change has been made in the Ohio law by which these reports are no longer filed with the Secretary of State, but with the Commissioner of Railroads and Telegraphs. Owing to this fact, there has been a delay in issuing the proper blanks to the street railway companies, and as a result these figures for the fiscal year ending April 30, 1906, are not available for publication in most cases. Through the courtesy of a number of companies, advance copies of the reports which have been or will be filed with the Commissioner, but which have not yet been made public, are presented in Table XII., together with the 1905 figures.

INDIANA STATISTICS

Certain reports are required of the Indiana electric railway companies by the State Auditor, but up to the present, none has been available in published form outside of the report of the Indiana State Board of Tax Commissioners, which gives the assessed value of main trunk, second track, side track, rolling stock and improvements on right of way of the different electric railway companies, but no figures on gross receipts. During the last year, however, reports have been required from the State Bureau of Statistics of all of the roads in Indiana, and while individual figures have not been made public, the totals are available through the courtesy of Joseph H. Stubbs, State Statistician of Indiana. These figures are presented in Table XIII.:

Table XIII., showing statistics of all of the electric lines in Indiana for the year ending June 30, 1905:

EARNINGS AND EXPENSES	
Gross earnings	\$6,757,730.22
Grand total expenses	4,679,027.57
Gross income	\$2,078,702.65
EARNINGS IN DETAIL	
From passengers	\$6,308,653.95
From freight	120,770.37
From express	66,522.48
From mails	3,741.17
From rents	82,033.60
From all other sources.....	176,008.65
Grand total earnings	\$6,757,730.22
EXPENSES IN DETAIL	
Maintenance of way and structures.....	\$405,039.43
Maintenance of equipment	369,265.60
Conducting transportation	1,798,928.91
General expenses	1,078,236.19
Additions and betterments	1,027,557.44
Grand total expenses	\$4,679,027.57
DISBURSEMENTS IN DETAIL	
Total expenses as above	\$4,679,027.57
Interest on funded debt.....	2,078,302.01
Taxes for Indiana	294,619.00
Taxes for other States	55,748.17
Rentals	267,001.68
Grand total disbursements	\$7,374,698.43

PASSENGER AND FREIGHT BUSINESS	
Total number of passengers carried.....	112,838,065
Total tons of freight and express.....	33,216
MILES OF TRACK	
Number of miles of main track in Indiana.....	847.49
Number of miles of side track in Indiana.....	34.25

WAGES—1905		
Employees in Indiana	Number Employed	Total Yearly Compensation
General officers	51	\$115,141.83
Other officers	38	65,875.68
General office clerks	140	70,889.64
Station agents	66	23,255.00
Other station men.....	29	13,340.00
Motormen	806	489,291.35
Conductors	803	489,235.38
Other trainmen	119	90,351.74
Machinists	33	23,093.61
Carpenters	39	26,231.54
Other shopmen	265	151,490.16
Section foremen	90	51,991.99
Other trackmen	524	199,271.05
Flagmen and watchmen	16	8,040.55
Operators and dispatchers	23	13,315.20
All other employees	295	172,346.30
Totals	3,337	\$2,003,161.02

ACCIDENTS				
	From Causes Beyond Their Own Control,		From Their Own Carelessness,	
	Killed	Injured	Killed	Injured
Passengers	0	38	10	1,869
Employees	0	12	3	129
All others.....	1	10	26	2,288
Totals	1	60	39	4,286

The amount paid in damages during the year 1905 for accidents was \$96,061.30.

OHIO STATISTICS

In view of the impossibility of obtaining figures from all or a greater part of the Indiana roads, it was deemed preferable to devote the analysis of the gross receipts of the electric railway companies in the district under consideration to those in Ohio, and several diagrams are presented herewith. For the purpose of this analysis, twenty-eight roads were selected. Of these, five have their chief terminal in Cleveland, six in Columbus, seven in Dayton, four in Toledo, and six have been selected at large through the State from among those roads which do not directly enter one of the very large cities of the State. The figures on population have been taken from the latest Governmental Census Report, which is that of 1900, and the figures on earnings are given in column 2, and are either for the year ending Dec. 31, or, where these figures were not obtainable, are for the year ending April 30, 1905.

An explanation should also be given of the method of securing the figures on tributary population. While not entirely satisfactory, it is probably the best available outside of an enumeration of the houses along the line. It was assumed first that the contributing territory to be taken should be that approximately 2½ miles on each side of the route of the railway. This distance was adopted partly because it is the figure often employed in calculations by financial houses, and partly because of the fact that the townships in Ohio, as a rule, are 5 miles square, so that the figure lent itself very easily to the approximations on population. Where a line extended through the center of a township, therefore, its entire population was taken as the number of people served. Where a line extended through only the corner of a township, a different plan had to be followed. In this case the number of inhabitants in the towns on the line of route were first added to the population served. The populations of these towns were then deducted from the population of the township. If there were any large communities in the township which were not served by the railroad, their populations

were also deducted from the total population of the township. It was then assumed that the remaining population was equally distributed throughout the township, and the proportion which the area of a strip 2½ miles each side of the track in the township bore to the whole population of the township was then taken as the proper proportion of the residual population of the township served by the interurban railway.

Tables XIV. to XVIII. have been compiled for each of the main groups of roads in Ohio. As will be seen, earnings per mile of track have been given for both passenger earnings and total earnings. The average passenger earnings have also been calculated per inhabitant in three ways, viz.: (1) including the terminal cities; (2) excluding the main terminal city, and (3) excluding both terminals where the road connects two large cities. The gross earnings have also been estimated on the basis of the inhabitants served, inclusive of the terminals. The roads have been divided into groups so that those roads entering the same city, and hence operating under the same conditions so far as main terminal city is concerned, could be compared more closely than would otherwise be possible. To understand the local conditions under which each of these lines operates, the following summary is given:

CLEVELAND GROUP

Lake Shore Electric:—The main line extends to Toledo with branches to Sandusky, South Lorain, Gibsonburg, and a line

Middlefield, 1800; the Garrettsville division goes to Chagrin Falls, 2000; Hiram, 1500, and Garrettsville, 2000. This district is a rich farming and dairy country and there is no competition to Cleveland. Freight and milk business is very heavy. The traffic to Gates Mills, a summer town for wealthy Clevelanders, is very heavy, and the company gives a half-hourly service to this point. The earnings per mile of track for the calendar year of 1905 were \$2,681.

Northern Ohio Traction & Light Company:—The lines of this company touch Cuyahoga Falls, 2500; Akron, 5000, with a branch line to Barberton, 7000, and another branch to Kent, 1500, and Ravenna, 2500. The through travel between Cleveland and Akron is very heavy and the line is double track with half-hourly service. The company also operates 20 miles of city lines in Akron with local service to Cuyahoga Falls. It does an extensive express and milk business, and there are several resorts on the line which attract the summer travel.

Cleveland, Painesville & Eastern:—The line of this company extends easterly out of Cleveland in two divisions as far as Willoughby, with one line on to Painesville, 30 miles. The main line goes out Euclid Avenue, which is lined with homes of city farmers to Willoughby. The Shore Line follows the Lake Shore through Collinwood, 7000, passes a number of lake resorts and derives large travel from hampers and those who have summer homes on the lake front. Milk and express amount to

TABLE XIV.—SHOWING STATISTICS OF THE INTERURBAN ELECTRIC RAILWAYS CENTERING IN CLEVELAND.

1	2	3	4	5	6	7	8	9	10	11	12	13	14 15	
													TOTAL EARNINGS.	
	COMPANY.	Fiscal Year Ending During 1905.	City Mileage.	Interurban Mileage.	Total Mileage.	Passenger Earnings Per Mile, Total.	Population Per Mile Including Terminals.	Passenger Earnings Per Inhabitant, Col. 7 ÷ Col. 8.	Population Per Mile Excluding Main Terminal.	Pass. Earn. Per Inhab. Ex. Main Terminal, Col. 7 ÷ Col. 10.	Population Per Mile Excluding Both Terminals.	Pass. Earn. Per Inhab. Ex. Both Terminals, Col. 7 ÷ Col. 12.	Per Mile of All Track.	Per Inhab. Including Term., Col. 14 ÷ Col. 8.
CLEVELAND.														
A	Lake Shore Electric.....	Apr. 30	15	145	160	\$4,146	3,750	\$1.15	541	\$7.66	541	\$7.65	\$4,370	\$1.16
B	Cleveland & Southwestern.....	Apr. 30	..	133	133	3,302	3,428	.91	707	5.65	579	5.65	\$3,744	1.08
C	Eastern Ohio.....	Apr. 30	..	81	81	1,987	4,544	.41	112	17.70	112	17.70	2,732	.56
D	Northern Ohio.....	Apr. 30	30	68	98	7,453	4,570	1.61	674	11.03	238	31.19	9,118	1.95
E	Cleveland, Painesville & Eastern.....	Apr. 30	1	42.8	43.8	4,662	9,243	.50	529	8.83	529	8.83	5,260	.57
	Average.....		..	....	103.2	\$4,310	5,107	.91	512	10.17	399	14.2	\$5,045	1.06

from Norwalk to Sandusky. It touches Lorain, 30,000; Elyria, 15,000; Sandusky, 20,000; Norwalk, 7000; Fremont, 8000; Cleveland, 500,000; Toledo, 225,000. It has a very large amount of through passenger traffic, and in summer an extensive park travel to no less than thirty resorts along the lake shore and the islands near Sandusky. Its express business is quite an important item. The company also operates city lines in Sandusky and Norwalk, but their earnings do not constitute a very important proportion of its gross. The company's gross earnings per mile of track during the calendar year of 1905 were \$4,927 and this year will probably reach \$5,625.

The system of the Cleveland & Southwestern has two main divisions which extend out of Cleveland to the south and west. The southern division goes to Medina, 2500; Seville, 1500, and Wooster, 2500. The western division extends through Elyria, 15,000, and Oberlin, 3500, to Norwalk, 7500. It also has branches to Lorain, 30,000; North Amherst, 1500; Grafton, 1500, and Wellington, 2500. It gets considerable through travel between the terminal points and has a large express and milk business. It owns Puritas Springs and enjoys considerable summer traffic. The earnings per mile of track for the last calendar year were \$4,024, and this year will probably reach \$4,825.

The system of the Eastern Ohio Traction Company also has two divisions, both of which extend out of Cleveland. The Eastern division goes to Chardon, 2000, and has a branch to

quite an item. Since the first of the year the company has been operated in connection with the Cleveland, Painesville & Ashtabula, and through cars are now operated between Cleveland and Ashtabula, 60 miles. The road is handicapped considerably by having a haul of nearly 9 miles on city track, from which it derives very little revenue.

Examining again Table XIV. and referring to the different roads by their distinguishing letters to avoid repetition, it will be seen that the passenger earnings per mile vary between \$3,300 and \$4,660, with the exceptions of road D, which is considerably higher than the average, largely on account of its Akron system, and road C, which is considerably lower than the average on account of its comparatively low population per mile of track outside of Cleveland. If, however, we examine the total earnings per mile of track as given in column 14, this percentage of variation is much decreased on account of the large freight and milk business on road C. In population per mile of track including terminals (column 8) the figure for road E is considerably higher than the average, because it is a short line and the population of Cleveland is consequently a large factor in the total population. This is shown in the Cleveland curve in Fig. 1, in which the populations are plotted as ordinates and the earnings per mile of track as abscissae. The form of the curve is quite irregular, as C and E are lower than the average for the reasons mentioned, and D is considerably above the line.

Column 10 in Table XIV. gives the population per mile, excluding Cleveland, except that in the case of the Lake Shore

Railway (road A) the population of Toledo has also been taken out for the reason that this city might be considered as bearing the same relation to the traffic that Cleveland does. We then get passenger earnings per inhabitant varying from \$5.65 to \$17.70, and the Cleveland curve shown in Fig. 2, in which the points have a much more rational distribution than in Fig. 1. The principal exception is D, which is much above the average for the reasons already outlined. In column 12, the population of both terminals has been excluded. Here, A, C and E have the same figures as in column 10, because Toledo has already been deducted from A, and C and E have no other large terminals. The tributary population B has been reduced by the omission of Lorain, and D by the omission of Akron. Column 12 shows that with both terminal cities omitted, three of the roads, A, B and E, have population figures very closely approximating each other. It is interesting to note in diagram Fig. 3, in which these values are plotted, that with the exception of D, which is extraordinarily high, the figures are within a comparatively nar-

3700, to Springfield, 40,000; traverses a good farming district and receives much through business to Springfield and to Dayton over connecting lines.

Scioto Valley Traction Company:—This line now has 81 miles of track and, as described elsewhere, is operated by the third rail. It extends from Columbus in a southerly direction, the main line going through Circleville, 7500, to Chillicothe, 14,000, while a branch goes to Lancaster, 11,000. The main line traverses a very rich farming district and gives better time than the parallel steam roads between terminals. The earnings given in the table are almost exclusively passenger. A freight business was started Dec. 1 last year, and the traffic is proving surprisingly heavy. The earnings for this year will be largely in excess of those given for 1905.

Columbus, Buckeye Lake & Newark:—This road has also been made a part of the new Indiana, Columbus & Eastern system. Newark has 20,000 population and the road

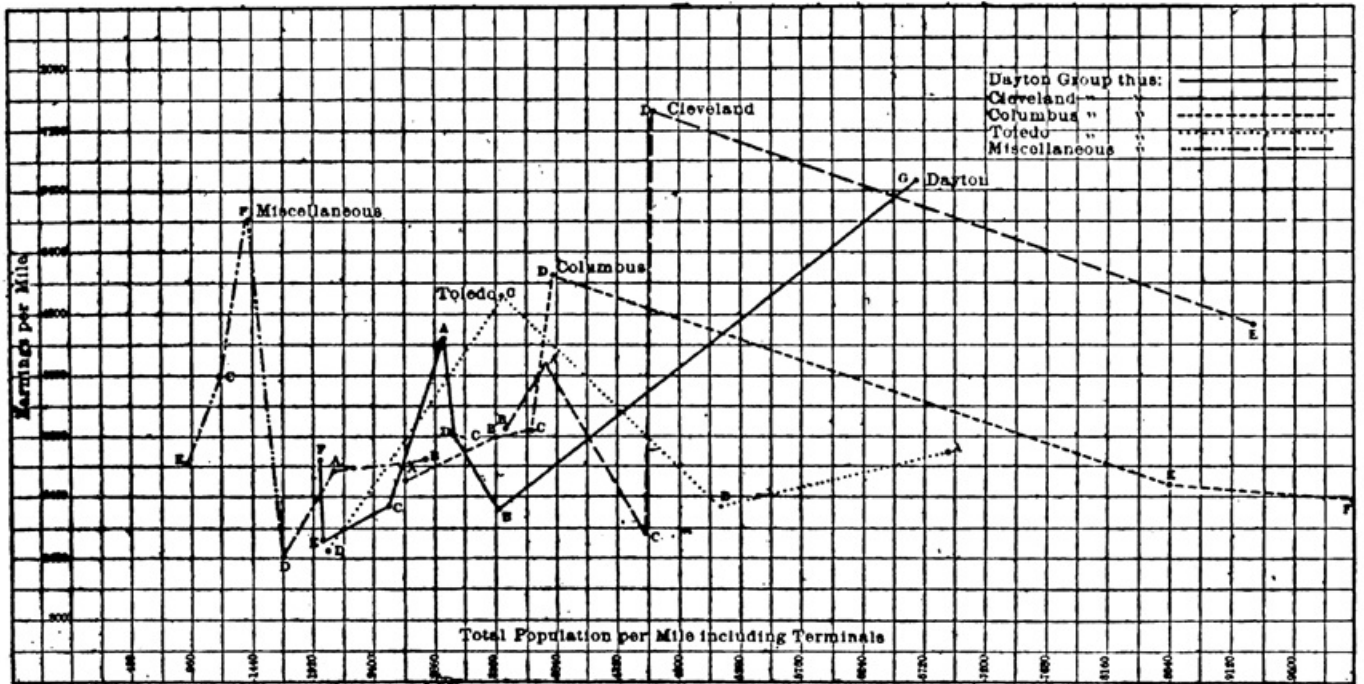


FIG. 1.—RELATION BETWEEN PASSENGER EARNINGS PER MILE AND TRIBUTARY POPULATION, INCLUDING BOTH TERMINALS

row triangle whose apex is at the origin. In the group B and E are especially close together.

COLUMBUS GROUP

Corresponding figures to those shown for the Cleveland district in Table XIV. are presented in Table XV. for the Columbus district. Here the roads represented are six in number and are as follows:

Columbus, Delaware & Marion:—The line of this company extends north from Columbus through Worthington, 1500; Delaware, 8000, and Prospect, 1500, to Marion, 13,000. The latter is a good manufacturing town and the road gets considerable through business. The express business is very heavy, much farm produce being handled. Small local service given in Delaware and Marion. The company operates three parks and caters to the excursion business. It also has a heavy commuter business in and out of Columbus.

Columbus, London & Springfield:—This road has been purchased by the Schoepf syndicate and is now a part of the Indiana, Columbus & Eastern system. It passes through London,

gets the bulk of business. The line traverses a good farming country and has a large express business. There is a branch line to Buckeye Lake, a famous camping, fishing and hunting resort. The company operates a park and hotel and summer traffic is very heavy.

Columbus Grove City & Southwestern:—This line is now a part of the Indiana, Columbus & Eastern system and goes through a farming district with no steam competition.

Columbus, New Albany & Johnstown:—The line of this railway extends out of Columbus in a northeasterly direction into a territory which has no steam railroad transportation. The electric line gets all the business there is, both passenger and freight, and the latter is quite an item.

An examination of column 5 shows that the roads composing this group correspond much more closely in length than in those of the Cleveland district, and the passenger earnings per mile, with the exception of D, are quite close to the average of \$3,200. To the large park business of road D is undoubtedly in large part due its high earnings per mile of track. The population

figures given in column 8 are very much higher for the last two roads than for the rest, on account of the shortness of these two lines and consequent preponderance of the population of the city of Columbus, but in reality the tributary population is smaller, as shown in column 10. An examination of column 8 and the Columbus group in Fig. 1 shows A, B and C close together, D very much higher on account of its large business, and E and F at the end of the scale on account of the large population per mile due to Columbus. In the population per mile, exclusive of main terminal as given in Fig. 2, we find E and F now near the origin, A, B and C in practically a straight line, and D much above the others in the group.

Taking up now, population, excluding both terminals, the population of Marion has been omitted from line A, Springfield from line B, Chillicothe from line C, and Newark from line D. This gives the populations presented in column 12 and the points in Fig. 3.

DAYTON GROUP

The roads composing the Dayton group are seven in number and are as follows:

Dayton & Troy:—This road goes north through Tippecanoe, 1500, and Troy, 6000, to Piqua, 8000, and does extensive interline business with the Western Ohio for Lima, Findlay and Toledo. It started a freight business about the first of the year and is now doing extensive interline freight. It is thought that the earnings this year will reach \$5,800 per mile.

Dayton, Covington & Piqua:—The line of this railway also extends north from Dayton, traversing the Stillwater Valley, a very fertile district. It touches West Milton, 1500; Covington, 1500, and Piqua, 8000. It gives faster time than the parallel steam road and consequently gets the bulk of the local business. Farm products and tobacco furnish quite a profitable freight traffic. The company operates a park near West Milton and pushes the excursion business.

Dayton & Northern:—This road has also been purchased by, and is now a part of, the Indiana, Columbus & Eastern

Dayton & Western:—The line of the Dayton & Western Company extends west from Dayton through Eaton, 4000, to Richmond, Ind., 12,000, and has a branch line to New Paris, where there is a noted summer resort. The line is a part of the through line to Indianapolis and obtains considerable through

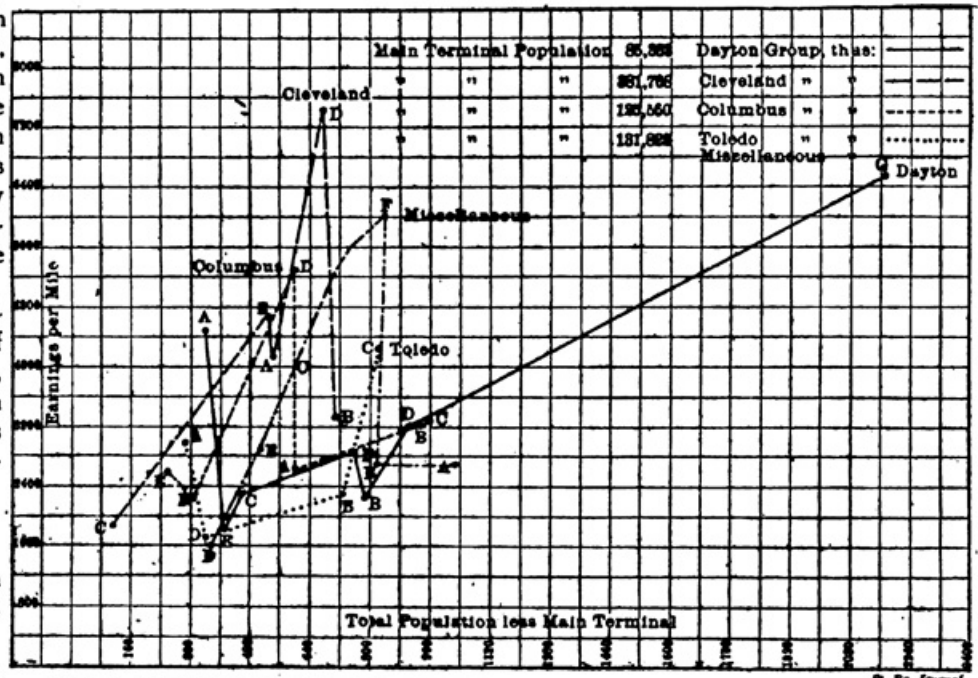


FIG. 2.—RELATION BETWEEN PASSENGER EARNINGS PER MILE AND TRIBUTARY POPULATION, EXCLUDING LARGEST TERMINAL

travel to that city and intermediate points. The freight business also furnishes good revenue.

Dayton & Xenia:—The Dayton & Xenia Traction Company operates two electric lines between Dayton and Xenia, 9000, with a branch to Spring Valley, 2500. The farming country through which it runs is very prosperous and the through travel between Dayton and Xenia is quite large. The comparatively low earnings per mile of track are due to the fact that it consists of two lines which were consolidated. Infrequent service is given on one of them with hourly service on the other.

Dayton, Springfield & Urbana:—This is another property which now forms part of the Indiana, Columbus & Eastern system. The earnings shown include those of an extension known as the Urbana, Bellefontaine & Northern, recently con-

TABLE XV.—SHOWING STATISTICS OF THE INTERURBAN ELECTRIC RAILWAYS CENTERING IN COLUMBUS.

1	2	3	4	5	6	7	8	9	10	11	12	13	14 15	
													TOTAL EARNINGS.	
	COMPANY.	Fiscal Year Ending During 1905.	City Mileage.	Interurban Mileage.	Total Mileage.	Passenger Earnings Per Mile, Total Mileage.	Population Per Mile Including Terminals.	Passenger Earnings Per Inhabitant, Col. 7 ÷ Col. 8.	Population Per Mile Excluding Main Terminal.	Pass. Earn. Per Inhab. Ex. Main Terminal, Col. 7 ÷ Col. 10.	Population Per Mile Excluding Both Terminals.	Pass. Earn. Per Inhab. Ex. Both Terminals, Col. 7 ÷ Col. 12.	Per Mile of All Tract.	Per Inhab. Including Term., Col. 14 ÷ Col. 8
COLUMBUS.														
A	Columbus, Delaware & Marion.....	Nov. 30	5	56	61	\$2,623	2,664	\$.98	606	\$4.32	411	\$6.87	\$3,116	\$1.07
B	Columbus, London & Springfield....	Apr. 30	..	52	52	3,183	3,341	.95	925	1.60	191	3.43	4,307	1.28
C	Scioto Valley.....	Apr. 30	..	47	47	3,274	3,641	.89	970	3.50	694	4.90	3,404	(b) .93
D	Columbus, Buckeye Lake & Newark	Apr. 30	..	39.1	39.1	5,306	8,817	1.39	606	8.75	142	37.29	5,366	1.66
E	Columbus, Grove City & S. W.....	Apr. 30	..	15	15	2,592	8,630	.30	259	9.99	259	9.99	3,111	.36
F	Columbus, New Albany & Johnstown	Apr. 30	..	8.6	8.6	2,236	14,929	.15	329	6.80	329	6.80	2,673	.17
	Average.....				37.2	\$3,202	6,170	.78	616	5.84	337	11.46	\$3,829	.92

(b) Based on prorata earnings for year.

system. It extends out of Dayton in a northwesterly direction through Brookville, 1500; Arcanum, 1500, to Greenville, 6000. It traverses a good farming district and connects with the Dayton & Muncie, giving through service to Muncie.

structed and not making a very heavy showing. The main line is located between Dayton, Springfield & Urbana and is one of the most prosperous lines in the State. Springfield has a population of 40,000. There is a great deal of travel between Spring-

field and Dayton. This section will be double-tracked next year. There is also a branch line to New Carlisle, 1500. The company operates a park and secures considerable summer traffic. The express business is very good though undeveloped.

Cincinnati-Northern Traction Company:—The main line of this company extends from Cincinnati through Hamilton, 25,000; Middletown, 12,000; Miamisburg, 4000, to Dayton, 90,000. There are a large number of small towns along the line and its route traverses the most densely populated section of the State. A considerable portion of the line is double-tracked. The company operates the city lines in Hamilton, and has

touching the suburbs and a number of small towns tributary to Toledo. There is a large resident population, and much of the business is derived from pleasure riders desiring to visit a number of points of historic interest near Maumee, also because of the beautiful river ride.

Toledo & Indiana:—The tracks of this company parallel the main line of the Lake Shore & Michigan Southern Railway (a steam railroad), and touch Holland, 1200; Swanton, 1200; Delta, 1500; Waseon, 2500; Stryker, 1500, and Bryan, 3500. It traverses a good farming district and operates standard freight trains by electric locomotives, in addition to

TABLE XVI.—SHOWING STATISTICS OF THE INTERURBAN ELECTRIC RAILWAYS CENTERING IN DAYTON.

1	2	3	4	5	6	7	8	9	10	11	12	13	14		15
													TOTAL EARNINGS.		
	COMPANY.	Fiscal Year Ending During 1905.	City Mileage.	Interurban Mileage.	Total Mileage.	Passenger Earnings Per Mile, Total.	Population Per Mile Including Terminals.	Passenger Earnings Per Inhabitant, Col. 7 ÷ Col. 8.	Population Per Mile Excluding Main Terminal.	Pass. Earn. Per Inhab. Ex. Main Terminal, Col. 7 ÷ Col. 10.	Population Per Mile Excluding Both Terminals.	Pass. Earn. Per Inhab. Ex. Both Terminals, Col. 7 ÷ Col. 12.	Per Mile of All Track.	Per Inhab. Including Term., Col. 14 ÷ Col. 8	
DAYTON.															
A	Dayton & Troy.....	Apr. 30	3	30	33	\$4,480	2,951	\$1.52	366	\$12.24	366	\$12.24	\$4,669	\$1.58	
B	Dayton, Covington & Piqua.....	Apr. 30	..	33	33	2,232	3,371	.68	785	2.84	386	5.77	2,595	.76	
C	Dayton & Northern.....	Apr. 30	..	40	40	2,281	2,519	.87	461	4.72	461	4.72	2,641	.99	
D	Dayton & Western.....	Apr. 30	..	40	40	3,205	3,036	1.05	902	3.55	447	7.18	4,286	1.57	
E	Dayton & Xenia.....	Apr. 30	..	53	53	1,827	2,022	.90	412	4.43	412	4.43	2,074	1.00	
F	Dayton, Springfield & Urbana.....	Apr. 30	..	73	73	2,880	1,959	1.47	762	12.07	239	12.07	3,163	1.61	
G	Cincinnati & Northern.....	Apr. 30	5	68	73	6,540	6,634	.98	2,169	3.01	1,000	6.53	6,963	1.04	
	Average.....	.....	..	....	49.3	\$3,349	3,213	1.06	836	6.12	473	7.56	\$3,770	1.22

* For 1904.

TABLE XVII.—SHOWING STATISTICS OF THE INTERURBAN ELECTRIC RAILWAYS CENTERING IN TOLEDO.

1	2	3	4	5	6	7	8	9	10	11	12	13	14		15
													TOTAL EARNINGS.		
	COMPANY.	Fiscal Year Ending During 1905.	City Mileage.	Interurban Mileage.	Total Mileage.	Passenger Earnings Per Mile, Total.	Population Per Mile Including Terminals.	Passenger Earnings Per Inhabitant, Col. 7 ÷ Col. 8.	Population Per Mile Excluding Main Terminal.	Pass. Earn. Per Inhab. Ex. Main Terminal, Col. 7 ÷ Col. 10.	Population Per Mile Excluding Both Terminals.	Pass. Earn. Per Inhab. Ex. Both Terminals, Col. 7 ÷ Col. 12.	Per Mile of All Track.	Per Inhab. Including Term., Col. 14 ÷ Col. 8	
TOLEDO.															
A	Maumee Valley.....	Apr. 30	..	20	20	\$2,980	\$6,897	\$.43	306	\$9.73	306	\$9.73	\$3,296	(a) \$.47	
B	Toledo & Indiana.....	Apr. 30	..	30	30	2,276	5,123	.44	729	3.11	729	3.11	2,627	.51	
C	Toledo, Bowling Green & Southern.....	Apr. 30	5	46	51	4,225	3,408	1.24	823	5.13	478	8.80	4,502	(a) 1.30	
D	Toledo & Western.....	Apr. 30	..	78.5	78.5	1,729	2,045	.84	365	4.72	365	4.72	2,604	1.21	
	Average.....	.....	..	....	48.7	\$2,802	4,368	.74	556	5.67	469	6.59	\$3,257	.87

(a) Excluding light and power.

branches to Mt. Healthy and Germantown. Its express business is probably the largest in the State. There are several parks on the route and a summer Chautauqua brings it heavy business at certain times. It also has large commuter business.

The earnings per mile of track of the roads in this group correspond fairly closely with the exceptions of A, E and G, the latter very high because it operates the city system in Hamilton. The population per mile is high because both Dayton and Cincinnati are included. The Dayton group in Fig 1 shows an irregular curve with A, F and G along one line, and B, C and E along another line. Taking the population per mile, excluding Dayton, we have figures from 366 to 2169, and receipts varying from \$2.84 to \$12.24, with an average of \$6.12. In this curve and in column 10, Cincinnati is deducted from line G, instead of Dayton, as Cincinnati is the larger city. The population per mile, exclusive of both terminals, has been obtained by deducting Piqua from the line B, Richmond from line D, Springfield from line F, and Dayton from line G. The diagram Fig. 3 shows a fairly regular curve outside of points A and F.

THE TOLEDO GROUP

The Toledo group contains the four following roads:

Maumee Valley Railway & Light:—The lines of this company form a kind of belt on both sides of the Maumee River,

package cars. It gives a fast limited service and gets considerable through business.

Toledo, Bowling Green & Southern:—The lines of this railway extend due south from Toledo through Maumee, 3000; Perrysburg, 1500; Bowling Green, 5500; North Baltimore, 1800, to Findlay, 20,000. It furnishes the most direct route from Findlay to Toledo, and there is a large amount of through travel. It traverses an oil district, from it derives a large freight and passenger business. This is one of the best purely interurbans in the State from the standpoint for earnings per mile of track, and due to the connection recently made with roads south for through business from Dayton to Toledo, the earnings are increasing rapidly.

Toledo & Western:—This line, the longest of the Toledo group of roads, extends westward from Toledo, traversing a very fertile farming district, which has no other means of transportation. A branch line extends north to Adrian, Mich., a prosperous city, which gives considerable through business to Toledo. About 40 per cent of the receipts of the company are in freight, handled largely in standard freight trains. As there are few towns, the passenger business is smaller than the average.

With the exception of road C, the passenger earnings per mile of the Toledo group are lower than any of the other groups,

largely on account of the absence of practically all city business and also because of the great length of line D. By the development of freight business, however, this latter company has been able to increase largely these earnings per mile, as shown in column 15. The population, including terminals (column 8), varies inversely according to the length of the line, but with the deduction of Toledo the order is radically changed. Line A

gives it considerable additional summer revenue. The line traverses a productive oil district.

The Springfield & Xenia extends from Springfield, 40,000, to Xenia, 9000, and is the only direct route connecting these two county seats. It has an arrangement with the Dayton & Xenia for through business to Dayton and derives considerable summer traffic from a park on its line.

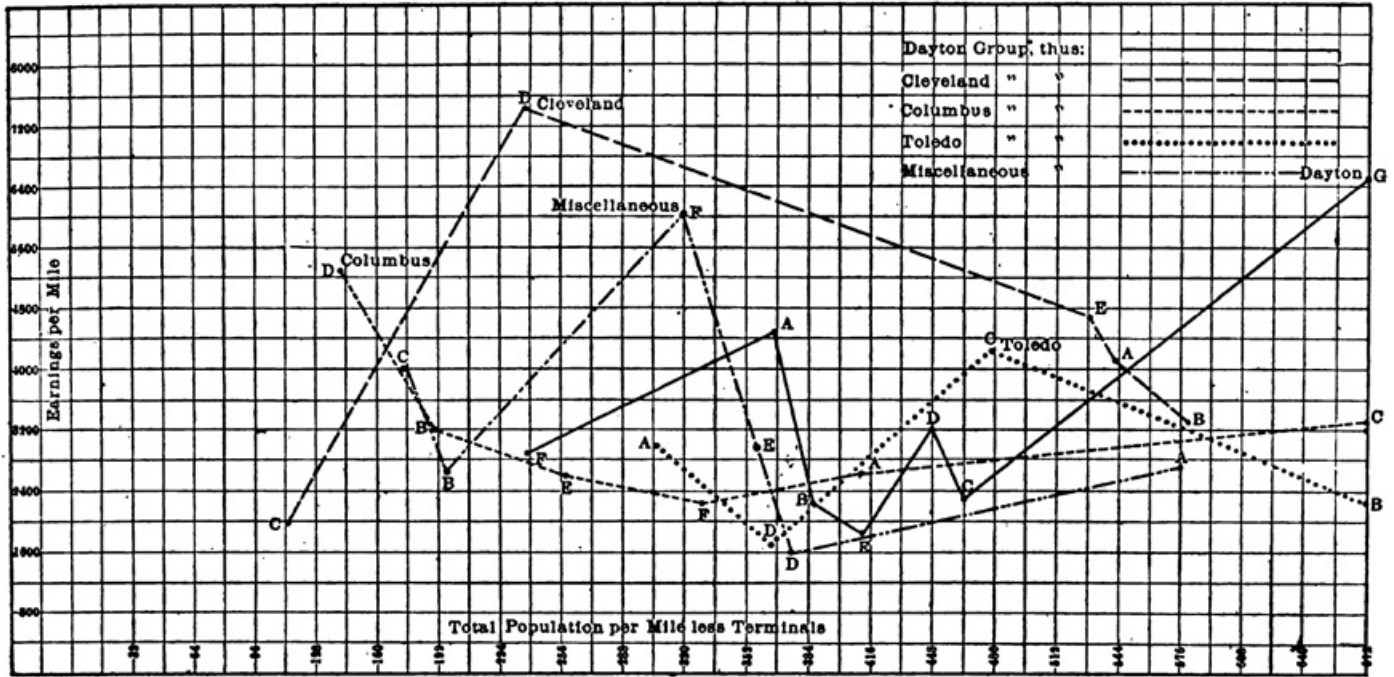


FIG. 3.—RELATION BETWEEN PASSENGER EARNINGS PER MILE AND TRIBUTARY POPULATION, EXCLUDING BOTH TERMINALS

has the lowest population per mile, excluding Toledo (column 10), but the highest receipts per capita (column 11), and this throws its point on the curve in Fig. 2 considerably higher than the others. The population per mile, excluding both terminals, is obtained by deducting Findlay from line C in the values given in column 10, and leaving the others the same, as there are no

Columbus, Newark & Zanesville:—The line of this company is also now a part of the Indiana, Columbus & Eastern system. The main line is an extension of the Columbus, Buckeye Lake & Newark to Zanesville, 25,000, and the road gets considerable through business to Columbus. The system includes the city lines in Newark and a branch line to Grandville,

TABLE XVIII.—SHOWING STATISTICS OF VARIOUS INTERURBAN ELECTRIC RAILWAYS IN OHIO, NOT INCLUDED IN THE PREVIOUS GROUPS.

1	2	3	4	5	6	7	8	9	10	11	12	13	14		15
													TOTAL EARNINGS.		
	COMPANY.	Fiscal Year Ending During 1905.	City Mileage.	Interurban Mileage.	Total Mileage.	Passenger Earnings Per Mile, Total Mileage.	Population Per Mile Including Terminals.	Passenger Earnings Per Inhabitant, Col. 7 ÷ Col. 8.	Population Per Mile Excluding Main Terminal.	Pass. Earn. Per Inhab. Ex. Main Terminal, Col. 7 ÷ Col. 10.	Population Per Mile Excluding Both Terminals.	Pass. Earn. Per Inhab. Ex. Both Terminals, Col. 7 ÷ Col. 12.	Per Mile of All Tract.	Per Inhab. Including Term., Col. 14 ÷ Col. 8	
GENERAL.															
A	Toledo, Fostoria & Findlay.....	Apr. 30	..	16.8	16.8	\$2,738	2,085	\$1.30	1,031	\$2.61	576	\$4.70	\$2,961	\$1.42	
B	Springfield & Xenia.....	Dec. 31	..	20	20	2,712	2,726	1.00	813	3.33	197	1.38	2,712	1.00	
C	Columbus, Newark & Zanesville.....	Apr. 30	..	34	42	3,985	1,166	3.41	606	6.57	174	22.90	4,295	3.68	
D	Springfield, Troy & Piqua.....	Dec. 31	..	29	29	(b) 1,595	1,693	.94	374	4.26	374	4.26	1,760	1.04	
E	Cleveland, Painesville & Ashtabula...	Apr. 30	..	29	29	2,889	955	3.02	508	5.67	356	8.58	2,922	3.05	
F	Canton, Akron—New Philadelphia..	Apr. 30	18	60	78	6,013	1,395	4.31	840	7.15	319	15.63	6,614	4.74	
	Average.....		..	..	35.8	\$3,322	1,666	2.33	695	4.93	333	9.57	\$3,542	2.49

(b) Based on pro rata earnings for year.

large terminals except Toledo on these lines. Fig. 3 shows A and E in one line, and B and D in another line.

OUTSIDE LINES

In addition to the figures already given, six lines in Ohio which do not belong in any of the groups mentioned have been selected for this comparison as follows:

Toledo, Fostoria & Findlay:—This is the shortest of those selected. Its line extends from Findlay, 20,000, to Fostoria, 15,000, with a northern extension to Pemberville, which was completed this year, and affords connection for Toledo over the Lake Shore electric. Reeves Park, owned by the company,

a noted college town. There is a great deal of picturesque scenery along the route and several summer resorts.

Springfield, Troy & Piqua:—This is another Springfield road. Its line extends northwest from Springfield to Troy, 6000, where it connects with the Dayton & Troy for Dayton, Lima and Toledo. It derived considerable through business by means of this connection and operates through freight cars from Springfield to Dayton. It gets considerable carload freight from the farming district traversed.

Cleveland, Painesville & Ashtabula:—The line of this company extends from Painesville to Ashtabula and is now operated in connection with the Cleveland, Painesville &

Eastern, from which it derives considerable through business through Geneva and Ashtabula. Its business in summer is very heavy to many resorts along the lake.

Canton-Akron-New Philadelphia:—This railway extends from Akron, 50,000, through Conton, 40,000; Massillon, 15,000; Beach City, 1500, and Canal Dover, 7000, to New Philadelphia, 8000, and city lines in Canton and Massillon. The property has recently been consolidated with the Northern Ohio Traction & Light Company. The northern section traverses a good farming district, while the line to the south is through the coal district. The company operates park and summer theater near Canton and derives considerable business from this source.

None of these lines has any large terminal and the average passenger earnings per mile of track are considerably lower than that of any of the other groups. The tributary population, including terminals, is also lower, but excluding terminals is higher. In this group the population, excluding main terminal, that is the difference between column 8 and column 10, has been obtained by deducting Findlay from line A, Springfield from line B, Zanesville from line C, Springfield from line D, Ashtabula from line E, and Akron from line F. The figures given in column 12 have been obtained by also subtracting Fostoria from Line A, Xenia from line B, Newark from line C, Painesville from line E, and Canton from line F.

SUMMARY

Tables XIX. and XX. summarize the earnings of the roads in the different groups according to the passenger earnings and total earnings per mile of track.

Table XIX. shows only four roads with earnings over \$5,000 per mile of track. These roads are the Northern Ohio; Colum-

TABLE XIX.—DIVISION OF ROADS SHOWING PASSENGER EARNINGS PER MILE OF TRACK.

PASSENGER EARNINGS PER MILE OF TRACK.	Cleveland Group.	Columbus Group.	Dayton Group.	Toledo Group.	Miscellaneous.	Total.
Under \$2,000.....	1	0	1	1	1	4
\$2,000 to \$2,500.....	0	1	2	1	0	4
2,500 to 3,000.....	1	2	1	1	3	7
3,000 to 3,500.....	1	2	1	0	0	4
3,500 to 4,000.....	0	0	0	0	1	1
4,000 to 4,500.....	1	0	1	1	0	3
4,500 to 5,000.....	1	0	0	0	0	1
Over \$5,000.....	1	1	1	0	1	4
Total.....	5	6	7	4	6	28

bus, Buckeye Lake & Newark; Cincinnati Northern and Canton-Akron-New Philadelphia. With the exception of the second each of these lines, it will be remembered, possesses considerable city mileage, while the Columbus, Buckeye Lake & Newark has an exceptional park traffic. Looking now at Table XX., which includes freight earnings, it will be found that with but one other exception these four lines are still the only ones showing gross earnings of over \$5,000 per mile of track.

Looking now at lowest figures for earnings per mile of track,

Table XIX. shows that there are only four roads of the twenty-eight which have passenger earnings of less than \$2,000 per mile of track, and that when the freight earnings are added, as in Table XX., this minimum earning capacity is reduced to one road. This road is really not an exception because, as stated previously, it is a comparatively new proposition and its earnings are based upon a portion of the year only. Table XX. also shows only one other road has gross earnings of less than \$2,500 per mile of track, and if the local conditions of this road, mentioned in the previous text, are recalled, that is, that it consists of two consolidated lines, upon one of which infrequent service is given, the reason can be understood. In other words, Table XX. shows that under ordinary conditions, and without city systems, the interurban railways of Ohio have been earning gross between \$2,500 and \$5,000 per mile of track, and that the greater proportion of them show for 1905 gross earnings of about \$3,500 per mile.

Referring now to the different diagrams, Fig. 2, or that in which the tributary population is taken after deducting that of the main terminal, seems to give on the whole the most logical distribution of points. Line D in the Cleveland group, the Northern Ohio Traction Company, is far above the average zone, for the reasons mentioned; while line G of the Dayton group is far to the right on account of the inclusion of Dayton and also for the reasons mentioned previously in this article. All the other roads group themselves approximately closely along a line drawn at an angle of about 45 deg. from the axis of abscissae, with some of the older and more prosperous lines above and some of the later roads below this assumed average line.

No attempt has been made in this article to reproduce diagrams showing the relations between gross earnings per mile and

TABLE XX.—DIVISION OF ROADS SHOWING TOTAL EARNINGS PER MILE OF TRACK.

TOTAL EARNINGS PER MILE OF TRACK.	Cleveland Group.	Columbus Group.	Dayton Group.	Toledo Group.	Miscellaneous.	Total.
Under \$2,000.....	0	0	0	0	1	1
\$2,000 to \$2,500.....	0	0	1	0	0	1
2,500 to 3,000.....	1	1	2	2	3	9
3,000 to 3,500.....	0	3	1	1	0	5
3,500 to 4,000.....	1	0	0	0	0	1
4,000 to 4,500.....	1	1	1	3	0	4
4,500 to 5,000.....	0	0	1	1	0	2
5,000 to 5,500.....	1	0	0	0	0	1
Over \$5,000.....	1	1	1	0	1	4
Total.....	5	6	7	4	6	28

population, but it is thought that if such a diagram should be drawn with the population of the main terminal omitted in making up the figure for rides per inhabitant, the points would group themselves even more closely around a central line. This is indicated from column 14 in the different tables, which shows that those roads which on account of length or comparatively low tributary population are low in passenger earnings per mile of track are the ones which have been best able to develop a good freight business.