

SCHEDULES, LIMITED SERVICES, SPEEDS, FARES, DESPATCHING AND MISCELLANEOUS MATTERS

DETERMINING SCHEDULES

Most of the early interurban roads in the Central West provided for hourly service, and schedules were prepared to have cars leave terminal points on the even hour. This practice is still followed by a number of roads, but the theory that it is always the most satisfactory method of handling the business is losing ground. It is convenient for the public to know that cars leave on the even hour, and the people become accustomed to it and expect it, but this plan is very often a losing proposition for the road. For instance, if cars leave on the even hour, it frequently is necessary for a car to lay up at a terminal for from ten to forty minutes. Wages of crews, interest and other expenses go on, but the car is earning nothing during a very considerable portion of the day. In such cases it is better to have the car leave one of the terminals at some uneven fraction of the hour, and thus keep the car earning a greater portion of the time; frequently it is possible to dispense with one car and a crew on a line by this method. The idea, too, that all cars should run through over the entire line is meeting with less favor. On a number of roads the traffic on an extension is not sufficient to warrant the frequent service that is demanded on other portions.

In some portions of Ohio, near Cincinnati, for instance, the roads have abandoned almost entirely the idea of giving even-hour service, and they lay out their schedules as do railroads, running trains at times of day when the business demands. This is directly opposed to the old street car and suburban railway plan, but it is a question that is receiving serious consideration. Reference to the table on page 667 will show that the Cincinnati, Georgetown & Portsmouth, for instance, runs trains at very irregular intervals. There are periods in the middle of the day when trains are one and one-half to two hours apart. In the morning there are three times as many trains into the city as are going in the other direction, while in the evening there is frequent service out of the city and but few trains in the other direction. A portion of the trains run about half the length of the road; seven a day go through to Georgetown, while only four a day go beyond that point to Russellville. This company follows the idea of polling trains at intervals; that is, the conductor takes a vote to see whether the passengers are pleased with the time of departure and arrival of the train, or whether some would prefer to have it a little earlier or a little later. If it is found that a train is not paying, it is taken off and tried at some other time of day.

This scheme, of course, necessitates liberal advertising of time tables, and it might not work out satisfactorily on a line running between two large cities.

The question of operating cars at more frequent intervals than hourly headway has been much considered of late. The business of a number of roads has grown to a point where more frequent service is demanded, and some of them have put on half-hourly cars between certain points. Usually the half-hour cars are operated only in summer. A number of roads argue that there is little advantage in this plan, claiming that the public does not become acquainted with the fact that half-hourly cars are in operation until it is time to take them off in the fall, and that the traffic on the hourly cars is relieved but little by this method. Again, people board the half-hourly cars and are disgruntled to find that they only go part way to their destination and they must lay up at some intermediate point. The majority of operators believe that it is a much better plan to handle increased traffic by running double headers. In this way on rainy days,

or during unpleasant weather, the extra car need not go on, thus saving much mileage as compared with the plan of having the extra car leave always on the half hour. It is claimed also that this is much safer from an operating standpoint, because, as a rule, it is considered undesirable to operate half-hourly headway on single track roads with infrequent turnouts, especially as a number of the roads are operating numerous freights and limiteds in addition to the local cars. While a number of the roads have cars equipped with train control apparatus, only the Scioto Valley, the Stark Electric and the Lake Shore Electric are operating cars in trains, and the two latter only at infrequent intervals. Many of the roads would be glad to solve the problem in this way, but the objections of city councils, right-angle turns in towns, and, in some cases, weak bridges, make train operation impractical. The tendency is in this direction, however.

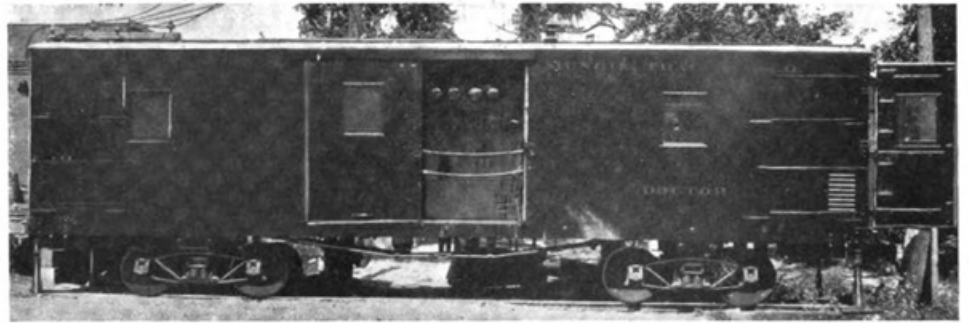
The Lake Shore Electric has a very flexible arrangement for varying its service on the main line between Cleveland and Toledo. The heaviest traffic is, of course, in and out of the large cities. During the summer months the company runs half-hourly service out of Cleveland to Lorain, and this part of the road has been double-tracked for this service, while out of Toledo it runs occasional half-hour cars. These, of course, are in addition to through hourly cars and five through limited trains a day.

For its winter schedule, it has announced a change which greatly reduces its mileage, but, at the same time, maintains the service in very good shape. There are hourly local cars out of both terminals, as in summer; but the cars which precede the five limiteds a day out of Cleveland and Toledo run only to Lorain and Fremont, respectively, at which points they are passed by the limiteds in the same direction. In this way there is full hourly service between the points of heaviest traffic, with the limiteds on the heaviest half hours, while between Fremont and Lorain, where the business is light, there is a car every hour, but the limiteds, of course, only make the city stops. The Canton-Akron system operates hourly cars from Akron to New Philadelphia, while between Canton and Massillon and between Canal Dover and New Philadelphia there are additional cars, which give 30-minute and 15-minute service.

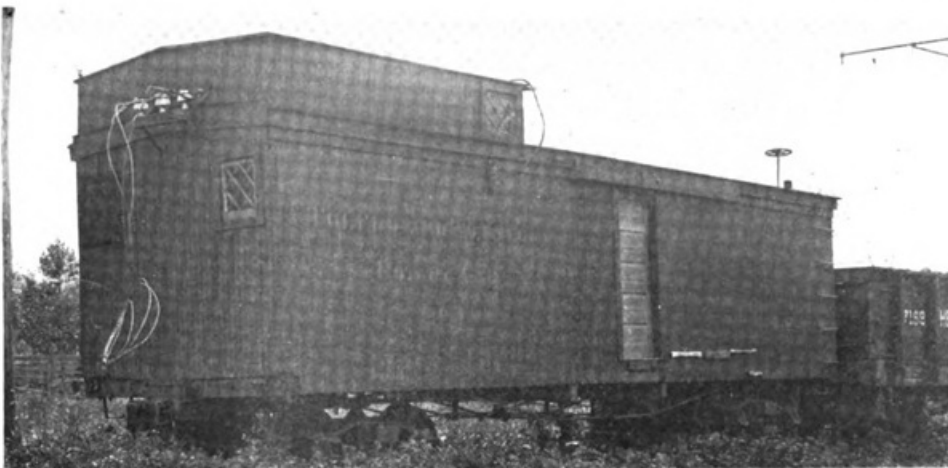
The frequency of stopping points is another subject that is being much discussed. The earlier roads figured on getting the bulk of their business from the farmers, and in order to secure rights of way they put in about as many stopping points as were demanded. The tendency is now very much in the other direction. Long experience has shown that the country people are short-distance riders as a rule, and that the making of frequent stops is often the cause of severe loss to the company. The actual cost of stopping and starting a heavy interurban car is considerable, and the rider who stops a car and rides only to the next stopping point for five cents is an unprofitable customer. Several roads have located their stopping points a mile apart and make a minimum charge of ten cents between stations. The Scioto Valley makes but one stop to the mile, while the Cincinnati, Georgetown & Portsmouth and the Dayton, Covington & Piqua have five stopping points to the mile. The difference in their service is apparent from their schedules, which are indicated in the table on page 667. The Lake Shore Electric has reduced its stops to two to the mile, and the Toledo Indiana has followed the same practice. Indiana roads make less frequent stops. The Indianapolis & Northwestern has its stopping points three-quarters of a mile apart, while the Indianapolis & Cincinnati has them a mile apart. Trains on the Kokomo,



COMBINATION PASSENGER, FREIGHT AND SUB-STATION, FORT WAYNE & WABASH VALLEY



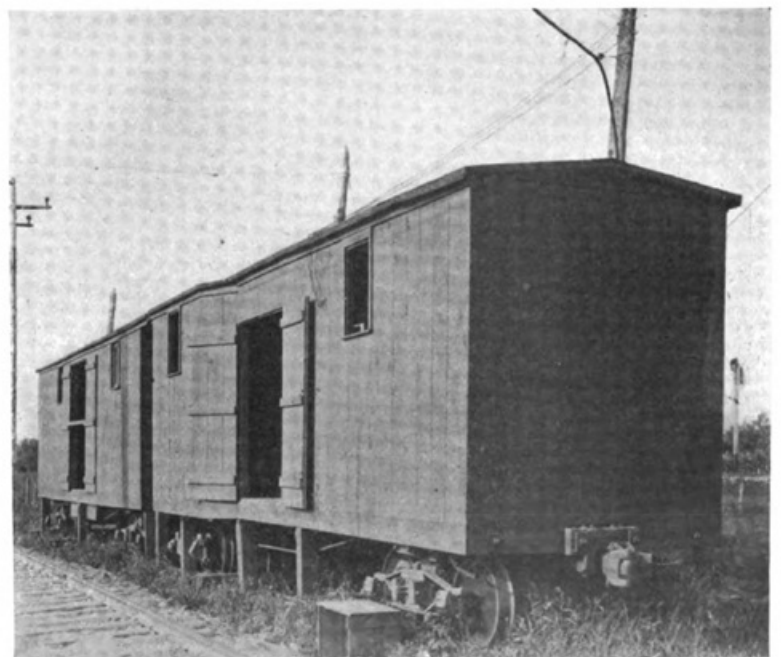
PORTABLE SUB-STATION, DAYTON & MUNCIE



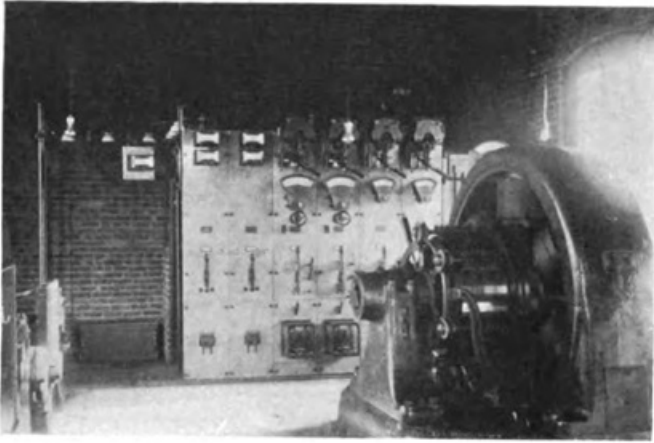
PORTABLE SUB-STATION, TOLEDO & WESTERN RAILWAY



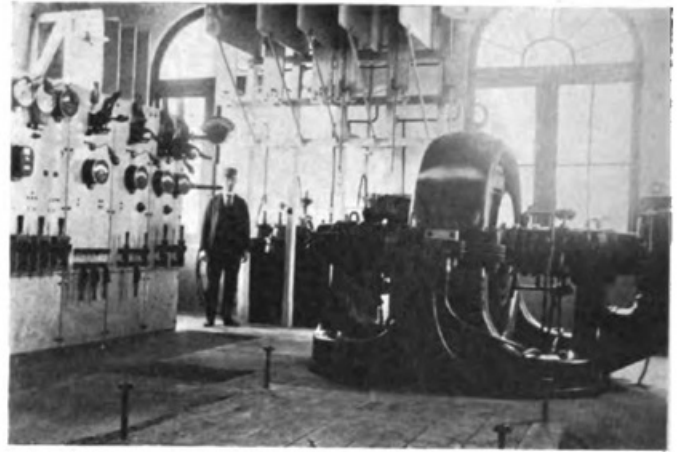
PORTABLE SUB-STATION, CINCINNATI & COLUMBUS



PORTABLE SUB-STATION, COLUMBUS, DELAWARE & MARION



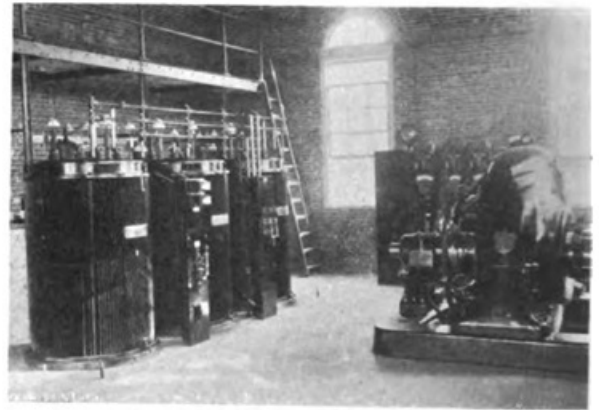
INTERIOR PLEASANT VALLEY SUB-STATION, COLUMBUS,
NEWARK & ZANESVILLE



TYPICAL SUB-STATION, CLEVELAND & SOUTHWESTERN



INTERIOR CHASELAND SUB-STATION, COLUMBUS, DELAWARE &
MARION



TYPICAL SUB-STATION, SCIOTO VALLEY



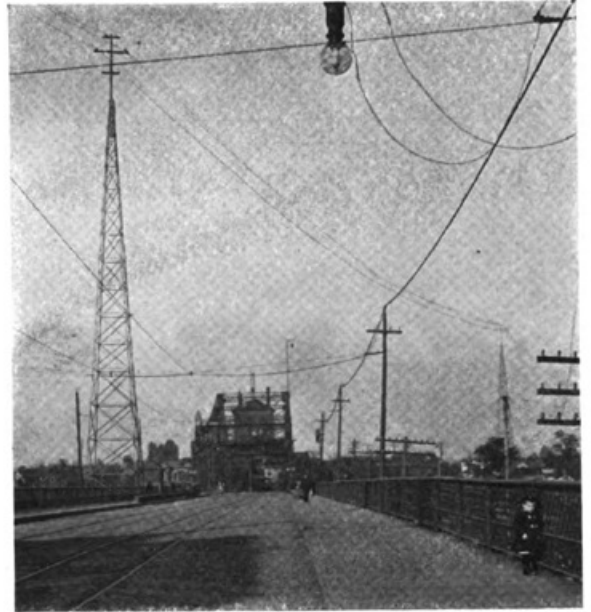
LINE ANCHORAGE AT POWER STATION, SCIOTO VALLEY



PROSPECT SUB-STATION, COLUMBUS, DELAWARE & MARION



CAR HOUSE AND SHOPS AT NEWARK, OHIO, COLUMBUS,
NEWARK & ZANESVILLE



TOWERS CARRYING HIGH-TENSION WIRES OVER
NAVIGABLE STREAM, LAKE SHORE ELECTRIC



CAR HOUSE, SHOPS AND OPERATING HEADQUARTERS, WESTERN
OHIO RAILWAY



LINE CAR, COLUMBUS, DELAWARE & MARION



STORING CARS OUTDOORS. PROTECTING FENCE TO SHIELD
THEM, PAID FOR BY ADVERTISING, STARK ELECTRIC



CAR FOR STRINGING WIRE, COLUMBUS, DELAWARE
& MARION



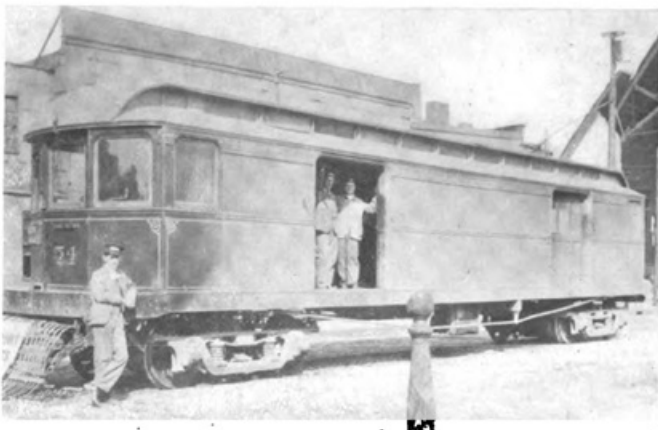
75-TON LOCOMOTIVE AND FREIGHT TRAIN, TOLEDO & WESTERN



FREIGHT TRAIN, WESTERN OHIO



EXPRESS CAR, STARK ELECTRIC



EXPRESS CAR, CLEVELAND & SOUTHWESTERN



ELECTRIC TRUCK FOR HAULING EXPRESS, CINCINNATI, GEORGETOWN & PORTSMOUTH

TABLE IX.—DETAILS OF SCHEDULES, SPEEDS, LIMITED SERVICE, ETC., ON ROADS TREATED (See also Following Page).

NAMES OF COMPANIES.	How Are Schedules Determined.	Details of Actual Schedules.	Schedule Speed Including Stops in M. P. H.	Maximum Speed Between Stops in M. P. H.	Number of Stops to Mile.	Average Time in Minutes Taken at Stops.	Advantage of Limited Service.	Excess Fare on Limiteds.
NORTHERN OHIO GROUP. Cleveland & Southwestern.....	Locals leave Cleveland on hour, limiteds at intervals extra.	Southern division—7 locals to Wooster, 4 to Berea only, 3 limiteds to Wooster. Western division—18 locals to Wellington, 12 locals to Norwalk, 12 limiteds to Oberlin, 4 limiteds to Norwalk.	Limiteds 26.8 Locals 18	50	3	1	Get long distance riders and traveling men.	No.....
Lake Shore Electric.....	Locals leave Cleveland on hour and half hour, limiteds at intervals extra.	13 through locals, Cleveland to Toledo; 6 locals to other points; 19 locals to Elyria, 5 limiteds to Toledo, 2 limiteds to Sandusky.	Limiteds 27.4 Locals 20	60	2	1	Get long hauls and extra business that could not otherwise get.	No.....
Eastern Ohio.....	Leave Cleveland on the hour on two divisions, half hour cars to intermediate points in summer.	Eastern division—21 cars to Gates Mills, 14 through to Chardon, 7 through to Middlefield. Garrettsville division—19 cars to Chagrin Falls, 5 to Garrettsville, 2 limiteds.	Locals 17	40	4	1	Get suburban commuters....	No.....
Toledo & Indiana.....	In summer local cars hourly from Toledo, with 5 limiteds each way extra. In winter local cars 2 hours, limited cars 2 hours, leave Toledo on the hour.	9 locals to Bryan, 7 limiteds to Bryan.....	Limiteds 31.9 Locals 24	55	2	1	Get long hauls.....	Summer only for chair seat.
Toledo & Western.....	Cars at irregular intervals, best suited to handle the traffic.....	8 cars to Fayette, 4 cars through to Pioneer on main line. 11 cars to Adrian on Adrian division. No limiteds.	Locals 20.2	40	5	1	.....	.....
Toledo, Pt. Clinton & Lakeside.....	Leave Toledo on the half hour.....	15 locals, Toledo to Marblehead; 2 limiteds, Toledo to Marblehead.	Limiteds 26 Locals 22.8	50	2	1	People want faster service...	No.....
Stark Electric.....	Leave Canton on the hour.....	16 cars daily, Canton to Salem; 2, Canton to Alliance; 3, Alliance to Salem. No limiteds.	Locals 21.1	50	4	2	.....	.....
Canton-Akron.....	Hourly service over whole line, half hour Canton-Massillon.	15 locals daily, Akron to New Philadelphia; one-half hour cars Canton to Massillon; 3 limiteds to Cleveland.	Limiteds 23 Locals 18	45	4	2	Get through business.....	No.....
CENTRAL AND SOUTHERN OHIO GROUP. Western Ohio.....	Irregular service on various divisions best suited to handle the traffic.	8 locals daily from Findlay to Celina, 2 others run one-half way each way. Picqua to Wapakoneta, locals every 2 hours. 6 limiteds daily, Picqua to Findlay.	Limiteds 30.5 Locals 21	60	3	1	Get long hauls.....	No.....
Ft. Wayne, Van Wert & Lima.....	Hourly cars leaving Lima at 5 minutes after hour	9 locals daily, Lima to Ft. Wayne; 5 limiteds, Lima to Ft. Wayne.	Limiteds 30 Locals 24.4	62	3	1	Secures much business that could not get otherwise.	No.....
Dayton & Troy.....	Keep service ahead of demand. Hourly local cars, Dayton to Piqua; 4 extras to Tippecanoe City; 7 through limiteds additional.	13 locals, Dayton to Piqua; 4 extras to Tippecanoe City only; 7 through limiteds.	Limiteds 30 Locals 22	60	4	1	Get business from steam roads	No.....
Dayton, Covington & Piqua.....	Hourly from Dayton on the hour.....	16 locals, Dayton to Piqua; 3 extras, Dayton to West Milton; no limiteds.	Locals 19.4	45	5	..	.....	.....
Scioto Valley.....	Hourly service, one division on the hour, other on half hour.	15 hourly to Chillicothe; 15 hourly to Lancaster; no limiteds.	Locals 28	60	1	1	.....	.....
Cincinnati & Columbus.....	Cars at irregular intervals as found desirable..	13 cars daily, Cincinnati (Norwood) to Hillsboro; 2 extras to Milford; no limiteds.	Locals 25	55	2	..	.....	.....
Cincinnati, Milford & Loveland.....	Cars at irregular intervals. Average 40 minutes to Milford, once in 2 hours to Blanchester.	24 cars to Milford, 6 go through to Blanchester; no limiteds.	Locals 20	45	5	..	.....	.....
Interurban Ry. & T. Cincinnati.....	Cars at irregular intervals, frequent service to nearby points, three divisions.	Suburban division—11 cars to Bethel, extras to Coney Island and Hamlet. C. & E. division—13 cars to New Richmond. Rapid division 13 cars to Lebanon, extras to Deer Park; no limiteds.	Locals 17.5	40	6	2	.....	.....
Cincinnati, Georgetown & Portsmouth.....	Cars at irregular intervals like steam road. Frequent service mornings and evenings and between nearby points.	16 cars daily to Bethel, 7 go through to Georgetown and 4 a day to Russellville, Saturdays and Sundays extras; no limiteds.	Locals 19.7	45	5	2	.....	.....
INDIANA GROUP. Indiana Union.....	Governing feature is the making of connections with steam roads.	Comprehensive local and limited service.....	Limiteds 23 Locals 28	69.8 On down grade	..	..	Get steam railroad passengers	Small excess.....
Indianapolis & Northwestern.....	Regular cars to leave Indianapolis on the hour	7 local cars; 3 limiteds to La Fayette and Crawford.	Limiteds 27.5 Locals 20	65	1½	1½	.....	Small excess.....
Indianapolis & Cincinnati.....	To leave Indianapolis on the hour.....	6 on Rushville division, 5 on Shelbyville division; limiteds Ind. to Rushville and Shelbyville.	Limiteds 27 Locals 21	50	1	1	.....	Small excess Small excess.
Indianapolis, Columbus & Southern.....	To make connections with steam roads at Columbus and interurbans at Indianapolis.	5 cars; no limiteds.....	Locals 23	45	1	2½	.....	Small excess.
Terre Haute Tr. & Lgt.....	To leave Terre Haute on the hour.....	2, Sullivan line; 3, Brazil line; 2, Clinton line; 1, St. Mary's line; no limiteds.	Locals 26.6	52	1	2	.....	.....
Kokomo, Marion & Western.....	Connections with other roads are considered..	3 cars, limiteds Kokomo and Marion.....	Locals 22.3	50	All road crossings	..	.....	No.....
Ft. Wayne & Wabash Valley.....	To make connections and leave terminals at most convenient intervals.	5 cars, locals one-half hour, limiteds 4 hours..	Limiteds 30 Locals 23	75.9	1.5	..	Get class of business could not get otherwise.	.....
MICHIGAN GROUP. Rapid Railway System, Detroit.....	To leave terminals on the hour.....	Local cars and limiteds, Detroit and Pt. Huron.	Limiteds 28 Locals 20	..	..	1	Accommodates the public and creates traffic.	No.....
Detroit, Ypsilanti, A. A. & J.....	Local cars and limiteds, Detroit and Jackson..	Limiteds 26 Locals 20	57	All cross roads and private stops	..	Get passengers who would otherwise take steam road.	Small excess.....

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Marion & Western stop at all road crossings. On the Ft. Wayne & Wabash Valley system there are 104 scheduled stops in 75.9 miles, making an average of about one and one-half stops per mile. The franchise of the Detroit, Ypsilanti, Ann Arbor & Jackson system compels it to stop trains at any point along the line where the signal may be given. As a result, there are a great many private stops, and stops are also made at all cross-roads. The tendency of most of the systems is to avoid private stations and to stop only in towns and at important road crossings.

LIMITED SERVICE

Out of 26 leading Ohio, Indiana and Michigan interurban lines investigated for this article, 17 are giving limited service. Methods of running these cars and the objects in view differ somewhat. One of the first roads in the district to run limited service was the Cleveland, Painesville & Eastern, which, about six years ago, commenced the operation of a fast car from Painesville into Cleveland in the morning and returning in the evening. It stopped only at certain points, and was designed to accommodate the commuters of Painesville and the more distant points on the line. The Indiana Union Traction Company was also one of the first to give a limited service, the idea being to accommodate the people of the larger towns. This idea has been followed largely by other roads, and several of the high-speed roads are giving a service designed to attract the long-distance traveler. These cars do not stop in the smaller towns and make only station stops in the larger towns, and they compete very closely with the steam trains making a similar number of stops. The institution of this class of limited service has brought to the interurbans a large amount of business which they could not otherwise get. The plan recently adopted of running limited cars over two or three connecting lines and giving fast service between the important centers has also brought the roads a large amount of new business, while the practice now being generally adopted by

TABLE IX.—DETAILS OF SCHEDULES, SPEEDS, LIMITED SERVICE, ETC., ON ROADS TREATED.—Continued.

NAMES OF COMPANIES.	Points Between Which Limited Service is Given.	Distance.	Time.	Time on City Street	Number Regular Stops.	Number of Limiteds Each Way Per Day.	Regular Fare.	Steam Fare.	Time on Steam Trains.	Baggage Limited.	Charge for Baggage.	Longest Ride Without Change Miles.
NORTHERN OHIO GROUP.												
Cleveland & Southwestern.....	Cleveland to Wooster.	52	2 hours, 30 minutes.	30	3	3	\$1.05	\$0.70	1 hour, 5 minutes.	Yes	No	52
Lake Shore Electric.....	Cleveland to Oberlin.	27	1 hour, 35 minutes.	30	1	12	.60	.25	1 hour, 40 minutes	No	No	56
	Cleveland to Norwalk.	86	2 hours, 15 minutes.	30	3	4	.95	2.25	Local 34 hours.	No	No	120
	Cleveland and Toledo.	190	4 hours, 30 minutes.	60	12	5	1.75	1.80	Local 1 hour, 45 minutes.	No	No	42
	Cleveland and Sandusky.	60	2 hours, 30 minutes.	37	6	2	1.00	.40	1 hour, 10 minutes.	No	No	56
	Cleveland to Gates Mills.	16	1 hour.	40	3	1	Chartered.			Yes	No	60
	Cleveland to Chagrin Falls.	18	1 hour.	40	3	1	\$0.30	1.10	1 hour, 30 minutes.	Yes	No	60
	Toledo to Bryan.	56	1 hour, 40 minutes in summer 1 hour, 50 minutes in winter.	18	5 in summer, 9 in winter.	7	1.15	\$2.30 round trip	3 hours to change cars.	No	No	60
	Toledo & Western.....	..	2 hours.	23	7	2	Toledo to Pioneer, \$1.15. Toledo to Adrian 65 cents 85 cents (90 cents in winter)	1.10	Av. train 2 hrs., 10 min.	No	25c.	52
	Toledo, Ft. Clinton & Lakeside.....	52	2 hours.	60	2	3	95 cents, \$1.05 round trip	1.15	Av. train 5 hrs., 20 min.	Yes	No	100
	Stark Electric.....	60	2 hours, 40 minutes.	20	14	7	Dayton to Toledo \$3.00. \$5.25 round trip.	\$3.10	Average train 2 hours.	Yes	No	62
	Canton-Akron.....	(23 on C. A. Ry.)	2 hours, 40 minutes.	18	14	7	Dayton to Toledo \$3.00. \$5.25 round trip.	3.10	Av. train 5 hrs., 30 min.	Yes	No	100
CENTRAL AND SOUTHERN OHIO GROUP.												
Western Ohio.....	Dayton to Toledo.	160	6 hours.	20	14	7	Dayton to Toledo \$3.00. \$5.25 round trip.	\$3.10	Av. train 2 hrs., 30 min.	No	No	34
Ft. Wayne, Van Wert & Lima.....	Lima to Ft. Wayne.	(80 on W. O.)	2 hours, 57 min. on W. O.)	18	23	23	\$1.00	1.00	Av. train 2 hrs., 30 min.	No	No	49
Dayton & Troy.....	Dayton to Toledo.	100	2 hours, 10 minutes.	26	14	7	\$0.60	1.00	Av. train 2 hrs., 30 min.	No	No	52
Dayton, Covington & Piqua.....	Dayton to Toledo.	(81 on D. & T.)	1 hour, 3 min. on D. & T.)	28	..	..	40	25c.	..	..	..	52
Scioto Valley.....	Dayton to Toledo.	49	1 hour, 40 minutes.	..	..	..	35	25c.	..	..	..	32.5
Cincinnati & Columbus.....	Cin. to Bethel (local).	52	1 hour, 5 minutes.	..	..	..	..	..	..	..	..	..
Cincinnati, Milford & Loveland.....	Cin. to New Rich. (local).	38	1 hour, 50 minutes.	..	..	..	..	..	..	..	..	..
Interurban Ry. & T. Cincinnati.....	Cin. to Lebanon (local).	32.5	1 hour, 53 minutes.	..	..	..	..	..	..	..	..	..
Cincinnati, Georgetown & Portsmouth.....	Cin. to Lebanon (local).	21.7	1 hour, 25 minutes.	..	..	..	..	..	..	..	..	..
	Cincinnati, Georgetown & Portsmouth.	54	2 hours, 45 minutes.	35	10	9	Ind. to Muscie 55 cents	..	2 hours	Yes	No	138
INDIANA GROUP.												
Indiana Union.....	Indianapolis to Muncie.	57	2 hours, 5 minutes.	35	7	8	\$1.05	..	2 hours, 40 minutes.	Yes	No	69
	Indianapolis to Marion.	72	2 hours, 25 minutes.	..	..	..	.60	.82	2 hours	Yes	25c.	41
	Indianapolis to Leansport.	80	2 hours, 30 minutes.	..	..	..	.45	.55	1 hour, 15 minutes.	..	25c.	41
	Indianapolis to Peru.	77	2 hours, 35 minutes.	..	..	..	..	..	1 hour.	Yes	25c.	26
	Indianapolis to LaFayette, and to Crawfords.	69	2 hours, 15 minutes.	..	..	..	..	..	..	..	..	..
	Indianapolis to Rushville, and to Shelbyville.	53	1 hour, 40 minutes.	..	..	..	..	..	..	..	..	..
	Kokomo to Marion.	41	1 hour, 32 minutes.	..	..	..	..	..	..	..	..	..
	Ft. Wayne to Peru.	59	2 hours.	15	4	4	\$2.35 Ft. Wayne to Ind.	..	1 hour, 50 minutes.	Yes	No	138
	Ft. Wayne to Indianapolis.	138	4 hours, 40 minutes.	45	17	7	..	..	2 hours, 30 minutes.	No	25c.	74
	Detroit to Ft. Huron.	68	2 hours, 15 minutes.	..	..	..	..	..	..	..	..	..
	Detroit to Jackson.	76	3 hours.	40	4	4	..	..	..	..	..	..
MICHIGAN GROUP.												
Rapid Railway System, Detroit, Detroit, Ypsilanti, A. & J.....	Detroit to Jackson.	74	1 hour, 50 minutes.	..	..	..	..	..	..	..	..	..

roads giving such service, of providing schedules which will allow for close connections, is rapidly building up the long-distance traffic to a point where the electric lines of Ohio, Michigan and Indiana are becoming serious competitors of the steam roads on journeys of from 100 to 300 miles. Such trips are already common occurrences, and plans for new limited services over new routes are constantly enlarging the possibilities in this direction. As yet the idea of traveling 200 or 300 miles on a stretch on electric cars is apt to be sneered at by professional traveling men and those who live much of the time in steam railway coaches, but all the objections are being rapidly overcome. However, it is not the commercial men alone to whom the interurbans are catering for long-distance business. The occasional traveler, or the tourist who enjoys seeing the country and the numerous villages, towns and cities passed through, those to whom time is not an all-important factor, and those to whom the saving of money is an important consideration, are the ones that are being attracted to the possibilities of long trips offered by the electrics.

The entire absence of smoke and dust and the pleasure of riding through the country at high speed, with the windows open and arriving at destination without being covered with soot and cinders, are some of the strongest arguments in favor of electric travel, and they are arguments which almost invariably result in a new patron for the electric lines once a person is induced to try such a trip.

It is not intended to convey the idea that the bulk of the business on limited trains in this district comes from the long-haul passengers. In fact, the contrary is true, but the long hauls form a new class of patronage, and a very profitable one, to the interurbans. It can probably be stated without offense that a number of operators rather overestimated the possibilities of getting this class of business when the long-distance services were first started. Some of the roads believed that by offering service de luxe they could secure a considerable portion of the class of passengers who travel in parlor cars on steam roads. They started out by offering all the comforts of the finest Pullman trains, chair seats, Brussels carpets, reading tables and literature, and, in one or two instances, buffet service. As far as Ohio roads are concerned, these ideas have been pretty largely dispelled. The chair seats necessarily reduced the seating capacity of the cars; there was an objection to the excess fare, which the roads felt obliged to charge for the superior service; and while the cars secured considerable new business, they shut out those who really wanted the faster service, but did not care to pay for the high-class accommodations.

The standard practice for this class of service has settled down to a longer car, with comfortable roll-top upholstered or leather seats and larger seating capacity; and, so far as the Ohio roads are concerned, the excess fare has been entirely eliminated. This is, of course, due partially to the two-cent fare law on steam roads, which made necessary closer figuring for the electrics, but it was mainly due to the reasons above mentioned that the special accommodations were abandoned.

In Indiana the idea of charging a graduated excess fare, running from 5 to 25 or 30 cents, according to distance, is the rule. The chief object of this is to keep off the local traffic going from one town to the next, and it is practical because the rates in that State are considerably lower than in Ohio and the steam roads have not been forced down to the lower rate.

The Indiana Union Traction Company and the Fort Wayne & Wabash Valley in their Indianapolis-Fort Wayne service afford facilities for light buffet lunches, and, as this is one of the longest runs in the district, it is fairly well patronized. The cars used on this run have chair seats in the smoker, but not in the main passenger compartment.

The practice of making every other car a limited, adopted at

first by the Indiana roads, has recently been taken up on some of the Ohio properties, but the scheme more generally used in Ohio is to run from two to five limited trains a day, in addition to the regular local hourly service. A more detailed description of some of the limited services offered in this district follows:

Cleveland-Toledo.—While not the longest nor perhaps the speediest service in the district, the facilities offered by the Lake Shore Electric Railway are worthy of first mention. This was the first road to demonstrate that people could be induced to ride in electric cars for distances over 60 to 75 miles. The service was started three years ago; and, in the face of the finest steam road service in the country and day and night boat lines eight months in the year, the venture has been a tremendous success. Originally there were three fast through cars a day at a schedule of 5 hours for 120 miles, an hour faster than the local cars. This was reduced to $4\frac{3}{4}$ hours and then to $4\frac{1}{2}$ hours, and plans are under way for a still further reduction in time, which will be made possible by the building of a cutoff and by the important double-tracking work now under way. This speed is really very creditable when all the circumstances are considered.

The cars make 12 station stops and 13 stops for derailleurs, while stops are frequently necessary at passing points. They traverse 21 miles of city streets, including terminals, for which 147 minutes are allowed. This leaves but 2 hours and 3 minutes for the 99 miles of high-speed track, requiring an average speed of 48.2 miles an hour. There are numerous stretches which are covered at better than 60 miles an hour to accomplish this. The cars show a remarkably creditable record for being on time, much better in this respect than the trains of the steam road. The cars used in this service were described and illustrated in a recent issue of the STREET RAILWAY JOURNAL. They have leather upholstered seats, and, in order to give a maximum seating capacity, the baggage department was dispensed with on the latest cars. Two-car trains, or double-headers, are frequently necessary on these runs. The cars have four 85-hp motors and can make 65 miles an hour.

A year ago the earnings per car-mile for all of the limiteds was 38 cents. At the present time, with two additional limiteds each way, all limited cars are averaging a trifle over 50 cents a car-mile—an earning capacity which probably cannot be equaled in the district.

Dayton-Toledo.—The longest interurban run in the district is the Dayton-Toledo service operated in conjunction by the Dayton & Troy, Western Ohio and Toledo Urban & Interurban lines. For two years the first-mentioned roads gave limited service from Dayton to Lima, 80 miles, in 2 hours and 30 minutes. The completion of the Western Ohio extension to Findlay made possible the new service this summer, and by an alliance with the last-mentioned road it was extended to Toledo. The parlor car excess fare service which was given on the shorter trip was abandoned, and each road now furnishes two special cars for the service. There are seven limited trains a day each way, of which six cover the entire route. On the Western Ohio and Toledo Urban & Interurban the cars superseded regular local cars, but the Dayton & Troy, with heavier traffic, continues its hourly local service. The cars run through without change, but each road operates the car while on its line. The long run and the fact of operating over three roads made it desirable to give more time than the trip could actually be made in, under different operating conditions. Five minutes layover is allowed in each of the division points—Findlay, Lima and Piqua—and this allowance of 15 minutes enables the roads to make a very creditable showing in the way of keeping the cars on time. The scheduled time for the 162 miles is 6 hours. Including the allowances for layovers and for 16 scheduled stops, the cars

spend 144 minutes on 26 miles of city track, which calls for a speed of approximately 40 miles an hour for the remaining 136 miles. The schedule calls for 60 miles an hour on a number of 4-mile and 5-mile stretches. The cars have practically no lay-over in Toledo, and the round trip of 324 miles of continuous running is a severe test as to the standing up and heating qualities of the modern interurban electric motor. Baggage is carried on these cars, no charge being made, a practice which has very recently been adopted. The one-way fare for the through trip is \$3, which is but 5 cents cheaper than the railroad fare since the 2-cent law went into effect, but the round-trip rate is 75 cents less than that of the steam road. The through business is proving very satisfactory to the companies concerned, while the town-to-town business, which is, of course, the bulk of the traffic, gives the cars an earning capacity of 2 to 3 cents a car-mile better than the local cars on the lines concerned. Two days a week the roads have been giving cheap excursion rates—\$3 round trip from Dayton to Toledo and \$4.25 round trip to Detroit or the Lake Island resorts, the latter being under an arrangement with the lake boat lines. These excursions are run from all points on the system with corresponding rates.

Indianapolis-Fort Wayne.—The most noteworthy service of this class in Indiana is that between Indianapolis and Fort Wayne, a distance of 138 miles, which is operated jointly by the Indiana Union Traction Company and the Fort Wayne & Wabash Valley Traction Company. The one-way trip is made in 4 hours and 40 minutes. This service was described at some length in the STREET RAILWAY JOURNAL for June 16, 1906. The one-way fare between Indianapolis and Fort Wayne on this limited service is \$2.45. Three-compartment buffet cars are employed. The rear compartment is for passengers, and the forward compartment, which includes the motorman's cab, is a baggage room. Between these is a smoking room. Light refreshments are served from the buffet, consisting of sandwiches, eggs, bread and butter, tea and coffee, etc. Sixteen scheduled stops are made between Indianapolis and Fort Wayne. When limited service was first inaugurated on Indiana railway lines, in order to cut down the running time, very few stops were made; but at the present time limited trains on the majority of the roads stop at all the towns of any size. The gain in running time is made by cutting out the cross-road and other country stops. This change in practice is well illustrated on the Indianapolis & Muncie division of the Indiana Union Traction Company. When limited service was first inaugurated on this system the only stop made between Muncie and Indianapolis, a distance of 56 miles, was at Anderson. At the present time ten town stops are made. C. A. Baldwin, superintendent of transportation of the Indiana Union Traction Company, states that in his experience the best returns from limited service are obtained when stops are made at all the principal towns. The only exception to this practice made by the Indiana Union Traction Company is in the operation of the "Marion Flyer," which makes but two scheduled stops between Marion and Anderson, a distance of 72 miles. The Indiana Union Traction Company has gone into limited service rather extensively. On the Indianapolis & Muncie division the limited cars and regular cars making all stops are alternated, the limited cars being run at two-hour intervals. The same is true on the Indianapolis Northern division of the road. On these limiteds a fare slightly in excess of the regular fare is charged, and the cars used are always the newer ones and are furnished somewhat better than the regular cars. The object in charging the excess fare is largely for the purpose of excluding the shorter-haul travel. It is believed that by excluding this element from the regular cars, many people who would otherwise travel by the paralleling steam roads are induced to patronize the electric line. With the exception of the cars in the Fort Wayne special service, the limited cars

of the Indiana Union Traction Company are not equipped for carrying baggage, and the baggage of a passenger traveling on the limited cars is carried on the regular train either preceding or the one immediately following the limited car.

On the Indianapolis & Northwestern system limited cars are run at about three-hour intervals. The run between Indianapolis and La Fayette, over a distance of 68.75 miles, is made in 2 hours and 30 minutes, the regular cars making the run in 3 hours and 15 minutes. The gain in time is made by cutting out the stops at the small country towns and having the limited trains make only three regular town stops and four flagged stops. An excess fare of 20 cents is charged between Indianapolis and La Fayette, the regular fare being \$1.05. Baggage is carried on the limited trains, as the cars in this service are of the same type as those in regular service and are provided with baggage compartments. One limited train in each direction is run in the morning and in the evening on each division of the Indianapolis & Cincinnati Traction Company. The limited trains on the Rushville division make three scheduled stops between Indianapolis and Rushville, a distance of 41 miles. The run is made in 1 hour and 32 minutes, or at the scheduled speed of 27 miles per hour. An excess fare of 15 cents is charged to Rushville, the regular fare being 60 cents. Baggage is carried on the limited cars. On the Kokomo, Marion & Western system limited trains are run in each direction every three hours and no excess is charged on them. The only limited service given on the Fort Wayne & Wabash Valley system is that of the Fort Wayne special, which, as has previously been said, is operated jointly by the Indiana Union Traction Company and the Fort Wayne & Wabash Valley Traction Company.

Limited trains are operated over all of the interurban divisions of the Detroit United Railways. To the company the operation of these trains is simply a matter of creating new through business. The rate is the same on the limited as on the local cars. Henry Bullen, general superintendent of the system, is of the opinion that it is a mistake to charge excess fare on limited cars. He believes that it is due to the fact that no excess is charged that the limited cars operated by the company always carry full loads and are the source of a great deal of revenue. Four limited trains are operated daily in each direction over the Toledo division, two over the Flint division, and three over the Port Huron division. The time from Detroit to Port Huron, a distance of about 68 miles, is 2 hours and 15 minutes, which gives a schedule of 28 miles per hour, and this is practically the same schedule as that of the Fort Wayne special between Fort Wayne and Indianapolis. Limited cars of the Detroit, Ypsilanti, Ann Arbor & Jackson Railway make two stops at all large towns, one stop being in the east end of the town and the other in the west portion. Seven limited trains are operated daily in each direction. The run between Detroit and Jackson, a distance of 76 miles, is made in 2 hours and 30 minutes. An excess fare is charged on the limiteds and no baggage is carried on them.

The Toledo & Indiana Railway has an unusual scheme for limited service. During the summer months it operates parlor cars, making the 56 miles from Toledo to Bryan in 1 hour and 45 minutes. These cars are in addition to the regular hourly service and an excess fare is charged. They secure the better class of through business and pleasure traffic. During the winter months the parlor cars are retired from the service, more stops are made by the limiteds, and the time is increased to 2 hours, the cars alternating with the local cars. Manager Darrow, of this company, finds that there is not the demand for the parlor cars in winter, and the scheme reduces the mileage in the winter months. No excess is charged in winter.

The Fort Wayne, Van Wert & Lima gives very fast service between Fort Wayne and Lima with five cars each way, making the 62 miles in 2 hours and 10 minutes. The service competes

very closely in time with the parallel steam road. The cars are duplicates of those used on the Indianapolis-Fort Wayne service.

The Cleveland & Southwestern has increased its business tremendously the past summer by frequent limited service. On its western division it ran hourly limited cars as far as Oberlin, four a day going through to Norwalk, in addition to hourly local cars to Norwalk and Wellington, leaving Cleveland on the half hour. It also has three limiteds to Wooster on the southern division in addition to hourly local cars. No excess is charged on limiteds and free baggage is carried. The Northern Ohio Traction Company, acting in conjunction with the Canton-Akron Company, which it now controls, has recently started limited service between Cleveland and Canton. This is in addition to limited service between Cleveland and Akron, started some months ago. The cars cover the 60 miles in 2 hours and 40 minutes, of which 1 hour is spent on 10½ miles of city track. The round trip rate is \$1.65, as compared with \$2.30 on the parallel steam road. The Cleveland, Painesville & Eastern and the Cleveland, Painesville & Ashtabula recently started joint limited service between Cleveland and Ashtabula, making the 60 miles in 2 hours and 30 minutes. Very fine cars are being delivered for this service. The Toledo, Port Clinton & Lakeside runs two cars each way a day between Toledo and Marblehead, 52 miles, in two hours. The Eastern Ohio has a limited car each way on each of its two divisions. The one on the eastern division runs to and from Gates Mills and presents an unusual arrangement. It is known to the country people as the "Blue Blood Special," being in reality a chartered car run for the benefit of wealthy suburbanites, who clubbed together for its operation. It makes no city stops, and only at points in the country where members of the club, who designate their membership by holding up a yellow card, desire to board the car.

The Schoepf syndicate has announced that it is soon to resume the operation of limited cars between Dayton and Indianapolis. Before the consolidation of the properties on this route, the three roads operated what was known as the "Interstate Limited," giving parlor buffet service with excess fare. This was abandoned some months ago. It is understood that the new cars will be similar to those on the Indianapolis-Fort Wayne service, and that the 108 miles will be covered in 4 hours, 15 minutes better than the previous service.

It seems quite probable also that the Schoepf syndicate will resume limited service between Dayton and Columbus, and possibly between Columbus and Zanesville. These services were abandoned some months before the sale of the properties to the Schoepf interests on account of poor power conditions. These conditions are now being improved and it is reasonable to suppose that the service will be resumed, as it is needed to complete the chain across Central Ohio and Indiana. Fast service will also doubtless be given between Dayton and Cincinnati as soon as the improvements on the Cincinnati Northern, now well under way, are completed.

The Scioto Valley Traction Company and the Cincinnati & Columbus Traction Company do not give special limited service, but their local service is very fast, the former running 49 miles in 1 hour and 40 minutes, equal to about 28 miles an hour, while the latter has a schedule of 2 hours and 5 minutes for 52 miles, or a fraction under 26 miles an hour. These roads have but one stopping point to the mile.

LONG DISTANCE TRIPS

Four hundred miles in a day is now possible on the regular every-day limited cars of this district. From Indianapolis to Cleveland by electric cars is a roundabout ride, but it can be covered in a day. Here is the proof, taken from the time cards of the various roads concerned. Under present conditions it

is not a trip that is likely to be taken except for amusement, but another year will see cutoffs in operation which will reduce the time and distance by more than 25 per cent.

			MILES.
Indianapolis-Ft. Wayne Ltd...	{Lv. Indianapolis....	7.00 a.m.	} 134
	{Ar. Ft. Wayne.....	11.40 "	
Ft. Wayne-Lima Ltd.....	{Lv. Ft. Wayne.....	12.05 p.m.	} 65
	{Ar. Lima.....	2.10 "	
Lima-Toledo Ltd.....	{Lv. Lima.....	2.15 "	} 81
	{Ar. Toledo.....	5.20 "	
Toledo-Cleveland Ltd.....	{Lv. Toledo.....	7.30 "	} 120
	{Ar. Cleveland.....	12.00 "	
Total			400

A large number of trips above 250 miles can be made on traction lines in less time than they can be made on steam roads, because of the infrequency of steam road service and long delays in making connections for isolated points. Tickets are sold every day out of Cleveland for Detroit, 180 miles, and it is possible to continue on from that point to Port Huron, Mich., 250 miles, with better connections than can be made by steam. Tickets are frequently sold out of Dayton for Port Huron, Mich., a trifle under 300 miles, and people have frequently gone from Zanesville, Ohio, to Indianapolis and points beyond, 250 to 300 miles, actually making better time than by steam roads for the reasons mentioned.

FARES

Last year the majority of the roads in Ohio raised their rates to approximately 2 cents a mile for one-way cash fares, and, in spite of the recent reduction of the rates on steam roads in Ohio, to 2 cents a mile, this basing rate is still retained by the majority of electric roads. As a matter of fact, there are two instances where the interurban roads are getting more than 2 cents a mile, and there are several instances where the rates between certain points on electric roads are now a trifle higher than rates of the parallel steam roads, due to shorter mileage on the latter. The fact that the interurban roads are maintaining practically the same rates as the steam lines on single one-way trips offers a remarkable commentary on the advantages of interurban electric roads, namely, frequent service and the operation of cars to convenient points in the business centers of large cities. The situation was watched with considerable anxiety after the passage of the 2-cent fare bill. It was feared that the electrics would be forced to go back to their old rates and might even be obliged to cut below the comparatively lower rates in force in Indiana and Michigan, but after six months of the lower competition, it has not been found necessary to change this basing rate, and almost without exception the roads have shown greater increase in earnings than in any similar period in their histories.

On a number of roads this has been effected largely by improving the service through the purchase of new rolling stock and by faster schedules and more frequent limited trains. The growth of the systems and the ability to make better connections have also had much to do with this result. Steam roads have found that the short-haul travel was not profitable at the lower rates, and have cut off many of their local runs, thus improving conditions for the electrics. On the majority of the longer hauls the interurbans have been holding their own or making gains. This is evidenced by the experience of the Lake Shore Electric, whose Cleveland-Toledo limiteds have been increased from three to five a day and they have been earning about 50 cents a car-mile, where a year ago they earned less than 40 cents a car-mile.

The Lake Shore Electric, Stark Electric, Interurban Railway & Terminal Company, Cincinnati, Georgetown & Portsmouth and several other roads make a reduction of 5 to 10 per cent on one-way ticket fares as compared with cash fares paid on the car. This is, of course, to encourage the sale of tickets at ticket offices.

The Toledo & Indiana makes the increased rate of 5 cents flat above the ticket rates to any point, and issues a cash receipt, which is good for a rebate of five cents at any ticket office. The Dayton, Covington & Piqua does not sell tickets.

Much of the success of the Ohio interurbans in holding their own against the new competitions is due to the fact that, as a rule, they are making considerable reduction on round-trip tickets, whereas the steam roads in Ohio have cut off all reductions on round trips. An example of this is furnished in the case of the through Dayton-Toledo service, where the one-way rate is \$3 and the round-trip rate \$5.25. The steam rate is \$3.05, with no reduction for round trip. The reductions made vary considerably. In the case of the Scioto Valley, Cincinnati & Columbus and Cincinnati, Milford & Loveland, the round trip rate is 1.9 cents, while on the Cincinnati, Georgetown & Portsmouth it is but 1.35 cents per mile.

years ago nearly all of the roads sold mileage books, but at present only 5 out of 17 roads in Ohio have such books.

The interchangeable coupon book of the Central Electric Railway Association has been pretty generally adopted. This, of course, gives the reduction of 16 2-3 per cent from the one-way cash fare rate. The sales of this form of book have been increasing steadily during the past few months, the gain for August being \$3,700 over the previous month. Ten roads sell school tickets. In the northern and eastern parts of Ohio the rate is 1 cent a mile, the tickets being good on school days only. The roads around Cincinnati seem to make a considerable reduction in this, the Cincinnati, Milford & Loveland selling such tickets at 0.60 cent, and the Cincinnati, Georgetown & Portsmouth at 0.61 cent per mile.

There is a considerable difference of opinion as to the advisability of making special rates on Sundays and holidays. Some

TABLE X.—RATES OF FARE IN CENTS PER MILE ON ROADS TREATED (See also Following Page).

NAMES OF COMPANIES.	Cash Fare Per Mile, in Cents.	Ticket Rate Per Mile, in Cents.	Round Trip Rate Per Mile, in Cents.	Family Commutation. Rate Per Mile, in Cents.	Individual Commutation. Rate Per Mile in Cents.	Mileage Books. Rate Per Mile, in Cents.
NORTHERN OHIO GROUP.						
Cleveland & Southwestern.....	1.82	1.82	1.61	1.44	1.27	
Lake Shore Electric.....	2.00	1.82	1.71	Limit 6 months. 1.55	Limit 60 days. 1.25	
Eastern Ohio.....	2.21	2.21	.....	No limitations. 1.83	1.10	
Toledo & Indiana.....	5c. more than ticket rect. redeemed.	2.00	1.80	.....	Limit 30 days. 1.60	
Toledo & Western.....	2.00	2.00	1.50	.....	1.00	1.50
Toledo, Ft. Clinton & Lakeside.....	1.75	1.75	1.61	1.40	.....	1.50
Stark Electric.....	2.00	1.75	1.75	No.	No.	Good for anyone. No.
Canton-Akron.....	1.75	1.75	1.50	No.	No.	No.
CENTRAL AND SOUTHERN OHIO GROUP.						
Western Ohio.....	2.00	2.00	1.80	1.75	.....	1.75
Ft. Wayne, Van Wert & Lima.....	2.00	2.00	1.80	.....	.....	.....
Dayton & Troy.....	2.00	2.00	1.80	1.33	.....	1.10
Dayton, Covington & Piqua.....	2.00	No tickets.	.....	1.33	1.33	1.50
Scioto Valley.....	2.00	2.00	1.90	1.67	1.20	.....
Cincinnati & Columbus.....	2.00	2.00	1.90	No limitations.	30 days limit. 1.00	No.
Cincinnati, Milford & Loveland.....	2.11	2.11	1.90	.66	1.17	No.
Interurban Ry. & T. Cincinnati.....	1.75	5 to 10c. less.	1.66	One month only. 1.57	10-trip book. 1.42	No.
Cincinnati, Georgetown & Portsmouth.....	2.00	1.50	1.35	.....	30 days.	1.25 Family.
INDIANA GROUP.						
Indiana Union.....	1.50	1.50	Slight reduction	No	No	1.25
Indianapolis & Northwestern.....	1.50	1.50	5 to 10c. reduction	.....	20 rides at rd. trip rate	.....
Indianapolis & Cincinnati.....	1.50	1.50	5 to 10c. reduction	Interchangeable coupons good for family	.....	.....
Indianapolis, Columbus & Southern.....	1.50	1.50	15c. reduction to Columbus, 41 miles.	No.	16 2/3% reduction from round trip rate.	No.
Terre Haute Tr. & Lgt.....	1.00-2.00	None.	No.	No.	No.	No.
Kokomo, Marion & Western.....	1.67	.....	5c. reduction for fares over 15c.	No.	No.	Yes.
Ft. Wayne & Wabash Valley.....	2.00	2.00	Slight reduction for round trip.	No.	About 1c. per mile	Yes.
MICHIGAN GROUP.						
Rapid Railway System, Detroit.....	1.50	1.50	Slight reduction for round trip.	\$10 book at 1/2 reduction.	.....	Yes.
Detroit, Ypsilanti, A. A. & J.....	2.00 W. of A. A. 1.00 E. of A. A.	Slight reduction from cash fare W. of A. A.	.....	No.	No.	E. of A. A. 1.00c. W. of A. A. 1.50c. per mile

There is little uniformity of practice in regard to the sale of commuter and mileage books, each road governing its practice by the local conditions and the competition offered; but, as stated, many of the roads are finding their positions stronger than formerly through the cutting off of local steam trains. Family commuter books are sold by ten out of seventeen roads in Ohio. They are limited usually to six months or a year, but the tendency is to drop all other limitations, making the books practically wide open for any one who desires to use them. The rates vary from 0.66 cent per mile on a monthly family book sold by the Cincinnati, Milford & Loveland, to 1.83 cents on the Eastern Ohio for this class of book. Individual commuter books are not so generally used. The Toledo & Western and the Cincinnati & Columbus give as low as 1 cent a mile on such books, which are good for thirty days, with no rebate for unused portions. Several roads have books selling at the rate of about 1.25 cents per mile, with sixty-day limitation. Several

of the roads, particularly those in the western part of the State, make a rate of 1 1-3 fare for round trips on special days, while the roads in the Cleveland district feel that they can get all the people they can carry at the regular rates. Week-end rates with tickets good for three days are made by several of the roads, but the general sentiment is against this. Under the head of "other rates" there are several peculiar schemes. The Toledo & Indiana makes a rate of 1 cent a mile for evening rides after six o'clock. The Toledo, Port Clinton & Lakeside makes all its rates 5 cents cheaper in summer than in winter. The Dayton & Troy and Western Ohio run semi-weekly long-distance excursions at the very low rate of 1 cent a mile. Chartered car rates vary considerably; but, as a rule, they are based on 1 1-3 fare for a party of twenty or more. Several roads make a flat rate for the use of cars between certain points.

The rates of fare over the roads visited in Indiana and Michigan vary from 1 to 2 cents per mile, the lowest rates being on

the Brazil division of the Terre Haute Traction & Light Company and on the Detroit, Ypsilanti, Ann Arbor & Jackson Railroad east of Ann Arbor. On the eastern end of the latter road the charge is made by townships, the fare being 5 cents per township, which usually means a distance of about 5 miles. This low rate is the result of franchise requirements. On that portion of the road west of Ann Arbor the franchise permits of a 2-cent-per-mile fare, and this fare is charged. This road, therefore, represents the two extremes of interurban fares of the roads visited.

Tickets are sold by practically all of the systems. Usually no reduction is made from the regular fare paid on the train for a ticket fare, the only exception to this rule being the Detroit, Ypsilanti, Ann Arbor & Jackson Railway, which sells tickets over that portion of the road west of Ann Arbor at a slight reduction from the fare when paid on the train.

The State laws of Indiana are said to practically prevent the

tion Company gives a 5-cent reduction when the one-way fare is more than 15 cents.

The interchangeable coupon book of the Central Association is used by all the Indiana and Michigan roads visited, with the exception of the Terre Haute Traction & Light Company, the tracks of which are not yet connected to those of any other system, and the Detroit, Ypsilanti, Ann Arbor & Jackson Railway, which uses a mileage book not limited to the use of one person. The Indianapolis & Cincinnati Traction Company issues a special contract by which the interchangeable coupon book of the Central Electric Railway Association may be used on the lines of the company by the purchaser or by members of his family or firm. It may also be used in payment of the personal fare of any traveling companions for whom it may be presented. The Fort Wayne & Wabash Valley uses, in addition to the interchangeable coupon book, an individual mileage book. This

TABLE X.—RATES OF FARE IN CENTS PER MILE ON ROADS TREATED.—*Concluded.*

NAMES OF COMPANIES.	Inter-changeable Coupons, Rate Per Mile in Cents.	School Tickets, Rate Per Mile in Cents.	Sunday Rates, Per Mile in Cents	Week-end Rates, Per Mile in Cents.	Other Rates.
NORTHERN OHIO GROUP.					
Cleveland & Southwestern.....	1.51	1.00	....	....
Lake Shore Electric.....	1.51	School days only. 1.00	....	....
Eastern Ohio.....	....	School days only. 1.10	....	....
Toledo & Indiana.....	1.67	School days only.	1.33	....	Evening rate 1c. a mile, good only for evening issued.
Toledo & Western.....	....	1.00	1.33	....
Toledo, Ft. Clinton & Lakeside.....	1.63	....	....	....	Summer rates 5c. cheaper than winter.
Stark Electric.....	No.	No.	No.	No.	20 party rate 1.33c. per mile.
Canton-Akron.....	No.	No.	No.	No.	20 party rate 1 3/4 miles for 15c. each person.
CENTRAL AND SOUTHERN OHIO GROUP.					
Western Ohio.....	1.67	1.00	....	1.25	
Ft. Wayne, Van Wert & Lima.....	1.67	....	....	....
Dayton & Troy.....	1.67	....	1.05	1.05	Long distance excursion twice a week, 1c. per mile.
Dayton, Covington & Piqua.....	1.67	....	....	....
Scioto Valley.....	Don't sell.	1.00	....	....
Cincinnati & Columbus.....	No.	.75	1.00	1.33	No.
Cincinnati, Milford & Loveland.....	No.	School days .60	No.	No.	No.
Interurban Ry. & T. Cincinnati.....	No.	School days. .87	No.	No.	No.
Cincinnati, Georgetown & Portsmouth.....	No.	School days. .61	No.	No.	No.
Cincinnati, School days.					
INDIANA GROUP.					
Indiana Union.....	Yes.	....	No.	....
Indianapolis & Northwestern.....	Yes.	1.00	Where rate is over \$1, Sunday rate is made \$1.	No.	
Indianapolis & Cincinnati.....	Yes.	\$2.50 for 100 coupons, school days.	1c. per mile to Indianapolis only.	From Indianapolis out Sat. return Sun. or Mon. 1c. per mile.	
Indianapolis, Columbus & Southern.....	Yes.	No.	No.	No.	One-way coupon books, 25 round trips, not trans'ble.
Terre Haute Tr. & Lgt.....	No.	No.	No.	No.	No.
Kokomo, Marion & Western.....	Yes.	1/2 off during school term.	Yes, especially in summer.	....	Working book 1/2 off reg. fare
Ft. Wayne & Wabash Valley.....	Yes.	No.	Occasionally.	No.	
MICHIGAN GROUP.					
Rapid Railway System, Detroit.....	Yes.	1 fare round trip limited to certain hours.	No.	No.	
Detroit, Ypsilanti, A. A. & J.....	No.	Discontinued.	No.	No.	Special excursions.

charging of excess fares on trains. In order to charge excess for cash fares a ticket agent must be at the window of the ticket office constantly for one-half hour before the departure of trains, in order that passengers may buy tickets if they so desire. As the duties of ticket agents are usually combined with those of freight agent, and occasionally with the duties of sub-station man, to comply with the law it would be necessary to employ additional help, the cost of which would often more than offset the excess obtained from cash fares. Usually a reduction is made from the regular fares when round-trip tickets are purchased. On the Indiana Union Traction Company the round trip fare is about 80 per cent of the double one-way fare. The Indianapolis & Cincinnati Traction Company gives a 10-cent reduction from the double one-way fare on round trip tickets on the Rushville division, and from 5 to 15 cents reduction on the Shelbyville division. The Kokomo, Marion & Western Trac-

tion Company gives a 5-cent reduction when the one-way fare is more than 15 cents.

is made up of 5-cent coupons, and a book of \$10 worth of coupons is sold for \$8, giving a 20 per cent reduction, or reducing the fare to 1.6 cents per mile. A one-way coupon book of twenty-five round trips is sold over the Indianapolis, Columbus & Southern road. The coupons are good only for thirty days and are not transferable. The only system using a family commuter ticket is the Detroit United Railways. A \$10 book of fares is sold at a reduction from the regular rate of about 30 per cent. On the Indianapolis & Northwestern system a 20-ride commutation ticket is sold at round trip rates. An individual commutation ticket is sold on the Indianapolis, Columbus & Southern Traction Company at a reduction of 16 2-3 per cent under the round trip fare. This ticket is good only between stations designated by several of the systems. There is no uniformity of the regulations governing the use of such tickets on the different roads. The

Indianapolis & Northwestern system issues school tickets to persons under eighteen years of age at 1 cent per mile. A certificate, to the effect that the purchaser is a student or scholar, is required from the superintendent of the school. A school ticket of 100 5-cent coupons is sold by the Indianapolis & Cincinnati Traction Company for \$2.50. This is at a reduction from the regular rates of 50 per cent. The teacher must give a certificate, and the tickets are accepted only between the hours of 7 a. m. and 5 p. m. The Kokomo, Marion & Western Traction Company sells school tickets at a reduction from the regular rates of 33 1-3 per cent. The tickets are not limited to hours or ages, but are good only during school terms. School tickets are sold at the rate of one fare for the round trip by the Detroit United Railways. The tickets are issued to students in schools ranging in grade from kindergartens to high schools and are limited to certain hours. No school tickets are issued by the Detroit, Ypsilanti, Ann Arbor & Jackson Railway. They were formerly issued, but were recently discontinued.

The majority of the roads visited make no special Sunday rates. The Indianapolis & Northwestern Traction Company, however, makes a slight concession by charging a maximum fare of \$1 on Sundays. Special Sunday rates are frequently made on the Kokomo, Marion & Western Traction Company. Very few Sunday rates are made by the Fort Wayne & Wabash Valley system, but they are made on special occasions.

The Indianapolis & Cincinnati Traction Company makes a Sunday rate of 1 cent a mile from all points on the Rushville division to Indianapolis. Travel in the opposite direction is taken care of by "week-end excursion tickets," which are sold at the Indianapolis terminal ticket offices on Saturdays and Sundays for all stations on the Rushville division, and are good returning either on Sunday or on Monday.

The Kokomo, Marion & Western Traction Company issues a "work book," which sells at a reduction of 33 1-3 per cent from the regular fare. However, it is good only between the hours of 5 and 8 a. m. and 4:30 and 7:30 p. m. All of the systems make special rates for special cars. These rates, however, are made on different bases by the different roads. Some base the rates on the mileage, some on the time the car is in use, and some consider the number of passengers carried, as well as the mileage and the period of time the car is in service.

The Detroit, Ypsilanti, Ann Arbor & Jackson Railway charges \$75 for a special car between Jackson and Detroit, a distance of 76 miles. The party carried is limited to sixty people. No extra charge is made for the layover in Detroit. On the Fort Wayne & Wabash Valley system a charge of 60 cents per car-mile is made. The party is limited to the comfortable loading of the car. In addition to the mileage, a charge of \$1 for each hour of layover is made. The minimum rate for a special car is \$10.

TRAIN DESPATCHING

In spite of the fact that the average operator in speaking of his train despatching system claims that it is exactly like steam-road practice, there is a remarkable lack of uniformity on this important subject. There are variations in the methods of transmitting messages, methods of receiving them, methods of recording them and many variations in the methods of handling trains. The telephone is of course used by all Ohio roads in transmitting messages, but the Toledo & Western offers a variation from this in that many of its orders are transmitted by telegraph to the agents the same as in steam road practice, but the orders delivered to crews at sidings along the line are by telephone. There is a considerable difference of opinion as to the advisability of allowing agents to handle messages. The roads which come the nearest to genuine steam practice of course transmit orders through agents. The Lake Shore Electric, Toledo & Western, Toledo, Port Chester & Lakeside, Cincinnati, Georgetown & Ports-

mouth, Dayton & Troy and several other roads deliver many of their messages in this way. The Dayton & Troy delivers messages through agents, and all agents not only keep a record of the passing of trains, but report each train to the despatcher. The advantages claimed for the plan of having agents to handle messages is that it saves the time of crews and avoids the necessity for the crews calling at certain points when there may be no orders. It is possible also when agents are maintained at stations to reach crews at critical times.

On the other hand, the Scioto Valley, Stark Electric, Eastern Ohio, Cleveland & Southwestern and several roads do not believe in having the station agents pay any attention to the handling of trains, preferring to limit the transmission of messages to direct conversation between train crews and despatchers. The Cincinnati, Georgetown & Portsmouth, Cincinnati, Milford & Loveland, Cincinnati & Columbus, Interurban Railway & Terminal and several roads in the central part of the State do not require written orders. The claim is made that it takes too much time to write the orders, and that in fact written orders do not afford any greater check against the train crews, as in case of accident from mistakes orders can be altered to suit the occasion.

Verbal orders are strongly criticised by many operators, and in a number of cases unusual precautions are taken to insure a careful check on all who have any connection with the handling of orders. The Stark Electric crews take their orders in triplicate by means of carbon-backed slips, one order going to the motorman, another to the conductor and the third remaining in a book in the telephone booth. The Cleveland & Southwestern affords even a closer protection through the use of the Egery automatic register in both the despatcher's office and the telephone booth. By this method copies of the order are locked in the register in both the despatcher's office and the telephone booth, and they are accessible only to the train master or superintendent. On the Scioto Valley, Dayton & Troy and the Toledo & Indiana the despatcher keeps a record book of each order issued in addition to the usual train sheet, which is used by practically all of the roads.

Ideas as to the best method of receiving orders at passing points differ considerably. On the Stark Electric, the conductor takes the order and reads it to the motorman who must be at the booth at the time; the conductor reads it back and the despatcher in closing gives the time. Both the motorman and conductor sign the order; as stated, these orders are in triplicate. Practice on the Canton-Akron is very similar, except that the use of station booths has been abandoned and portable 'phones are carried on all cars. The Fort Wayne, Van Wert & Lima also has portable 'phones. On the Interurban Railway & Terminal, the motorman takes the order and repeats to the conductor and the conductor repeats back to the despatcher; the Dayton & Troy has a similar practice.

On the Lake Shore Electric the conductor takes the order and reads it aloud to the motorman who hangs it on a hook in front of him. On the Scioto Valley this plan is reversed; the motorman takes the order and reads it to the conductor, the idea being that the motorman is the one who should be most impressed and as he is the responsible party the order should be taken by his hand.

The kind of order issued also shows wide variation. The Western Ohio requires that calls shall be made at every passing point. The first crew arriving calls, and if there are no orders for the other car it is given the "high ball." Local cars clear limiteds by 2 minutes at sidings so that limiteds seldom have to stop for orders. Express cars run extra and clear times of passenger cars by 4 minutes. On the Eastern Ohio the order carries the car past two or three meeting points and the crew is then required to call. The numbers of cars to be passed and passing points are indicated in the order.

On the Lake Shore Electric, cars when on time are given

clearances between certain points. Limiteds call only at four points on the line, but orders may be issued to them at other points through the station agents. The form usually used is known as No. 17 in steam-road practice. Express cars when on time run as second sections of local cars and make the same schedule. When off time they are required to call at every siding. Orders are issued by number, using the train number and car number. Sidings are known by names, not by numbers; numbered sidings having been found a cause for mistakes. The Lake Shore is divided into two divisions with two sets of dispatchers.

The Scioto Valley has certain calling points where all trains must report and register. The Cincinnati, Georgetown & Portsmouth has reporting points 15 miles apart. On this line all west-bound trains have superior rights over east bound. On the Dayton, Covington & Piqua, written orders are issued only at the dispatcher's office at the center of the line. Cars run on a time card and if 4 minutes late at a siding they call for orders. On the Stark Electric, written orders are issued at Alliance, the center of the line, giving clearance through to either terminal if the cars are on time. If 2 minutes off time, the first car reaching a regular passing point calls for orders. Orders are also issued through sub-station attendants. The company hires only steam-road dispatchers of experience.

On all of the roads visited in Indiana it is the practice to run trains on dispatcher's orders, these orders being given over the telephone. The method of receiving the orders and the manner in which they are given, however, differ on the several roads. Sometimes the motorman receives the order and repeats it to the conductor. On some roads, the conductor receives the order and repeats it to the motorman. Some roads are run on verbal orders, but the majority use written orders. On some of the systems attempt is made to keep the dispatcher and trainmen from associating together, with the idea that the less feeling of personal friendship that there is between them, the greater will be the respect of the trainmen for the dispatchers' orders.

The Indiana Union Traction Company has a separate telephone line for the transmission of train orders. Two dispatchers are employed, one located at Anderson and another at Tipton. Each dispatcher has charge of more than 100 miles of track. An order book is used by the dispatchers and all orders given are numbered and recorded. The orders are received by the motorman, are then written on order blanks by him and are then read to the conductor. The motorman's filled order blanks are turned in at night and are compared with the orders of the same number in the order book of the dispatcher. If there is any discrepancy in the orders, the motorman's order is pinned over the order in the book and the discrepancy is investigated later. On the Indianapolis & Northwestern Traction Company, the conductor receives the order and repeats it to the train dispatcher. On the Indianapolis & Cincinnati Traction Company, either the motorman or the conductor receives the order, but both sign it. At night the order blanks filled by the trainmen are turned in for comparison with those in the order book of the dispatcher.

Verbal orders are used on the Indianapolis, Columbus & Southern system. At designated points the motorman receives the orders and at other points the conductor goes to the telephone. This practice is followed in order to save time, as at some points it is more convenient for one of the trainmen to go into the telephone booth than for the other to do so. Telephone booths are used, but telephones are also carried on the cars as a precautionary measure. At the present time one telephone line is used both for dispatching and for company business, but another line will be installed shortly. Telephone jacks, to which connection can be made with the car 'phone, are installed at intervals of 1000 ft.

On the Terre Haute Traction & Light Company it is the custom for the motorman to receive the orders and to repeat

them to the conductor. Both trainmen are held equally responsible.

Telephone booths are erected at all regular meeting points on the Kokomo, Marion & Western system. The usual car telephone is carried and jack boxes are located on poles at intervals of 1 mile. The motorman receives and writes the orders which he turns in to the dispatcher at night. These are verified by the dispatcher, who then sends the blanks to the superintendent.

On the Fort Wayne & Wabash Valley system two copies of orders are taken by the trainmen. The order is received by the motorman. One copy is signed and is given to the conductor, while the motorman holds the original copy. On heavy excursion days, the orders given by the dispatcher are practically all meet orders. This avoids the necessity of the conductor being compelled to study the time-table to locate meeting points at a time when his attention is absorbed in taking care of unusually large crowds. The dispatchers on this system handle the cars on 100 miles of track.

On the Detroit United Railway system, car telephones have not been found entirely satisfactory and telephone booths have been installed at all terminals and switches. This road is one of those upon which verbal orders are given. The conductor receives the order from the dispatcher, but the motorman is required to be at the booth so that he can hear the conductor repeat the order to the dispatcher. This practice is followed in order that if there is any doubt in the motorman's mind as to the meaning of the order, he can make his doubts known before the receiver is hung up.

A system which is probably the safest, but which consumes more time is in use on the Detroit, Ypsilanti, Ann Arbor & Jackson Railway. Verbal orders are given. The motorman goes into the booth while the conductor is required to stay at such a distance from the booth that the conversation in the booth cannot be overhead. If there are no orders, the motorman simply informs the conductor of the fact. If orders are given, the motorman receives them and then sends the conductor to the telephone while he himself goes beyond hearing distance. After the conductor has received the order, the two trainmen compare the orders given, and if they are not identical, the dispatcher is again called up for further information.

EXAMINATION AND REQUIREMENTS OF TRAINMEN

Practically all of the interurban roads require trainmen to pass comprehensive examinations before they are put in charge of interurban cars. Where city lines are operated, the most promising motormen and conductors on these are selected to operate the interurban cars. For such men a short period of instruction in regard to runs, time-tables and methods of handling the cars is usually sufficient.

On the Kokomo, Marion & Western traction system, the interurban motormen are selected from those in service on the city lines. One of the best motormen decides whether or not the applicant is fitted to take an interurban run. C. A. Baldwin, superintendent of transportation of the Indiana Union Traction system, requires all applicants for positions of motormen and conductors on interurban cars to pass a thorough examination on schedules, signals, handling of cars and the meeting of emergencies. Mr. Baldwin examines the men personally. Most of the motormen in the employ of the Indianapolis & Northwestern Traction Company are old steam-road engineers. In addition to examinations on schedules, signals, and the operation of cars, the men are required to pass a very thorough examination on the electrical and air equipment of the cars. The examination with regard to car equipment and the handling of the cars is in charge of Leverett M. Clark, master mechanic of the system, who has prepared a very comprehensive set of questions for the purpose.

These questions do not go into the details of the apparatus, but are concerned almost entirely with the meeting of emergencies. Some of the questions admit of very definite answers. General answers apply to others. The list is prepared particularly to cover the operation of L4, K14 and type M control systems and automatic air-brake systems. A study of the air-brake manual with which each man is supplied aids much in acquiring the knowledge required to answer the questions with regard to air brakes, but an intimate knowledge of the apparatus is absolutely necessary. An applicant is expected to answer correctly about 90 per cent of the questions.

NOVEL METHOD OF COUNTING TICKETS

As many interurban roads have found the problem of counting city, park and other forms of tickets a rather expensive and somewhat annoying matter, there is illustrated on Plate XVI. a counting device, developed by W. A. Gibbs, general manager of the Columbus, Newark & Zanesville Traction Company.

This particular machine was designed especially for counting street railway tickets and transfers, and its method of operation is as follows: The pipes are connected to an exhaust fan or an air pump, which creates a suction in them. The dash pot shown on the front of the machine, which carries the square nozzle extending down into the ticket feed-box, is simply a means for bringing the air suction into contact with the pack of tickets in the ticket box. It is connected to the crank shaft in the machine by an arm extending back to the vertical shaft and has a reciprocating up and down motion.

The ticket is lifted off from the top of the pack by the air suction and carried through separators in order to separate tickets that might be stuck together. It is taken off from the nozzle on the dash pot by the stripper, which is the sleeve shown in the

engravings, through which the extension on the lower end of the dash pot passes. The stripper fits this end of the dash pot closely so that the air suction is maintained on the ticket to hold it on the lower end of the stripper, while the dash pot raises up high enough to allow the carriage time enough to pass in and out in order to take the ticket away.

The clamping arrangement shown on the front side of the machine is a gaging device, which is so adjusted that should the tickets fail to separate, they cannot be carried back by the carriage, but are held in the same position that they were lifted up in, and are carried back down through the separators until only one ticket comes up, when it will pass through the machine.

The fingers on the machine are so arranged that if a ticket is not taken off, they drop down through slots, and the machine does not register. This feature of the machine being unable to count if a ticket does not pass through it, together with the arrangement for preventing two from passing through at one time, makes the device absolutely correct in its count. It is not necessary to stop the machine in order to place the tickets or transfers in it. The machine may be operated continuously and the method of filling is simply to open the doors of the feed-box and set in as many tickets as may be desired to count at one time. The feed-box can be made of any length, so that as high as 2000 or 3000 tickets may be put in at one time if desired. It then requires no attention from anyone, as it will run the tickets off, and cease counting immediately as soon as the supply is exhausted. The machine is built in sections 8 ins. wide each. As many sections may be supplied as desired to suit various sizes of tickets. It is estimated that one person can count 50,000 tickets per hour on this machine if they are put in in packages averaging 500 tickets each.

