

# Electric Railway Journal

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**PSYCHOLOGICAL TESTS FOR MOTORMEN** It is some four years ago that Professor Münsterberg outlined his tests for motormen. They were planned originally because of several striking instances of "man failure" in railway service, which indicated that the attention of the operator of the car wandered at a critical moment from his work and his mind failed to grasp a situation which required action on his part. The general subject was brought to the attention of a number of prominent psychologists by Martin J. Insull, now vice-president Middle West Utilities Company, and Professor Münsterberg invented the apparatus described in his book on "Psychology and Industrial Efficiency." So far as we know, the only company to adopt this equipment has been the Dallas Consolidated Electric Street Railway, but, according to P. W. Gerhardt, superintendent, in a paper presented at the Galveston meeting this week and published elsewhere in this issue, the use of this test apparatus and of other psychological tests for prospective employees introduced on the line has been satisfactory. The plan is certainly an ingenious one, although we believe that many managers will consider that careful observation of the action of a man in actual service of the road will be at least equally as valuable as that with a test model.

**REGULATING RATES UPWARD** Bowing to the final prevailing opinion of the Court of Appeals, the up-State New York Public Service Commission has finally allowed the Ulster & Delaware Railroad to increase its mileage-book rates 0.9 cent above the maximum of 2 cents a mile fixed by the old railroad law. This enforced action at last cancels a distinct reversion by the New York commission from constructive regulation to the old practice of inexperienced legislative domination over rates. The old 2-cent maximum rate fixed by the New York Legislature before commission regulation began in the State, which rate the New York body last summer refused to exceed, was simply a makeshift guide pending the installation of more scientific rate-making methods, and the commission was not justified in claiming to be limited thereby. It is, of course, wise for administrative bodies to exercise constraint in interpreting doubtful provisions of law relating to their own powers, but it is also necessary for them to have a clear understanding of regulatory theory and the intent of their governing laws. The idea that commissions are free to regulate rates only downward from an old arbitrary maximum limit fixed by legislative enactment is a travesty upon justice, and we hope that the courts have now made this point clear to the excessively timid minds of the

New York commissioners. One single official body to handle the entire rate question and to regulate rates either upward or downward as justice demands, forms the real basis of regulation, and the New York Commission will do well in the future to display eagerness rather than reluctance in the carrying out of its duties to all parties concerned.

**TERMINALS AND TRAFFIC CONGESTION** The completion of the great Public Service terminal in Newark, N. J., is an important event, not only locally but as one solution of a most perplexing and complicated problem, namely, How are cars to be handled in the business districts of large cities? No general solution of this problem is possible because cities are as characteristically different as are individuals. Where it is possible to do so, the simplest plan is to spread out the downtown traffic by routeing no more cars through the congested centers than is absolutely necessary. If outlying points can be connected by crosstown lines which do not pass through the business districts congestion can be reduced somewhat. This procedure is being followed in many important cities. There is, however, a traditional desire on the part of patrons to go through the business districts, even when it is not necessary. An educational campaign must be conducted, therefore, whenever extensive rerouteing is contemplated. On first thought it would appear that a central terminal like that in Newark would increase rather than decrease congestion, as it seems to involve a deliberate bringing of many lines to the same point. Actually, it does not do this on account of the peculiar local transportation conditions. In spite of its large population, Newark is a city of one restricted business district from which the lines radiate somewhat like the ribs of a fan. It is practically necessary for all lines to pass near, or to terminate in, the business center. A great deal of the traffic is with outlying towns of importance which border closely on the city. It was this traffic, superimposed upon the local traffic, which produced an unbearable congestion. The merits of the terminal plan as adopted in Newark are, first, that the long-distance and local traffics are separated, and, second, that a considerable proportion of the cars are loaded and unloaded upon the company's property, where all modern devices for expediting traffic can be utilized without interference from vehicular street traffic. By the use of a subway and elevated structure it has been possible to deflect the suburban traffic from the streets without congestion, and the use of train floors on two levels, with a concourse between, has provided for rapid loading and unloading. Coin-



idently with the inauguration of the new service, some rerouting has been carried out with the purpose of averaging the downtown traffic density, thus making the most of the present opportunity to prepare for future growth. All of this has been done after the most painstaking collection and study of traffic data, and this journal shares the expectation of the management that the terminal itself, and the other improvements which it made possible, will be increasingly appreciated by the people of central New Jersey.

#### COMBINATIONS FOR EXPORT TRADE

The European war has shown our unpreparedness in other directions than in a purely military way and has turned topsy-turvy some of the pet ideas of the political reformers who have had a great deal to do with the direction of the policies of this country during the past few years. For instance, we have been taught that combinations of capital designed to secure monopolies or practical monopolies in transportation or industrial lines have been most iniquitous. Interlocking directorates are evidence of an effort to throttle trade, and holding companies are anathema, even when they control public utilities whose rates are subject to regulation by commissions. Combinations of labor to raise wages are permissible, but combinations of capital to raise prices are punishable under the penal code.

The researches of the Federal Trade Commission, however, initiated to determine the means by which American manufacturers can extend their export trade now and after the war, has led to some surprising discoveries. It is found, for example, that it has been upon the same system of combinations and price agreements which have been condemned here that the foreign manufacturers have been building up extensive trade abroad. Indeed, in many cases, these combinations have not been limited by the boundaries of any one country, but have been international in character. According to the Federal Trade report, it has been through just such a combination as those described that a large export business has been built up in the electrical apparatus field by the two leading German electrical manufacturers. More than one-half of the coal and coke exported from Germany has been sold by one central agency in that country, and practically all of the iron and steel export business of Germany has been conducted through a single selling agency. Much the same condition has existed in Great Britain, as well as in France and Belgium. Even Japan has its central export agencies controlling the output and sale of certain of its manufacturing, mining and merchandising enterprises. Nor have these organizations been confined to the activities of selling alone. There are corresponding combinations, encouraged by the governments of many of the different countries, to conduct buying, and they have succeeded in fixing the price at which the individual American producer has been able to dispose of his goods abroad.

In view of these facts, the Federal Trade Commission has reached the conclusion that Congress should definitely declare that the existing law does not forbid sim-

ilar co-operation among American manufacturers for export trade. At present, uncertainty as to the extent to which the law covers foreign business deters American manufacturers and producers from developing effective export organizations. The commission believes that permission of this kind would not permit the manufacturers to exploit the home market or act unfairly against individual American exporters in foreign trade, and it urges all interested in this development of the country's business to impress their ideas on Congress, so that the necessary legislation can be secured. Undoubtedly, the plan proposed will assist greatly to establish our manufacturers on an equal basis with those in other countries and thus help to develop the foreign business which has almost been forced upon this country as the result of the war. While this unnatural condition continues, legislation of this kind may not be so necessary, but with the close of the war, it would be very desirable to have in operation export organizations similar to those possessed by our foreign competitors, so that the American producer will not be handicapped as he has been in this direction in the past.

#### ENGINEERS AND PREPAREDNESS

The turn-out of the engineering profession in the parade in New York City last Saturday is significant not only as showing the patriotism of the profession at large, but in indicating that a great body of trained men will put themselves at their country's service on short notice. The engineer, taking that term in its broadest signification, is going to be an extraordinarily important factor in the next war, as he has been in the one now wrecking a hemisphere. Battles are won not by waving swords in a wild charge against the serried ranks of the foe, but by organizing the production of beautifully fused shrapnel and high explosive shell, and launching them with a mathematical precision that leaves no serried ranks to contest the advance. The man with the rifle still counts, as he always will, yet he must wait for the engineer who plans, and the skilled artisan who executes, to make his way passable. It is for this reason that the engineering professions are so important to that national preparedness which, thank Heaven, is now on the road to becoming a reality in the not distant future.

A remark recently made by a distinguished past-president of the American Institute of Electrical Engineers is worth mentioning in this connection. He suggested that although one instinctively thinks of the lawyer as leading in political and civic movements, yet in the last analysis the lawyer's mind is trained to work in a beautifully qualitative analysis of situations, invaluable in estimating the general relations of affairs, while the engineer's mind is trained to think quantitatively, grasping with instinctive precision elements of force and balance in his physical environment. Therefore, when it comes to the precise organization of men and material to meet a given situation, it is the engineer whose qualities of mental training ought to make him superlatively useful, while his legal colleague



may excel in grasping the motives which lead to the determination of strategy.

Along the line of transportation in particular, which determines the success of mobilization and supplying the armies in the field, engineers can work with peculiar success, especially if they have been trained in the problems of this particular work, and transportation is now more than ever before the fundamental requirement of successful war on account of the enormous bodies of men involved and the huge supplies of munitions which must be put ready at their hands. It behooves American engineers, therefore, to get together in a permanent effort to increase the military efficiency of their country. Their march last week was only a pledge of loyalty to be redeemed by persistent and organized effort until the country is ready to meet, if the dire need should arise, its enemies within and without, and to smite them without the unnecessary loss of a man, a shell or an hour of time.

#### PASSING OF THE HORSE CAR IN NEW YORK

What proof can Chicago now offer that New York is but a backward village? How will Philadelphia repel the traditional slander as to her slowness? What will replace the old reliable resource of countless comedians and joke writers—now that the date has been set for the disappearance of the horse car from the streets of New York? It is well enough to laud this latest triumph of the storage-battery car, but in the round of ribald comment that has already begun upon this happening we shall hope to find here and there a word of kindlier requiem. Is there none so poor to do the horse car reverence? Probably not, for in the affairs of the world in general and the business of transportation in particular

. . . . The wiser mind  
Mourns less for what age takes away  
Than what it leaves behind.

May we not, however, and should we not in simple justice, at least credit the horse car with being one of those ladder rungs by which St. Augustine in his famous passage—*"De vitiis nostris scalam nobis facimus, si vitia calcamus"*—tells us that we may rise to higher things? Efficiency first, by all means—though it is a doctrine that sharpens the intellect more than it softens the heart. And we whose lives lie mainly in this century should remember that while the horse car is extinct outside of New York, and about to vanish from that territory, there are many men now living who cherish the kindest recollections of horse-car days. Keeping a few horses moderately well shod and maintaining the strips of strap-iron on which the horse car ran was an easy life compared with the trials of present-day transportation. The pioneers of urban transportation, if no others, will feel the pathos of these lines by William Watson, written, it would seem, with foresight of the passing of New York's last horse car:

Onward the chariot of the Untarrying moves;  
Nor day divulges him nor night conceals;  
Thou hear'st the echo of unreturning hooves  
And thunder of irrevocable wheels.

#### EXPLAINING SERVICE CHANGES

The mere announcement of a contemplated change in service generally carries news of great interest to the public, but it is often possible to go much farther than this toward creating an appreciation on the part of passengers of the advantages of such changes from the transportation point of view. Thus, the Boston Elevated Railway has lately issued various bulletins of service changes in its cars for the benefit of patrons, and in the wording of these announcements the superintendent of traffic goes out of his way to make the meaning of such changes clear and to point out just how the service will be improved by the announced modifications.

These bulletins discuss such points as the previous headway on lines affected, the improved facilities resulting from any reduction in car intervals, the increase in seating capacity in totals and percentages for both normal and rush hours, provision of extra service in rush hours and changes in transfer points associated with the introduction of additional service. In one interesting case where it was decided to divert cars on two lines via a route 0.29 mile longer than before, the point was made that this would be unlikely to result in a lengthened running time, for the reason that the transfer of rolling stock movement would take place from a line where seventy-two cars per hour were operated to a line carrying but twelve cars per hour. Such a change, it was explained, would tend to result in freer movement. In another case, where the more balanced headway was substituted for a somewhat irregular schedule, the bulletin showed that this would improve the facility of transfer at an important station, and thus materially contribute to the shortening of the time of journeying between points separated by a transfer.

Publicity material of this kind is read with interest by a large number of patrons, and the opportunities thus afforded to give them some insight into the problems of rendering service are indeed well worth utilizing. Nothing like the throwing of bouquets need be attempted, and the use of many figures in such bulletins depends almost entirely upon the opportunity for interpretation. Some figures, of course, are necessary, and if pithy explanations, couched in terms easily understood by the average passenger, are supplied, there is no question that the trouble taken to set forth the effect of service changes on the public's convenience is well warranted. It is an eye-opener to most riders to learn that so many scores of cars per hour are normally provided, or that the service is increased by specific amounts in the rush period. The patron, perhaps, senses the latter provision, but is often surprised to find how many cars an hour actually are run over the rails in a given district in those periods of the day where short waits are occasionally his fortune. This sort of publicity is useful in bringing the patrons to a better understanding and also to a better use of the facilities which are possible with the existing volume of revenue. A service change furnishes an excellent occasion for such educational propaganda.



# Traffic Development on the Scranton & Binghamton Railroad

The Methods Used to Stimulate Receipts on This Interurban Line Have Brought a Traffic of 82,000 Passengers per Mile of Road, the Returns from Operations Other than Handling Passengers Amounting to 23 Per Cent of Gross Receipts

IN the heart of the anthracite coal mining region of northeastern Pennsylvania is situated the city of Scranton, whose phenomenal growth in population, resources and wealth, since it became a city about fifty years ago, ranks it as the third largest community in the State. Naturally, its progress has been reflected in the tributary territory, and with the recent rapid exploitation of the coal mining resources and the development of many industrial plants attracted to the locality by the numerous natural advantages, the need of adequate common carriers has become pressing.

To meet this need the properties which now comprise the Scranton & Binghamton Railroad were organized,

tance of 43 miles, together with a 7-mile branch to Lake Winola, Pa. In addition, the company has purchased the entire capital stock of the Binghamton Railway Company, which operates about 50 miles of street railway in the city of Binghamton, N. Y., including extensions to several near-by villages. It will, therefore, be seen that the Scranton & Binghamton Railroad Company controls approximately 100 miles of street and interurban railway and has under construction an extension of its interurban tracks to the New York State line for the establishment of physical connection between its two systems, the latter work being planned for completion late during the current year.



SCRANTON & BINGHAMTON TRAFFIC—PASSENGER TERMINAL AT SCRANTON

being conceived with the idea of providing more frequent and satisfactory transportation facilities between Scranton and the numerous thriving towns and villages scattered through the rich agricultural district to the north. The enterprise had for its ultimate objective the connection of Scranton, by means of a high-speed electric railway system, with the flourishing manufacturing city of Binghamton, N. Y., as well as the provision of passenger and freight service suitable for the thickly-populated intermediate territory. Much has been accomplished since the project was launched. The properties, which made a modest beginning eight years ago under the name of the Northern Electric Street Railway Company, have been successively taken over by the Scranton & Binghamton Traction Company and the Scranton & Binghamton Railroad Company in order to permit an enlarged scope of operations, and at the present time there is being operated a high-speed interurban railroad from Scranton, Pa., to Montrose, Pa., a dis-

The interurban mileage extending north of Scranton has been built in accordance with a policy of gradual extension, under which each section of the line, as soon as it was completed, has been placed in revenue-producing service. This has been done not only because each section would thus carry the fixed charges upon it, but also for the purpose of beginning intensive development of its traffic resources at the earliest possible moment. A large share of the company's success has been ascribed to the latter feature, as exemplified by the record of the interurban line for the year ending June 30, 1915, during which period 2,201,430 passengers were carried on the 27 miles of interurban road then in operation. Since the rates of fare ranged from 5 cents to \$1.05, the receipts from passenger traffic amounted to \$220,476.59. The results of the company's outside activities are reflected by the receipts from milk and from express traffic for the same period, these amounting to \$31,980.26, while the sale of current and miscel-





SCRANTON &amp; BINGHAMTON TRAFFIC—POWER STATION AND REPAIR SHOP AT DALTON

laneous operations brought \$32,459.90. Together, the two latter items amount to no less than 23 per cent of the total receipts.

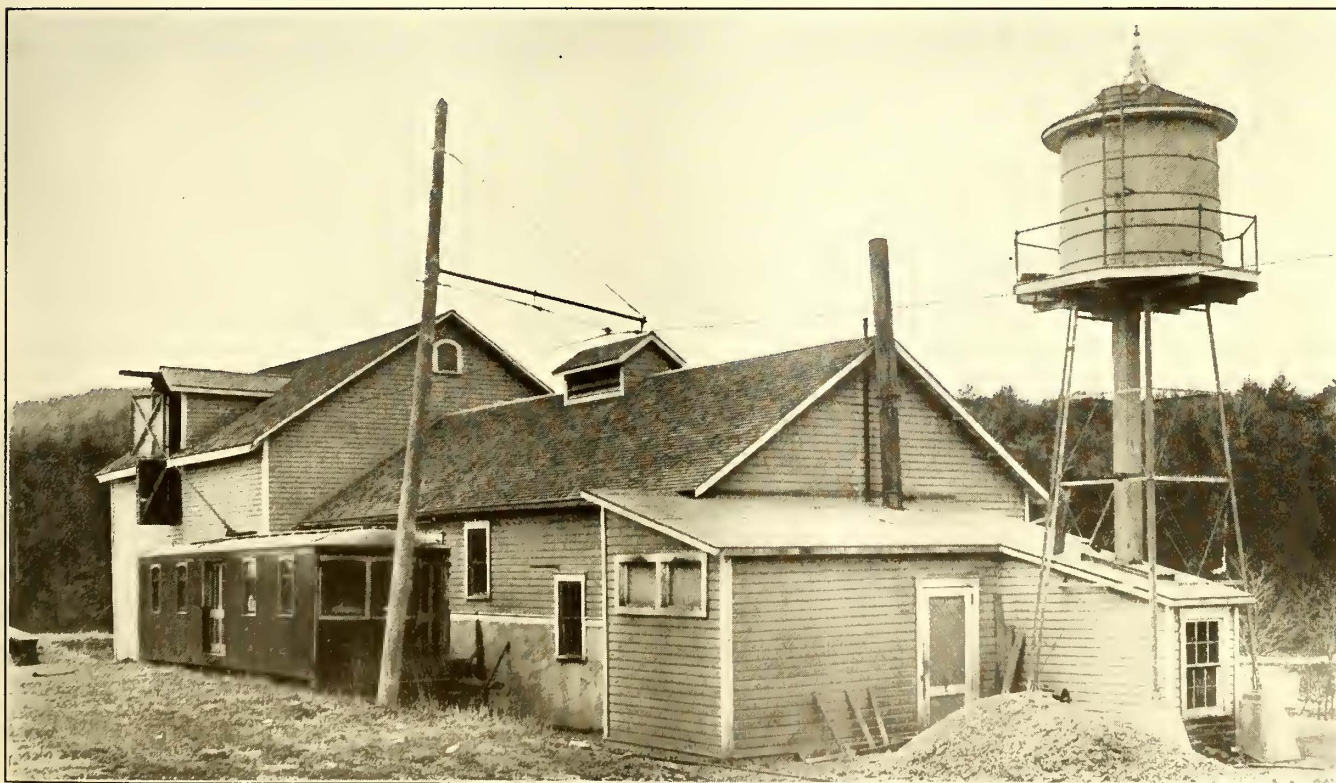
#### OUTSIDE ACTIVITIES

It should be said here that, with the exception of the sale of current for commercial purposes, all of the outside activities of the company have in view the common end of increasing freight, express and passenger traffic over its lines. In no instance does the company deal direct with the public except as a common carrier, and it is only to augment its revenues in that capacity that its various enterprises are undertaken. Aside from this, however, each one of these enterprises is designed to provide sufficient rental returns to cover approximately the capital charges on the money invested.

In general, a list of the company's outside activities embodies the following: The provision of facilities, mainly in the form of coal pockets, for the handling of

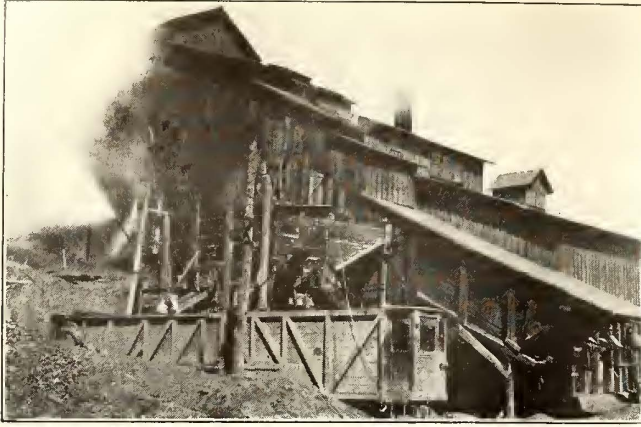
fuel for retail purposes; the provision of creameries to encourage shipments of milk and dairy products from the farms served by the line; the operation of amusement parks to produce passenger traffic in the summer months; the sale of current for commercial purposes to companies operating lighting and power businesses which in turn retail the current to the local consumers.

The company's coal business constitutes an excellent example of the policy of developing outside enterprises solely to produce traffic. Some years ago the company purchased a large bank of culm, or refuse coal, from a mine, from which steam fuel is obtained through the operation of a coal-washing plant. Nevertheless, no attempt has been made to develop a retail coal business through this ownership, the culm bank having been acquired solely to insure an adequate and economical fuel supply for the company's power plant during a reasonable number of years to come. It is considered to be too valuable an asset for the company's own future



SCRANTON &amp; BINGHAMTON TRAFFIC—CREAMERY AT LAKE WINOLA





SCRANTON &amp; BINGHAMTON TRAFFIC—COAL CAR BEING LOADED



SCRANTON &amp; BINGHAMTON TRAFFIC—PORTABLE SUBSTATION

needs to be exhausted in retail sales, as witnessed by the fact that the value of the company's culm holdings has approximately doubled since acquisition. On the other hand, although the company has never contemplated entering the coal business either on a wholesale or retail basis, it has constructed coal pockets, at the towns of Factoryville, Nicholson and Brooklyn with the intention of providing facilities for the stimulation of its coal traffic.

These pockets are leased to local dealers for a nominal rental, the company looking only for increased coal shipments as its source of revenue. The pockets are supplied with coal of the required grades and sizes direct from the mines at Scranton, so that they constitute merely distributing stations for fuel in the country districts. The pockets cost about \$500 each, and the wisdom of the investment is clearly indicated by the fact that at the pockets at Nicholson, a typical installation, the receipts for the year 1915 were \$1,021, representing shipments of 756 tons of coal which otherwise would not have been obtained.

A similar policy has been followed in the case of the creameries that the company has built, there being two of these, one at Lake Winola and one at Nicholson. Both of these plants are about 18 miles from the city of Scranton and they are leased to private operators who are in no other way identified with the railroad company, the rental yielding a return of about 6 per cent on the investment. Naturally, all of the products of these creameries are shipped over the company's lines at es-

tablished rates, and this is the primary reason for their existence. The company is thus relieved from the complication of being connected with the dealings between the creamery operators and the farmers from whom the milk supply is derived and with the consumers to whom the products are delivered. The railway thus becomes merely the medium through which the products are transported between one and the other of the directly-interested parties.

The company's amusement parks, of which there are two, one at Lake Winola and one at Clarks Summit, are operated indirectly by the company, under the direction of an agent who reports direct to the general manager. It is the duty of this agent to book excursions and picnics on suitable dates for the parks and to supervise the operation of everything in and about them. Practically all of the devices for the entertainment of patrons are rented on a percentage basis by concessionaires who are under the supervision of the agent. The revenue derived from this park business is very gratifying, not only because of the large number of passengers carried, but because of the fact that the regular round-trip fare is 75 cents to one park and 25 cents to the other. It might be said here that the amusement park idea is especially popular in Scranton, possibly because the chief industry, that of coal mining, is invariably slack in summer and also because the topography of the city makes the establishment of parks within the city limits a difficult matter.

The sale of current, as previously mentioned, is made

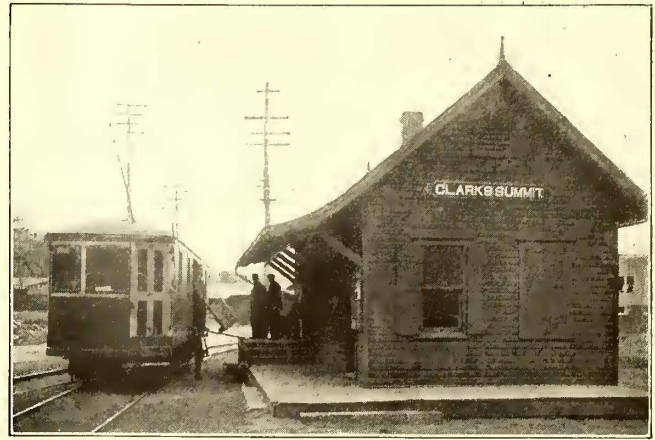


SCRANTON &amp; BINGHAMTON TRAFFIC—THREE-CAR PASSENGER TRAIN; TYPICAL VIEW OF LINE SHOWING AUTOMATIC SIGNALS





SCRANTON & BINGHAMTON TRAFFIC—COAL POCKETS AT FACTORYVILLE



SCRANTON & BINGHAMTON TRAFFIC—TYPICAL FREIGHT AND PASSENGER STATION

to local lighting companies which are not affiliated in any way with the Scranton & Binghamton Railroad Company. They are supplied, under contract, with current measured at the railroad company's switchboard and they retail it to their patrons, all of the wiring and apparatus required to serve the consumers belonging to the lighting companies and being operated and maintained by them.

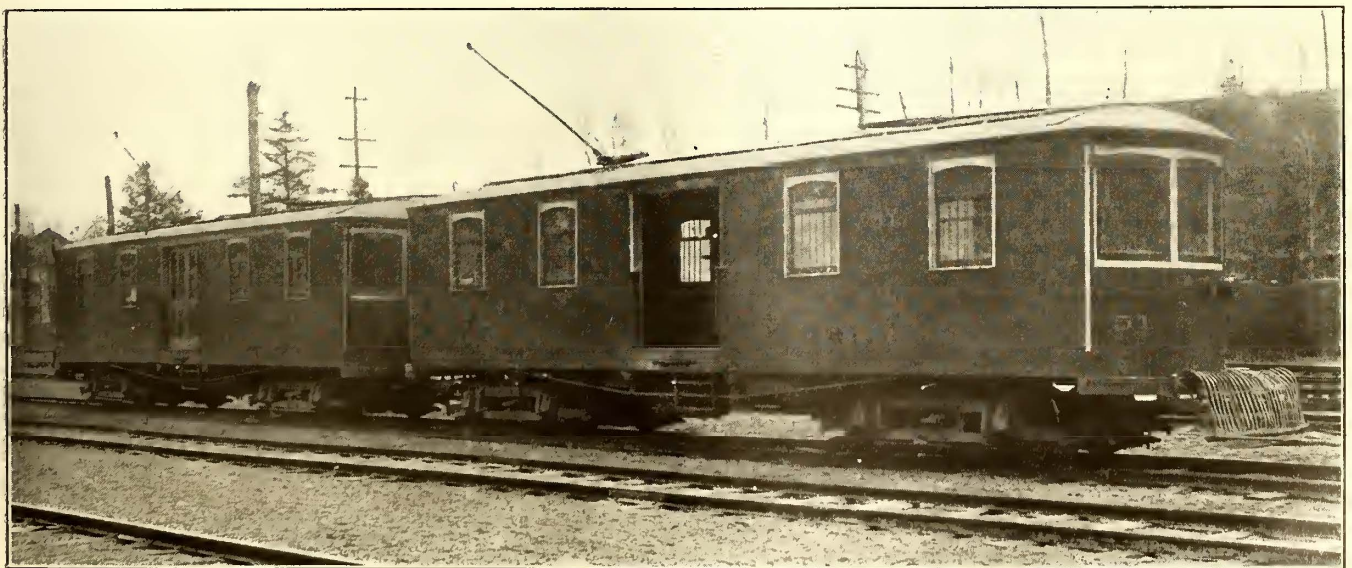
This branch of the business developed naturally from the fact that the railway company had to develop its own power, and because of the policy of gradual extension, which involved locating the central power station at a point only 12 miles from the Scranton end of the line. Since the ultimate length of the line was to be about 70 miles, the transmission of high-tension current was a necessity, and this made the furnishing of current for commercial purposes along the company's lines and in the towns adjacent thereto an easy matter. The power plant, which is located near the town of Dalton, is designed to handle (with additional generating units and substations) the requirements of the whole system, including the Binghamton railway and its connections. It is equipped with 2000 hp. of boilers, and the generating units now being installed, in addition to the present equipment, bring its capacity to 4000 kw. Substations to supply 600-volt railway power are located at approximately 15-mile intervals, being situated at Chinchilla, Foster and Heartlake. North of the power station there is a 66,000-volt transmission

line which is erected on 40-ft. poles carrying three No. 4 gage solid copper wires. For the shorter section running south to Scranton, a 16,500-volt transmission line fully meets the requirements of the situation.

#### FREIGHT AND EXPRESS TRAFFIC

In general, the development of freight and express business has been accorded the major share of the company's efforts. It is felt that, in this particular case, only the surface of a very rich revenue producer has yet been scratched, and there are now in hand plans that contemplate the rapid advancement of this side of the railway's business to a point where it will at least equal, if not surpass, the passenger business now being carried on. Even at the present time the company's efforts to educate its patrons in the use of its line for this purpose are showing gratifying results, and this branch of the railway's operations is already of great assistance in tiding over the lean spots in the year.

The principal method of educating the public to use the company's facilities for handling freight and express is that of personal solicitation. In the long run this has been found to be the most effective means to the desired end, several solicitors being practically continually occupied in pointing out the advantages of the service to prospective shippers. There are no really unusual features in connection with the history of the development of the various major classes of freight that are handled. The road taps the richest dairy and agri-



SCRANTON & BINGHAMTON TRAFFIC—TYPICAL EXPRESS TRAIN



cultural district in the vicinity, and the natural market for the bulk of the farm products of the whole section is the city of Scranton. In a like manner much of the merchandise required by the farmers in villages throughout the territory is supplied from the same city, and the problem has been merely to educate shippers to prefer the facilities offered by the electric railway to any other means of transportation for their goods. The securing of patrons has, therefore, resolved itself simply into a matter of salesmanship to secure a trial of the company's facilities and to provide such satisfactory service that the business, when once secured, may be retained.

Some idea of the extent of the freight and express operations may be gathered from the statement that during the year 1915, with only 27 miles of road in operation, 3172 carloads were moved for 87,801 car-miles. The commodities carried consist chiefly of coal, crushed stone, grain, hay, merchandise and general agricultural products such as fruit, poultry, eggs, fresh meat, milk and dairy products. In this list practically the only one that is unusual is the item of crushed stone, this material being obtained from a quarry near the town of Nicholson and delivered in carload lots to the Delaware, Lackawanna & Western Railroad at an interchange point near by. For this the electric railway receives a switching charge of \$3 per car, about 600 cars being interchanged with the steam road during the course of a year.

In accordance with the company's policy to serve the public merely as a common carrier and to make no special effort to get the buyer and seller of transported commodities together, there is no provision for pick-up and delivery service in connection with the express business in any of the towns that are served. The only service that is rendered by the company in this connection is an immediate notification to the consignee when goods are ready for delivery at the company's station.

Express shipments are made in cars that have Brill standard express bodies 40 ft. long which are mounted on No. 27-E trucks equipped with Westinghouse 101-D quadruple motor equipments. These cars have been proved by experience to meet the requirements of the company in a thoroughly satisfactory manner, and at the present time two new express cars of the same type are on order, together with a new freight car which will be used, in addition to the existing coal-handling equipment, principally for hauling coal. These freight cars have 40-ft. gondola bodies mounted on No. 50-E-3 trucks and are equipped with Westinghouse No. 318 motors.

#### TRAFFIC INTERCHANGE WITH STEAM ROADS

A feature of the company's express and freight business has been the establishment of amicable arrangements with intersecting steam railroads. One of these appears in the previously-mentioned interchange arrangement with the Delaware, Lackawanna & Western Railroad at Nicholson. Another example, which constitutes an interesting feature in the construction of the company's connection to the town of Montrose, appears in the electric railway's agreement with the Lehigh Valley Railroad. Under this agreement the Scranton & Binghamton Railroad is to electrify 3100 ft. of the steam railroad company track, using jointly with it a handsome new station that has been built in the town. By an arrangement between the two companies the expenses of maintenance and operation, together with the capital charges, are equally divided, the latter being covered by payment by the electric railway of a rental which is based on an appraisal of the facilities used.

The advantages of this arrangement are readily ap-

parent. Not only does it relieve the steam railroad of considerable expense, but it enables the electric railway to secure an entrance into the town without vexatious right-of-way delays at minimum expense. It permits interchange of freight between the two roads and has a stimulating effect upon the business of both. In fact, it is believed that the results obtained under the agreement will go far to explode the ancient theory that the interests of electric and steam railroads operating in the same locality are necessarily at variance. The town of Montrose, it may be said, is a county seat which was served originally by the Lehigh Valley and D., L. & W. Railroads. But since the electric railway desired access to the town by means of a stub branch from its main line, a few miles east of the town, the agreement permitted the company to construct this stub so as to connect with the nearest point on the Lehigh Valley tracks, electrifying the latter as far as the railroad station, as explained in the preceding paragraph.

## Safety Council Growing Rapidly

Active Campaign Now in Progress Is Bringing Many Electric Railways Into the Membership

**T**WENTY-TWO new members joined the electric railway section of the National Safety Council between March 1 and May 15. The membership now embraces about eighty electric railways, and the active membership campaign that is being carried on is resulting in one or two new members each week. This growth is in keeping with a phenomenal increase in membership by the National Safety Council itself. At the time of the annual congress last October approximately 1400 firms and corporations were members. On May 1 the number had grown to nearly 2000. The objective of 3000 members by next October seems easily within sight.

The electric railway section, through George Oliver Smith of the Doherty Operating Organization, chairman, and H. A. Bullock of the Brooklyn Rapid Transit Company, chairman membership committee, has been pressing its campaign by means of circulars. It has doubled its membership since last fall. The section maintains a weekly service of safety bulletins dealing with hazards of electric railway operation in addition to the regular weekly bulletin service of the National Safety Council, and its members are supplementing this by co-operative exchange of special safety material. The members added between March 1 and May 1 are as follows: Austin (Tex.) Street Railway; Baton Rouge (La.) Electric Company; Central New York Southern Railroad Corporation, Ithaca, N. Y.; Chattanooga Railway & Light Company, Chattanooga, Tenn.; Chicago, Aurora & De Kalb Railroad Company, Aurora, Ill.; Claremont Railway & Lighting Company, Claremont, N. H.; Columbus (Ga.) Railroad Company; Connecticut Company, New Haven, Conn.; Cumberland County Power & Light Company, Portland, Me.; Jacksonville (Fla.) Traction Company; Key West (Fla.) Electric Company; Nashville Railway & Light Company, Nashville, Tenn.; Ohio Valley Electric Railway Company, Huntington, W. Va.; Tide-Water Power Company, Wilmington, N. C.; Vicksburg Light & Traction Company, Vicksburg, Miss. Since May 1 the following have joined: Charleston Consolidated Railway & Lighting Company, Charleston, S. C.; Mason City & Clear Lake Railroad, Mason City, Iowa; New York State Railways, Syracuse, N. Y.; Ogden, Logan & Idaho Railway, Ogden, Utah; Salt Lake & Ogden Railway, Salt Lake City, Utah; Salt Lake & Utah Railroad, Salt Lake City, Utah; Shore Line Electric Railway, Norwich, Conn.



# Southwestern Association Holds Twelfth Annual Convention in Galveston

Employee Training, One-Man Cars and Coasting Recorders Were Among the Topics Discussed at the Meeting Held May 17 to 20—Abstracts of Several of the Papers Are Published

AS this issue of the ELECTRIC RAILWAY JOURNAL goes to press the Southwestern Electrical & Gas Association is in session in Galveston, Tex., with a registration of 200 railway, gas and electrical men from the Southwest, and many manufacturers' representatives.

On Wednesday morning an address of welcome was delivered by Mark H. Royston, city attorney of Galveston, with a response by H. B. Head, Texas Light & Power Company, Dallas. This was followed by the presidential address of David Daly, Houston Electric Company. Mr. Daly discussed in a forceful manner the short-sightedness of the public in the present jitney situation.

At the first railway session held on Wednesday afternoon the discussion centered in the one-man car, and it was suggested that this might better be termed "the front-entrance car," or "the safety car." Several abstracts of papers delivered at the railway sessions are given in this issue, and other abstracts with a report of the discussion will follow.

## Scientific Selection of Employees

BY P. W. GERHARDT

Superintendent of Transportation Dallas Consolidated Electric Street Railway

How many railways have attempted to carry the safety-first idea to its logical conclusion—the elimination of the unfit applicant before he is placed on the car as a trainman? After all, in its final analysis the question of accident prevention rests almost wholly with the man on the car. It is the man behind the controller who really counts. Too often the matter of hiring the man to whom is intrusted the handling of expensive equipment and who will be responsible for the very lives of his passengers, is left to some subordinate whose only recommendation is that he is an old, experienced trainman, sometimes too old to be used elsewhere.

Even where the hiring of trainmen is done by one of the higher officials, all too frequently the only test brought to bear is this official's reliance in his ability to size up a man. After having passed this superficial test the applicant is placed in charge of a trainman or platform instructor, who instructs him to a greater or lesser extent in the duties and responsibilities of a trainman. He is then placed on the extra board, and if he does not make good is discharged and another man employed to take his place.

In his treatment of this subject the writer will confine himself to his personal experiences in the hiring of trainmen for the Dallas Consolidated Electric Street Railway. It must be borne in mind that the psychological tests outlined are in a manner experimental, and are no doubt susceptible to improvement.

Confronted by conditions of employment somewhat as outlined above, we finally decided that the best course lay in the entire reorganization of our methods of employment and training. We then sought for a man competent to build up this department to a high state

of efficiency. We decided that such a man must be an educated, technically trained man, must possess the ability of handling men and, more than all else, he must be imbued with enthusiasm and with an abounding belief in the importance of his work. Such a man was secured by employing a graduate in electrical engineering and supplementing his technical training by many months of actual experience as a trainman and shopman. This man was then put in charge of our school of instruction, and much credit is due him for the development of the tests now in use.

Let us assume that an applicant presents himself for employment. As he takes the half dozen steps from the door to the desk of the employment agent he is watched for any signs of physical defect. His manner of approach is noted, and aside from a brief "good morning," he is left to open up the question of employment in his own way. We naturally expect him to have the innate courtesy to remove his hat and state his business in a polite manner. A few general questions as to age, previous occupation, etc., are asked, the effort being made to have the applicant do as much talking as possible. He is encouraged to give his reasons freely for wanting to secure work on the cars and for thinking that he can qualify for the work.

At this stage we can eliminate from further consideration all applicants who are in any wise crippled, deformed, repulsive in appearance, dirty or slovenly in their dress, or show signs of excessive use of tobacco or liquor. We further eliminate all applicants under twenty-one years of age, or over forty years. We also eliminate all applicants under 5 ft. 6 in. or over 6 ft. 1 in. in height, the one being too short to reach his signal cords or properly handle his controller; the other too tall to see under his route sign when standing erect. These limits would, of course, vary with the equipment that may be in use on different roads. Moreover, we can find no use for the man who shows symptoms of tuberculosis or other contagious disease; the man who wears glasses, or has any defects in his speech, or the overly fat man. The latter is too apt to be lazy and awkward, and in any case takes up unnecessary space on the cars.

The applicant having passed this preliminary test receives an application blank and is told to take it into the outer office and carefully fill in all the information called for. The time consumed by the applicant in filling out the blank, as well as the number of errors or omissions made, is noted. From this application blank we can judge the applicant's handwriting, and from his answers to the different questions we get a fair indication of his general fitness for the work. The application in use by us requires forty-five minutes for the average applicant to properly fill out. A bright man, or one who has had clerical experience, can complete it in from fifteen to thirty minutes. Any applicant who consumes more than an hour and a half to complete it, or who omits answering five or more questions, is deemed too slow or careless for further consideration.

If a perusal of the application proves satisfactory the



applicant is told to report to the chief instructor for further test. All applications are marked with a grade, A, B or C, and filed for future use. In this manner we have on hand at all times a large number of applications from which to select our men as we may need them. This obviates the chance of being caught in a pinch and having to hire such men as may present themselves at the time.

As soon as the applicant presents himself to the chief instructor he is weighed and his height is measured, his hearing is tested with a stop watch, and his eyes are tested for range of vision with a standard chart and for color blindness with Holmgrene yarns. We also use a distant signal placed at the far end of a long room and controlled by push buttons in such a manner that red, green, violet, yellow and clear light can be flashed at random, the applicant being required to name the colors as they appear.

Up to this point the applicant has undergone such tests as are ordinarily applied by all electric railways, but these simple tests have served to eliminate fully 80 per cent of the applicants.

The remaining 20 per cent are now subjected to the psychological tests, which we shall designate as follows: The attention test, the observation test, the judgment test.

#### THE ATTENTION TEST

This test consists of a printed sheet of standard size paper, 8½ in. x 11 in., divided into six divisions. Divisions 1 and 2 are in the way of catch questions, and require the closest attention of the applicant. Divisions 3, 4, 5 and 6 are simple problems in addition, subtraction, multiplication and notation. At the top of the sheet is printed the following:

"General Directions—Do what the printed instructions tell you to do.

"Do not ask the examiner any questions about the examination.

"Do not ask any other person who is taking the examination any questions or watch anyone to see what he does.

"Work as rapidly as you can without making any mistakes."

The applicant is handed this sheet and told to follow the printed instructions. He is then timed with a stop watch and the number of omissions and errors counted. In practice we call this sheet test Attention A, covering Divisions 1 and 2. Attention B, covering 3, 4, 5 and 6. The time consumed is noted separately for A and B, as we have found that many of our applicants who make a good grade on A fall down on B, due to not having had any recent practice in arithmetic.

This test is given but once, as its effectiveness depends wholly upon its novelty. The object of this test is to determine the applicant's ability to receive instructions and to do as he is told to do. How often do accidents occur due to the trainman's neglect or misunderstanding of a rule or bulletin? If by so simple a test we can decrease the chances of such accidents, is not the effort well worth while?

#### OBSERVATION TEST

This test is adapted from the test originally devised by Prof. Hugo Münsterberg primarily for street car motormen. The apparatus as used by us consists of a rectangular box approximately 11 in. long, 5 in. wide and 4 in. deep, in the cover of which is fixed a glass window 2 in. x 4½ in. Inside this box, and made to pass under this window by means of a series of rollers, is a continuous belt 60 in. long and 4½ in. wide. Through the center of this strip are drawn two parallel

lines one-half of an inch apart representing the tracks of a street railway in the middle of a street. The whole strip is divided into ½ in. squares; thus there are four squares on each side of the track. The squares between the tracks are white and marked A, B, C, D, etc. The four squares on each side of the track are colored red and green, in an irregular manner, and upon each square is one of the first four digits, these digits being arranged indiscriminately.

The digit 1 represents the movement of one square, the digit 2 represents a movement of two squares, the digit 3 represents a movement of three squares, and the digit 4 a movement of four squares, or, as it is usually explained to the applicant about to take the test, the digit 1 represents a pedestrian, the digit 2 a horse-drawn vehicle, the digit 3 an automobile, and the digit 4 a piece of fire apparatus or a jitney.

Furthermore, the green squares denote a movement parallel to the track and therefore are not liable to collision, while the red squares represent a movement toward the track, and represent potential collisions.

The idea to be grasped by the man taking the test is that any digit on the green square cannot come into collision with his car, but any digit on a red square may do so. Thus the digit 1 on a red square adjacent to the track means a collision, while the digit 1 on a green square or digit 2 on a red square, two or three squares away from the track, cannot cause a collision. Likewise the digit 3 on a red square one, two or four squares from the track does not mean a collision, as in the first place it will have crossed in safety ahead of the car, and in the second case will not have reached the track until after the car has passed.

After the principle of the apparatus is fully explained to the applicant, he is requested to turn the crank and announce by letter the spaces on the track where collisions will occur, and the number of such collisions. The time required to run through this entire strip, as well as a record of the omissions is kept, and a grade is established therefrom.

It is significant that repetitions of this test do not show any improvements. The test is therefore run through from three to five times, and an average taken. This test will bring out two types of undesirable motormen; first, the type who will make few errors but will consume so much time that he would never be able to maintain a schedule, and second, the type who will make fast time, but may have a collision with anything that chances to pass onto the track. It is well worth our while to eliminate both types and employ only the men who can make the best test with a minimum of omissions in a reasonable length of time. The limit for both errors and time are both established from actual tests on trainmen already in service.

#### JUDGMENT TEST

We have all had experience with the motorman who, when danger becomes imminent, loses his head and cannot decide whether to trust himself to his brakes or to his reverse; or who, on a slick track, forgets until too late that his car is equipped with sand. If he has time, this man would know exactly what to do and when to do it, but when two or more conflicting factors present themselves he is unable to decide which is of the greater importance. We usually ascribe this man's action to poor judgment, or in the case of an old, experienced man, we call it "man failure." On the other hand, we point with pride to certain of our motormen who, no matter what the conditions may be, can be depended on to take the best action under the circumstances. The object of this test is to determine this class of man. This test, like the previous one, was devised by



Prof. Hugo Münsterberg, to be used in the selection of ship captains, but we felt that it could well be adapted to street railway service.

The apparatus consists of twenty-four cards, 3 in. x 5 in. The upper half of each card is divided into forty-eight squares. In each square is printed the letter *a*, *e*, *o* or *u*, in irregular order. On four of these cards one of these vowels appears twenty-one times, and the others nine times each. On eight cards one letter appears eighteen times, the others ten times each. On eight cards one appears fifteen times and the others eleven times each. On four cards one appears sixteen times and the others eight times each, and in addition there are eighteen consonants mixed in. The applicant to be tested is given this set of cards well shuffled and told to sort them into four piles in such a way that the first pile shall contain all cards in which the letter *a* predominates. The second pile shall contain the cards in which the letter *e* predominates. The third pile, all cards in which the letter *o* predominates, and the fourth pile all cards in which the letter *u* predominates.

The applicant is warned that he must not attempt actually to count the letters on each card. However, any attempt to do so would so increase the time required for the test that the final result would be highly unsatisfactory. The time required to sort the cards is taken with a stop watch. After the cards are all placed the number of errors made in placing them is recorded. It should be noticed that there are four different combinations to each pile. It is manifestly easier to place those cards correctly where the predominating letter appears twenty-one times and the other three nine times each, than it is to place those cards whereon the predominating letter appears fifteen times against eleven for each of the other three. Naturally the easier it is to make a correct selection, the graver is the offense in making an error. The penalty for mistakes in the selection of the various cards is arbitrarily taken as four points for every mistake in those cards in which the predominating letter appears twenty-one times, three points for mistakes in the eighteen-letter cards, two points for mistakes in the fifteen-letter cards, and one point in the eight-letter cards.

As in the observation test, the limits for errors and time can best be established from tests made upon employees in the service. In this test to a greater extent than in either of the other two, much can be learned from a close observation of the applicant under test. As a matter of fact, we give more weight to the observation of the applicant while taking this test than to the actual score made.

We find the man of snap judgment who will rapidly place the cards but in doing so will make many errors. On the other hand, there is the man who cannot make up his mind, but will hesitate, start to place the card in one pile, then draws back, reconsiders and perhaps will finally place it in another pile. This man seems to be undergoing mental strain, and while he will consume much time in making the test, his errors in sorting will be erratic, or, to use a technical term, he "hunts." Again we have the dishonest man who will attempt to count the letters, and with furtive, sidewise glances, try to see if he is being watched. The man for whom we are searching will be observed to give each card a few moments' consideration before placing it, and once his decision is made, he will not hesitate in placing the card. This man will appear to take a keen interest and enjoyment in the test.

This test, like the observation test, can be repeated without any material change in the results obtained, and it is our practice to make from three to five tests on each man.

We appreciate the fact that unless the results obtained from these tests are borne out in actual practice, the tests are more of a theoretical than of a practical value. To this end the entire series of tests was given to the men already in service, and an especial attempt was made to secure tests on men who had been previously discharged for incompetency and recklessness in handling their cars. It is gratifying to state that the tests so made bear out the theory to a remarkable degree.

We feel that not only do we secure a higher grade man by our present method of employment, thereby reducing our accidents and increasing the good will of our patrons, but a considerable saving is effected in the hiring of fewer men. The cost of hiring and training a new man for street railway work has been variously estimated at from \$25 to \$75.

On the lines of the Dallas Consolidated Electric Street Railway there were employed new trainmen, as follows: in 1912, 551 men; in 1913, 527 men; in 1914, 282 men; in 1915, 222 men. For the first quarter of 1916 there were employed seventeen trainmen.

It is interesting to note in this connection that whereas in November of 1911 the average length of service of all trainmen was twenty-six months, in April, 1916, the average length of continuous service was forty-six months, showing an increase of more than 77 per cent in less than five years. Moreover, of the trainmen employed during the first three months of 1912, only 71 per cent were still in service on May 1 of the same year. Of those employed in the first quarter of 1914, 80 per cent were still in service on May 1. Only seventeen men were employed during the first three months of the present year, and all of them were still in the service on May 1.

In conclusion we wish to repeat that what has been done is largely in the nature of experimental work and must be improved and amplified, but we believe that we have made a start in the right direction. The final goal will not be reached until there is established an employment bureau in charge of a trained, competent man, who will employ all the men needed by the various departments, and until there is in each position a man who is in the best place in the world for him.

## The Effectiveness of Coasting Recorders in Reducing Power Consumption and Operating Costs

BY V. W. BERRY

General Superintendent Northern Texas Traction Company,  
Fort Worth, Tex.

Only very recently has the question of economical operation of cars been given the thought that its importance justifies. To get the best results in economical car operation, some means of checking the operation of each motorman must be provided. The Northern Texas Traction Company has installed for this purpose the coasting time recorder of the Railway Improvement Company, a device which is compact and neat in appearance, has no particularly intricate parts to get out of order, is reliable, and of which the cost of maintenance is very small.

While considering the installation of coasting recorders we arranged with the Railway Improvement Company to make a test in the early part of 1914 on the Hemphill line of this company. For a period of six weeks in May and June we metered the energy used by the cars, kept a careful record of passengers carried, car mileage, etc., all without the knowledge of the trainmen. We also made a stop-watch check of the coasting being



done by motormen on this line, and found it to average 5 per cent.

Following this test, we installed coasting time recorders on the cars on this line, keeping records similar to those kept during the preceding six weeks. During this time motormen were instructed in the use of the recorder, and its operation and object were explained to them.

A comparison of the results obtained during these two six weeks' tests follows:

	Before	After	Difference
Kilowatt-hours per car-mile.....	2.73	2.02	0.71 or 26.0%
Watt-hours per ton-mile.....	145	108	37.0 or 25.5%
Coasting, per cent.....	5.0	29.6	24.6%

We also made a test to determine the saving in brake-shoe wear. The brakeshoes were weighed prior to and following each six weeks' test. A saving of 38 per cent in brakeshoe wear was indicated.

As compared with 1912, our cost per car-mile of maintenance of electrical equipment of cars was reduced 40.5 per cent; as compared with 1913, 31.6 per cent, and as compared with 1914, 17.5 per cent. Just what part of this decrease was due to increased coasting and what part to increased efficiencies at the car shops is, of course, an indeterminate quantity. However, it is my opinion that a part of it was due to increased coasting.

Another phase of this matter is the reduction in accidents due to increased coasting. A great deal has been said and written within the last few years about safety first. In the operation of cars to obtain the best possible coasting record it is absolutely necessary that motormen be on the lookout for opportunities to let their cars "roll," and if sufficient interest is developed among the men along this line a material reduction in accidents should follow.

We have observed in connection with the operation of recorders that our motormen run their cars more nearly on schedule time than they did before. Our schedules are made with the idea that we want them maintained as given to the men. We do not want men to leave the terminals on schedule time and then run to suit themselves, just so they get back at the terminals on time. But we want them to be at the various time points along the line at the proper times. This is especially important on loop lines and on double-track lines in maintaining proper spacing of cars. Having sufficient interest in coasting the men watch their time closely, and do not run ahead of their schedule. They use spare time in "rolling" in order to keep up their coasting percentages.

It is frequently suggested that the men who make the high records run late and drag the line. This is an erroneous idea, because in doing so they would have to make more stops per mile, due to picking up passengers that rightfully should be carried by the car following. For a proper distribution of loads the cars must be kept on schedule time.

To obtain the best results in economical car operation, we must recognize the fact that all men are not equally endowed with the requisites which make a good motorman. In employing new men some system should be developed whereby we can ascertain their qualifications to some degree. Good judgment is necessary, and coasting is simply the exercise of good judgment. The man who can best judge what speed his car should attain before cutting off power in order that it may "roll" a certain distance in a given time is the man who will become a good coaster. A man who had been operating a car in Fort Worth but a short time, who seemed to be having trouble making the schedule, and who was also a low coaster, told me that he could not understand how his instructor made the time so easily and apparently

rolled along so uniformly, while he had to fight all the time to keep on schedule. The new man kept his car at a maximum speed a greater length of time than did the instructor, but in so doing had to apply his brakes much sooner in making a stop, thereby reducing his coasting and increasing his power consumption.

### Practicability and Operation of One-Man Cars

BY D. R. LOCHER

Vice-President and General Manager Corpus Christi Railway & Light Company, Corpus Christi, Tex.

The conditions recently faced by a great many street railway companies, especially small systems, have been the cause for adding one more indorsement to the saying, "Necessity is the mother of invention." Necessity must have been the cause for conceiving the up-to-date, one-man cars. It surely was the cause of the Corpus Christi Railway & Light Company adopting them, and, in the writer's opinion, the results that this company has had prove their practicability, at least for small and medium-sized street railway systems.

The city of Corpus Christi has about 20,000 population, and the railway system consists of 10 miles of single track. The company was operating three lines with a total of five two-man cars on fifteen- and twenty-minute headways. The present owners purchased the property in the early part of 1914, just at the time the city had started its first permanent street paving program. As the street railway was built on the principal streets, the company was required, under its franchise, to rebuild an unusually large part of its track, substituting 70-lb. rail in concrete for the lighter old rail, which was laid in natural soil. Consequently, at the close of the first year's operation the new owners found themselves with three times as much investment in the property as there was the year before, and notwithstanding that the city was showing a healthy growth in population the earnings were decreasing each day.

This company has never had any jitney competition, but its competitor was found to be the accommodating automobile owner who picked up a load of friends who were on the corners waiting for the street cars. A survey showed that the friendly automobile was hauling about as many passengers as the street cars. To beat the accommodating friend it was decided to cut the headway in half. Obviously this would be impossible if the operation costs would double, so we were forced to consider one-man cars. The controlling elements in consideration were the public, the carman, the cars and the electrical equipment.

The company placed an order for eight double equipments of the "Wee" railway motor with the Westinghouse Electric & Manufacturing Company. This was the first purchase of motors of this size, which have a rating of 17.5 hp., at 600 volts, and weigh complete about 800 lb. each. Eight all-steel cars with folding doors and steps at each corner were also purchased. These cars seat twenty-eight, and are 26 ft. long over bumpers. The bodies are mounted on radial trucks, with 9 ft. 6 in. wheelbase and 24-in. wheels. A feather-weight air brake, in addition to a hand brake, sanding apparatus, fare box and motorman's mirror complete the equipment. The cars, fully equipped, weigh about 12,000 lb.

The subject of one-man operation was taken up with the platform men. It happened to be an opportune time, for they had just petitioned for a raise in the wage schedule. They were called together, the condition of the business was frankly stated to them and the new



equipment was described. They were asked to assist in working out the problem and increased wages were promised if they would do their share toward making the undertaking a success. The men enthusiastically entered into the new order of things.

The public was next notified of the proposed change through the local press. The new cars were described and the increase in service was emphasized, with satisfactory results. The newspapers and many citizens have commended the service. The company is now giving a five-minute service each way through the business district of the city.

The earnings before the one-man cars and increased schedule were put into operation had been decreasing 10 per cent to 15 per cent each month over the same month of the previous year. For the three months of this one-man, ten-minute service the earnings have increased 29.7 per cent. The five cars formerly operated, each equipped with two 35-hp. motors, made 737 car-miles daily and used an average of 1336 kw.-hr. Ten cars are now operated, making 1356 miles and using 1708 kw.-hr. Eight are equipped with 35-hp. motors. In addition a work car was in use on construction work. However, charging all of the energy to the passenger cars, we were able to operate 84 per cent more car-mileage with only 27 per cent more energy.

The total result has been to increase the car-mileage 84 per cent, to decrease earnings 15 per cent per car-mile and to decrease operating expenses 37 per cent per car-mile. The car-mileage has not been increased 100 per cent because 1600 ft. of track on one line has been torn up for the past six months. This fact, together with the increased wages paid the car men, the extra power required and the wages of one extra car cleaner, account for the failure of the expenses per car-mile to decrease 50 per cent.

The cost of journal-box lubrication for the five cars which were in service for January, February and March, 1915, was \$45.08. The cost for the same months in 1916 was only \$9.31. Most of this reduction is due to the use of a different method of lubrication on the new cars. The power and speed of the small motors have proved very satisfactory. As many as seventy-eight passengers have been carried on one car up a 6 per cent grade with no difficulty. Our schedules are all at the rate of 8 m.p.h., the same as when the cars were operated by two men.

The car operator keeps a pad of transfers hanging in front of him, and at the end of each trip he punches a number of these, which are good on any one of the other routes, so that when a transfer is asked for he has only to tear it from the pad and hand it to the passenger, thus avoiding any delay or loss of time consumed in punching transfers as they are asked for. We operate with a locked fare box but, as all lines pass the office the men experience no trouble in keeping themselves supplied with change. The "stop-look-and-listen" rule is rigidly enforced at railroad crossings. A comparison to show the tendency of one-man cars either to decrease or increase accidents would, in my opinion, be futile.

It is my belief that mental alertness and thoughtfulness on the part of the motorman is the controlling factor in preventing accidents. The one-man car is no more "bonehead-proof" than is the two-man car. It does, however, have some advantage due to the fact that it is possible to have only one "bonehead" in its crew.

As a consequence of the adoption of one-man cars it has been possible for this company to give the community just twice the street railway service that was formerly given and at the same time increase the com-

pany's earnings about 30 per cent, with an increased operation cost chargeable to the one-man cars of only 6 per cent.

## Missouri Association Holds Aquatic Meeting

The C., M. & St. P. Electrification Was the Principal Electric Railway Topic Discussed

THE convention of the Missouri Association of Public Utilities was held on the steamer Quincy during a cruise from St. Louis to Peoria, Ill., and return. The meeting was attended by 213 members and guests and it was held on May 11, 12 and 13. Among the guests were the mayors of four cities.

The program was largely made up of papers on lighting, industrial power and district heating. Of particular interest to railway men, however, was an illustrated talk by J. C. Thirlwall of the railway and traction department of the General Electric Company, Schenectady, N. Y., on the electrification of the mountain division of the Chicago, Milwaukee & St. Paul Railway. He described the staggered suspension used in the power lines to prevent flashing over and to permit the carrying of higher potentials. Of interest also to railway power plant men was the paper by W. D. Stuckenberg, president of the Commercial Testing & Engineering Company, Chicago, who showed that tests of composite coal samples properly selected are very representative of the fuel a consumer receives.

At the executive session on the last day of the convention the following officers were chosen for the ensuing year: President, Hugo Wurdack, Light & Development Company of St. Louis; first vice-president, Bruce Cameron, United Railways, St. Louis; second vice-president, J. H. Van Brunt, St. Joseph Railway, Light, Heat & Power Company, St. Joseph; third vice-president, J. M. Scott, Kansas City Gas Company, Kansas City; secretary-treasurer, F. D. Beardslee, Union Electric Light & Power Company, St. Louis.

## B. R. T. Motor-Car Maintenance

The thirty-one automobiles operated by the Brooklyn (N. Y.) Rapid Transit Company traveled 222,975 miles in the year 1915. The cost of maintenance averaged 7.76 cents per mile exclusive of operation, storage, chauffeurs' wages and depreciation. This equipment consists of seven touring cars, seven runabouts and twelve service vehicles, of which three are electrics. The condition of each machine is reported daily to the shop for such minor attention as may be necessary, and this is supplemented by a careful shop inspection weekly. Defects are not permitted to become aggravated and where general conditions require, usually after 10,000 to 12,000 miles service, each car is thoroughly overhauled.

In addition to the above information, which was published in the *B. R. T. Monthly*, the following details of this automobile operation have also been secured:

CALENDAR YEAR 1915	
Mileage—Touring cars and runabouts.....	130,572
Service vehicles .....	92,403
	222,975
	Cost per Mile
Costs—Gasoline, electricity and oil.....	\$3,912.13
Tires and tubes .....	3,256.97
Motor parts and sundries .....	3,278.81
Shop tools and miscellaneous supplies	490.68
Shop labor .....	6,365.71
	\$17,304.30
	\$0.0776



# Des Moines Front and Center-Door Cars

These Cars Combine Several of the Features of the Pittsburgh Low-Floor Cars and the Cleveland Front-Entrance, Center-Exit Cars, Provision Being Made So That Either Method of Passenger Handling May Be Used as Desired

WHEN a new franchise was granted to the Des Moines City Railway Company, Emil G. Schmidt, its president, promised the public that he would rehabilitate and modernize the property and place in service new cars which represented the most advanced ideas in design and construction. After a careful study and a personal investigation of various types of equipment in actual service, Mr. Schmidt decided on a combination of the Pittsburgh low-floor car and the Cleveland front-entrance, center-exit car. It was found that a four-motor equipment was best suited for service in Des Moines, and the management preferred the small-wheel trucks used on the Pittsburgh cars to the larger trucks used on the Cleveland cars. The low truck and the installation of a slight ramp at each side of the center door made it possible to reach the car floor level with two steps, the one from the street being 14 in. and the one to the car floor level being 12 in.

All of the Des Moines City Railway's lines have loop or wye terminals, hence the new car is single-end, and it seats fifty-four passengers. The rear half of the car is fitted with cross-seats, and a circular seat is built around the rear vestibule. The front end of the car has cross-seats on one side and a longitudinal seat on the other and thus provides a wide aisle for the ingress and egress of passengers. At this time no definite plan of operation has been adopted for the new equipment, but it is of interest to note that practically any system of fare collection may be used. With the front and center doors either the pay-as-you-enter or pay-as-you-leave plan may be adopted, or the combination of the two, such as is employed in Cleveland and known as the pay-as-you-pass plan, is equally adaptable to this type of car.

The desire for light weight, consistent with necessary

strength for safety and reasonable life, has governed the design. The car is of all-steel construction below the belt rail, except for the floors, and in many instances pressings were substituted for standard sections to keep down the weight. The inside finish is plain, being designed particularly to facilitate car cleaning. Regarding this car, President Schmidt states: "We have learned by experience that the public would rather ride in a plain car that was kept clean than in one that has elaborate ornamental trimmings which collect the dust and dirt." In connection with the adoption of a light-weight car, the management was of the opinion that although this car might not last as long as the heavier types, the saving in power and wear and tear on the track would more than offset the loss due to a shorter life of the car. The principal dimensions are as follows:

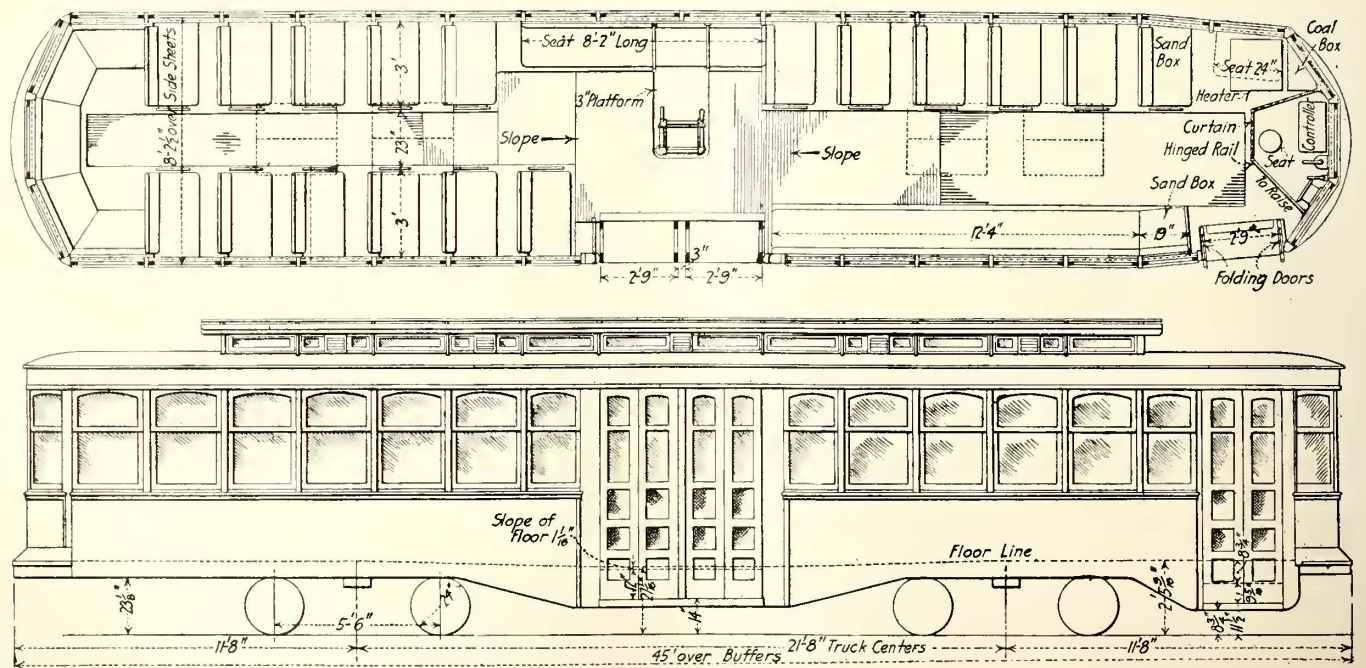
Length of car body over buffer.....	45 ft.
Length of car body over dash.....	44 ft.
Length of bolster centers.....	21 ft. 8 in.
Width of car body over all.....	8 ft. 5 1/2 in.
Width of car body over side sheets.....	8 ft. 2 1/2 in.
Width of car body inside of wainscoting.....	7 ft. 11 in.
Height from rail to top of trolley board.....	10 ft. 10 in.
Height from rail to top of floor at bolster.....	2 ft. 5 9/16 in.
Height from rail to top of floor at center.....	2 ft. 3 1/16 in.
Height from rail to first step at center door.....	14 in.
Height from rail to first step at front door.....	11 1/2 in.

The weights are:

Car body .....	16,000 lb.
Trucks .....	12,000 lb.
Air brake and electrical equipment.....	5,000 lb.
<b>Total .....</b>	<b>33,000 lb.</b>

This weight corresponds to 648 lb. per seated passenger.

The underframe is of the side-girder construction with a continuous fish-belly girder on one side and a girder of the same dimensions on the operating side,



DES MOINES CAR—FLOOR PLAN AND SIDE ELEVATION



but with the special construction necessary to carry the stresses around the center door opening by way of the underframe, and the side plate and letterboard. Vertical stresses due to car loads and track conditions are cared for by the side girders, the floor system merely serving as a means of transmitting stresses to the girders.

The side sills, which also serve as the bottom flanges of the fish-belly girders, are formed of  $\frac{3}{8}$ -in. x  $2\frac{1}{2}$ -in. x 3-in. angles extending continuously from buffer to buffer. The buffers are 5-in.  $6\frac{1}{2}$ -lb. channels, bent to form the car ends, securely riveted to the side sills and provided with  $\frac{1}{8}$ -in. x  $26\frac{1}{2}$ -in. anti-telescoping plates which extend the full width of the car body. Essentially the underframing is composed of the vestibule panels at each end of the car, the two panels containing the body bolsters, and the panels forming the central portion of the underframe. Both the vestibule and the bolster panels are braced diagonally, but the central panel contains simply longitudinal and transverse members. Two 4-in.,  $5\frac{1}{4}$ -lb. channels, spaced 15 in. back-to-back, frame into the buffers and are riveted to the fish-belly cross-sills at the body corner posts. All the cross-sills are of the fish-belly design and are pressed from steel  $\frac{3}{16}$  in. thick.

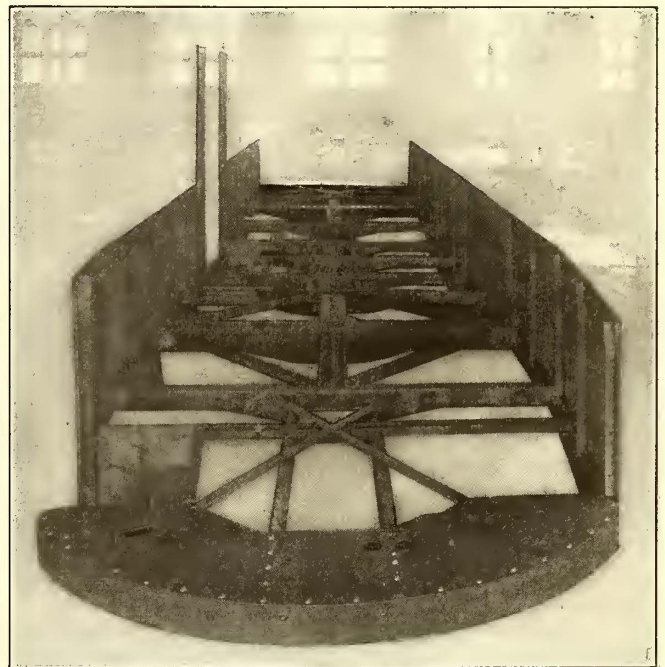
The body bolster construction also is somewhat unusual in that it is composed of two-pressed steel fish-belly channels made of  $\frac{5}{16}$ -in. steel and fitted with a top cover plate  $\frac{3}{8}$  in. x 11 in. extending the full width of the car body, and a bottom cover plate  $\frac{7}{16}$  in. x 11 in., also extending the full width. The two bolsters frame into the side girders, which are reinforced at this connection, and they are provided with side bearings which will permit a 5-ft. 6-in. wheelbase truck to operate around the 45-ft. center radius curve. The fish-belly girders are built up of  $\frac{3}{32}$ -in. plates with the  $\frac{3}{8}$ -in. x  $2\frac{1}{2}$ -in. x 3-in. angle side sills forming the bottom flanges, and a  $\frac{3}{8}$ -in. x 3-in. steel plate forming the top reinforcement. A uniform post spacing of 2 ft. 6 in. has been adopted, except for the panels at each side of the center-door opening, where the spacing is reduced to 2 ft. Girder stiffeners are provided at each side post by riveting  $\frac{1}{8}$ -in. x  $1\frac{1}{2}$ -in. x  $1\frac{1}{2}$ -in. angles to the web plate. Each joint in the girder side plate is spliced with a  $\frac{3}{32}$ -in. x 5-in. plate. It is also of interest to note that the side girders extend into the vestibules from the front-entrance door opening to the rear-vestibule corner post.

That portion of the body above the belt rail is built of wood. Ash side posts support the iron carlines which are made of the  $\frac{3}{8}$ -in. x  $1\frac{1}{4}$ -in. bars bent in one piece to the contour of the roof, extending between the side plates and bolted securely to them. The side plates, deck sills and plates are of long-leaf yellow pine and extend the full length of the car body. The deck mullions, the end transoms and the carlines are made of ash, and the carlines are placed one over each post and one between posts. The body roofing is of tongued and grooved  $\frac{1}{2}$ -in. poplar, and the hood roofing is formed of two thicknesses of  $\frac{1}{4}$ -in. basswood. Covering this roof is the usual 8-oz. cotton duck laid in white lead and oil.

The body floor is built of a single thickness of tongued and grooved yellow pine, depressed along the aisles and provided with hard maple floor mattings. A  $2\frac{1}{4}$ -in. ramp extends from the body bolster to the side of the center door opening. A tapered flat-front type vestibule and a straight rear vestibule were adopted for these cars. The outside of the vestibule is sheathed with 14-gage sheet steel between the buffer and the sash rail.

Each vestibule is fitted with three drop sashes, the one at the right of the motorman's position being made in two parts and the upper or Gothic sash is arranged for a Keystone illuminated sign. The rear center vestibule sash is also made in two parts and arranged for an illuminated sign. Sashes in the sides of the car are single and made in two parts, of which the upper one is fixed and made in continuous lengths. The lower sashes are of the Forsyth beadless brass type, and they are provided with two spring sash locks and bottom-cushion weather stripping. The deck and transom sashes are all stationary, and five of the deck sashes on each side of the car are provided with automatic ventilators.

The lighting system for these new cars follows the Cleveland standard and includes five 92-watt Mazda lamps in series, fitted with Alba shades and mounted along the center line of the deck ceiling. A spare lamp is connected with a Nichols-Lintern selector switch so that it can be instantly cut into the circuit in case any one of the other five lamps fails. In addition to these lamps for general illumination, five 23-watt tungsten



DES MOINES CAR—END VIEW OF ASSEMBLED GIRDEES AND UNDERFRAME

lamps are distributed in the sign boxes at the front vestibule step opening, over the fare box, and in the head lamp.

Two sections of two-leaf folding doors, arranged with an operating mechanism under the control of the conductor, close the center openings. The front opening is closed with one set of two-leaf folding doors and fitted with an operating mechanism of the overhead type which is under the control of the motorman. All the steps are stationary and provided with Mason carborundum safety treads. Incidentally, the two center-door openings and the front-door opening are all of the same width, being 2 ft. 9 in. in the clear. The general arrangement of the car body is shown in the plan in one of the accompanying illustrations, and the inside finish is in light cherry of a plain, sanitary design. The wainscoting between the floor line and the window stools is of steel, and the headlining is Veosote.

Other specialties include Pantasote curtains, Rexall metal rollers and National Lock Washer Company's cur-



tain fixtures, Consolidated Car Heating Company's signal buzzer system, Sheraduct conduit, Crouse-Hinds conduit fittings, Peacock staffless hand brakes, Wyoming sand traps and Ohio Brass Company's sand valves, Automatic ventilators, Keystone destination signs, Golden Glow incandescent head lamps, Heywood Brothers & Wakefield Company's rattan upholstered pressed-steel seats, Peter Smith Heater Company's forced-circulation, hot-air heaters, International R-5 type registers, H. B. Life-guard fenders, General Electric air brakes, McGuire-Cummings trucks equipped with 24-in. Griffin F. C. S. wheels, Symington malleable-iron journal boxes, More-Jones Brass & Metal Company's journal brasses, Railway Materials Company's brakeshoes, Hartman self-centering center bearings and Perry anti-friction side bearings. General Electric Type 25-A, fully ventilated, multi-fan, light-weight motors and K-35 control, were also adopted for these cars.

## Iowa Association Changes Name

At the Closing Session of the Dubuque Convention Maintenance Was Discussed, Officers Were Elected and the Constitution Was Revised

THE closing session of the Iowa Street & Interurban Railway Association's convention at Dubuque, Iowa, was held during the morning of May 12. John Sutherland, master mechanic Tri-City Railway, Davenport, read the paper on "Inspection and Maintenance of Rolling Stock," abstracted in last week's issue. C. M. Feist, master mechanic Sioux City (Iowa) Service Company, opened the discussion by emphasizing the importance of keeping men constantly at particular repair jobs, so that they may become expert. He said that the maintenance of rolling stock equipment had not been very expensive with his company because all old-type motors had been replaced with new interpole motors about five years ago. Since making the change not a single commutator had been turned, whereas the old-style motors had to have their commutators turned and slotted every six or seven months. Mr. Feist also said that armature-bearing life had been prolonged by broaching the babbitt linings. The inside diameters of these bearings were babbitted slightly scant, and the broaching compressed the babbitt to the correct diameter. This process made the metal both denser and smoother. O. S. Lamb said that it was difficult at times to get the management to purchase modern equipment to replace the obsolete. In many instances it would be economical to scrap old motors and cars and purchase modern motors and lighter cars. President Leussler closed the discussion by suggesting that the best way to convince a management of the economy of a change in equipment was to submit to it carefully prepared data.

In the executive session which followed the constitution and by-laws of the association were amended, changing the name to the Iowa Electric Railway Association, and permitting manufacturing companies to become members for an annual fee of \$10. Representatives of manufacturers will receive the same privileges as the railway members except that they cannot serve on the board of directors or vote on matters pertaining strictly to railway methods, standards or rules. The field of the association was also extended to include Nebraska.

Following the report of the resolutions committee, E. C. Allen, general manager Cedar Rapids & Marion City Railway, was elected a director of the association and its president; C. E. Fahrney, general manager Ottumwa Railway & Light Company, was elected vice-president, and H. E. Weeks, secretary and treasurer Tri-City Railway, was re-elected secretary and treasurer.

## Some Comments on Public Utility Commissions\*

Utilities Are Natural Monopolies and Duplication of Service Produces Wasteful Competition—  
Centralization of Control in Competent Commissions Is Advantageous to the Utility

BY SAMUEL INSULL

President Commonwealth Edison Company, Chicago, Ill.

PUBLIC utility business as a whole, including telephone, electric, gas, steam and electric railways, receives operating revenue of upward of \$4,313,000,000. Of this amount one-third is received by local public utilities. This business yields \$985,000,000 annually and it pays more than \$2,000,000 in taxes. It is capitalized at \$25,000,000,000, which represents assets of about \$30,000,000,000. Public utilities pay more than \$1,750,000,000 annually in wages and salaries, and they employ 2,250,000 men. About two-fifths of the capital employed is for local utility business, and it also pays about the same proportion of taxes. The ratio of capital employed to revenue produced is of the order of \$5 to \$6 of capital to \$1 of revenue. In other words, this shows that the public utility business as a whole is among the most conservatively capitalized of any class of business. The utility business is not over-capitalized, but its assets exceed the capitalization. Instead of apologizing to those who criticize our economical situation we should refute their arguments with the foregoing figures, which were taken from the Federal census reports. I am a great believer in hitting back, and if critics will take the broad general view they cannot help but be convinced by these census figures.

The public utility business to be economical must be a monopoly. Duplication of investment should be prevented by refusing to grant competitive franchises. It has been a good many years now since politicians came to the conclusion that the public utility business must be a monopoly. I have given a great deal of thought to public utility regulation. About eighteen years ago, as president of the National Electric Light Association, I read a paper in which I indorsed regulation on the ground that for economical reasons public utilities must be monopolies. [Mr. Insull then read portions of this address.] Franchises granted to utilities should obtain the same rights for their security-holders as those given to other investors.

Public utilities perform a public function, and for that reason there is no question about the right of states to regulate them. Since it is granted that the business must be a monopoly the state must see that the price of service is based on the cost and a fair return. This is a fundamental, inherent right of the business. The establishment of commissions was due to the failure of competitive franchises, and also to a failure of public utility officials to realize their responsibilities. Many of them were in the habit of charging all the traffic would bear, or they were ruled by a desire to possess themselves of the other man's property. I want to sound a note of warning against the practice of disregarding the rights of existing public utility corporations operating in a given territory. I have yet to find a case where it was good business deliberately to invade the territory of another utility. Since I became connected with the public utility business I have started twenty-five or thirty different utility corporations, but I have never found it economical or desirable to parallel another man's investment. On the other hand, if my

\*Abstract of paper read at the meeting of the Iowa Gas, Electric Light, Street & Interurban Railway Association, in Dubuque, Iowa, on May 11, 1916.



rightful territory is invaded I will fight back relentlessly.

After years of experience and consideration I cannot see any other solution of the public utility problem than through strong regulative bodies. The more centralized and powerful they are the better they are for all public utilities. If there is anything wrong with my business I want to know it, and the best way to find it out is for high-class men with the regulative viewpoint to investigate it. I understand that this view is not popular in Iowa and elsewhere, nevertheless I am very certain that the best results can be obtained by state commissions. In Illinois, home rule for Chicago is being urged, and probably will be granted. I consider such a move a step backward. Thirty-three states now have commissions with jurisdiction over public utilities. This is sufficient evidence that the trend is in that direction. A large proportion of the people may think wrongly on some problems for a time, but they will hardly make a mistake on fundamental questions.

Commissions are in a fair way to substitute arbitration for war between the public utilities and the public. In Idaho, for instance, the state commission ruled in a certain case that it would not be placed in a position of throttling ambition by fixing a rate of return. Such a ruling creates greater incentive for better management. If the laws creating a commission are properly drawn, and permit the employment of competent men, they, as a rule, after a few years of experience, see the necessity for changes in the laws affecting public utilities, and will champion a move to that end. Commissions have a right to regulate in the way that best suits the purposes of government, and they ought to exercise that right. The changes taking place in the utility business are not confined to any one community, and local regulation cannot much longer remain effective. Regulation gives much greater permanence to investment, and in the final analysis we cannot have regulation without protection.

One of the greatest disadvantages of commission regulation is the possibility of the creeping in of politics. It would be the poison and ruin of any regulative body, and it is our business to decry the commission's being used for political purposes. Regulation interferes with our liberties of action, yet it is very good discipline. Some human beings, when working for large corporations, are apt to feel a little bit "sot up," and regulation is good for that ailment. Public utilities cannot keep their power without the good-will of the communities they serve, and regulation is a great aid to this end.

One very serious question in commission regulation is to what extent such a scheme is disastrous to enterprise. If the business is run too much by rule the initiative and enthusiasm of the operators may be unfavorably affected. This is a very serious consideration and deserving of much thought. Moreover, states are not in the habit of bidding as high for brains as utility companies. If the price only permits the hiring of relatively cheap commissioners instead of obtaining high-grade men, the commissions are very liable to hold the men of great finance in distrust. Such commissions also, when newly appointed, think their function is to prosecute and persecute public utility companies.

The census figures show the enormous amount of money invested in the utility business, and that money has rights under all circumstances. The capital invested is not owned by a few, but represents the savings of the workers of this country, the widows and orphans. It is a mistake for anyone to claim that the captains of the industry own the utilities, when, in fact, they own relatively a small proportion. Utility security-holders have a right to protection as much as anyone.

It is a wise policy for utilities to get their employees to invest in their securities. Such a policy brings their influence for the utility and is an aid to regulative relief.

If public regulation fails public ownership will follow, and I believe it should in that case. The success of regulation is up to the public utility operators, and they must recognize the principle that monopolies must be regulated if privately owned. It should become our duty to see that regulation is a success, because it is to our own best interests. Argument that public regulation is a failure is no argument against public ownership. Present indications point to the fact that in but a short time every state will have some form of regulation.

It is fundamental that our best interests will be served by maintaining cordial relations with our patrons and commissions. One does not buy his goods from a man who is disagreeable unless the goods are very cheap. Cordial relations will give a bigger return on our investments than any other one thing. I believe in being candid and aboveboard in my relations with the public. I believe in taking them into my confidence, not as a favor but as a right. We get our income from them and are dependent upon them for our success.

Small and large companies alike need initiative and enterprise in developing a public utility business. Do not manufacture your product when you can buy it cheaper. The increase in the business will be enormous in the next few years, hence it is wise to have a broad policy as to rates. In other words, do not be afraid to sell your product too cheap. We public utility men have a great opportunity to benefit ourselves. We are more or less semi-public servants, however, and we should not make the mistake of looking too much to personal interests and not enough to community interests.

## U. S. Civil Service Examination for Assistant in Transportation

The United States Civil Service Commission announces an open competitive examination on June 13, 1916, for assistant in transportation, for men only. From the register of eligibles resulting from this examination certification will be made to fill a vacancy in this position in the Office of Markets and Rural Organization, Department of Agriculture, Washington, D. C., at a salary ranging from \$1,800 to \$2,400 per annum, and vacancies as they may occur in positions requiring similar qualifications, unless it is found to be in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

The duties of this position will be to assist in the rendering of practical service to producers and distributors of farm commodities, especially perishable commodities, in every phase of the transportation problem, and to co-operate with both shippers and carriers in raising the standard of transportation service and in reducing the economic waste of foodstuffs in transit.

The division of statistics of the Interstate Commerce Commission has just issued a preliminary abstract of the statistics of common carriers for the year ended June 30, 1915. This report includes tables showing the revenues and expenses in detail, income statement, profit and loss statement, balance sheet, operating statistics, particulars of equipment, etc., for railroad companies having, with a few exceptions, annual operating revenues above \$1,000,000. The compilation also includes abstracts from the annual reports of the principal express companies and the Pullman Company.



# Papers Read at Lancaster

## Conclusion of Pennsylvania Association Spring Meeting Report—Papers on Rush-Hour Traffic, One-Man Cars, Accident Reserves, Training of Platform Men, and Freight and Allied Service

IN the ELECTRIC RAILWAY JOURNAL of May 13, page 1904, there was published a report of the proceedings of the Pennsylvania Street Railway Association at the spring meeting in Lancaster, Pa., on May 9 and 10, with the papers that were presented on labor, the Engineering Manual and physical examination for employees. This issue contains the remainder of the papers dealing with miscellaneous topics concerning the operation and management of electric railways.

### Rush-Hour Traffic

BY P. T. REILLY

Superintendent of Transportation, Scranton (Pa.) Railway

In our city, where labor unions are so strong that they are establishing their own working hours, the rush-hour problem is being solved rather nicely. This problem has been helped somewhat by a law passed by the recent Legislature creating a shorter work day for women. Thus instead of having the rush hour confined to one hour in the morning and another hour in the evening, as formerly was the case, it is in a measure divided into several hours, both morning and evening. One set of workmen commences at 7 a. m., another at 7.30 a. m., others at 8 a. m., while the clerks and others go to work from 8.30 a. m. to 9 a. m. The time for quitting work varies from 4 p. m. to 6.30 p. m. In the mining industry, in which there are a large number of workmen, employees are constantly going to and from work. As a rule each man employed in or around a mine lives in close proximity to it so that we have no particular rush to or from work by employees of this industry.

While we have no very large manufacturing plants located at some distance from the center of traffic, like all street railways we have our rush hours. At the beginning of the rush-hour period we make an effort to see that all regular cars are running on scheduled time. This is accomplished by closely checking the cars at a given point and by placing inspectors at important junctions to assist crews and traffic. We operate twenty-seven lines of cars, and on lines where this rush period occurs regularly every evening we meet it by placing extra cars in service operated by extra men. We also run what are called noon or half-day cars. These cars go out from 10 a. m. to 11 a. m. and operate till from 8 p. m. to 9 p. m. They either shorten up the headway of the regular cars or run as a separate line, doubling up the service as the schedule provides. The number of extra trippers operated between 4 p. m. and 7 p. m. represents 20 per cent of the regular service.

We always make it a practice to see that our largest cars are placed on lines where the traffic is heaviest. Each line is watched carefully and checked occasionally, and when it seems to require extra service we either add trippers or shorten up the headway as seems most desirable. We find that it is more satisfactory to do this voluntarily and bring the attention of the people to the increased service we are rendering than to wait for some citizens' committee to call or send in a petition or to wait for public criticism.

One of the interesting things we learned in the handling of tripper service on lines that have fairly frequent

headway is that better results are obtained by running trippers a few minutes ahead of the regular car and going to the end of the line rather than splitting the service and running only a portion of the trip. Men employed running trippers are paid platform time except when the cars are operated by regular men, who are paid at the rate of time and one-quarter.

A careful checking and study of our lines convinces me that too many trippers can easily be placed in service. Particularly is this true where a reasonably frequent and regular service is maintained on the line. Years ago when cars were small and tracks were bad and service was slow and irregular, it was more of a hardship to ride in a crowded car in rush hours than it is now considered to be because the cars are so much faster that one is rarely crowded for more than ten minutes. Trippers are expensive to operate. They usually carry passengers in but one direction, and they are not regarded with much favor by employees. If too many are operated, dissatisfaction usually exists among crews. It seems well, therefore, to make the regular service handle this so-called rush business so far as it can reasonably do so.

I find the best method next to adding a small number of trippers is to impress conductors with the habit of being good-natured. This is a mental attribute which costs nothing and covers a multitude of sins. The public, whether in a crowded car or in spacious, comfortable surroundings, appreciates good-nature. The conductor who is trained to smile instead of to frown and who will take an interest in his passengers goes pretty far into the solution of the crowded car. One of the difficult problems of the rush-hour traffic is the person who stands in the middle of the aisle of the car and refuses to move so that passengers can pass. This fellow is somewhat of the impression that no seat means no fare. He does not stop to think there is a seat for him in the car directly following. He has a grouch. This grouch is often contagious and spreads among the other passengers. In handling this well-meaning passenger, much depends on the conductor. The stern command to move up front will not move him. He only becomes more stubborn. Politeness, however, will usually do the trick. The conductor who can say diplomatically, "Will the gentleman in the aisle be kind enough to move forward?" will usually put him in motion and permit passengers to move more freely.

Another helpful agent is the public press. We must recognize the fact that newspapers are the teachers of the people. An article now and then relative to manners on the street cars helps a great deal. The effect of their work in this respect is shown by the fact that in a few seasons they made the so-called "end-seat hog" on open cars so unpopular that it is now hard to find one. The people will not be driven, but they will follow gentlemanly treatment and advice. Occasional newspaper articles telling about the good service and improvements contemplated will put people in a pleasant frame of mind, and when they believe they have good service and are boosters of their local road, many of the difficulties of rush-hour service are overcome without additional expense.

My experience has been that passengers properly



treated during the day with a regular, reasonably frequent service do not complain much against the strap. By giving the public the best you have with due economy of operation, and truthfully assuring them that it is the best at your disposal, they are willing now and then to put up with a little inconvenience, but do not inconvenience them too much or keep at it too long. Show them by increased service occasionally that you are glad to have them in the cars and have it known that they will be properly treated as passengers. See that the conductor attends to business, calls streets intelligently and accurately, that he and his car are neat, clean and tidy, and have him understand that he is employed to serve the people.

The street railway company is like the merchant who wants friends. When you call on a merchant who is your friend, if he is busy, you are glad of it. You do not tell him he ought to build another store, just to accommodate you. The people who are the friends of a street railway—and every man, woman and child ought to be won as a friend of the company—will not kick if they find the company busy and prospering. It is usually some employee who is the cause of making enemies for the company. The untidy conductor disgusts lady passengers. A loud, talkative and inattentive conductor disgusts men. It is no hardship on the crew to insist that they do the work for which they are paid and that they give extra attention to their passengers when the car is crowded. I think we will all agree that next to providing some extra cars and good equipment with wide aisles and a reasonably fast schedule, a neat, tidy, courteous crew, who know their business and attend to it, is the most important factor in the solution of the rush-hour traffic.

## One-Man, Light-Weight Cars

BY W. E. MOORE

Consulting Engineer, Pittsburg

The one-man, light-weight car is not new. John Stephenson more than fifty years ago built such cars for New York City, and at the same time he embodied conveniences for fare collection and handling the car by the driver. These early cars, seating from twenty to twenty-five passengers, weighed less than 2 tons. They were often of the "bob-tail" variety without rear platform but with a center rear door and step, the door being controlled by a strap running forward to the driver on the front platform. A fare box was located in the front bulkhead within convenient reach of the driver, in some cases supplemented by a slotted top, inclined nickel chute or carrier.

These cars exemplified in their design, choice of material and construction a high degree of skill and good judgment on the part of the builder. The bodies of the first cars were framed of ash carlines and stanchions with poplar cove and convex panels, glued and "scrimmed." The sash were often but  $\frac{3}{8}$  in. thick. The trucks were of trussed construction, framed of light iron forgings, with malleable-iron journal boxes, spring seats, etc. The springs were of the coil pattern, cushioned on rubber buffers. The axles were usually  $2\frac{1}{4}$  in. to  $2\frac{1}{2}$  in. in diameter, with 24-in. to 30-in. wheels, and weighing 140 lb. to 180 lb. each.

With the advent of electric traction numerous house carpenters entered the car-building business and offered their clumsy, ill-proportioned wares, painted in gay colors, lettered in gilt and ornamented with numerous brass trimmings, to the trusting and unsuspecting street railway magnates, who vainly vied with each other for the largest and the heaviest cars, weight even having been made a strong talking point by the car

builders. Many cars were put upon the market weighing 35 tons to 55 tons, a weight per passenger seat ranging from 1200 lb. to 2000 lb.

Thomas Elliott, then mechanical engineer for the Atlanta (Ga.) Railways, seems to have been the first fully to appreciate and preach the fatal results which were sure to come from such ill-conceived and useless extravagances. Some eighteen or nineteen years ago he developed that type of car, now so popular, which does away with the hog chain and over truss and wooden boarding on the sides. He substituted therefor a sheet of steel of a length extending from end to end of the car and around the corner posts to the door openings and of a depth from the window rail to the bottom of the car sill, thus embodying a complete girder side construction and sheathing for the car. Notwithstanding the fact that a number of such light-weight steel-side cars were operated and were described in the technical journals, it required more than a dozen years before street railway men and car builders began to note the advantages of this light-weight, durable construction.

Now the financial tide has turned adversely for electric railway enterprises, and street railway managers are compelled to abandon many things not absolutely necessary. The light-weight, one-man car, while it cannot be said to be a panacea for all of the street railway man's ills, nor a remedy for lost returns on money wasted for heavy equipment, does, however, offer great hope for reducing expenses, increasing travel and knocking out jitney competition in many localities. Its popularity is attested by use on one hundred railways in the United States.

Keeping pace with the call for reduction in weight, low cost of construction and operation has required innovations and advances in the design, material and construction of car bodies, trucks and electric motors. The light-weight, one-man car is generally smaller than the ordinary single-truck car, although it usually seats more passengers than did the single-truck car with 20-ft. body. It usually seats twenty-five to thirty passengers and is from 25 ft. to 30 ft. long over bumpers. It should weigh, ready for operation, not more than 10,000 lb. Such a car can be bought, complete with trucks and motors, for \$2,500. The weight is distributed about as follows: Body, 5500 lb.; truck, 2300 lb.; two motors each developing about 30 hp., 800 to 900 lb. each. Chilled-iron carwheels are now available at a weight of approximately 200 lb. each.

The entire equipment has been refined, even down to the brakeshoes, which weigh 13 lb. and cost 25 cents each as compared to those of the old type, which weigh 30 lb. and cost 60 cents each.

The truck design of the new cars has been worked out with coil springs operating in series with semi-elliptic springs, so that the riding qualities are superior to any single trucks heretofore marketed. Teetering is practically absent, due partly to the long wheelbase, generally made 9 ft. or 10 ft. This is permissible because the submergence of flange of the 24-in. wheel in the guard-rail grooves is shortened to the extent that the 10-ft. wheelbase truck will round short-radius curves about as easily as the old 8-ft. truck with 33-in. wheels. The improved riding qualities of these trucks are remarkable; in fact, these cars ride practically as well as the jitneys.

Steel-side car construction has reduced the thickness of the car side to 1 in. or less, giving a corresponding increase in the aisle width ranging from 6 in. to 8 in. Coupled with the savings in power, track maintenance, wheel and brakeshoe wear by reduction of weight, the economy of the light-weight, one-man car has been



greatly increased by the simplification of the body and wearing parts. For instance, the doors have been so designed that no mechanism is required for their operation, and the old-style hinges have been replaced by continuous, durable hinges of "piano-box" construction, incidentally keeping out cold air and excluding dirt. The trucks have been so designed that the wearing parts are unusually accessible. An axle with wheels may be removed by simply loosening U-bolts from the journal box, while the brakeshoes may be readily replaced and adjusted by means of a single nut.

The light-weight cars for many cities or suburban routes are equally as fast in loading and schedule as the two-man cars. For instance, with 500 volts at the trolley wheel, and a load of twenty passengers, an acceleration of  $1\frac{1}{2}$  m.p.h. per second can be assumed. With a braking rate equal to that obtained on air-brake cars and assuming ordinary grades and six-second stops, the following schedule speeds can be obtained: Five stops per mile, 11.4 m.p.h.; five and one-half stops, 11 m.p.h.; six stops, 10.7 m.p.h.; six and one-half stops, 10.3 m.p.h.; seven stops, 10 m.p.h.

The greatest economy of these cars is due to their light weight and the elimination of the conductor. In other words, the platform labor has been divided by two where one-man cars have been installed as a rule. There are, however, exceptions in some cities where the travel is unusually heavy on one end of the line for certain hours of the day. In such case it is customary at such heavy hours to put on a "swing" conductor, who rides out to the first passing point and collects the fares, swinging over to the next car and returning to the starting point for another swing run. In some other cases where the car line runs through a city with a fare zone in the city and other fare zones at either end it is occasionally essential to put on a conductor to take up the fares in the middle zones, leaving the motorman to collect the fares from the passenger boarding the car in the outer zones.

In the case of some eighteen cars operated under the direction of the writer on four street railway lines, there was an approximate saving of \$5 per car per day in platform expense. Under ordinary conditions one-man, light-weight cars require a maximum of  $\frac{3}{4}$  kw.-hr. per mile as against  $1\frac{3}{4}$  to  $2\frac{1}{2}$  for the ordinary single-truck, two-man car, weighing 10 tons to 15 tons. This saving in power, at  $1\frac{1}{2}$  cents per kilowatt-hour at the trolley wheel, and a mileage of 180 per day, usually amounts to \$2 or \$3 per day.

It has been found that the 200-lb., 24-in. chilled car-wheels have two-thirds the life of the 600-lb. 33-in. wheels, as a rule. That is, the wheel cost is reduced to approximately one-half, with a corresponding saving in rail wear and joint maintenance. Many recent improvements in light-weight motors have reduced the cost of motor maintenance to less than one-half the former cost per motor-mile. The 25-cent brakeshoes have been giving an average life of 7500 miles.

Actual records of the claim department show the percentage of miscellaneous accidents to have been materially reduced, while boarding and alighting accidents have been practically eliminated. Collisions with vehicles seem to have been reduced by reason of lighter weights and more quickly operated high-efficiency brakes. New trucks have been developed with hand brakes which require practically no more labor to operate than air brakes, as the brakes are applied with only half a turn of the crank handle and a moderate pull on the brake handle is sufficient to skid the wheels.

The introduction of the steel-sided car, with the elimination of the bulkhead and double sliding doors, together with the simplification of the trucks and wear-

ing parts, has reduced car maintenance fully one-half. In other words, the light-weight, one-man car can be said to cost approximately one-half to operate, less than one-half for power, about one-half for platform expense, one-half for maintenance, one-half for track wear, all with a smaller proportion of accident expenses per passenger. With such cars it is feasible to double the number of trips, thus increasing the convenience to the public, with a resulting increase in traffic and at the same time keeping within the present limit of operating costs. This makes most effective competition for jitneys, as there is nothing equal to frequency of service for building up travel, especially in those cities where the traffic density is such that it is impracticable with the old two-man, heavy-weight car to operate less than a 15-min. headway.

These cars, like other advances in the arts, have their drawbacks. The labor unions object to them, and in some cases incite remonstrance on the part of the public, because each car eliminates the necessity for one man's labor. Such objections can usually be overcome when putting on the new cars by doubling the headway. Where this is not necessary, it may be best to give the motormen on the one-man car a cent or two per hour more than the other motormen.

It is not claimed that the light-weight, one-man car is a "cure all." It nevertheless is a remedy for many of the railway man's troubles which come from over-investment and high operating expenses. Some new railway projects which were not feasible otherwise will become so with these cars, for 50-lb. rail can be used where 70-lb. rail has been required. There will be a corresponding difference in bridges, power stations, lines, etc. It is believed that these cars will be the salvation of many properties which are now in a precarious financial condition.

### Training Platform Men

BY W. A. HEINDLE

General Superintendent Southern Pennsylvania Traction Company, Wilmington, Del.

The method in vogue for training platform men is hardly worthy of the name. Good motormen and conductors are born and not made. Some men take to it naturally and are fitted for the job. It is a true statement in that selecting proper men 50 per cent of the usual training is accomplished.

The question of how to secure such trainmen is a very important problem in every street railway operation. The grade of men available and offering for such employment is rapidly deteriorating. This may not be true in isolated sections, but is certain in the larger industrial territories where diversified employment is offered. In the early days of electric railways, motormen and conductors were hired with the prospect of permanency. Now, however, social unrest, the labor agitators, unionism and the scarcity of employees in the homes of the "war brides" are strong factors affecting the problem of the operators of our cars. Competition and search for men has been extremely keen. Agents of the munitions companies have boarded our cars and solicited motormen and conductors to file application for employment with promise of several years' work and much higher wages than our standard. The magnetism of high wages proved irresistible to numbers of men who had been with the company for years.

An applicant to our company is required to fill out blanks giving the usual information as to age, training, home address, reference, etc. If he appears suitable for the job, forms are sent to parties referred to, and should the replies be satisfactory the man is employed. All papers are filed and a card record is kept of each



employee, giving date of appointment, badge number, record of accidents, reprimands, penalties, checks, etc. Upon being hired, the student after receiving the company's book or rules and a short general talk by the division superintendent, is then assigned to certain motormen or conductors for breaking in. Learners are given fifteen days on the various lines, being paid 75 cents per day. The instructing motormen or conductors receive 25 cents per day in addition to their regular wage. After being pronounced O. K. by the regular, the student is put through the school of instruction and made familiar with all the equipment of a model car. He is examined on the rules by the general instructor or division superintendent and is finally assigned to the extra list.

The new men are carefully watched by the inspectors for several months, particularly with regard to reckless running, the taking of chances and the handling of the public. At each car barn the company has provided club rooms for the use of the men. These are maintained by the Employees' Relief Association and are fitted with pool tables and games and supplied with current literature. At intervals all men, old and new, are called together for an hour, at regular pay, and are addressed by the heads of the departments, superintendents, claim agents and occasionally by one of their own number on topics of interest, such as "safety-first" matters, prevention of accidents, fares and collection of same, car operation, schedules, operation of signals, courtesy and kindred subjects. These meetings serve a dual purpose: (1) in giving the management an opportunity of talking direct to the men, and (2) in making the men mix. Moreover, a healthy discussion of the operating difficulties clears up many questions which may arise.

A bi-weekly bulletin is written by the superintendent of transportation and posted so that all may read. This bulletin always records the number and nature of accidents on the various divisions, how they might have been avoided, articles on various phases of operation, instructions for particular cases, commendation for meritorious service, etc. That the meetings and bulletins are productive of good results is shown by a reduction in the payments for accidents and damages from 5 per cent and 6 per cent of gross to 2 per cent in five years.

I sometimes think that men of middle age, of settled habits, are preferable to the younger men for car operation. The older men will be more careful and perhaps will hold their jobs longer. I am also a believer in giving the employee the benefit of the doubt in all cases. The discharge should only be resorted to for good and sufficient reason. In some cases, if he is retained in service, a serious accident will make a careful man of one who was formerly reckless. This day of many automobiles and trucks takes the strictest attention and carefulness on the part of the trainmen. We endeavor to instill in the minds of our men that "safety-first" begins at home. That it is up to us to look out for the ninety-nine out of every 100 who will not stop, look and listen for their own protection.

We should devote more attention to personal contact with the men. The too-often used manner of some inspectors and superintendents in bawling out orders, humiliating the men before the public, should give way to a quiet word with the reason for such orders carefully explained. Make the men feel that they are of as much importance in their place as the general manager is in his, and that the company is worthy of their loyalty and best endeavors, for loyal employees will oftentimes in a large measure counteract any adverse criticism of the service. If the motorman or conductor

appreciates his job, feels that he is the company's agent and what he does adds to its weal or woe, he is an efficient and loyal employee.

## Handling Accident Reserves

BY H. D. ANDERSON

Assistant Comptroller American Railways, Philadelphia, Pa.

By establishing a reserve to care for the expenditures in connection with accidents and damages, an equalization of operating expenses for the current year is effected. If no amounts have been set aside within the year measured upon such unit as may be gained from the experience of past years, the true operating expenses of that year will not be correctly stated in the income account. If payments representing claims which have accrued during past years are charged to the operating account in any one year, it is an unfair burden on the income account for that year.

As there is unquestionably a direct relation between the number of accidents occurring and the number of passengers carried to operating revenue from transportation, it is the practice of the American Railways to base its accrual to the reserve account on a percentage of the operating revenue from transportation, having first determined from an examination of the accounts for the previous year the exact percentage of payments made. As a case in point during 1915 the percentage of expenditures in connection with accidents to transportation revenue on one of our companies was 0.64 per cent. The company had been setting aside during 1915 1 per cent. After considering the balance in our reserve account and examining a schedule of unsettled claims and suits filed (such a statement always being prepared for this purpose at the close of the year), it appeared that for 1916 it would be necessary to accrue monthly 0.5 per cent of transportation revenue. In the case of another company it was necessary to accrue 4 per cent. The percentage varies in our different companies in connection with the physical character of the territory; the class of equipment used; the class of men that the company is able to obtain as trainmen, and the result of systematic effort on the part of the management to reduce accidents.

A study of the income accounts of the several subsidiary companies for past years shows that this method has been satisfactory. This method is apparently fairer and more satisfactory than setting aside at the beginning of the year an arbitrary amount and charging it up in twelve equal installments. This latter method does not show a curve, whereas in the method outlined the accruals are of course largest during the summer months when earnings are the greatest. Thus the large earning months thus receive a fair proportion of the yearly charge, and it is invariably the case that during these same months the largest number of accidents occur.

Some may object to this method on the theory that if during any one year the company should be so unfortunate as to sustain a large number of very serious accidents, then the accruals for that year having been based on the previous year would not truly show operating conditions. For those who wish to draw a finer line and attempt to fix in each month the approximate liability for that month, probably a better method would be to compute the total amount of claims entered against the company during the month and the actual payments made on account of such claims. The ratio thus obtained could be used as a unit for each month during the fiscal period, but this method also has its weakness in that the ratio would very probably in some months be considerably out of line owing to the recovery of large amounts by claimants. It may be said in this connec-



tion that it has been the experience of the American Railways that the final cost of claims settled is about 10 per cent of the total amount of claims filed.

After the reserve account has been established the question may arise as to the disposition of the balance. Should the money represented be invested in securities, set aside as a special cash fund or retained by the company to be used as a part of its working capital? The very nature of this account is that it is active, debits and credits constantly being made, and it would seem that the average company would find it more advantageous to retain the money and use it as working capital rather than to possibly at times be forced to borrow cash and pay interest thereon.

After all the vital point for the companies' consideration is that at all times the balance in the reserve account plus current accruals is enough to provide a sufficient amount for the reasonable settlement of all outstanding claims and possible future accidents within the year to a reasonable extent. The fact that a large credit balance may appear in the reserve account is not always proof that sufficient provision has been made or is being made. The balance may be apparent but not real, and this condition may be brought to light by a study of the schedule of the claims filed and of the claims unsettled.

## Freight and Express Service and Mail Service Rates

BY J. E. WAYNE

Superintendent York (Pa.) Railways

The freight and express organization of the York Railways consists of a general freight agent, whose duties are soliciting and collecting, as well as clerical work at the York warehouse. This agent, together with two men employed as freight handlers, completes the force at York. Warehouses are operated at Red Lion, population 3000, 9 miles from York; at Hanover, population 10,000, 20 miles from York, and Spring Grove, population 1500, 10 miles from York. At each of these warehouses one man is employed as agent, doing soliciting and collecting as well as general work about the warehouse. At times it is necessary to employ extra help, but under ordinary conditions one man is able to transact the business in a satisfactory manner. Reports are made daily by each agent of the business done that day, and all money collected is forwarded to the auditor.

### SERVICE AND EQUIPMENT

We operate one trip daily except Sundays on four suburban lines, on regular scheduled runs, and on one line two trips daily except Sundays. The average daily mileage is about 160, and the car hour average is 40.

We do not render pick-up and delivery service with auto or wagon, for this could not be operated profitably at the present rates. We do, however, give this service with express cars where the shipper and consignee are located directly along the track.

Between York and Red Lion, a distance of 9 miles, an auto-truck line was started by outside interests, making one round trip per day, picking up shipments in Red Lion and delivering these in York and intermediate points, and vice versa. This service lasted about two weeks, and was discontinued as unprofitable. There is, however, a stage line running over this same route and carrying shipments as low as 5 cents, which takes considerable business away from us. Although the owner of stage acknowledges an unprofitable business, he continues to operate.

The equipment consists of four double-truck box

motor cars, capacity 20 tons; two double-truck flat motor cars, capacity 20 tons; three flat trailers, capacity 20 tons, and one dump car, capacity 20 tons.

Sidings have been installed at various points where the customer has given some assurance of a large volume of business, the company installing the necessary special work and the customer bearing the balance of the expense.

### RATES AND CLASSIFICATION

The steam road rates in our territory were used as a basis for rates, and with a few exceptions our rates are similar to theirs. L. C. L. shipments with a few exceptions are classified according to the official classification used by the steam roads. We do not classify any commodity less than fourth class.

C. L. shipments are not classified, all such shipments being forwarded at the same rate, regardless of the commodity, and charged for on a mileage basis. One day is allowed for loading and unloading C. L. shipments on trail cars. C. L. shipments consist mostly of crushed stone, lime, brick and lumber. L. C. L. shipments consist of groceries, hardware, feed, flour, beer, milk, cigars and tobacco.

### MILK

For shipment of milk we sell 20 tags for \$1.50, each tag good for transportation of one can with maximum capacity of 6 gal., regardless of the actual number of gallons contained therein. Double tags are required for each 6-gal. can of cream. This makes a rate of 1.25 cents per gallon for milk and 2.5 cents per gallon for cream. When shipped without tags, the charge is 2 cents per gallon for milk and 4 cents per gallon for cream. These rates apply between any two points on one line. One-half of each tag is lifted by conductor and forwarded to the auditor, the other half, bearing the name of consignor and consignee, remaining on the can.

Transporting milk at our present rates is not very profitable, and to make any profit it is necessary to handle shipments on regular passenger runs, with the exception of one line, on which we operate a milk car. While we think rates should be higher, raising them at present would encourage the use of motor trucks, two of which are now being operated for this purpose. Daily shipments consist of about 250 6-gal. cans.

Handling milk on passenger cars of course reduces the seating capacity, and often causes cars to run late. Several claims have been paid resulting from milk being spilled on passengers. On our heaviest milk run it is necessary to employ an extra man for three hours each morning to assist in handling milk cans. On the arrival of a car carrying milk at Centre Square, where all suburban lines terminate, milk is either transferred to a freight car or the car is run to a warehouse several blocks away causing it to leave late on next trip.

### EXPRESS ON PASSENGER CARS

Express shipments are accepted on suburban passenger cars at a minimum rate of 15 cents. Shipments must be delivered to the car and prepaid, consignor receiving a receipt therefor bearing a 1-cent revenue stamp, a duplicate of the receipt being retained by the conductor to be turned in to auditor. The company does not assume any liability for these shipments after they have been placed beside the company's tracks at the point of delivery as designated by the shipper. Claims have been made for damage to goods after such delivery, but were always refused.

On city lines we accept packages for 4-cent ticket or 5 cents and do not issue receipt. The acceptance of all



shipments on passenger cars is left to the judgment of the crew when no inspector is present, and only such shipments are accepted as can be carried without interference with passengers or operation of cars. We are now considering a plan whereby all shipments on passenger cars will have the weight plainly marked thereon, charge being made in accordance therewith.

#### NEWSPAPERS

Local newspapers are delivered to residents along suburban lines, by being thrown off by the motorman while the car is in motion. Frequently these papers are attended to by employees, who happen to be riding on the front platform. Rates of 25 cents per 100 lb. and 50 cents per week per line are charged for this service. This method of delivery is a great convenience to the newspapers and patrons of suburban lines, but, on account of the attention of the motorman being diverted from his work, we have considered discontinuing it.

Out-of-town newspapers are charged for at the same rate per 100 lb., but all shipments are made in bulk and delivered to various points like express matter. Owing to newspapers being delivered direct to passenger cars, the weight is checked by our men only four times per year for a period of one week, the company depending on notification from the newspaper of any change in weight. Average weight of newspapers is 200 lb. daily, except Sunday, when about 4000 lb. are forwarded.

#### COMPETITION

The low rates and convenience of the parcel post have seriously affected our express business. We are at present carrying very few small parcels compared with the number transported before the inauguration of this system. A sub-postoffice is located in each large department store where parcels formerly forwarded via trolley are sent by mail direct from store to customer. Many of these packages shipped by parcel post are carried on our cars in mail bags, for which we receive no additional revenue from the government.

The automobile is our most serious competitor. A total of 75 per cent of revenue derived from moving household goods has been taken away by auto trucks, as well as a fair percentage of other shipments. The passenger automobile is also detrimental to the express business, articles formerly sent on cars being carried in this manner.

#### MAIL SERVICE RATES

Mail service rates should undoubtedly be increased. On our Hanover line we are now carrying mail with an average daily weight of 1250 lb. Before the parcel post system went into effect this weight was 400 lb. The average weight per mail has increased from 100 lb. to 325 lb., and the number of bags or sacks from nineteen to fifty-eight per day. As many as twenty-seven bags are carried on one trip. On another line, average daily weight has increased from 55 lb. to 400 lb., and weight per mail from 9 lb. to 60 lb. We are still receiving 3 cents per mile, regardless of the number or weight of bags.

The employees of the Chicago, Ottawa & Peoria Railway, a subsidiary of the Illinois Traction System, Peoria, Ill., will have free use of cottages for their summer vacation at a pleasant camping spot on the banks of Au Sable Creek, 15 miles from Joliet, Ill. The summer colony will be known as the "C. O. & P. Camp" and over the entrance will be the words, "Come and Play." The cottages are being erected now and will be ready for the use of the employees by June 1.

## Jitneys in Rochester to Be Stopped

Up-State Public Service Commission Declares Electric Railway Must Constitute Backbone of Dependable Transportation in City and Its Development Must Not Be Retarded

**H**OLDING that the operation of 136 jitney buses on the streets of Rochester will not meet the demands of public convenience and necessity as well as will improvements in the street railway service, the Public Service Commission of New York, Second District, on May 19 denied the application of some threescore individual operators for jitney bus certificates, covering fourteen routes substantially parallel to the trolley lines in that city. The dismissal of the jitney applications is coupled, however, with recommendations for extensions and improvements in the electric railway service which the commission says must be made or another application for jitney operation may meet with more favor. The case is the first in which the jitney and the electric railway have come before the commission on a square issue of public convenience and necessity on a large scale. All the commissioners concur in the opinion. A report by Charles R. Barnes, electric railroad inspector of the commission, on the transportation system in Rochester, forms a part of the order.

The opinion, which was delivered by Commissioner Emmet, reviews the history of the policy of the State toward competition in the public utility field, pointing to the change in this policy with the enactment of the public service commissions law in 1907 from one of encouragement of competition to a policy of regulated monopoly. This policy of regulated monopoly, the report says, is not one designed to show favoritism to extant interests but to protect the public itself, experience having shown that unrestricted competition in this field invariably results in disaster to the competitors, in which disaster the public has a prominent share. The function of the jitney, according to Mr. Emmet, is to supply service to streets and neighborhoods which now have no electric railway readily available. He believes that the time is not yet ripe to abandon the electric street railway as the standard means of urban transportation in this climate and finds that the operation of jitneys in direct competition would so impair electric street railway revenues and progress as to result in defective service and the eventual death of the older means of transportation.

#### MR. EMMET'S OPINION

Mr. Emmet says in part as follows:

"Possibly this would have appeared more clearly if a single responsible company, instead of a number of individuals whose only bond in common is that they have been represented in this proceeding by a single attorney, had applied for leave to operate enough improved motor buses to take care of the same volume of business that the individually-owned touring cars included in this application would be capable of handling over streets substantially identical with those occupied by the street railway company. The granting of a certificate to such a competitor would at once be recognized, we suppose, by every thoughtful person, as equivalent to a decision that the commission saw nothing further to be gained by encouraging the further development of the electric railway system in Rochester. And since arrested development, in the case of any business enterprise, usually means slow death, such a decision could only be taken to mean that in our opinion the traffic needs of Rochester would best be served by a gradual replacement of the old by the new method of transportation. Now, as a



matter of fact, the commission believes nothing of the sort. On the contrary, we are of the opinion that the electric railway must for many years be regarded as the backbone of any dependable transportation system in such a city. To arrest the development of electric railways in Rochester would be to injure greatly the city's growth and future prospects. And the situation seems to us to be in nowise changed, assuming the volume of competition to be the same in either case, by the fact that the competition comes from individual, and perhaps in some cases irresponsible, owners of automobiles, instead of from a single well-managed company. In either case the volume of competition contemplated by the present application would certainly be large enough to interfere seriously with any further immediate growth of Rochester's electric railway system. And, in our opinion, no dependable form of transportation, good alike in winter and in summer, has yet been devised to take the place of what Rochester would lose if further development of its electric railways was to be discouraged and interfered with by the State.

"What, then, is the proper function of the jitney? Our answer is that, except in cases where the existing street railway system obviously cannot or will not supply the reasonable requirements of a community, the use of jitneys, for the present at least, ought to be confined to streets and neighborhoods which now have no electric railway readily available. Further than this, we seriously question, as a general proposition, the propriety of extending formal recognition at this time to automobiles of the touring-car type, as a suitable form of vehicle for carrying large numbers of passengers at a low rate of fare over regular urban routes. Such use cannot be otherwise regarded than as unnatural and freakish. Without actually holding that under no circumstances will the use of cheap second-hand touring cars be countenanced by the Public Service Commission of the Second District as a regular means of transporting passengers for a low rate of fare in a great city like Rochester, we feel that we ought at this time at least to suggest that only in cases of extreme urgency should such cars be employed in this way. Certainly we have not been impressed with the belief that any such urgency exists in Rochester at the present time.

"We realize, of course, that in every large city people will be found who would enjoy making occasional use of the jitneys, and in so far as our present order interferes with the pleasure of these people, we regret being compelled to make it. The problem before us would, of course, be a very simple one if we were not required to give any particular consideration to the effect of unrestricted jitney competition upon the general problem of transporting passengers in a large city, if all we had to do was to assist in establishing transportation facilities which would cater to the widest range of individual tastes. But if that was intended to be our only function, it must be perfectly obvious to everybody that Chapter 667 of the laws of 1915 would never have been placed upon the statute books at all. The present policy of the State with regard to this matter is plain, and it is our duty to carry out this purpose until the law under which we are acting is repealed. This would be our duty even if, as individuals, we disapproved of the purpose of the present law. As a matter of fact, we approve of it and regard it as absolutely essential, from the standpoint of securing dependable transportation facilities in our larger cities, that the law should be enforced in such a case as this.

"It should be understood, however, that this com-

mission is by no means of the opinion that a corporation like the New York State Railways should never, under any conceivable circumstances, be subjected to competition from other groups of investors who are willing in a businesslike way to risk their money in supplying better transportation facilities to the people of Rochester. A situation may yet arise which will require the bars to be let down and the railway to be left to struggle for existence without further State protection against wasteful competition. Protection is being extended to it now because we feel that, on the whole, the existing street railway system of Rochester—viewed not as a mere money-making machine operated for the benefit of its stockholders but as a public agency—is distinctly worth saving in the interest of the people of Rochester. It has performed very valuable services in the upbuilding of Rochester and seems now to be in a position where, with the help of the State instead of its hostility, it will be able to solve the Rochester transportation problem satisfactorily. A further effort should be made to get the very best results possible out of such a system before condemning it as outworn or contributing toward its eventual undoing. If that effort fails, we will, as our order states, be prepared to give further consideration to alternative methods of supplying Rochester with a proper transportation system.

"In reaching this conclusion, we have acted in strict accord with what we understand to be the purpose of the statute from which our powers have been derived, and we hope that our decision will, on the whole, be approved by the thoughtful citizens of Rochester."

#### MR. BARNES' REPORT

Mr. Barnes' report stated that while the transportation system of Rochester is not excelled by that in any other city in the public service district the system is not being used to the highest degree of efficiency. He recommended, among other things, the basing of the schedules on fifteen-minute periods, traffic checks to be made at the beginning of each season. He suggested the installation of the company's own telephone system, certain changes in the track layout, and a number of lesser improvements. He stated that traffic checks showed on the whole system 2.9 per cent more seats furnished than passengers carried during the evening rush hours and 8 per cent in the morning rush hours. The respective percentages of standing passengers were 17.8 and 10.5.

Mr. Barnes also included in his report a study of the jitney traffic from two angles, one supposing that the jitneys only supplement the trolleys, taking off the passengers who now stand, and the other supposing jitneys to be substituted for trolleys entirely.

Under the former supposition Mr. Barnes showed that the present applicants would have barely enough cars for this purpose in the morning rush and not quite enough in the evening rush. This service would require that 304 jitneys an hour would have to be run through Main Street between State and St. Paul Streets during the evening rush hour. As checks show that vehicles at present use this street at this time to the number of nearly 450 an hour, the increase of this traffic by 70 per cent would be a serious problem. If jitneys were substituted entirely for the trolleys, it would require something like 2000 cars operated at headways of from 5.4 to 37.8 seconds. This would mean more than 6500 jitney movements through Main Street in an hour, which, Mr. Barnes says, is palpably impossible.



1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

## ASSOCIATION NEWS

1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

Power Plant Construction, Labor Matters and Rapid Transit Were Discussed at Section Meetings—  
Motor Vehicle Committee Met on May 19—At New Haven C. H. Chapman  
Described the Ideal Employee

### OPERATION OF MOTOR VEHICLES

The meeting of the committee on the operation of motor vehicles of the American Electric Railway Association was held at the New York office of the association on May 19. Those present were Britton L. Budd, Chicago; William A. House, Baltimore; Henry G. Bradley, Boston; C. L. S. Tingley, Philadelphia; Frank Silliman, Jr., Philadelphia, and Secretary E. B. Burritt. Recent developments in the jitney situation in different cities were discussed and the general conclusion was reached that it confirms the claim of the committee made in the past that, as a substitute for electric railway service, the jitneys were a failure. At the meeting, the president and secretary were authorized to extend their study of motor vehicles to include that of motor-bus lines, whether operated as competitors to or as feeders of electric railway lines.

### CAPITAL TRACTION SECTION

A meeting of the Capital Traction Company section, No. 8, was held in Washington on May 11. The principal speaker was J. H. Hanna, vice-president of the company, who described the construction and operation of the Georgetown power station, which furnishes power for the entire system of the traction company. A description of this station appeared in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 4, 1912. Mr. Hildebeitel of the Westinghouse Electric & Manufacturing Company, who supervised the erection of the turbines in the power station, also explained some of the details of the turbine construction. By way of entertainment G. F. Espuata gave a number of imitations, and at the close of the meeting light refreshments were served.

In his address Mr. Hanna stated that the planning and supervision of the building of the power plant were carried on entirely by the company's engineers. The plant was built in 1910 and 1911 at a cost of considerably more than \$1,000,000. It is equipped with four horizontal steam turbines, having a total capacity of 11,000 kw., the output during 1915 being more than 24,000,000 kw.-hr. Mr. Hanna stated that the substitution of double-truck cars for single-truck cars had had much to do with the necessity for the construction of this plant, the power required per car-mile for the heavier equipment being approximately 50 per cent greater than that for the lighter cars.

### CONNECTICUT COMPANY SECTION

As stated briefly in last week's issue, a paper on "The Greater Responsibility of Railway Labor," by C. H. Chapman, manager Bridgeport division, was delivered at the May meeting of the Connecticut Company section.

In his paper, which was of more than local interest, Mr. Chapman stated that the greatest problem before the industry is to educate employees and the public to the responsibilities of labor. Present conditions in this respect reminded him of a story of the schoolboy who when asked to name the mountains in Holland, replied "There ain't none." He said that labor is extremely backward in accepting any degree of responsibility.

The transportation utility must deliver safety and

good service and must maintain reasonable and pleasant relations with the public. Labor has the first of these directly in its control; loyalty, courtesy and intelligent co-operation of labor solve one-half of the good-service problem, and employees are the best advertisers in promoting good relations. Labor is proud, and rightfully so, but it would have more pride and dignity if its representatives should come to the company saying: "We bring you safety, loyalty and economy. From now on, every member of our organization is to frown on all recklessness and carelessness. Every member willfully concealing matters of danger because of careless acts of fellow employees will be expelled from our ranks. Loyalty to your interest is for our interest also, because we believe that courtesy to the public and intelligent co-operation will help us in every way. We deem it an advantage to ourselves as employees to have our company well thought of and spoken of by the public. This increases our pleasure in life. By the exercise of care, we can save you accident claims, while by crying down and exposing recklessness, we can save you repair bills. Our motormen, by saving power, expect to reduce your expenses materially, and our members in exposing and discrediting dishonest conductors, expect to swell your gross receipts."

In commenting upon this imaginary manifesto, Mr. Chapman expressed the belief that serious accidents are not often caused by the first omission or act of carelessness. It is rather probable that the first time a man runs by a signal or gets into a tight place, he is "scared to death." Generally nothing happens, he is not even reported, he "gets away with it," as the saying goes. This has a tendency to make him more careless in ignoring danger until some day the inevitable occurs. He has a bad accident. Mr. Chapman also assumed that on a certain division of the local company all the employees on a given date commenced and continued a concerted effort to attract public attention. From the switchman to the manager, everyone was banded in a conscientious and painstaking effort to promote pleasant public relations.

Under these conditions, Mr. Chapman believed that the words "rotten service" would be entirely forgotten, and that the division would hold an enviable position in the street railway world.

### PUBLIC SERVICE SECTION

Company section No. 2 met in Newark, N. J., on May 18 to hear a lecture on the history and present status of the dual subway system of New York City by J. V. Davies, of the consulting engineering firm of Jacobs & Davies, which has had much to do with the development of rapid transit in and around New York.

The names of three new members were read and the suggestion contest awards for February and March were announced. Seventy-three suggestions were considered in February, including some carried over from January, and twenty-four were received in March. There is promise of sustained interest through this monthly consideration of, and reward for, meritorious suggestions. After the formal exercises of the meeting a monologist entertained the company with impersonations.



Mr. Davies first endeavored to impress upon his audience the magnitude of the rapid transit program in and around New York. Including the steam railroad electrifications and the subway and elevated work completed and in progress a capitalization of roughly \$700,000,000 is involved. This is nearly twice as great as the cost, to date \$357,000,000, of the Panama Canal, and the work has been ten times as difficult. The rapid transit history in the city began in 1868 with a temporarily unsuccessful elevated road, but ten years later the construction of a general elevated system was begun and soon completed. Electrification of the system was begun in the year 1902.

The process of electrification of railways had gone far enough to warrant the projecting of a subway system during the late nineties, and in 1899 and 1900 "contract No. 1" was let to John B. MacDonald. This covered the present subway system from City Hall Square northward, and involved construction and operation for fifty years. The contract was divided by the contractor into a construction contract and an operating contract, the latter being let to the Interborough Rapid Transit Company. Shortly thereafter the line was extended under the East River to Brooklyn and a thirty-five-year operating contract was entered into with the Interborough Company.

Mr. Davies then explained the tri-borough project for extension of the subways, which was not successful, and the dual project, now rapidly approaching completion. This utilizes the East River bridges and gives the Interborough East Side and West Side lines in Manhattan and extends the Brooklyn service of the same company. It also gives the Brooklyn Rapid Transit Company a central line in Manhattan under Broadway and provides for the outlying boroughs by extensions of elevated lines. Something like \$350,000,000 will be invested by the city and the two companies, the former putting in more than one-half of the money.

The operating contract provides first for operating costs, maintenance and depreciation; next for a limited return to the companies; next for a return to the city, with final distribution of remaining profits. It will be many years before the city will reap direct financial returns on its investment. When the dual system is completed it will be possible to ride 26 miles on the Interborough system or 21 miles on the B. R. T. system for a nickel.

## One-Motor, Coupled Cars a War-Time Emergency

Possibly of all of the tramway companies in England the Newcastle Tramways have experienced the most difficult conditions arising from the war, according to the *Tramway & Railway World*. The reason is that all of the industrial section in the city is concentrated along the River Tyne and it can be served by only one route running practically parallel to the river side, thus causing considerable congestion. Although the introduction of trailers as a means of relieving the congestion of traffic and the shortage of motormen would have been desirable, the war rendered it practically impossible to obtain deliveries of trailers and suitable couplers, owing to the overcrowding of factories with munition work. Another consideration which presented itself was that when the present conditions came to an end with the termination of the war, the provision of trailers might not be necessary.

The solution of the problem consisted in the adoption of coupled motor cars, after taking away one motor from the inside axle of each car. Two single-truck motor cars are coupled together, the trolley standard on one

being removed. Each car is equipped with one motor on the leading axle, the other being removed. The controllers on the center platform have also been removed, leaving a controller at each end of the units only. The power circuit of the cars are completely rewired. One motorman controls the two cars, and each car has a woman conductor. The coupler consists of a rigid bar spring connected to each car platform, and the power cables are attached through tubes fixed on the top and bottom of this coupling bar. To protect passengers the cars are equipped with side-guards, consisting of telescopic rods and tubes. When running at dusk there are lights just under the brake handle in the center which are fitted with ruby lamps to call the attention of passengers to the fact that there is a car immediately following.

While the coupled cars are a little slower than a single car with the same equipments the double units can easily keep up to the scheduled time of the many heavy truck cars with four-motor equipments that are running on the same route, while the combination units have the advantage of consuming less energy. On curves their action is easy as each car is a motor car, there being no drag on the leading car as when followed by a trailer. By the use of the coupled cars it is unnecessary to switch cars at each end of the line, as is the case with trailers when there is no loop on which to turn around.

## Recent Electrolysis Discussion in Atlanta

The safety code conference which was held in Atlanta, Ga., early in May was reported briefly in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 6, page 859. An abstract of the paper on electrolysis mitigation, by Burton McCollum of the United States Bureau of Standards, was appended to the report. The discussion of Mr. McCollum's paper brought out the need for co-operation of affected interests in applying mitigating expedients. Elam Miller, American Telephone & Telegraph Company, supported the recommendation that the trouble be attacked at the source. Cable drainage as necessarily practiced by the telephone company in some cases has proved less satisfactory. Pipe drainage is still less effective due to the presence of the joints. He said that in Europe there is little or no call to apply pipe drainage because return feeders are generally used.

G. J. Yundt, Southern Bell Telephone & Telegraph Company, suggested that as all utilities perform public services the greatest good to the greatest number demands co-operation in protecting gas and water pipes and cable sheathing. The enormous recent growth of Southern cities, the higher potential drops in railway returns due to the longer lines and the demand that all utility plants be placed underground are factors in the growth of the electrolysis problem.

A. F. Ganz, Stevens Institute of Technology, commented favorably upon the fact that the bureau did not suggest the elimination of electrolysis, on account of the great cost, but rather proposed a reasonable degree of mitigation. He deprecated the making of a certain type of electrolysis surveys by engineers recommending pipe drainage in which readings of voltage between rails and pipe are made and charted. In some of these cases, he said, the trouble is reported as ended when the large currents which have been induced to flow in the pipes are causing joint electrolysis, and more total damage than before.

Other speakers emphasized the importance of good bonding, and the general sentiment seemed to favor the recommendations of the Bureau of Standards.



# EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices  
in Every Department of Electric Railroading

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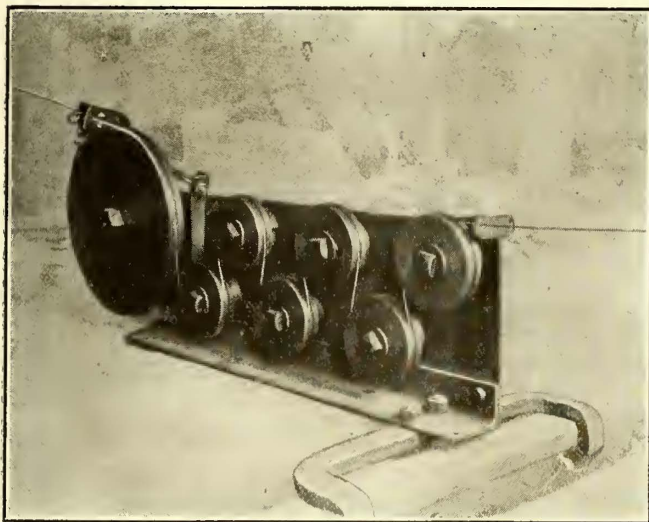
## Home-Made Armature Banding Tensioner

BY M. F. FLATLEY

Master Mechanic Terre Haute, Indianapolis & Eastern Traction Company, Lebanon, Ind.

The correct tension in armature banding wire is an important requisite to low armature maintenance. To supply this demand a home-made tensioner was designed and manufactured in the shops of the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind. This tensioner is a portable device requiring only to be anchored to permit its use with any lathe, and it can be adjusted to any desired tension for the different types of armatures.

As shown in the accompanying illustration, the tensioner is relatively simple in design, yet it possesses features not included in more complicated types. Essen-



HOME-MADE ARMATURE BANDING TENSIONER USED BY T. H., I. & E. TRACTION COMPANY

tially, this device consists of one 11½-in. steel pulley and six 4¼-in. steel pulleys mounted on a plate which in turn is riveted to a base angle and yoke for anchoring it to a track rail.

In the banding operation the wire is passed around the six small pulleys, thence over the large pulley, and through a spring-jaw clamp to the armature. The clamp prevents the wire from unwinding from the tensioner pulleys when the end is cut at the armature. One side of the 11½-in. pulley has a projecting hub, 8½ in. in diameter, to which a friction brake mechanism is applied. With this brake and the combination of pulleys the required tension can be obtained. The proper tension for each armature is determined by a dynamometer attachment.

As is evident from the above, the cost of manufacturing this device is relatively small, and it has proved very satisfactory, particularly in small shops where the standard equipment for armature banding is not available.

## Maintenance of Controller Handle Bushings

BY E. D. RANSOM, B.E.

A certain percentage of equipment troubles can be traced directly to mishandling of apparatus by motormen. This is strikingly true of hand-operated and non-automatic apparatus, the most common example of which is the platform controller. Unless some such device as the automotoneer is used, which many do not believe advisable, the life of the equipment is, to a great extent, in the hands of the man operating the controller. Overloads on equipment are prevented or caused by his good or bad judgment and training.

Even when the controller itself is in the best possible condition there are two elements which affect its operation. One of these is the operator, as already stated, and the other is the handle, which is detachable. The conditions with respect to the operation of the controller may be any one of the following:

The motorman may use average judgment in operation, and the handle connection to the controller shaft may be tight, as it should be. This is the proper condition.

The motorman may use good judgment, but may have a defective handle with which he cannot get the desired results.

The motorman's judgment and the handle may both be defective, in which case much injury is done to the equipment.

The importance of this subject is indicated by the statements made in the following paragraphs, all of which are based upon actual experiences on a large street railway system, where the advisability of changing from a bushed-casting handle to some satisfactory form of clamping attachment is under consideration. All of the conditions mentioned above have to be met, and it is a regrettable fact that the number of cases coming under the first head are greatly in the minority. It is as necessary properly to maintain controller handles, if they are of a replaceable bushing type, as it is to instruct the motormen, and it is proportionately easier to do so as the element of man-failure does not have to be contended with.

This article deals with troubles resulting from worn handles of the bushing type, with suggested methods of determining proper removal periods, and with improvements found to be helpful in prolonging the life of handles. Methods of manufacturing and repairing handles are also described.

The troubles directly attributable to worn handle bushings, as found by experience, are chiefly overheated resistance grids and controller flashing. On the railway in question an epidemic of overheated resistance grids started at certain carhouses. The overheating in many cases proved to be due to badly-worn handle bushings.

*Worn Bushings and Overheated Resistance Grids.*—In some cases where overheating was found the handle, which was of malleable iron with renewable brass bushings, had been in service so long that the bushings were worn almost round, there being nearly 30 deg. of lost



motion. On investigation of the damage it was found that on throwing the controller to the full multiple position, or until the handle was against the stop, in every case the controller cylinder was found to be on the last resistance point instead of being in full multiple, as would have been expected from the position of the handle. The result was, of course, that although the motorman operated the controller correctly, it was never beyond the last resistance point. One panel of resistance grids was, therefore, always overheated and considerable damage was sometimes done to the car body from this overheating. Careful inspection and re-bushing of handles at the carhouses resulted in a marked reduction in the trouble except in places where it could be accounted for on other grounds. There were still cases of setting fire to car flooring from overheated resistance grids, but this was found to be due to failure to remove all charred wood. A bed of charcoal was thus left which was easily ignited by ordinary resistance grid radiation, and in all such cases the controller and resistance grids did not show the indications significant of worn bushings.

**Worn Bushings and Controller Troubles.**—It was also noticed with worn bushings that, on account of the uncertain contact on the last position due to lost motion, the controller cylinder segment was always burned away at the edge. As a result the gap in the contact became so great that it often resulted in the production of an arc which flashed to the nearest ground in the controller. The greater the wear in the bushing the more was the lost motion, and consequently the greater was the gap in the cylinder contact. Contrary to first impressions, the handles that were worn but slightly more than the allowable amount often gave more controller trouble than those more badly worn. The simple reason for this was that where lost motion was only slight the gap in the controller contact was proportionately small and created an arc, whereas with more lost motion the gap was so great that the arc was broken in the natural functioning of the controller. It must be remembered that this applies only to the last position which is determined by the controller handle stop. On the other positions the cam gives each notch its proper contact.

**Manufacturing and Testing Handles.**—The general statements made above will serve as an introduction to a description of the methods of making and testing con-

insure absolute correctness as to gage. The tests performed on the board are indicated by numbers and have the purposes outlined below. The test board consists of a row of standard controller cylinder shafts of machined steel on which the newly-bushed handles can be placed and checked for correctness both of bushing fit and location of handle stop.

Test No. 1 is for handles used on four-motor equipment, and is as follows: The newly-bushed handle is placed on a template shaft, thus checking the fit of the bushing. If the bushing is properly lined up, the handle stop will fall directly in the opening A. This

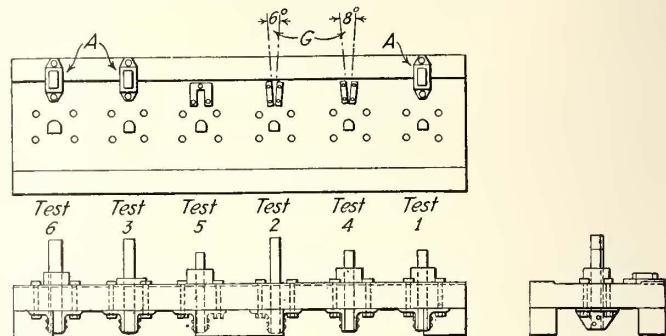


FIG. 2.—TEST BOARD FOR CHECKING CONTROLLER HANDLE ADJUSTMENTS DURING MANUFACTURE

checks the distance between the center of the shaft and the handle stop, so that when the handle goes into service it is certain to give the correct position of the controller cylinder when the handle is against the stop post on the controller top, corresponding to the last position.

Test No. 2 is used to determine whether or not it is necessary to rebush partly-worn handles. The gap *G* allows for a lost motion of 6 deg., which has been found to be the maximum variation that can be allowed with provision for a safe margin. Newly-bushed handles are not necessarily tried on this gage as there is no lost motion on a handle with a new bushing, properly made and installed.

Test No. 3 is the same as No. 1 but is for two-motor equipment controller handles.

Test No. 4 is the same as No. 2, but is for two-motor equipment controller handles. The gap *G* allows for a lost motion of 8 deg. instead of 6 deg.

Test No. 5 is used for reverse handles for both types of controllers, being a check similar to that made in tests Nos. 1 and 3, which determine the proper distance between the center of reverse cylinder shafts and reverse handle stops, at the same time furnishing a gage for the handle bushing fit on the shaft.

Test No. 6 is for air-brake handles, and gives the same results as No. 5 for reverse handles.

All of the above tests are made during the course of manufacturing bushings and installing them, so that at all times the gages furnish a check upon the accuracy with which the work is being done. When the handle is finally placed in service it is as perfect a fit as if it were a part of the shaft, provided that the shafts are properly maintained. The maintenance of these shafts is so closely related to the subject under discussion that it merits some attention in this article.

**Maintenance of Controller Shaft Ends.**—The replacement of controller shafts is an expensive piece of work. The following method has proved successful in bringing old shafts up to standard gage and thus avoiding the necessity for replacing them.

The length of shaft allowed for the handle fit was originally 1½ in. and this has been increased to 2 in. by means of the addition of a repair sleeve of No. 16

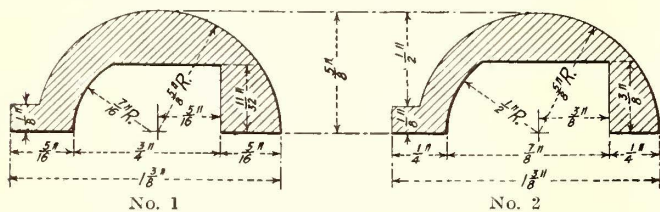


FIG. 1.—CROSS-SECTION OF CONTROLLER HANDLE BUSHINGS FOR TWO-MOTOR AND FOUR-MOTOR EQUIPMENTS

troller handles on one large property. The malleable-iron casting as received is first smoothed down and finished in the machine shop. The rolled brass bushing, made in two sections, is then placed in the handle base and pinned through the hub with No. 6 gage soft steel wire riveted at both ends. The bushing is shown in section in Fig. 1, bushing No. 1 being for controllers on four-motor equipment, and bushing No. 2 for those on two-motor equipment. These bushings have given very short service and at present nickel-bronze bushings are being tried on 100 sample handles. It is expected that these will have a much longer life.

Before handles are placed in service and, in fact, during the process of manufacture, they are checked by means of a test board like that shown in Fig. 2, to



gage steel, mounted on the end of the shaft as shown in Fig. 3. This sleeve not only gives the increase in length, but also brings the shaft up to gage dimension. The top of the shaft is drilled and tapped to take a 5/8-in. No. 14-24 round-head machine screw, which is screwed into the shaft 3/8 in., leaving the head about 1/4 in. above the top of the old shaft. The shaft sleeve is then slipped over the top of the shaft and is pinned in place by means of No. 6 gage soft wire passing through countersunk holes in the sleeve and having both ends riveted over and filed flush. The space in the top of the sleeve is filled with babbitt metal, forming a firm anchorage around the head of the screw. The first sleeves were pinned with steel pins, but these were found to wear loose on account of their brittleness.

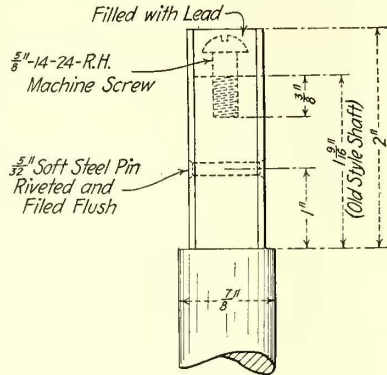


FIG. 3—SLEEVE FOR REPAIRING CONTROLLER SHAFT

Shafts equipped with sleeves fastened with soft steel wire pins are just now being returned with their controllers for repairs after ten months of service. In all cases the sleeves are found as tight as when originally installed. All shafts are now gaged by test handles and any found badly worn are repaired by the addition of sleeves. The shafts are thus kept up easily to gage and there is a substantial saving over the cost of new shafts.

**Service Tests.**—In addition to the tests made during manufacture, as described above, the company whose practice is covered therein provides for service tests in the carhouses. After the handles have been completed and tested in the shops, they are sent to the carhouses where they are placed in service. At each of these is a test board arranged as shown in Fig. 4, designed for tests similar to those already described except that they are limited to checking the effect of wear. All handles are tested on these boards at stated intervals, the lengths of which vary with the location of the carhouse and the class of service of the cars assigned thereto. The tests for wear are as follows:

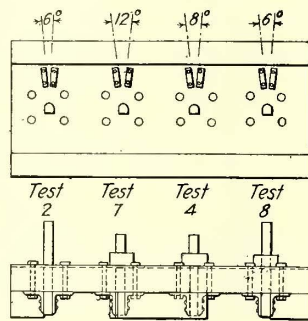


FIG. 4—TEST BOARD FOR CHECKING CONTROLLER HANDLE ADJUSTMENTS IN SERVICE

Test No. 2 indicates the degree of lost motion due to bushing wear on the handles used with four-motor equipment. The gap *B* allows for a swing of 6 deg. on a radius from the center of the shaft to the handle stop. Any handle showing lost motion up to or beyond this limit is returned to the shop for rebushing.

Test No. 4 is the same as test No. 2 except that it is for handles used on two-motor equipment.

Test No. 7 checks reverse handles and test No. 8 checks air-brake handles.

By the proper use of these boards in the carhouses, it is possible to remove worn bushings from service before they have caused severe trouble. The whole value of the method depends upon timely removal. In order to

insure testing at proper intervals the present practice is to hold motormen responsible for their own controller handles after they have been instructed as to the proper use of the test board. They are penalized if the handles are found to be worn beyond the gage limit. By placing the responsibility on each individual motorman, and providing sufficient spare handles to permit the prompt replacement of those requiring rebushing, the removable bushing type of handle can be used effectively.

In competition with the bushed handle there is the type in which the handle is rigidly attached to the shaft. The principal difficulty with this type results from the fact that the clamping of the handle is left entirely to the motorman. The writer has found that, since the handle is placed on the shaft at the last minute, sometimes sufficient care is not used to insure a tight fit. In addition, there are failures due to the inherent design of attachable car devices which are bound to get out of adjustment if not carefully inspected.

In conclusion, the writer would express the conviction that if the inspection and maintenance of the equipment are thorough, the renewable bushing type of controller handle is probably superior to the clamping type.

### Measuring Yardage of Granite Blocks by Weight Instead of Count

BY CHARLES H. CLARK

Engineer Maintenance of Way, Cleveland (Ohio) Railway

There has always been more or less controversy between the manufacturers of stone paving block and the buyer as to the number of yards contained in a steam railroad car. A railway company obliged to pave its tracks necessarily has to buy new paving blocks. These blocks are sometimes bought by the thousand, but more often by the square yard, which is the only way in which they should be purchased, as one then knows what charge should be made for a unit of pavement.

Specifications generally specify that there shall be a certain number of blocks per square yard and that a

WEIGHTS AND COUNTS OF CARLOADS OF STONE PAVING BLOCKS, CLEVELAND RAILWAY, APRIL, 1916

Car	Marked Weight, Pounds	* Corrected Weight, Pounds	Gross Weight, Pounds	Net Weight, Pounds	Number of Blocks in Frame (8 yd.)	Weight of Blocks in Frame, Pounds	Shipper's Count
A.....	40,700		142,400	101,700	240	4,440	5,200
B.....	42,400	42,050	121,900	79,850	224	4,300	4,200
C.....	37,400	37,600	117,500	79,900	229	4,320	4,200
D.....	34,400	34,650	113,300	78,650	230	4,220	4,200
E.....	48,100	48,650	147,150	98,500	223	4,340	5,200
F.....	47,300	48,550	151,300	102,750	240	4,150	5,500
G.....	31,600	32,000	115,600	83,000	222	4,500	4,200
H.....	46,800	48,800	141,400	92,600	230	4,300	5,000
I.....	31,900	32,750	111,200	78,450	228	4,260	4,200
J.....	33,700	34,000	110,900	76,900	228	4,280	4,200
K.....	41,100	43,100	142,600	95,500	226	4,260	5,200
L.....	82,500	83,500	117,800	84,300	222	4,300	4,400
M.....	39,000	38,000	136,000	98,000	227	4,260	5,000
N.....	32,300	33,680	119,100	85,420	225	4,360	4,500
O.....	39,200	39,500	135,450	95,950	231	4,320	5,200
P.....	40,900	42,100	140,000	97,900	227	4,350	5,200
Q.....	33,900	33,650	114,200	80,550	220	4,300	4,200
R.....	33,600	37,100	110,000	72,900	236	4,360	4,200
S.....	34,300	38,400	120,200	81,800	218	4,280	4,200

\*Not taken.

test of each car shall be made. But even then the count of the blocks can be wrong by one side or the other, and after the blocks are thrown into a common pile there is no way of obtaining a recount if there is a difference of opinion between shipper and receiver.

When one is paying \$2.58 per ton freight on blocks in addition to their original cost, a difference of 5 or 10 yd. in the count or measurement in one car will amount to a considerable sum of money when figured for the entire season. In view of this fact the Cleveland Rail-



way decided to make a test, establish a pound-per-yard basis and weigh the cars. From the data for nineteen cars shown in the accompanying table we established a weight of 535 lb. per square yard.

## Corrugated Culvert Pipes Tested Under a Sand Bed\*

BY GEORGE L. FOWLER  
Consulting Engineer, New York, N. Y.

After the completion of the hydrostatic tests of "Armco" iron corrugated culvert pipe described in the *ELECTRIC RAILWAY JOURNAL* for May 13, it was decided to make tests of the same range under a bed of sand. Kiln-dried sharp sand was used in these tests in order that the conditions might be kept as uniform as possible.

It was supposed that the sand would arch under a load and be self-supporting to a certain extent, but there were no data available to indicate the extent to which this would occur. Some preliminary laboratory tests, therefore, were made to determine this arching quality, and the data obtained were used in testing the corrugated pipe. The tests showed that, on a slightly yielding bottom like the top of a corrugated culvert, the sand arches and the bottom is relieved of the load. Further, when the sand is confined the lateral thrust does not increase, but the vertical load is carried by the frictional resistance of the sand against the sides of the confining structure.

With the data obtained from the preliminary tests, a box like that shown in the accompanying illustration was built. The box was made of heavy planks supported in a structural steel frame. One side was made movable so that any desired width up to 7 ft. could be obtained, and the box had a height sufficient to take in a pipe 8 ft. long and 48 in. in diameter, and to allow for 2 ft. of sand above it and 1 ft. below it. Three jacks, each of 100 tons capacity, were provided for imposing the load on the sand, which was done by means of three platens 25 in. wide and reaching the full length of the box. Floating planks, 12 in. wide and 30 in. long, carried on ball bearings, were inserted in the fixed side of the box and held in place by levers resembling those of a platform scale, as shown in the drawing. Diaphragm dynamometers were connected with the floating planks to indicate the magnitudes of the forces acting upon them.

The movable side of the box was so adjusted that when the pipe under test was in place there would be 1 ft. of sand between it and each side of the box. Sand was then put into the box and tamped down to a depth of 1 ft. The pipe was then put in place and the sand was rammed about and beneath it and was carried up above the top of the corrugation to a depth of 14 in.

After the pipe had been put in place it was calipered at each corrugation on both vertical and horizontal diameters. The pressures were then applied in varying increments until the vertical diameter had been shortened by 1 in. The floating-plank dynamometers were read to determine the arching properties of the sand.

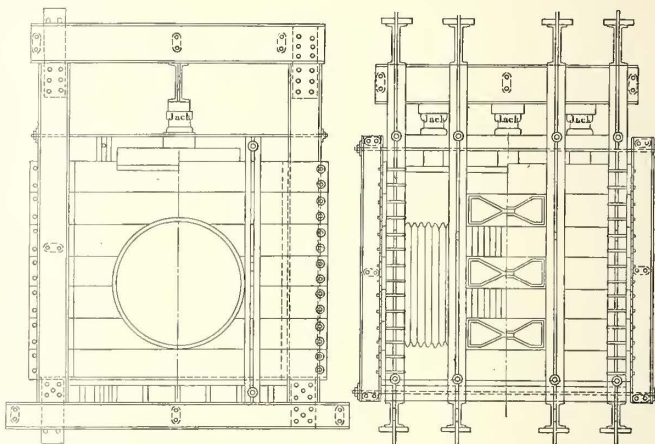
Tests were also made of smooth pipe 12 in. in diameter, and these showed that, under the conditions of the tests, the pipe with  $\frac{1}{2}$ -in. depth of corrugation was about twice as strong as the smooth pipe, and that one with  $\frac{3}{4}$ -in. depth of corrugation was about three times as strong.

In measuring the pressure on the top of the pipe under a bed of sand from 12 in. to 14 in. thick it was found that on the 12-in. pipe the pressure was higher

than the average pressure exerted by the platens on the sand. With the 24-in. pipe it was also slightly higher, but with the 48-in. pipe it was very much lower. This was due to the relative diameter of pipe and width of platen.

These tests, while exhibiting the general features of the conveyance and distribution of sand pressures, were not extensive enough to warrant the development of a formula for calculating the pressures exerted under beds of sand. It has been shown that the amount of pressure put upon buried surfaces with a given load, depends upon the depth of sand above them, as this pressure decreases with an increase in the depth of sand. As to what may be the proportional effect of depth of sand on the increase or decrease of pressure, there are not sufficient data to determine. The lateral pressures, when measured in pounds per square inch, were low as compared with the vertical pressures, but no definite ratio could be determined.

When the 24-in. pipe was being tested the lower floating plank was a little more than 2 ft. below the surface of the sand and the top of the upper plank was about 4 in. below the surface. The pressures on the top of the sand and on the two platens averaged as follows: Surface, 38½ lb. per square inch; upper floating plank, 3.74



ELEVATIONS AND PARTIAL VERTICAL SECTIONS OF SAND BOX FOR USE IN TESTING CORRUGATED CULVERT PIPE

lb., and lower floating plank, 8.2 lb. When the 48-in. pipe was being tested, the top of the lower plank was about 4 ft. below the surface of the sand and the top of the upper floating plank was about 2 ft. below the surface. The average pressures on the three points were: Surface, 10.09 lb. per square inch; upper floating plank, 3.66 lb., and lower floating plank, 2.42 lb.

J. C. Meem found that in an excavation the lateral pressure increased very rapidly from the top down, reaching a maximum at a point dependent upon the "angle of repose" of the material and then decreasing. This, together with what has preceded, seems to show that after a certain, as yet undetermined, depth has been reached there can be no further load put upon a culvert pipe by an increase in the depth of cover, and that such an increase of depth serves directly to protect the pipe against an increase of burden due to an increase of surface loading.

While this condition seems to be pretty thoroughly demonstrated, it was felt that there might be a question in the mind of some engineers as to the action of the culverts under a loading similar to that applied in railway service. There it is applied through ties of limited width and separated by intervals in which no load is applied to the material. Accordingly the principal tests were made to determine this point. For these three pipes of 24 in., 36 in. and 48 in. diameter re-

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spectively were taken, each having  $\frac{1}{2}$  in. depth of corrugation. The 24-in. pipe was of No. 14 gage iron and the others of No. 12 gage. The load was applied through 8-in. ties spaced 22 in. between centers, and by means of jacks bearing on the centers of rails laid to a gage of 4 ft.  $8\frac{1}{2}$  in. across the ties. It was assumed that a normal covering was a thickness of sand equal to the diameter of pipe. As this was the condition in the case of the earlier 12-in. pipe tests, it was considered unnecessary to duplicate these. Under the wooden platen and 1 ft. of sand the 12-in. pipe of No. 16 gage metal had carried a load of 262,125 lb. before showing a deflection of approximately 1 in. The depth of sand over the pipes was about equal to the diameter for the 24-in. and 36-in. sizes, and  $3\frac{1}{2}$  ft. for the 48-in. size, the latter being necessitated by the size of the frame.

With the load applied through broad platens the increase in loading was stopped when the pipes had been deflected approximately 1 in. The increase was stopped automatically in the later tests by the ties sinking into the sand and thus refusing to carry more load. The result was that the distortion of the pipes under the greatest pressure obtainable was very slight. This pressure however, was considerably more than that applied through the platens, being, in the case of the 24-in. pipe, 237,800 lb. Had this load been applied on the platens with 12 in. of cover over the pipe, the latter would probably have been very seriously crushed, but under a cover of 24 in. it is also probable that the crushing would not have exceeded that obtained under the ties, because of the arching properties of the sand already discussed.

The point to be emphasized here is that under the heaviest load that can be applied to the ties of a railway track by the wheels of any existing locomotive or car, a 24-in. corrugated culvert pipe having the depth of corrugation and thickness of metal of the one tested, and buried under a cover of 24 in. of dry sand, cannot be deflected beyond its elastic properties of complete recovery of shape when the load is removed. The results of the tests of the 36-in. and 48-in. pipe corresponded very closely with those of the 24-in. pipe. It seems reasonable to conclude that under existing railroad loading corrugated culverts of 36-in. and 48-in. diameter are uncrushable when under a cover equal to their own diameter.

Some incidental facts that have been developed by these tests show that a given area will support a greater weight on a bed of sand if concentrated in one whole than if divided into smaller units. For example, in the preliminary tests the load was applied to platens measuring 2 ft. x 7 ft. 6 in. With any load that was applied there was no pushing of the platens down into the sand other than that due to the compacting of the sand, and in no case was there any real upward flow. The sand was elastic under the platens, and when the load was released it would spring back nearly to its original bulk. When the load was applied on three ties with the same total bearing surface as before, the division of the surface had the very marked effect of materially reducing the sustaining capacity of the sand. A limit was soon reached beyond which the ties were simply pushed down into the sand and without the development of any increase of resistance.

On the basis of the data afforded by these tests, and also of practical experience, it is evident that unusual depth of a ditch in which a corrugated culvert is installed does not involve any especially severe conditions. Indeed, such an installation is better protected from superimposed loads than one with a shallower cover. But it should be remembered that the weight of a cover

consisting of a wide loose fill or embankment is not so well supported laterally as in a narrow ditch, and that thus extremely high embankments may bring about conditions of unusual severity which should be provided for by the use of heavier gages.

The conclusions that seem warranted by the investigation described above are as follows:

The full collapsing strength of corrugated culverts, as determined by the hydrostatic test, described in last week's issue, can probably not be fully realized under an earth covering because of the impossibility of securing an even pressure upon all sides of the pipe. Under ordinary conditions of loading under a bank or fill, the maximum pressure will be exerted vertically, and the pipe will be distorted by a shortening of the vertical and a lengthening of the horizontal diameter.

The value of end support extends farther from the end of the pipe under an earth load than under a hydrostatic pressure. How much farther was not determined.

The greater the depth to which a pipe is buried, the less is the variation in the loads to which it will be subjected.

The maximum pressure upon a pipe is reached under a certain depth of cover which was not determined.

At depths greater than the maximum above referred to, the pressures due to surface loading decrease. This and the above conclusion apply also to lateral pressures.

The 12-in. pipe of No. 10 gage would be practically uncrushable under a cover of dry sand 3 ft. deep. This probably holds for all other granular materials.

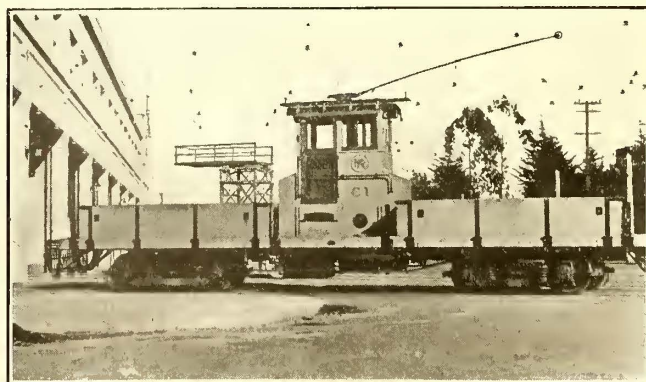
It is estimated that a depth of cover equal to three times the diameter of a pipe will suffice to protect it from any increase of pressure due to surface loading.

There are no data as to the depth of penetration of concentrated surface loads, but it is safe to calculate that the intensity is dissipated as the depth increases.

## A Work Car that Can Be Used as a Flat Car

The Municipal Railways of San Francisco recently built the all-steel work car shown in the accompanying illustration, which can be used as a flat car or for conveying material that requires bunkers. It is equipped with two bunkers each of 8 cu. yd. capacity, one on each end of the cab and which are so arranged that the ends and sides can be removed or swung out of the way, to permit use of the unobstructed deck for other purposes. The cab is set in the center of the car, and a  $2\frac{1}{2}$ -ft. space is allowed on either side so that the full length is available for loading long timbers or rails. The length of the car over all is 40 ft. and its width is  $8\frac{1}{2}$  ft. The total weight, unloaded, is 20 tons, with capacity for a load of 4300 lb.

The car is equipped with standard HL control, Brill



SAN FRANCISCO MUNICIPAL RAILWAYS' ALL-STEEL WORK CAR



trucks, and four 306-CA Westinghouse motors of the same type as used on the passenger cars of this system. The reverser, which on the passenger cars is mounted under the car floor, is installed in the cab of the work car. This arrangement makes it unnecessary to employ any mechanical equipment for throwing the reverser by hand for emergency usage. The wiring of the reverser is so arranged that at a later date it will be possible readily to install a drum switch which will permit operation of all four motors in series when the car is used for heavy hauling.

The floor of the cab is 26½ in. above the deck of the car, and in the intervening space are the air compressor and governor as well as a small tool box and considerable storage space. Larger steel tool boxes are built adjacent to the cab on both ends. Control for double sanding equipment is provided in the cab, and this is so arranged that the sand travels from the cab in either direction in a single duct which is divided on the truck, a branch leading to each rail. At the point where the duct branches a wedge-shaped plug is used to divide the flow so that each rail receives an equal amount.

"Golden Glow" headlights are used, adjusted so that the beam of light strikes the track 50 ft. ahead of the cab. Under each corner of the car deck is located a lamp socket which can be used for an extension when the car is engaged on night street work, but which ordinarily carries 23-watt lamps protected by strong globes and metal guards. All lighting circuits are in conduit and, as shown in the accompanying illustration, a line of lamps surmounting the cab is used for general lighting in night work. These lamps have earned for the car the nickname of the "tower of jewels."

The work car was built by the Pacific Car & Equipment Company, South San Francisco, Cal., at a cost to the city of about \$7,000. The car was designed in the city's engineering department under the direction of M. M. O'Shaughnessy, city engineer, and has been put in regular work service in charge of T. A. Cashin, superintendent, and W. C. Bendel, master mechanic of the Municipal Railways.

## Bonds and Bonding Practice

At the April meeting of the Denver Tramway Company section of the American Electric Railway Association, George H. Eveland read a paper on the above subject. After outlining the electrical principles involved in the return circuit of the electric railway and tracing briefly the history of the rail bond, he discussed the effects of careful attention to bonding maintenance. He considered the subject from three standpoints: operation, power economy and electrolysis mitigation.

Mr. Eveland summarized the above three phases of the subject somewhat as follows: From the standpoint of operation, poor bonding results in lowering the voltage beyond the defective bonds, making it more difficult for the motorman to make his run on time and thus reducing his coasting time. He had measured drops around joints as high as 6 volts and he told of an ingenious druggist who connected a doorbell across a strip of poorly-bonded track so that he would be notified of the approach of cars. From the standpoint of power economy, one poor bond can waste \$5 worth of energy in a year whereas to rebond this joint would cost less than \$1. From the standpoint of electrolysis, high resistance at a joint forces current into near-by water and gas mains with resultant troubles, as 1 amp. of current can take with it 40 lb. of metal in a year.

Taking up more in detail the subject of bond resistance Mr. Eveland divided this resistance into three parts; that of the conductor, that of the joint between

the conductor and the terminal, and that of the contact between the terminal and the rail. Of these all but the last are negligible in amount. The resistance is usually expressed in terms of feet of rail. To make this definition concrete a bond having a resistance of 20 ft. of 70 lb. rail was taken for example, such a bond being defective enough to warrant renewal. Assuming that the joint is rebonded so that its resistance is that of 3 ft. of rail, the difference between the resistances of the two joints is 17 ft., or 0.000255 ohm. With 100 amp. of current in the rail the power loss is 2.55 watts, and if this power is wasted continuously the energy consumption will be 22½ kw-hr. per year. This at 1 cent per kilowatt-hour amounts to 22½ cents per year. If rebonding costs 75 cents, the saving of 22½ cents is a return of about 30 per cent per annum on the investment. With one-half of this current in the rail the return will be 7.3 per cent. To save time in calculating, charts showing the resistances of bonds which justify replacing are very useful. Sometimes it is necessary to bond more heavily than the energy economics indicate to be desirable on account of local conditions regarding electrolysis mitigation.

Mr. Eveland concluded his paper with a discussion of bond testing. Defective condition of bonds may be indicated by the melting of light snow around joints with very bad bonds in fairly warm weather. Inspection from the rear of a car at night sometimes results in detecting very bad bonds from the arcs formed between the terminals and the rail. Motormen say that they can sometimes tell when a car is passing over a very bad bond from the jerk which the car gets. In Denver the following apparatus, locally designed, is used in bond testing. The instrument used is a double-scale millivoltmeter with a differentially-wound armature. This is used in connection with a contact bar provided with points which make contact across the joint and across a certain known length of rail. The scale for the winding connected across the length of rail has a range of 25 millivolts. This circuit is closed as soon as the contact bar is placed on the rail. The winding connected across the bond is in series with an arrangement of contacts and resistances so that the full scale reading may be made either 25 or 250 millivolts. This arrangement permits the measuring of the resistance of very bad bonds and also protects the meter.

In testing, the contact bar is placed on the rail so that the rail and bond windings are across the length of rail and the bond respectively. The bond contact is open, and the deflection shows the voltage drop across the length of rail spanned by the rail contact. The bond contact is then closed and the deflection noted. From the two readings the equivalent resistance of the bond in feet of rail is calculated. The resistance of every bad bond is noted on the test record so that the total resistance of the bad bonds in any section of track may be easily determined.

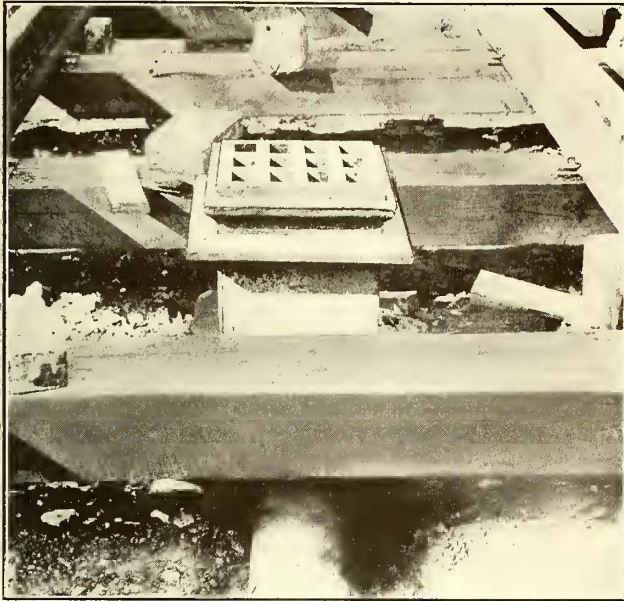
In poorly bonded track or toward the end of a line there is little or no current in the rail during the greater part of the time. It is thus impossible to test with the current drawn by the cars. In Denver the testing current, in such cases, is provided by a dry storage battery carried by the man who is making the test. An extra pair of contacts on the contact bar are used to connect the battery to the rail through a key switch. The battery furnishes about 30 amp., which is sufficient for testing purposes.

The Third National Exposition of Safety and Sanitation under the auspices of the American Museum of Safety will be held in the new Grand Central Palace, New York, from May 22 to 27, 1916.



### Catch Basins in Kansas City

Under all tracks now being constructed or reconstructed the Kansas City Railways are installing a 10-in. tile, centered under the track and connected with the sewers. Catch basins, located at low points in the streets, discharge excess surface water to the tile drains. The catch basins are iron boxes having flanges between which the granite paving blocks are inserted. The blocks

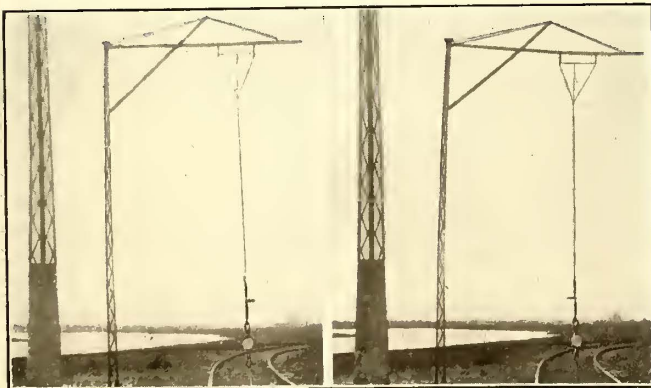


CATCH BASINS USED AT LOW POINTS IN RAILWAY TRACK IN KANSAS CITY

are flanged as for the rails, and cement grouting fills the interstice between the short upper edge of the blocks and the edge of the top of the catch basin. There has been much trouble heretofore at points where streets are low. As water cannot be carried away by the city catch basins, the resulting flooded streets often caused damage to motors and hampered traffic.

### Bates Trolley Pole Tested to Failure

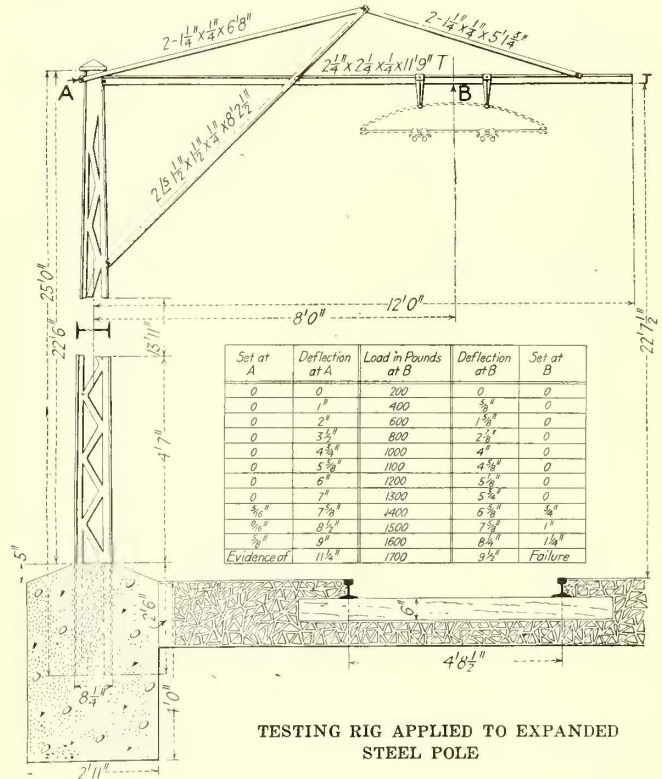
In order to test the efficacy of its expanded steel poles, the Bates Expanded Steel Truss Company, Chicago, Ill., subjected one of them, which was designed for catenary trolley construction, to a test to the point of failure. This pole was a 25-ft. expanded 4-in. section, to which a trolley wire supporting bracket, 11 ft. 9 in. long, had been applied. The design details of this pole and the manner in which it was set in the ground for testing are shown in one of the accompanying illustrations. The pole was embedded in concrete only 2 ft. 6 in., while



EXPANDED STEEL POLE READY FOR TEST AND AT THE POINT OF FAILURE

the concrete foundation was 2 ft. 11 in. square and 4 ft. deep. Previous tests had demonstrated that the thorough mechanical bond between the pole and the concrete made it unnecessary to encase it the entire depth of the concrete foundation block.

The pole was set 8 ft. from the center of the track and the bracket was 22 ft. 7½ in. above the top of rail. Cables were attached to the bracket 8 ft. from the center of the pole as shown in another one of the accompanying illustrations. The lower end of the cable was anchored to a tie, and a dynamometer for measuring the load was fastened to the cable. Just above the dynamometer a standard pull jack was secured to the cable suspended from the bracket and to the dynamometer. This pull jack applied the loads, which varied from 200 lb. to 1700 lb. The results of this test are shown in the table forming a part of the illustration of the pole design details. As indicated there, the loads applied are shown in the center column, the deflection at the top of the pole in the first column to the left, and the set at the top in the second column to the left. The deflection in the bracket at the point in line with the cable on which the load was applied, is shown in the first column to the right of the



TESTING RIG APPLIED TO EXPANDED STEEL POLE

one indicating the load, and the set in the bracket at this point is shown in the second column to the right.

In each instance and immediately following the application of the load and recording the deflection, the load was released to allow the pole to recover. This was done in order to determine the elastic limit of the pole and to measure the set. As shown in the table, the pole and arm fully recovered upon releasing the loads up to 1300 lb. At 1400 lb. the top of the pole took on a set of 5/16 in., and the bracket in line with the pulling cable showed a set of 3/4 in. When a 1700-lb. load was applied the pole began to fail. The compression in the flange on track side of the pole caused it to twist or rotate under the load, and the bracket bent slightly in the member where the cable was applied. The pole in the failed position is shown in one of the accompanying illustrations. It will also be noted that the deflection is uniform throughout the height which is an indication of the correct distribution of the metal.



## Gasoline Motor Cars Supersede Steam Trains in Cuba

The advent of up-to-date motor car service will be pioneered in Cuba by the Jucaro & Moron Railway Company on its line between these points via Ciego de Avila, a distance of 37.2 miles. Both towns are centrally located on the island, Jucaro being on the Caribbean Sea, while Moron is directly opposite on the Atlantic side. Steam trains which now operate over this line will be discontinued upon the arrival of the motor cars, which are expected at an early date.

Details of the construction of the motor car, which is manufactured by the McKean Motor Car Company, Omaha, Neb., are shown in the accompanying table.

Weight of car in working order.....	74,000 lb.
Length between pulling faces of couplers.....	72 ft. 3 3/4 in.
Length over end sills.....	70 ft. 0 in.
Length of engine compartment.....	13 ft. 8 in.
Length of mail compartment.....	2 ft. 6 in.
Length of baggage compartment.....	8 ft. 6 in.
Length of passenger compartment, first class.....	14 ft. 4 3/8 in.
Length of passenger compartment, third class.....	32 ft. 5 5/8 in.
Width inside.....	9 ft. 4 1/4 in.
Width over side sills.....	9 ft. 8 in.
Width over sheathing.....	9 ft. 8 1/4 in.
Width over all.....	10 ft. 2 3/4 in.
Height, top of rail to top of car (light).....	11 ft. 9 3/16 in.
Height, floor to ceiling at center of car.....	7 ft. 5 5/8 in.
Seating capacity.....	80

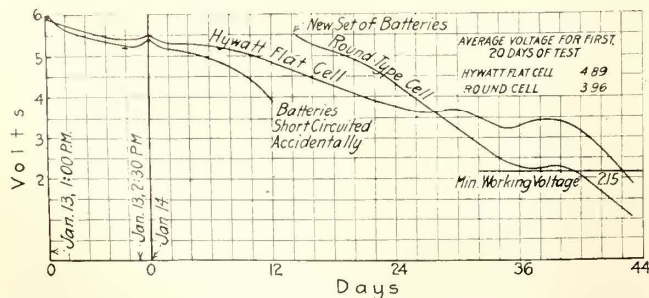
The data given in the table refer to the latest (1916) model, type C, 200-hp., 70-ft. all-steel motor car. The body conforms generally to motor-car standards except that two doors on each side were necessary to afford separate entrances for passengers of the first and third classes. In addition to the engine room, the cars contain three compartments; namely, first class, with a seating capacity of twenty; third class, with a seating capacity of sixty, and the baggage compartment, which is 8 ft. 6 in. in length.

Delivery of each car will be effected by running it to the seaboard under its own power in charge of a railroad conductor and motorman from the factory, who is a motorman duly examined and approved on operating department train rules and regulations.

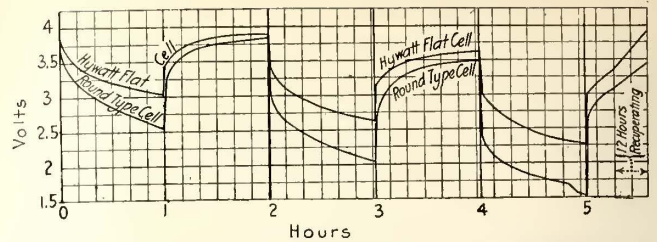
## Recent Endurance Tests of Dry Batteries

Some tests recently conducted by the Cleveland (Ohio) Railway on the life and recuperation of dry cells, resulted favorably for the "Hywatt" flat type of cell made by the Cleveland Battery & Electric Company. In the tests, the flat type of cell was compared with a round type, with the results shown on the accompanying curves.

One set of curves shows the result of a life test in which the batteries were subjected to the discharge current which four cells connected in series would send through a resistance of 12.2 ohms. The discharge was



RESULTS OF LIFE TESTS OF FLAT AND ROUND-TYPE DRY BATTERY CELLS



RESULTS OF RECUPERATION TESTS OF FLAT AND ROUND-TYPE DRY BATTERY CELLS

continued for one and one-half hours out of every twelve. In the recuperation test, three cells connected in series sent current through a resistance of 1.1 ohms during alternate sixty-minute periods. The intervening sixty-minute periods were allowed for recuperation. Readings were taken at five-minute intervals.

The "Hywatt" battery is rectangular in form, and is made up in units of from two to eight cells each. These have a uniform capacity of 60 amp.-hr. and the voltage is 1 1/2 per cell. The face of all units is of the same size, 4 1/2 in. x 6 1/2 in., and the thickness varies from 2 5/8 in. for the two-cell unit to 8 5/8 in. for the eight-cell unit. Each unit has but two binding posts.

In designing this form of battery, the manufacturers desired to avoid the use of the zinc container, which is a feature of the round type of cell. With the flat type they claim that the zinc sheet can be entirely consumed, delivering current up to the last, whereas in the round type the cell is rendered useless when the container is eaten through in spots. The ability of the "Hywatt" cell to maintain voltage under loads is attributed to the great depolarizing area of the electrodes.

## Output of Treated Timber

According to statistics just compiled jointly by the American Wood Preservers' Association and the Forest Service at Washington, D. C., there was treated at 102 plants in the year 1915, a total of 141,858,963 cu. ft. of timber, as compared with 159,582,639 cu. ft. by ninety-four plants in 1914, a decrease in quantity of about 11 per cent in 1915. Of the 1915 output, cross-ties contributed 78.4 per cent of the total; construction timbers, 8.3 per cent; paving blocks, 5.4 per cent; piling 4.4 per cent; poles, 1.7 per cent, and the remainder consisted of cross-arms, lumber, etc. With the exception of the two years, 1913 and 1914, the volume of timber treated in 1915 was the largest on record.

To treat the 1915 timber required 80,859,442 gal. of creosote, 33,269,604 lb. of zinc chloride and 4,899,107 gal. of all other preservatives, which included crude oil, coke-oven tar, refined coal tar, carbolineum oils, etc. Of the creosote used in 1915, 54 per cent, or 43,358,435 gal. was domestic, and 46 per cent, or 37,501,007 gal., German and English oil. In 1914 the larger consumption of creosote was met by imports, the falling off in 1915 being due to the European war.

The total amount of expenditure involved in equipment ordered and authorized by the New York, New Haven & Hartford Railroad from Sept. 1, 1913, to Dec. 31, 1915, is \$10,500,000. Of the 1236 units of rolling stock equipment that have been ordered during this period, 477 units have already been delivered. Of this equipment forty-four units are primarily for electric operation, including three electric locomotives, fifteen multiple-unit motor cars and twenty-six multiple-unit trail cars.



# NEWS OF ELECTRIC RAILWAYS

## COMMISSION SUGGESTIONS FOR REHABILITATION Recommendations by California Commission Contain Suggestion for Regulation of Auto-Bus Traffic

The California Railroad Commission issued an order on May 9 suggesting plans for the partial reconstruction and the operation of the lines of the San Diego & South Eastern Railway, parts of which were destroyed in the floods of last January. The suggestions are as follows:

1. That the petitioner reconstruct the Coronado Belt Line across the Sweetwater Valley from Eighth Avenue and Twenty-third Street, National City, to F Street, Chula Vista.

2. That the petitioner construct a connecting track along F Street, Chula Vista, from the Coronado Belt Line to the existing track on Third Avenue, Chula Vista.

3. That the petitioner electrify the lines to be constructed under suggestions 1 and 2.

4. That the petitioner operate freight service between San Diego on the north and Salt Works and Third Street, Chula Vista, on the south.

The San Diego & South Eastern Railway asked the commission for instructions as to the restoration of its lines, and for authority to reduce the number of trains operated. The company's line, prior to the floods which began on Jan. 27 was operated south from San Diego to Tia Juana, Otay and Sweetwater Dam, and east from San Diego to Foster. The motive power was partly steam and partly electricity. The floods completely washed out the line to Foster for 5½ miles, with the exception of short isolated portions. The damage was done by floods in the San Diego River and San Vicente Creek.

The flooding of the Sweetwater River washed out the entire Sweetwater branch below Sweetwater Dam, a little less than 5½ miles, also the interurban electric line between National City and Chula Vista, where this line crosses the river bottom, a distance of 1350 ft., and the Coronado Belt Line between National City and Marmarosa, where this line crosses the river bottom, a distance of 4700 ft. Floods in the Otay River washed out the track between Otay and Palm Avenue in the bed of the river 6500 ft.; the major portion of the track between the Salt Works and South San Diego, a distance of 6600 ft., and the connecting track between these two lines, a distance of 1 1/5 miles. Floods in the Tia Juana River washed out two portions of track between Schnell and Tia Juana, a distance of 2420 ft.; also two portions of track of the Coronado Belt Line at South San Diego, 2300 ft.

In addition to these main tracks, totaling nearly 15 miles, sidings and other tracks, about 5½ miles on various portions of the company's line were destroyed.

Of the main track a trifle less than 20 per cent was wiped out, and of the other tracks nearly 28 per cent.

The company's net deficit for the year ended June 30, 1915, was \$86,287. This was before the floods. In addition to the losses in revenue from the communities isolated by the floods, the company suffered further losses from auto buses operated between National City and San Diego. During the first ten days of April of this year the company operated its electric interurban railway business between San Diego and National City at a daily operating loss of more than \$50.

The Railroad Commission investigated thoroughly all these conditions and sought a plan under which the company could continue operations to the best advantage of all parties. This plan assumes a reduction in passenger fare between San Diego and National City points, from the present 10-cent cash fare to a 15-cent round-trip ticket bought in strips of ten for \$1.50, to be used during the calendar month, and transferrable to anyone. The commission says that the suggestions, if carried out, will insure to National City and Chula Vista good service at reasonable rates by a strong, responsible, well-qualified agency, but as

the San Diego Electric Railway has definitely refused to undertake the service, the commission cannot recommend to that concern that it engage therein, unless National City and Chula Vista regulate the auto-bus traffic so as to give the company some profit. The plan contemplates temporary suspension of service from the Salt Works to Tent City, Coronado over the Coronado Belt Line, as there is no necessity for it, and from Palm Avenue, Tia Juana over the old National City & Otay Railway's main line. The abandonment also includes the entire Sweetwater Branch, the National City & Otay Railway's main line from Twenty-fourth Street, National City, to Coronado Junction.

## COMMISSION DISCUSSES PUBLIC RELATIONS

### Section of Recent Report of Missouri Commission Devoted to Company Attitude Toward Public

The third annual report of the Public Service Commission of Missouri, for the year ended Dec. 31, 1915, contains an interesting statement on public relations. The commission says, in part:

"The public service corporations operating in this State are fast learning that the common principle of doing business in the open, giving it the fullest possible publicity, taking the public into their fullest possible confidence, should be adopted by them as the wisest and best policy. We believe that full and frank publicity should be the policy of every public service corporation with its patrons, to the end that all proper information to the investor and the public in general may be had. All public utilities are learning that the only way to gain the confidence of the public is first of all to merit it by square and frank dealing with the public. All public utilities should give full publicity to all dealings with the public; tell the public how much the company is earning, and how it represents only a fair return on the value of the property devoted to the service of the public, and whenever there is a dispute over any matter of service, resolve the doubt in favor of the public and do even more than is strictly required under its duties as a public service corporation.

"We believe the public is now becoming ready to meet the public service corporations, at the half-way station with fair and just treatment. If the integrity of investment, vital alike to rich and poor, employee and employer, is to be properly maintained, such should be the attitude of the public toward such public service companies.

"We think the attitude of the public toward the public service companies as to being on better terms is shown by the number of informal complaints. During the year 1914 this commission received 651 informal complaints, while during the year 1915 it only received 481 of such complaints. This desirable condition has been largely the result of broader and more liberal policies upon the part of public utilities and their dealings with the public. The adoption by the commission of uniform service rules for gas, electric and water utilities has doubtless tended to reduce the number of informal complaints.

"We also desire to state that the conditions between the public utilities and their employees are being greatly improved. The street railways in St. Louis and Kansas City have adopted the policy of issuing monthly bulletins giving information not only to the public, but to the employees of the company, as to the operating and other conditions of such utilities. A better feeling of loyalty is being cultivated by all the public utilities companies with their employees.

"Few complaints have been made to the commission during the year just ended as to any unfair or discourteous treatment of the public by agents or employees of the various public utilities operating in this State. We are gratified to be able to report that conditions are improving all along the lines above indicated."



CINCINNATI VALUATION FIGURES ANNOUNCED

Company and Commission Differ by \$11,000,000 on Tentative Cost Less Depreciation Figures

A tentative valuation of the property of the Cincinnati Traction Company was announced by the Ohio Public Utilities Commission on May 13. On some items the commission placed a higher valuation than the company did, and a number of items were allowed on which the company placed no valuation. However, the majority of items were valued at a lower figure than the company's engineers placed upon them.

The cost of the property new is placed at \$41,022,717 by the company, while the commission has fixed it at \$30,141,102. Depreciation was allowed by the company as \$5,185,672, and by the commission as \$5,801,354. The cost of the property, less depreciation, was placed at \$35,837,044 by the company, while the commission fixed the amount at \$24,333,947, a difference of almost \$11,000,000.

Both the city and the company will have thirty days in which to file additional statements and claims, after which a date will be set for a public hearing. Neither city nor company officials would comment on the report until they had had time to study it thoroughly. The figures of both the company and the commission, showing the cost new and depreciation, are as follows:

	Company		Commission	
	Cost New	Depreciation	Cost New	Depreciation
1. Grading .....	\$84,396	.....	\$95,991	.....
2. Track .....	7,182,417	\$1,896,369	7,342,925	\$1,968,731
3. Bridges .....	67,182	13,841	60,482	11,239
4. Inclines .....	345,668	99,177	332,918	103,893
5. Paving .....	872,773	277,218	910,159	304,848
6. Electrical distributing system .....	2,033,529	457,546	1,861,988	385,345
7. Rolling stock ..	4,982,227	1,096,108	4,798,446	1,183,271
8. Power - plant equipment ..	2,422,522	754,149	2,415,242	696,620
9. Substation equipment ..	267,890	23,945	289,375	23,616
10. Shop equipment ..	214,444	41,585	209,730	43,636
11. Buildings .....	2,269,979	525,734	2,085,137	474,119
12. Furniture and fixtures .....	49,264	.....	51,192	6,252
13. Stores, tools, etc. ....	628,504	.....	662,060	48,135
14. Frontage consents .....	609,609	.....	117,486	.....
15. Real estate .....	783,179	.....	630,699	.....
16. Profit of general contractor .....	.....	.....	1,323,441	333,912
16. Contributions imposed by ordinances, etc. Fire insurance, property damage, expense incurred by incorrect plans. ....	192,876	.....	85,237	.....
17. Administration - organization and legal .....	533,550	.....	452,050	.....
18. Taxes during construction ..	288,000	.....	534,225	.....
19. Interest, discount, hidden costs, etc. ....	3,812,481	.....	2,252,776	.....
	\$27,640,490	\$5,185,672	\$27,378,851	\$5,801,354

TABLE "B."

*Horse-car lines, dummy lines and incline planes ..	\$2,277,995	.....	\$2,000,000	.....
*Cable lines .....	2,503,051	.....	.....	.....
Track construction destroyed 1901-1913 .....	615,365	.....	576,138	.....
Paving destroyed from 1901-1913 ..	142,404	.....	136,740	.....
Changes made necessary by re-routing cars .....	19,262	.....	19,262	.....

TABLE "C."

Cost to reproduce paving laid by city .....	\$1,488,493	.....	.....	.....
Cost to reproduce paving, material furnished jointly by city and company .....	660,421	.....	.....	.....
Franchise value .....	5,675,236	.....	.....	.....
			\$30,110,991	\$5,801,354
Add one-tenth of 1 per cent for incorporation fee .....	.....	.....	30,110	5,801
Grand total val. ....	\$41,022,717	\$5,185,672	\$30,141,102	\$5,807,155

\*In tentative valuation the commission has allowed \$2,000,000 for this superseded property, subject to change on further hearing in fixing final valuation.

\$220,000,000 OF RAPID TRANSIT CONTRACTS

New York's New System the Greatest Single Municipal Undertaking in the History of the World

For convenience of construction and supervision the New York rapid transit work now under way was divided into routes and sections, there being eighty-nine sections in all. On May 15 seventy-six sections were under contract, and the Public Service Commission during the latter part of this month will open bids on five other sections, leaving only eight yet to be advertised for bids. These eight are mainly in the Boroughs of Manhattan and Brooklyn. These contracts are now in the course of preparation, and it is hoped that bids may be called for on all of them before the expiration of the present year.

On city-owned lines up to the present time the Public Service Commission has completed or under contract construction work on the new lines aggregating about \$180,000,000. In addition to this the two companies, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, have let contracts to upward of \$40,000,000. The total amount of construction contracts already awarded, therefore, aggregates about \$220,000,000. With respect to the sum involved the rapid transit subway construction now under way exceeds any other single municipal undertaking in the history of the world.

The new roads in Queens Borough are approaching completion, and it is expected that they will be in operation before the close of the coming summer. Queens heretofore has been a borough without rapid transit facilities.

The first line to be opened for operation in the Bronx will be the White Plains Road extension of the Lenox Avenue branch of the first subway. This line will run as far north as 241st Street, near the northern city line. It is expected that it will be in operation also before the close of the coming summer.

By the opening of the Fourth Avenue subway the Borough of Brooklyn has already enjoyed some of the benefits to be derived from the dual system. This line is now in complete operation, and by taking the Sea Beach trains it is possible to ride from the Municipal Building, Manhattan, via the Fourth Avenue subway to Sixty-fifth Street and thence via the Sea Beach cut directly to Coney Island over entirely new construction. The New Utrecht and Gravesend Avenue lines are both under construction, and the former should be ready for operation within a few months. Work has just fairly begun on the Gravesend Avenue line.

Under the new contracts the lower end of Manhattan Island is to be almost honeycombed with subway lines. For instance, below City Hall there will be the Seventh Avenue line in Greenwich Street, the Broadway line in Church Street, the present subway in Broadway, the Centre Street loop extension in Nassau Street, and the Brooklyn extension of the Seventh Avenue line in William Street. All are now under construction, with the exception of the Nassau Street line. Bids will be called for on this line within a short time.

The commission is now advertising for bids for the construction of four sections of the Fourteenth Street-Eastern district line, two in Manhattan and the other two in Brooklyn. This line is for operation by the New York Municipal Railway Corporation. The contract for this has already been let, and work is now under way.

The first operation in the Borough of Queens will be by trains of the Interborough system, although the New York Municipal has trackage rights over the Queens lines. By the change from the use of the Queensboro Bridge to the East River tunnel, Section No. 3, has construction of the Sixtieth Street tunnel for trains from the Broadway subway, which is for operation by the New York Municipal, it will not be possible to complete the tunnel in shape for operation by the time the rest of the Broadway subway will be ready. This change was made by the commission at the request of the Board of Estimate & Apportionment.

It is probable that the initial operation of the Broadway line will be by trains coming over the Manhattan Bridge and running through Canal Street to Broadway, and thence up Broadway to either Fourteenth or Twenty-sixth Street. This operation, it is expected, will be begun in the fall.



## FORT WAYNE EMPLOYEES TO RETURN

An agreement was reached on May 11 at Fort Wayne, Ind., by which the Fort Wayne & Northern Indiana Traction Company gained all the points for which it has contended since a strike was called on its city lines on Sept. 27, 1915. Actual operation of the lines was interrupted only during the first day or two of the strike, the company filling all the positions of the striking employees with other men. Since that time, affiliated labor unions have sought by boycott and other methods to force the company to reinstate in their old positions those of the employees who had not voluntarily returned to work shortly after the strike.

The company several months ago offered to take back as new men on the extra list all old employees who had gone on strike, provided they would sign the company's individual contract. This offer was refused by the members of the union, but after the conference on May 11 between the executive committee of the Federation of Labor, a committee of the carmen's union and officials of the Fort Wayne & Northern Indiana Traction Company, an agreement was reached by which the "strike" was officially called off. This agreement provides for the re-employment of between forty and fifty of the old employees before June 6 at the former scale of wages, these men to go on the extra list, and for the re-employment of other old employees as fast as vacancies may occur. It is also provided that the company will not discriminate against any man who may be a member of a labor union, but the company recognizes no organization, and buttons must not be worn by the men when on duty. All of the reinstated employees must also sign the individual working contract of the company. Under the agreement just reached, in consideration for the company agreeing to settle its differences with the striking employees, the Federation of Labor agrees "to do everything in its power to further the interests of the company, and will urge its affiliated organizations to do the same."

## PRIVATE OPERATION OF MUNICIPAL LINE URGED

The City Council of Seattle, Wash., has been petitioned by residents in the Lake Burien District to arrange for the operation of the Lake Burien Line, Division "C" of the Seattle Municipal Railway, by the Puget Sound Traction, Light & Power Company, preferably under lease. Several years ago these same property owners raised sufficient funds to build and operate the line, but late in 1913 they presented the property to the city as a gift. Since May 30, 1914, it has been run by the city. As Division "A" of the Municipal Railway, which operates in the northern section of the city does not connect with the Lake Burien line, Lake Burien passengers are forced to change cars at Riverside. The petitioners express the hope that under a lease of the property to the Puget Sound Traction, Light & Power Company they will have a continuous ride from the Seattle business district to the end of the Lake Burien line, or at least there will be a transfer arrangement between the municipal line and the lines of the traction company.

Division "C" is 9 miles long,  $4\frac{1}{2}$  miles of which are in the city limits. Passengers are required to pay a 5-cent cash fare to the city limits and an additional 5 cents to continue to Lake Burien. The utilities department of the city, however, sells 4-cent tickets, entitling passengers to ride without the city limits or within city limits, or a continuous ride on two tickets. A special commutation ticket is sold at the rate of sixteen tickets for \$1. This is equivalent to a through ride from terminus to terminus for  $6\frac{1}{4}$  cents.

The city has failed to obtain necessary common user rights to bring Division "C" cars to the business section, or to operate a municipal railway from the south terminus of the Lake Burien railway to the north terminus of Division "A." Hence, Lake Burien passengers who desire to come to the business district after disembarking from Division "C" at Riverside, are compelled to pay a 5-cent fare to the Puget Sound Traction, Light & Power Company. The petition says in part: "We desire to initiate proceedings looking to a service over the traction company's line into the business center without change of cars, and do not intend any disparagement of the management of the line by the city, nor of the conduct of its employees."

## BALTIMORE COMPANY WINS PAVING SUIT

The Supreme Court of the United States has denied the application of the city of Baltimore, Md., for a review by it of the decision of the Maryland Court of Appeals, which condemned the act of the State Legislature imposing a part of the cost of the new paving in Baltimore upon the United Railways & Electric Company.

The Legislature, by the act of 1914, attempted to cast the cost of repaving, between and on either side of tracks, upon the company whenever any street in the bed of which its tracks were laid was paved or repaved with improved paving. The Court of Appeals declared the law void, saying: "The Legislature had no power under the constitution and laws of this State to charge the railways company with the cost of doing the work sued for in this case. . . . After the most careful consideration of the case we do not find it necessary to pass upon the federal question—that is, whether the law was in conflict with the provisions of the United States Constitution, . . . but we rest the decision solely upon the constitution (of Maryland) and the decision of our court." The court then decided that a special paving tax such as was imposed by the law of 1914 would not stand unless the person assessed was benefited by the proposed improvement, and that electric railway tracks in the street bed were not so benefited.

The sum at stake was variously estimated at from \$1,000,000 to \$1,500,000.

## PUBLIC SERVICE RAILWAY INCREASES WAGES

Announcement was made by the Public Service Railway, Newark, N. J., on May 16 of an increase of wages for employees which is to take effect on July 1. The raise will mean about \$262,000 a year on the basis of present business. Not only will motormen and conductors profit by the raise, but other employees of the transportation department will figure in the company's action. July 1 was fixed as the date for the new scale becoming effective because it marks the beginning of the company's half-year. Only two and a half years ago, on Jan. 1, 1914, a wage scale ranging from 23 cents to 30 cents an hour and involving an addition of \$200,000 a year to the payroll was put in effect. The new rate will give the men from 25 to 32 cents an hour, the minimum being paid to beginners and the rate increasing with length of service. An increase was also authorized in the minimum wage to be paid extra motormen and conductors. The rate has been \$12 a week. After July 1 the extra men will be enabled to earn \$14 a week if they report for rollcalls and perform such duties as may be assigned to them.

**Change in Cleveland Operating Allowance to Meet Wage Increase.**—The increase of 9 mills per car-mile in the operating expense allowance of the Cleveland (Ohio) Railway under the Tayler grant to provide for the additional wages to be paid motormen and conductors was approved by the Cleveland City Council on May 15.

**N. A. M. Urges Fairer Railway Regulation.**—Correction of the defects in the system of railway regulation with the view toward restoring the energy and initiative of the transportation companies was urged in a resolution adopted on May 16 at the three-day convention of the National Association of Manufacturers at the Waldorf-Astoria Hotel, New York.

**Thompson Committee Considers Wire Tapping.**—On May 12, the Thompson legislative committee called Timothy S. Williams, president of the Brooklyn Rapid Transit Company, who told why the connection between the Centre Street loop and the Brooklyn elevated system at Park Row was not in operation. Since then the hearings that have been held have been devoted to inquiry into telephone wire tapping.

**Electrification of Short Lines for Passenger Service.**—Confirmation has been secured in New York of the report from Fairmont, W. Va., that an arrangement has been made by the Monongahela Valley Traction Company with the Western Maryland Railway by which the latter will electrify its lines leading to Helens Run and Wyatt Mines of the Consolidation Coal Company. The Monongahela Valley Traction Company will carry all passengers and ex-



press traffic over these lines, while freight shipment will be moved by steam power.

**New York's Horse Cars to Go.**—During the week ended May 13 the Public Service Commission for the First District of New York authorized the preparation of an order which will, in effect, direct the elimination from Manhattan Island of its last horse-drawn street car by Dec. 1, 1916. The New York Railways had contracted for seventy car bodies of a new type to replace the horse cars, and the company is experimenting with equipment for the new cars. The lines concerned are the Chambers Street-Madison Street, and the Avenue C. These are the only horse car lines in New York.

**Many Converts Still Untouched.**—The conscience fund of the Kansas City (Mo.) Railways is growing markedly, following the opening of the Billy Sunday revival. One woman wrote that she had ridden four or five times without paying. She had attended two of the meetings, wanted to get right with God, and, as a first step of cleansing her conscience, inclosed 30 cents. One man wrote that he had stolen his way into one of the dances which the company gave for its employees. He inclosed 50 cents. The sums received are small, but their number indicates an appreciable reduction of the usual drain on revenues due to purloined rides and evasions of the conductors and the transfer regulations.

**Philadelphia Primaries Vote Transit Loan.**—The Philadelphia transit loan was passed on May 16 by the voters at the primaries by a majority estimated at approximately 100,000. Mayor Smith expressed gratitude to the newspapers for their assistance in winning the victory, and especially to A. Merritt Taylor, director of city transit during the Blankenburg administration, who drew up the plans for transit improvement and returned recently to conduct the campaign favoring the program of construction as laid down by him. The transit bill must now be passed in the Common Council and then at a separate meeting of Select Council. The bill cannot be ratified by both branches until the second week in July, and the money for the appropriation will not be available before Aug. 1.

#### PROGRAMS OF ASSOCIATION MEETINGS

##### Central Electric Railway Accountants' Association

The meeting of the Central Electric Railway Accountants' Association, arranged to be held in Toledo, Ohio, on June 6 and 7, has been postponed to June 13 and 14.

##### West Virginia Public Utilities Association

The executive committee of the Public Utilities Association of West Virginia met at Charleston on May 8 and arranged a program for the regular annual meeting of the association to be held at Parkersburg on July 13-15.

##### New England Street Railway Club

In accordance with the plan of State meetings adopted for this year the meeting of the New England Street Railway Club on May 25 will be Rhode Island night, with Vice-President A. E. Potter in charge of the arrangements. The speaker will be Frederick W. Doolittle, New York, consulting engineer and director of the bureau of fare research of the American Electric Railway Association. His subject will be "Some Problems of the Electric Railway Industry."

##### Oklahoma Association

The annual convention of the Gas, Electric & Street Railway Association of Oklahoma will be held May 23, 24 and 25 in Oklahoma City. Headquarters will be at the Lee Huckins Hotel. The following papers of direct interest to electric railway operators will be presented: "Safety First," by J. J. Johnson, assistant general manager of the Oklahoma Railway; "Taxation of Public Service Corporations," by Prof. J. W. Scroggs, director of Extension Division of the University of Oklahoma; "Publicity Toward the Promotion of Harmonious Relations Between Public Utilities," by W. R. Molinar, manager of the Oklahoma Gas & Electric Company; "Fuel Efficiency," by A. J. Neff, of the American Public Service Corporation of Abilene, Tex.; "Report of the Rate Research Committee," by S. D. Irelan of the Bartlesville Interurban Railway Company.

## Financial and Corporate

### ANNUAL REPORTS

#### Washington, Baltimore & Annapolis Electric Railroad

The comparative statement of income, profit and loss of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., for the calendar years 1914 and 1915 follows:

	1915	Per Cent	1914	Per Cent
Railway operating revenues...	\$845,682	100.0	\$816,938	100.0
Railway operating expenses..	469,572	55.5	449,625	55.0
Net revenue railway operations.	\$376,110	44.5	\$367,313	45.0
Net revenue auxiliary operations .....	14,870	1.7	14,925	1.8
Net operating revenue.....	\$390,980	46.2	\$382,238	46.8
Taxes assignable to railway operations .....	42,582	5.0	37,814	4.6
Operating income .....	\$348,398	41.2	\$344,424	42.2
Non-operating income .....	12,465	1.5	13,071	1.6
Gross income .....	\$360,863	42.7	\$357,495	43.8
Deductions from gross income.	258,689	30.6	255,767	31.3
Net income .....	\$102,174	12.1	\$101,728	12.5

The company during 1915 had better receipts than in the preceding year, the increase in railway operating revenues amounting to \$28,744, or 3.52 per cent. This was in marked contrast to the year 1914, when the showing was a loss of \$15,001, or 1.8 per cent from the 1913 results. The operating expenses, however, also increased in 1915 over 1914, and in a slightly greater ratio than the revenues, so that the operating ratio showed an improvement, a rise from 55 per cent to 55.5 per cent. Taxes and fixed charges both increased, with the result that the net income was only slightly better than in 1914.

During 1915 the company expended \$81,101 for additions and betterments, this being divided \$20,354 for road, \$59,371 for equipment and \$1,376 for power. Miscellaneous comparative statistics follow:

	1915	1914
Revenue passengers carried.....	1,879,790	1,794,672
Earnings per car mile (cents).....	40.47	38.65
Earnings per mile of single track.....	\$8,550	\$8,274
Earnings per mile of road.....	\$15,390	\$14,866
Earnings per passenger (cents).....	35.97	36.71

#### Delaware & Hudson Company

The 1915 report of the Delaware & Hudson Company, Albany, N. Y., states that the business depression during the first half of 1915, together with heavy rainfall, especially on Saturdays and Sundays, and cool weather on holidays, adversely affected the revenues of its affiliated electric railways. Indeed, there were greater decreases than in any other year since the control of the electric railways by the railroad.

The operating revenues of the United Traction Company, Albany, N. Y., showed a decrease of \$134,638, while the expenses showed an increase of \$186,091. The net operating income showed a decrease of \$306,084. Operating expenses were unusually high, especially those for maintenance of way and structures and equipment, both principally due to heavy paving and other requirements by municipalities and the Public Service Commission. During December, 1915, the unusually heavy snowfall compelled extra efforts for maintenance of car operations and removal of snow from the streets. The estimated cost of the latter was \$11,564. Paving requirements were about nine times the normal amount, the year's work aggregating 34,250 yards, with an estimated cost of \$105,039. The total payments for paving amounted to \$135,347, of which \$107,886 was for work done during earlier years. These figures are exclusive of charges for ordinary paving maintenance, which amounted to \$45,193 in 1915, an increase of \$10,385 over 1914.

During 1915 the United Traction Company constructed 1,929 miles of additional tracks in Albany and Troy at an estimated cost of \$71,953. A total of 11,529 miles of track was reconstructed at a cost, exclusive of paving and ordinary maintenance, of \$163,682. Of the 11,529 miles, 6,379 miles were necessary only because of paving required by



the municipalities. There was expended during the year for improvements to the company's substation equipment and power lines, \$175,071, exclusive of ordinary maintenance amounting to \$48,821. These improvements were mainly to secure more economical power distribution and more efficient car operation. The company's net loss from the strike on Sept. 6-9, 1915, was \$11,500, and the employees lost \$12,000 in wages—both exclusive of additional expenses incident to the strike.

The operating revenues of the Hudson Valley Railway, Glens Falls, N. Y., showed a decrease of \$50,321 and operating expenses an increase of \$11,034. The net operating income, therefore, suffered a decrease of \$62,764.

The operating revenues of the Plattsburgh (N. Y.) Traction Company decreased \$1,976 and operating expenses \$244. The net operating income showed a decrease of \$1,827. Two of Plattsburgh's largest industries, employing 550 men, were not operated in 1915. The depression in this neighborhood was partly offset by the military instruction camp held during the summer.

The operating revenues of the Troy & New England Railway, Troy, N. Y., showed a decrease of \$2,569 and expenses an increase of \$5,421. The net operating income decreased \$7,897. The requirements met by this company during the year were abnormal, notwithstanding the great decrease in earnings. The expenditures for improvements and ordinary maintenance of way and structures totaled \$8,812, of which \$3,408 was for work ordered by the Public Service Commission. The renewal of about 5 miles of right-of-way fence cost \$1,365, all charged to maintenance. The power supply was greatly augmented through the construction of additional feeders by the United Traction Company.

JANUARY AND FEBRUARY EARNINGS

Returns Show Continued Depression in West, but Advance in Operating Revenues and Net for Other Sections

A comparison of electric railway statistics for January and February, 1916, with figures for the corresponding months of 1915, made by the information bureau of the American Electric Railway Association and shown in the accompanying tables, indicates an improvement in the electric railway business in the United States. Returns for January, representing 7328 miles of line of companies scattered throughout the United States, show an increase in operating revenue of 5.57 per cent, in operating expenses of 4.09 per cent and in net operating revenue of 8.10 per cent, while returns representing 5495 miles of line indicate an increase in taxes of 1.65 per cent and in operating income of 12 per cent.

Similar returns for February, representing 4710 miles of line, or only about 64 per cent of the January mileage, show increases in operating revenue of 9.07 per cent, in operating expenses of 7.55 per cent and in net operating revenue of 11.44 per cent. Returns for about 69 per cent of this mileage indicate an apparent decrease in taxes of 1.28 per cent and an increase in operating income of 12.31 per cent. It must be borne in mind in this connection that data from the Western district does not indicate any participation in this measure of prosperity. Of the three groups the Western, represented by 1588 miles of line, show a decrease during January of 2.35 per cent in operating revenues, an increase of 2.29 in operating expenses and a 10.50 per cent decrease in net operating revenue. Data for 1424 miles of line in this group show a 12.20 per cent decrease in operating income—this in spite of an apparent decrease in taxes paid of 2.43 per cent. The Southern group, represented by 822 miles of line, indicates a continued reduction in operating expenses and though taxes went up about 3 per cent, a gain in operating income of 15 per cent. The Eastern group, represented by 4916 miles of line, has gained 7.85 per cent in operating revenues, 5.04 per cent in operating expenses and 12.57 per cent in net operating revenue. All of the districts except the Western show a decrease in the operating ratio, the United States as a whole indicating a decrease from 62.97 per cent in January, 1915, to 62.08 per cent in January, 1916. The operating ratio of the Western district has increased from 63.75 per cent in 1915 to 66.78 per cent in 1916.

The returns for February indicate a slight improvement over those for January. It must be pointed out, however, that the apparent decrease in taxes for the United States as a whole and for the Western district in particular is almost entirely due to a considerable reduction in the gross revenue of a large Western city company. This company is taxed on the basis of its gross receipts, and any reduction in gross must be necessarily followed by a considerable reduction in the amount of taxes paid. Jitney competition, it is said, has played no inconsiderable part in bringing about this state of affairs.

TABLE I—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR JANUARY AND FEBRUARY, 1916

Account	January		February	
	Amount In 1916	Per Cent Increase Over 1915	Amount In 1916	Per Cent Increase Over 1915
<i>United States*</i>				
Operating revenues....	\$15,861,431	5.57	\$8,109,761	9.07
Operating expenses....	\$9,847,593	4.09	\$4,877,015	7.55
Net operating revenue..	\$6,013,838	8.10	\$3,232,746	11.44
Operating ratio, per cent:				
1915 .....	62.97	...	60.93	...
1916 .....	62.08	...	60.13	...
Miles of line represented	7,328.35	...	4,710.44	...
<i>Eastern District*</i>				
Operating revenues....	\$12,016,856	7.85	\$5,589,472	12.10
Operating expenses....	\$7,346,798	5.04	\$3,267,366	7.86
Net operating revenue..	\$4,670,058	12.57	\$2,322,106	18.65
Operating ratio, per cent:				
1915 .....	62.76	...	60.75	...
1916 .....	61.13	...	58.45	...
Miles of line represented	4,916.88	...	2,749.40	...
<i>Southern District*</i>				
Operating revenues....	\$817,725	4.59	\$588,106	5.31
Operating expenses....	\$479,466	d 2.34	\$327,405	d 0.83
Net operating revenue..	\$338,259	16.28	\$260,701	14.20
Operating ratio, per cent:				
1915 .....	62.79	...	59.11	...
1916 .....	58.63	...	55.67	...
Miles of line represented	822.64	...	637.64	...
<i>Western District*</i>				
Operating revenues....	\$3,026,850	d 2.35	\$1,932,183	2.20
Operating expenses....	\$2,021,329	2.29	\$1,282,244	9.13
Net operating revenue..	\$1,005,521	d 10.50	\$649,939	d 9.18
Operating ratio, per cent:				
1915 .....	63.75	...	62.14	...
1916 .....	66.78	...	66.36	...
Miles of line represented	1,588.83	...	1,323.40	...

NOTE.—Letter d denotes a decrease.

\*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River; *Southern District*—South of the Ohio River and east of the Mississippi River; *Western District*—West of the Mississippi River. The *Eastern District* does not include the Interborough Rapid Transit Company, New York, N. Y.

TABLE II—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS REPORTING TAXES FOR JANUARY AND FEBRUARY, 1916

Account	January		February	
	Amount In 1916	Per Cent Increase Over 1915	Amount In 1916	Per Cent Increase Over 1915
<i>United States</i>				
Operating revenues....	\$12,547,377	5.46	\$5,283,394	8.72
Operating expenses....	\$7,902,867	2.97	\$3,203,183	8.22
Net operating revenue..	\$4,644,510	10.01	\$2,080,211	9.51
Taxes .....	\$824,559	1.65	\$385,996	d 1.28
Operating income.....	\$3,819,951	12.00	\$1,694,215	12.31
Operating ratio, per cent:				
1915 .....	64.51	...	60.91	...
1916 .....	62.98	...	60.62	...
Miles of line represented	5,495.76	...	3,287.86	...
<i>Eastern District</i>				
Operating revenues....	\$9,175,541	8.36	\$3,046,002	13.45
Operating expenses....	\$5,716,978	3.85	\$1,804,183	10.67
Net operating revenue..	\$3,458,563	16.75	\$1,241,819	17.74
Taxes .....	\$560,680	3.04	\$216,862	2.63
Operating income .....	\$2,897,883	19.84	\$1,024,957	21.53
Operating ratio, per cent:				
1915 .....	65.01	...	60.71	...
1916 .....	62.30	...	59.23	...
Miles of line represented	3,414.43	...	1,523.91	...
<i>Southern District</i>				
Operating revenues....	\$615,303	1.69	\$533,639	5.01
Operating expenses....	\$348,539	d 3.34	\$298,943	d 1.51
Net operating revenue..	\$266,764	12.63	\$234,696	14.68
Taxes .....	\$53,362	3.97	\$27,110	6.69
Operating income .....	\$213,402	15.02	\$207,586	15.82
Operating ratio, per cent:				
1915 .....	60.85	...	59.72	...
1916 .....	56.64	...	56.01	...
Miles of line represented	656.60	...	580.95	...
<i>Western District</i>				
Operating revenues....	\$2,756,532	d 2.40	\$1,703,753	2.23
Operating expenses....	\$1,837,350	1.98	\$1,100,057	7.18
Net operating revenue..	\$919,182	d 10.14	\$603,696	d 5.71
Taxes .....	\$210,519	d 2.43	\$142,024	d 7.95
Operating income .....	\$708,663	d 12.20	\$461,672	d 5.00
Operating ratio, per cent:				
1915 .....	63.78	...	61.58	...
1916 .....	66.65	...	64.56	...
Miles of line represented	1,424.73	...	1,183.00	...

NOTE.—Letter d denotes a decrease.

\*See last paragraph of comment.



## PROTECTING UTILITY SECURITIES

### Newspaper Urges Utility Investors to Unite in Protection of Their Interests in Regulatory Cases

The part of the financial pages of the *Chicago Tribune* devoted to advice to investors recently contained a pertinent statement concerning the need of protection for utility securities. This suggests a line of publicity which should be encouraged by electric railways, who up to the present time have been more or less apathetic about this vitally important problem. The statement follows:

"Investors in utility stocks and bonds everywhere ought to join in an effort to have due consideration given to their interests by the commissions which fix rates and supervise the operation of utility corporations. At present such securities generally are allowed adequate protection, but the tendency is to yield to the demands of patrons and politicians and let the investor bear the burden as best he can. Continual exactions of one kind and another gradually reduce the profits of operating, cut down dividends and decrease the margin of safety protecting bond interest, thus undermining the value of securities and making sales of future issues more difficult.

"In Chicago there is nearly \$500,000,000 invested in utilities, not counting the telephone company. The gross earnings of these properties are not far from 15 per cent on the capitalization, and the net is not far from 6 per cent. The 6 per cent, however, does not all go to security holders. Some of it is directly paid to the city and smaller amounts are used up by other charges, so that the average return on the money invested is a fraction over 5 per cent.

"It thus appears that about two-fifths of the money spent for street car fares and lighting goes directly to pay for the use of the money invested in the plants. If the investors are assured of a permanent revenue they will be satisfied with a low rate of return, and an important item in the cost of utility service will be reduced to a minimum. If, on the contrary, the securities are continually menaced, no one will buy them except on a speculative basis, yielding a high income. Whether utility bonds shall rank among the most conservative investments or among speculative issues, rests chiefly with the rate-making and regulating authorities.

**Ardmore (Okla.) Railway.**—Application for a charter has been made by the Ardmore Railway to succeed the Ardmore Electric Railway, the property of which was sold under foreclosure as noted in the *ELECTRIC RAILWAY JOURNAL* of April 22, page 797.

**Aurora, Elgin & Chicago Railroad, Wheaton, Ill.**—The Aurora, Elgin & Chicago Railroad has arranged with the Central Trust Company, Chicago; the Bankers Trust Company, New York, and the Citizens' Saving & Trust Company, Cleveland, to purchase the fifteen year 5 per cent consolidated first mortgage gold bonds of the Elgin, Aurora & Southern Traction Company, payable on June 1, 1916.

**Barcelona Traction, Light & Power Company, Barcelona, Spain.**—It is announced that the Barcelona Traction, Light & Power Company has recently sold securities in Spain yielding the company the \$1,200,000 of capital required to complete the tramway between Barcelona and Larrasa and Sabadelle, Spain.

**Cities Service Company, New York, N. Y.**—Publication of the call of Cities Service Company 7 per cent notes of 1918, at 102 per cent of the face value plus accrued interest to the date of presentation, was begun on May 12. The notes will be payable on or before July 12, 1916, at the office of the company in New York.

**Dry Dock, East Broadway & Battery Railroad, New York, N. Y.**—The Public Service Commission for the First District of New York has denied the application of the Dry Dock, East Broadway & Battery Railroad for permission to issue \$2,800,000 in bonds. This action was without prejudice to the renewal of the application for an issue of \$1,828,385. The commission had previously denied the application and the company took the matter to the Appellate Division of the Supreme Court. The present action of the commission in permitting the renewal is in accordance with the decision of the court, which held that bonds could be issued in an

amount not exceeding previous expenditures on capital account.

**Edmonton (Alta.) Radial Railway.**—The audited report for the year ended Dec. 31, 1915, presented to the Edmonton City Commissioners, showed total receipts of \$520,322, with expenditure as follows: Transportation expenses, \$294,534; maintenance, \$11,374; equipment, \$33,996; general, \$30,362; interest and redemption charges, \$259,836; depreciation, \$25,551; altogether showing a deficit of \$135,758. At Dec. 31, 1914, the total deficiency was \$630,955, this being increased now to \$644,431. From this amount has to be taken \$198,585.20, the readjustment of the depreciation reserve as recommended by the investigation committee and approved by the Council. The total number of passengers carried in 1915 was 10,658,219 as compared to 14,081,564 in 1914. The traffic dropped considerably until September, when a rerouting of the cars was instituted and the soldiers returned to the city. In December 48,996 more passengers were carried than in December, 1914, and the expenses were reduced from 25.8 cents per car-mile to 19.8 cents. The running expenses for 1915 were 12.3 cents per car-mile, exclusive of power charges, as compared to 16.6 cents per car-mile in 1914.

**Hagerstown & Frederick Railway, Frederick, Md.**—The Fidelity Trust Company, Baltimore, Md., is offering at 100 and interest a block of first and refunding 6 per cent thirty-year sinking fund gold bonds of 1914 of the Hagerstown & Frederick Railway. The authorized issue of these bonds is \$10,000,000, of which \$850,000 is outstanding at the present time.

**International Railway, Buffalo, N. Y.**—The Public Service Commission for the Second District of New York has approved an issue of \$500,000 of International Railway 5 per cent refunding and improvement mortgage bonds. They must be sold at not less than 88 per cent of par to net \$444,400. This sum, with \$171,139 remaining from the proceeds of a previously authorized issue of the same bonds, making in all \$676,000, will be used to refund \$55,000 of car trust certificates due this year and to pay for the company's extension and improvement program for the calendar year 1916.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—The Youngstown & Sharon Street Railway has been authorized by the Ohio Public Utilities Commission to issue its improvement and refunding mortgage bonds of the total principal sum of \$39,135 to be delivered to the Mahoning & Shenango Railway & Light Company in payment, at par, for advances made by it for the construction of additions, extensions and improvements to the facilities of the company from Nov. 1, 1915, to March 31, 1916. The Youngstown & Niles Railway has been authorized by the commission to issue its common capital stock of the total par value of \$100,500 to be delivered to the Mahoning & Shenango Railway & Light Company, \$60,500 in payment for advances made for the construction of a line from Youngstown to Warren, and \$40,000 in payment of advances, by it, for the construction and completion of a line to Niles, Ohio.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—The Northern Ohio Traction & Light Company has sold to N. W. Halsey & Company, New York, N. Y., and Hayden, Miller & Company, Cleveland, Ohio, subject to approval of the Ohio Public Utilities Commission, \$4,000,000 of first-lien and refunding forty-year 5 per cent bonds. The proceeds of these bonds will care for all capital expenditures of the company and all maturities over the next three years.

**Otsego & Herkimer Railroad, Cooperstown, N. Y.**—The Public Service Commission for the Second District of New York has approved the proposed change of the name of the Otsego & Herkimer Railroad to the Southern New York Power & Railway Company.

**Seattle (Wash.) Municipal Railway.**—According to figures compiled by A. L. Valentine, superintendent of public utilities of Seattle, Division "A" and Division "C" of the Seattle Municipal Railway were operated during April at a loss of \$2,322. The actual operating loss of Division "A" amounted to \$395, to which is added \$1,593 interest on outstanding bonds, making a total loss for that line of \$1,989. The loss on Division "C" amounted to \$333.



# Traffic and Transportation

## PENNSYLVANIA CRITICISED CONSTRUCTIVELY Review of Results Achieved by Circular Asking Patrons for "Kicks"

Some months ago the Pennsylvania Railroad asked in bulletin No. 9 this question: "What causes lack of confidence in railroads?" The management of the railroad announced that it wanted to get at the causes wherever they existed and remove them and that the starting point was to get the people who lacked confidence in the railroad to say so and tell why. The company said that it asked these questions because it needed the confidence of its patrons, wanted their co-operation and asked for their friendship. It said frankly that to serve its patrons properly without these was almost an impossibility, and that its patrons would help the company to serve them by giving serious thought to the solution of its problems. It suggested that patrons, when they thought of something the railroad could do to improve the service and make people think better of it, should tell the management about it.

The story of the result of the campaign is contributed by Henry A. Beers, Jr., to *Printers' Ink* for May 11. Mr. Beers says when the publicity department of the railroad early in January published and posted 40,000 of its now famous Bulletin No. 9, it was virtually pinning to its own back the never-failing source of juvenile mirth, carrying the direct invitation, "Kick me." In response to this bona fide communication a pent-up public burst forth in such a fury of rhetoric that it might be said in paraphrase that the Pennsylvania Railroad had literally sown the wind and reaped a gas tank. It must not be gathered from this, however, that the full sweep of the thousand or more letters received in answer to Bulletin No. 9 were out-and-out "kicks," so-called. Many of the letters contained interesting suggestions, and where criticism was made it was more than often in a temperate and helpful spirit of co-operation. Incidentally where such suggestions and criticisms were well founded, as investigations showed, wherever practical the proper remedy was applied or steps are under way to remove the causes thereof.

The author says that of the letters examined very few on their faces betrayed marks of the so-called "crank," although many revealed a decidedly dyspeptic outlook on things as they are. In seeking to find "what my neighbor thinks of me" the Pennsylvania Railroad labored under no illusions. It did not expect a flood of compliments. One of the letters in particular is quoted as a fair example of what the railroad suspected was being said behind its back and what it preferred to have said to its face. Another letter was regarded as a keynote letter. It handled the subject in a really constructive way and was written in a genuinely good-humored and readable style. It dealt with the same principle that George J. Whelan has been applying unremittingly in the service of the United Cigar Stores, namely, the broad question of what constitutes real service and just where does a company's obligation to a purchaser of its commodities begin and where does it cease. The writer of this letter said that it was true that the company was as near perfect as human element could make it, but asked if it ever occurred to the man higher up that the vast system was something which the every-day man or woman could not grasp. It asked whether the officers appreciated and understood what the great world-war meant, whether they could grasp it and realize its vast operation. The opinion was expressed that the officers of the company could not, and the statement was made that the general public did not understand the railroad. The general injunction was to be more human.

Every complaint sent in was examined and delegated to the heads of the various departments of the road for further investigation and recommendations as to action. To many of the more important and significant communications, President Rea replied personally. In securing a

**Southern Iowa Railway & Light Company, Albia, Iowa.**—Alfred B. Mueller, receiver, on May 3 sold at Albia all the property of the Southern Iowa Railway & Light Company. The purchaser was Guy M. Walker, New York, N. Y., representing the bondholders. His bid was \$150,000. This is the second time the property has been offered for sale since January. The previous sale held on Jan. 20 was not confirmed by the court.

**Standard Gas & Electric Company, Chicago, Ill.**—The Standard Gas & Electric Company is inviting tenders on approximately \$2,000,000 of its convertible 6 per cent sinking fund gold bonds, and intends to pay \$1,478,000 of three-year 6 per cent notes which mature on June 1. The Philadelphia Trust Company, trustee for the bonds, has announced that it has on hand \$2,016,000 for the purpose of redemption and has called for sealed tenders of bonds at a price not exceeding 105 and accrued interest, to be received until May 26. Payment of the 6 per cent notes will retire all of the outstanding short-maturity securities of the original issue of \$3,000,000 made three years ago. Dividend scrip issued while the preferred stock cash dividends were discontinued is being rapidly exchanged for the company's 6 per cent twenty-year gold notes.

**United Railways, St. Louis, Mo.**—The Missouri Public Service Commission has authorized the issues of bonds by the Merrimac River Railroad and the St. Louis & Suburban Railway for refunding purposes, referred to in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1916, page 838.

**Youngstown & Southern Railway, Youngstown, Ohio.**—Judge C. M. Wilkins in the Common Pleas Court at Youngstown on May 13 ordered the sale of the Youngstown & Southern Railway, which has been in the hands of David Tod as receiver. The action was taken on petition of the New York Trust Company in foreclosure proceedings.

### DIVIDENDS DECLARED

Central Mississippi Valley Electric Properties, Keokuk, Iowa, quarterly, 1½ per cent, preferred.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, preferred.

Citizens' Traction Company, Pittsburgh, Pa., \$1.50.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

### ELECTRIC RAILWAY MONTHLY EARNINGS

#### ATLANTIC SHORE ELECTRIC RAILWAY, KENNEBUNK, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., April, '16	\$23,575	*\$20,703	\$2,872	.....	.....
1 " " '15	23,855	*23,304	551	.....	.....

#### CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Mar., '16	\$32,533	*\$20,087	\$12,446	\$11,046	\$1,400
1 " " '15	29,914	*17,198	12,716	10,918	1,798
3 " " '16	93,355	*56,769	36,586	33,158	3,428
3 " " '15	82,886	*50,861	32,025	32,817	†792

#### INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

1m., April, '16	\$3,243,929	\$1,210,258	\$2,033,671	\$1,187,776	†\$890,509
1 " " '15	2,926,690	1,090,775	1,835,915	1,085,452	†806,364
10 " " '16	29,702,743	11,605,286	18,097,457	11,370,597	†7,194,351
10 " " '15	27,839,526	10,781,264	17,058,262	10,866,772	†6,684,502

#### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Mar., '16	\$114,646	*\$78,281	\$36,365	\$36,356	\$9
1 " " '15	102,222	*70,439	31,783	35,990	†4,207
3 " " '16	334,522	*231,759	102,763	108,791	†6,028
3 " " '15	289,759	*210,984	78,775	107,908	†29,133

#### NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Mar., '16	\$392,206	*\$245,276	\$146,930	\$50,646	\$96,284
1 " " '15	280,779	*178,948	101,831	51,901	49,930
3 " " '16	1,118,751	*669,887	448,864	157,637	291,227
3 " " '15	822,069	*525,913	296,156	153,014	143,142

#### PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., April, '16	\$2,272,272	\$1,244,460	\$1,027,812	\$816,043	\$211,769
1 " " '15	1,971,599	1,140,510	931,089	816,022	15,067
10 " " '16	21,135,004	11,810,169	9,324,835	8,161,907	1,162,928
10 " " '15	19,776,806	11,486,176	8,290,630	8,101,462	189,168

\*Includes taxes. †Deficit. ‡Includes non-operating income.



thousand odd communications along these lines from the many millions who use the road the Pennsylvania feels that it has been able to draw off, to a certain extent, the bad blood that festered its corporate side. Mr. Beers says in conclusion that having now some basis on which to judge the standard of criticism against the road, the company is in a position to know more definitely just where it stands with its patrons. In short, it has a tangible basis on which to frame its future plans.

#### DAILY BAY STATE FARE SESSIONS

Daily sessions in the Bay State Street Railway fare case before the Massachusetts Public Service Commission were resumed on May 15 at Boston. There is little prospect of the board's taking the case under advisement before July 1. Localities affected will have an opportunity to discuss the effect of the proposed changes in rates after the present cross-examination of R. M. Feustel, valuation expert of the company, is completed. It is probable that rebuttal testimony will be offered by the remonstrants soon after the return of Alton D. Adams, advisory engineer for the various cities and towns. The commission's own consulting engineer in the case, B. J. Arnold, Chicago, has not yet been placed upon the stand, and it is probable that additional evidence may be submitted by the company.

Mr. Feustel was cross-examined by counsel for the remonstrants. The inquiry followed the preparation of the data submitted by Sloan, Huddle, Feustel & Freeman on behalf of the company. The failure of many of the company's lines to earn a 7 per cent return on their allocated investment cost received much attention. It was brought out that the establishment of through service from Scollay Square, Boston, to Revere Beach by the Boston Elevated and Bay State lines working through the East Boston-Orient Heights district was under consideration. R. S. Goff, vice-president and general manager of the Bay State company, said that no steps toward the establishment of a single fare for this service had been taken, and that if the proposed tariff of the Bay State company went into effect, the rate would probably be 11 cents. Chairman McLeod said that the inauguration of such service depended in large measure upon adequate provision for handling traffic through the East Boston tunnel, and involved the possible use of motor-trailer trains.

Several attempts were made by Counsel Wadleigh of the remonstrants to secure a statement from Mr. Feustel to the effect that one-man cars would be successful on various branch lines of the company, but the witness, while recognizing the possibility of such service, contended that he had not made a sufficient study of the local operating problems to commit himself. The point was brought out that service on branch lines is often in considerable measure influenced by the volume of transfer traffic and that the receipts of such lines are not an accurate index of the service requirements.

The witness agreed that the non-paying lines of the system must to some extent be carried by the profitable portions. The Newburyport-Ipswich route was such a line. It is now operated at a deficit of \$52,165 yearly. The investment on this route was \$380,919. There were 16.48 track-miles involved and hourly service was rendered. Under the new rate the fare from terminal to terminal will be 30 cents instead of 20 cents and an extra zone has had to be added.

The comparatively low average speed of the Bay State cars was attributed in large measure to the fact that the company included layover time in its figuring. The point was made that it would be of doubtful economy to purchase extra rolling stock simply to handle the Sunday and holiday peaks in the summer. The Bay State company's traffic was more dense in the summer months, that in nine representative districts ranging from 26.9 per cent to 48.00 per cent of the yearly total of the groups of lines involved in the months of July, August and September. Regarding analyses of traffic distribution, the point was established that the study of day cards was an unsatisfactory method of attacking this problem. A special and elaborate series of observations for even an approximate determination was necessary in this connection.

#### RAILWAY CAPITALIZES BILLY SUNDAY

Front-end Collectors Assist in Moving 16,000 Persons in Twenty Minutes

The Kansas City (Mo.) Railways, which has aided in advertising the Billy Sunday meeting at Kansas City, was remembered in the prayer of the evangelist the evening of May 12. The next day he gave to the Kansas City *Post* an interview complimenting and thanking the company for its service. In this interview he said:

"It's the best I've ever seen in any city where I've had meetings. I've not heard a single grumble or knock. There's psychology in giving the people good transportation service. It keeps the people of a city in good humor. And when people can come to the tabernacle in good humor they at least have a smattering of Christian spirit. If the street car company and its men can get the people to the tabernacle and home afterward without spoiling their humor the company is doing all in its power to help the Lord. I've noticed how quickly the crowds are carried away after a meeting. I've noticed how quickly the tabernacle fills sometimes. At times it is almost empty and all at once the people will begin streaming in through all doors and it will be packed. I'm glad for this spirit of co-operation of the street car company and all others that are helping."

The Kansas City Railways used the interview the next day, Sunday, in a half page of display space, adding and interpolating references to its service, and the part it plays in the welfare of the community. Above and below the advertisement were the lines, "Brighten the City Where You Are."

The Billy Sunday meetings have brought an increase of about 20 per cent in the gross business of the company, producing the largest week's business in its history, though not any record day. The attendance at the meetings has been from 20,000 to 40,000 a day, and on May 14 the attendance at the various meetings conducted by Sunday and his assistants was estimated at 80,000. The seating capacity of the pavilion is said to be 15,000, but frequently more than 5000 additional visitors fail to get in. W. C. Harrington, superintendent of transportation, uses about 130 extra cars for the service to and from the tabernacle, storing them on dead tracks and in carhouses. The meetings begin soon after the hall is filled. This makes the time of closing uncertain. Mr. Harrington therefore had a push button installed on the platform, and one of Mr. Sunday's assistants pushes the button when the last hymn is announced, thus warning Mr. Harrington. The extra cars are run in on four parallel lines within five blocks of the tabernacle in a few minutes. A crowd of 16,000 persons has been moved away within twenty minutes. Front-end collectors are used on all streets where cars are held for the meetings.

**One-Man Car Hearing Postponed.**—The hearing before the Public Service Commission of the State of Washington in regard to the operation of one-man cars in Spokane, referred to in the *ELECTRIC RAILWAY JOURNAL* of March 11, page 520, was postponed from May 8 to some time between June 5 and 10. Complaint against the operation of the cars by the Inland Empire Railroad and the Washington Water Power Company was made to the commission by the city.

**Conviction in Accident Complicity Case.**—Ben W. Small was sentenced on May 4 at Kansas City, Mo., to four years in the penitentiary for complicity in alleged fraudulent damage actions. He was also charged with having hired false witnesses. The case in which he was convicted involved two women witnesses against the Kansas City Railways. The women confessed, after receiving part of the judgment money, that they had not been near the scene of the accident to which they testified.

**"Puget Sound Electric Journal"** in New Dress.—The *Puget Sound Electric Journal* for May, published in the interest of the Puget Sound Traction, Light & Power Company, makes its appearance in the current issue in a brand new dress and a decidedly improved form made possible by gaining official permission to solicit advertising. For the present, at least, there will no other plan put into effect for handling company news and the personal gossip of the departments. The company payroll supports a community of 10,000 people.



**Hearings Begun in Albany Suburban Fare Increase Case.**—Charles F. Hewitt, general manager of the United Traction Company, Albany, N. Y., was on the stand on May 9 in the hearing before the Public Service Commission for the Second District of New York in connection with the new schedule of the company which would increase the passenger fare between Albany, Troy, Watervliet, Green Island and Cohoes from 10 cents to 15 cents. Included in the company's figures were elaborate studies of increases and decreases of population along its lines and a table showing the number of private automobiles, taxicabs and motor buses that are owned and operated within the company's territory.

**Application for Permission to Operate One-Man Cars.**—A. F. Haas, of the City Council of Seattle, Wash., on application of the Puget Sound Traction, Light & Power Company, has introduced three bills asking for authority to operate one-man cars on the Greenwood Avenue line at Ballard, the Bellevue-Summit line, and the Twelfth Avenue line. A. L. Kempster, manager of the company, states both the Greenwood and the Twelfth Avenue lines are operated annually at a heavy loss. On that account and in order to maintain a satisfactory service, the use of the new type of car is desired. The request has been referred to the franchise committee of the Council.

**Indiana Prize Contest.**—H. A. Nicholl, general manager of the Union Traction Company, Anderson, Ind., announced on May 10 its fifth prize contest. Thirty dollars in gold will be distributed in a first prize of \$15, a second of \$10 and a third of \$5 for the best papers on the subject, "Is the Safety Movement Advanced More by the Cautious, Efficient Employee, or by Mechanical Safety Devices?" The contest is open to all employees except department heads and assistants. All papers must be in the hands of the claim adjuster or the division superintendent on or before June 1, 1916. The winners will read their papers at the next safety-first banquet of the company.

**California Equalization Board Studies the Jitney.**—The State Board of Equalization of California is making an exhaustive study of the jitney question in California with an idea of incorporating in its biennial report, which will be presented to the State Legislature in the fall, some recommendations concerning jitney regulatory measures. In addition to the regular report, the board may issue a special report to Governor Johnson, devoted exclusively to the jitney question, as the State will suffer by the existence of the jitneys to the extent of about \$200,000 in tax income this year, this being 5 per cent of the \$4,000,000 which is the amount that the railroad companies are estimated to have lost on account of jitney competition. While returns have not been received from all of the roads, fifteen electric railroads say that they have suffered income losses that total \$1,500,000 in 1915 from jitney competition.

**San Francisco Grand Jury on the Jitney Question.**—At a recent session of the San Francisco Grand Jury, after a discussion of a report which asserted that jitneys on Market Street are "a menace and danger to life and limb of pedestrians," "an abuse of the public streets," and further declared that failure to abate them constitutes a dereliction of duty, the following resolutions were adopted: "Resolved, That we, the members of the Grand Jury of the city and county of San Francisco, do request the Board of Supervisors, and particularly the judiciary committee thereof, to report and enact immediately, by ordinance, such legislation as will give the police department the permanent right to regulate traffic and provide for the elimination of so-called jitney buses on Market Street, between Seventh Street and the Embarcadero." Prior to this action the matter had been referred to the police and they in turn had ruled that they had no jurisdiction over jitneys. The grand jury committee report states: "Your committee believes it is high time for sworn officers to cease shirking and sidestepping duties which the law imposes on them. The situation, in our judgment, is far too serious to warrant a continuation of the game of battledore and shuttlecock, particularly where human lives are involved. Human lives are hourly endangered because of lamentable inaction and a woeful disregard of public rights. Politics, for once, should be brushed aside."

## Personal Mention

Mr. D. W. Snyder, Jr., Jefferson City, Mo., has been appointed superintendent of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., vice Mr. M. G. Linn.

Mr. J. M. Wood has been appointed carhouse foreman and inspector of service of the Detroit (Mich.) United Railway, with jurisdiction over the movement of all cars or trains within the city limits of Flint.

Mr. Wilford Phillips, general manager of the Winnipeg (Man.) Electric Railway, has returned to Winnipeg from California and resumed his duties after a four months' vacation, much improved in health.

Mr. W. C. Miller, formerly in charge of the overhead lines of the Fox & Illinois Union Railway, Aurora, Ill., has been appointed general manager and purchasing agent of the company, to succeed Mr. F. M. Zimmerman, resigned.

Mr. M. G. Linn, formerly superintendent of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., has been appointed general manager of the Des Moines (Iowa) Electric Company, vice Mr. W. H. Thomson, resigned.

Mr. L. H. Lathrop, for the last five years general superintendent of the Menominee & Marinette Light & Traction Company, Menominee, Mich., has resigned to accept a similar position with the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.

Mr. James G. Haworth has accepted a position as chief engineer at the Anderson, Ind., power house of the Union Traction Company of Indiana, succeeding Mr. Frank Vestal. Mr. Haworth was graduated from Purdue University in 1910 with the degree of mechanical engineer.

Mr. Allan Purvis, superintendent of the Canadian Pacific Railway at London, Ont., has been promoted to general superintendent of the Eastern Division, with headquarters at Montreal, Que. Mr. Purvis was formerly manager of the interurban lines of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

Mr. L. G. Ireland has resigned as general manager of the Brantford (Ont.) Municipal Railway and the Brantford Electrical Commission to become connected with the Ontario Hydro Commission on the new Eastern Ontario power development project. Ireland was with the Hydro Commission for five years before going to Brantford.

Mr. R. F. Palmblade has been appointed acting general superintendent of the Jefferson City Light, Heat & Power Company and the Jefferson City Bridge & Transit Company, Jefferson City, Mo., vice Mr. D. W. Snyder, Jr. Mr. Palmblade will report to Mr. E. D. Bell, superintendent of the St. Louis Electric Terminal Railway, Illinois Traction System.

Mr. Max J. B. McConnell, chief clerk to Mr. Edward J. Cook, general manager of the New York State Railways, Rochester Lines, has been appointed assistant engineer of maintenance of way of the company. For a number of years after his graduation from Ohio State College Mr. McConnell was connected with the engineering department of the Pennsylvania and the Wabash Railroads. In February, 1913, he entered the service of the Rochester office of the New York State Railways.

Dr. J. T. Merz, owing to advancing years and increasing responsibilities, retired from the chairmanship of the Newcastle Electric Supply Company toward the end of last year, but was induced to continue his association with the directorate in the capacity of vice-chairman. At the annual meeting held recently, tributes to Dr. Merz's work on behalf of the company over a long period of years were paid by Mr. J. H. Armstrong, the new chairman, and by Dr. G. B. Hunter. Dr. Merz was one of the founders of the company twenty-seven years ago. He has served as chairman since 1901. The Newcastle Electric Supply Company has played a notable part in the industrial developments of Tyneside.



## OBITUARY

Lewis C. Sanford, secretary and treasurer of the Broadway Subway & Home Boroughs Car Advertising Company, a subsidiary of the Brooklyn (N. Y.) Rapid Transit Company, died on May 14 at his home in Brooklyn from heart disease. Mr. Sanford was thirty-six years old. He was appointed to the Brooklyn Rapid Transit Company in 1899 at the Fifty-second Street shops as an electrician's helper. In 1901 he was made receiver at the Unionville depot. In February, 1903, he was made receiver in the general office. In 1904 he was appointed chief clerk in charge of the records in the secretary-treasurer's department. In January, 1908, he was appointed acting assistant secretary of the Brooklyn Rapid Transit Company. In March, 1908, he was appointed assistant secretary. In April, 1915, he was appointed secretary and treasurer of the Broadway Subway & Home Boroughs Car Advertising Company, the new company organized to handle the Brooklyn Rapid Transit Company advertising. Mr. Sanford is survived by his widow and two children.

William Stanley, noted electrical engineer, died at his home in Great Barrington, Mass., on May 14. Mr. Stanley was born in Brooklyn, N. Y., on Nov. 22, 1858. He entered Yale in 1881, but left the university in his freshman year and took up the study of electricity by himself. In 1879 he became acquainted with Hiram Maxim, then chief engineer of the United States Electric Light Company, New York, and subsequently became assistant to Mr. Maxim. Mr. Maxim went to Europe and Mr. Stanley continued for a while as assistant in the Weston Electric Light Company, Newark, N. J., which had absorbed the Maxim Company. During his subsequent connection with the Swan Electric Light Company, Boston, Mass., Mr. Stanley invented and perfected an improved method of exhausting incandescent lamp bulbs. While in Pittsburgh in 1885 he devised the "multiple" system of alternating-current distribution. This was followed by the invention of an alternating-current generator by Mr. Stanley. In 1890 he moved to Pittsfield, and took into association C. C. Chesney. The Stanley Electric Manufacturing Company was formed to manufacture the devices invented, but was later amalgamated with the General Electric interests. In 1894 the alternating-current system of long distance transmission of power by the Stanley invention was successfully demonstrated. In this work Mr. Stanley collaborated with Mr. Chesney and Mr. Kelly, producing the famous "S. K. C. system." Of recent years Mr. Stanley had been engaged in consulting work with the General Electric Company. In 1913 Mr. Stanley was awarded the Edison medal, the fourth to receive this honor.

## HOT SPRINGS STREET RAILWAY PRAISED

The Hot Springs *New Era* said recently:

"The slogan of the Hot Springs Street Railway is: 'Service, That's What Counts,' and the management and employees of this company, during the racing season, have given a splendid demonstration of the advantage of having a motto and living up to it.

"For more than three weeks the company was taxed to care for the big crowds that attended the races daily. On one day recently it handled the double crowd at Oaklawn, the circus and the races, and every day the service was the same—safe, sure and reliable.

"Every day the service was carried on over a single thoroughfare, crowded with speeding automobiles, vehicles, trucks and pedestrians, and every minute required careful handling in loading, running and unloading the cars. The equipment was plentiful, and at each end of the line competent employees looked after the loading and departure of the cars. At Oaklawn the visitors were accorded simple and clear instructions as to the manner of entering the grounds and the collection of fares, while every safe expedient was used to load and return the crowds quickly after the races were over.

"If there was a single complaint during the racing season, it has not been heard. On the other hand, there were thousands of expressions commending the service.

"General Manager S. E. Dillon, Superintendent Butterfield and every other employee of the company is entitled to the highest commendation for strict adherence to the company's policy—'Safety First, and Service.'"

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

## RECENT INCORPORATIONS

**Ardmore (Okla.) Railway Company.**—Application for a charter has been made by the Ardmore Railway Company to succeed the Ardmore Electric Railway. Incorporators: I. M. Putnam, Wirt Franklin, S. Appel, Edward Gault and Roy M. Johnson.

## FRANCHISES

**Pine Bluff, Ark.**—The Hot Springs, Pine Bluff & Mississippi River Railway has received a thirty-seven-year franchise to construct a line in Pine Bluff. [Jan. 1, '16.]

**Stockton, Cal.**—The Tidewater & Southern Railroad has received a franchise from the Council to electrify the tracks of the Western Pacific Railroad on Hunter Street from Eighth Street to Hazelton Avenue, thence east on Hazelton Avenue to a point near Aurora Street.

\***Barton, Fla.**—A franchise has been granted for the construction of an electric railway from Bartow to Lakeland and Winter Haven, about 25 miles. Address County Commissioners for further information.

**Kankakee, Ill.**—The Kankakee Electric Railway has received permission from the Public Utilities Commission of Illinois to remove its tracks on South Washington Avenue between Hawkins and Jeffery Streets.

**Chelsea, Mass.**—The West End Street Railway has asked the Council for a franchise to relocate its tracks on Central Avenue and Hawthorn Street from Highland Street to Pearl Street, and on Pearl Street from the drawbridge at Chelsea Creek to Park Street.

**Detroit, Mich.**—The Detroit United Railway has asked the Council for a franchise to extend the Trumbull line both north and south. The company proposes to continue the line south from Michigan Avenue to connect with the tracks of the Fort line. Northbound it is proposed to continue the line to connect with the Grand Belt line, then west to Twelfth Street and north on Twelfth Street to connect with the Oakman Boulevard line.

**Kansas City, Mo.**—An ordinance has been introduced in the City Council of Kansas City to permit the Kansas City Railways to remove its tracks from McGee Street between Fifteenth and Nineteenth Streets. McGee Street adjoins the city's widest downtown street, Grand Avenue, on which there are tracks. Should the ordinance be passed, the company would be relieved of an obligation in the present franchise to build an extension of its lines on McGee Street southward and thence to the union station.

**St. Louis, Mo.**—The United Railways has asked the Board of Public Service Commissioners for permission to construct a loop on the Market Street line, near Tamm Avenue, in order to accommodate the crowds visiting the Zoo and Art Museum.

**Cincinnati, Ohio.**—The Cincinnati, Milford & Loveland Traction Company has asked the Council for permission to erect poles and string wires along Wooster Pike, Plainville Pike and other sections of the country to enable it to convey electric current for lighting and power.

**Philadelphia, Pa.**—The Philadelphia Rapid Transit Company has asked the Council for a franchise to construct a line on Fifty-sixth Street between Paschall and Lancaster Avenues.

**Nashville, Tenn.**—The Nashville Traction Company has asked the Board of Commissioners for permission to remove its tracks from Twenty-fifth Avenue.

**Dallas, Tex.**—The Dallas Southwestern Traction Company and the Dallas Northwestern Traction Company have received a six-months' extension of time on their franchises in which to begin construction of their proposed lines to Glen Rose and Denton respectively. [Nov. 6, '15.]



## TRACK AND ROADWAY

**Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.**—It is reported that this company contemplates the construction of an extension of its Cansler Avenue line from Fifth Street, Alabama City, to the Louisville & Nashville Railroad.

**Calgary (Alta.) Municipal Railway.**—The city commissioners have accepted the bid of the General Supplies, Ltd., Calgary, for 100 tons of 60-lb. rails in 60-ft. lengths at \$30 per long ton of 2240 lb., and 1000 square cedar ties at 30 cents each, to be used in construction of the temporary street railway line to Sarcee military camp.

**Pacific Electric Railway, Los Angeles, Cal.**—Work has been begun by this company on the construction of an extension to the Childs' tract, Glendale. Ultimately the road will be extended south to the Tropic line and thence to the Pacific Electric main line at Cypress Street.

**Municipal Railways of San Francisco, San Francisco, Cal.**—Negotiations are under way for an extension of the Municipal Railway line north in Baker Street from Greenwich Street to the bay shore. The new extension will cover the route of the old Harbor View line, which formerly ran down Baker Street, and which was removed before the exposition. The cost is estimated at \$50,000.

**Connecticut Company, New Haven, Conn.**—This company will reconstruct its track on Whiting Street, Plainville.

**\*Sarasota, Fla.**—Plans are being made for the construction of an electric railway from Tampa to Venice, about 68 miles. A. Evans Townsend, electrical engineer, Sarasota, is interested.

**Union Traction Company, Anderson, Ind.**—This company has construction forces at work improving its parks over the system. The improvements to Broad Ripple Park and Mounds Park are the most extensive.

**Fort Madison (Ia.) Street Railway.**—This company reports that its line is being entirely rebuilt.

**Salina (Kan.) Street Railway.**—This company states that it expects to place contracts within the next few weeks for 2000 ft. of new track.

**Shelbyville & Frankfort Realty Company, Shelbyville, Ky.**—It is reported that this company plans to construct three bridges in connection with its proposed electric railway from Shelbyville to Frankfort. J. W. Gudgel, Shelbyville, secretary. [April 22, '16.]

**Winnipeg (Man.) Electric Railway.**—This company is considering the extension of its Academy Street line to the Midland Railway of Manitoba and of its Talbot Avenue line from Roland to Cameron Streets.

**United Railways & Electric Company, Baltimore, Md.**—Work has been begun by this company on the construction of a 1-mile extension of its St. Paul Street line to Guilford.

**\*Minneapolis, Minn.**—Plans are being prepared under the direction of the city engineer for a municipal street railway from Thirty-second and Central Avenues to the city filtration plant, to cost about \$40,000.

**American Traction Company, Minneapolis, Minn.**—This company reports that its line connecting International Falls, Ranier and South International Falls, Minn., and St. Francis, Ont., 6¾ miles, will be electrified. Gasoline service is being used temporarily. A. L. Sorter, Minneapolis, president.

**Twin City Rapid Transit Company, Minneapolis, Minn.**—This company will replace its wooden bridges over the tracks at Deephaven, Tonka Avenue and Fair Oaks with bridges of steel and concrete.

**Kansas City, Mo.**—Steps have been taken by the City Council of Kansas City, Mo., to ascertain the possibility of purchasing the inter-city viaduct between Kansas City, Kan., and Kansas City, Mo., which shortens the traffic distance materially between the two cities. It is said the owners have made an offer to sell at about \$2,000,000, considerably less than the reputed cost. The street railway tracks on the viaduct have not been used for several years. The plans for the new Central Avenue viaduct, also crossing the Kaw River and providing for most of the street car travel between the cities, apparently do not take into consideration any prospect of using the tracks on the inter-city

viaduct, which is, however, of much value as a toll bridge for vehicular traffic.

**Brooklyn (N. Y.) Rapid Transit Company.**—Bids were opened by the Public Service Commission for the First District of New York for the construction of Section 4, a part of the new Eastern District subway. The line extends from Sixth Avenue, Manhattan, under Fourteenth Street, to and under the East River to North Seventh Street, Brooklyn, thence under North Seventh Street, Metropolitan Avenue, Bushwick Avenue and Johnson Avenue to a connection with the right-of-way of the Evergreen branch of the Long Island Railroad, where the line will become an elevated structure and continue over the right-of-way to a connection with the Broadway line, thence to East New York. The two lowest bidders were Mason H. Hanger Company at \$1,847,000 and F. L. Cranford, \$2,161,000.

**Buffalo & Depew Railway, Buffalo, N. Y.**—This company will construct an extension to Bowmansville, 2 miles, and to the New York Central station at Lancaster, ½ mile.

**New York State Railways, Rochester, N. Y.**—It is reported that a new scenic railway to cost about \$25,000 is to be erected by this company at Sea Breeze.

**Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.**—The bond issue to aid in the construction of this company's proposed line from Ossipee to Durham was defeated at a recent election in Durham and Patterson townships. It is proposed to raise the necessary amount by subscription, several offers to take stock having been made. Junius H. Harden, Burlington, president. [Oct. 9, '15.]

**Goldboro (N. C.) Electric Railway.**—This company reports that it will construct a 1½-mile extension to the new fair grounds.

**Dayton & Troy Electric Railway, Dayton, Ohio.**—It is reported that this company contemplates the construction of an extension from Piqua to Fort Loramie.

**Youngstown & Niles Railway, Youngstown, Ohio.**—The Public Utilities Commission of Ohio has authorized the Youngstown & Niles Railway to issue \$100,500 common stock, which will be given to the Mahoning & Shenango Railway & Light Company for money advanced for improvements. J. P. Wilson, Youngstown, president. [April 22, '16.]

**Oklahoma (Okla.) Railway.**—A report from this company states that its extension from Edmond to Guthrie, 16 miles, will be placed in operation on July 1.

**Sand Springs Railway, Tulsa, Okla.**—This company reports that it is building 5 miles of double track. All material for the construction has been purchased.

**Port Arthur (Ont.) Civic Railway.**—This company will reconstruct about ½ mile of track from Argyle Street to Arthur Street.

**Toronto (Ont.) Civic Railway.**—This company has under construction a ¾-mile extension on Lansdowne Avenue, off St. Clair Avenue.

**Montoursville (Pa.) Passenger Railway.**—A report from this company states that it will extend its line 1½ miles, 0.6 mile to be span-wire construction and 0.9 mile bracket construction. The company will be in the market for 56-lb. relaying T-rails.

**Philadelphia, Pa.**—Work was resumed by the Keystone State Construction Company on May 6 on the Broad Street subway and island station under City Hall.

**Eastern Pennsylvania Railways, Pottsville, Pa.**—It is reported that this company will expend about \$500,000 for improvements to its system. The company will put up about 40 miles of new wire this summer.

**Tennessee & Kentucky Railroad, Nashville, Tenn.**—Surveys have been completed of this company's proposed line from Nashville, Tenn., to Russellville, Ky., via Springfield, Orlinda and Adairville, 54 miles. It is reported that construction of the line will be begun immediately. It is also planned to construct a branch line from Orlinda, Tenn., to Frankfort, Ky., 14 miles. [Nov. 21, '14.]

**Southern Traction Company, Dallas, Tex.**—It is reported that this company is considering the construction of an extension from Waco to Taylor, about 70 miles.



Ogden, Logan & Idaho Railway, Ogden, Utah.—It is reported that plans are being considered by this company for the construction of an extension from Preston to Grace.

Emigration Canyon Railroad, Salt Lake City, Utah.—This company reports that it contemplates the construction of a 3-mile extension south to East Mill Creek.

\*Williamsburg, Va.—The city of Williamsburg has invited bids for the construction of an electric line. W. L. Jones, president City Council.

#### SHOPS AND BUILDINGS

International Railway, Buffalo, N. Y.—It is reported that this company will construct a new fireproof station at West Avenue and Transit Street, Lockport, to replace the old wooden structure. It is estimated that the cost will be about \$15,000.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York will open bids on June 1 for the construction of station finish on Sections Nos. 12 to 15 of Route No. 5, the Lexington Avenue subway. The stations to be finished under this contract are 110th Street, 116th Street, 125th Street, Third Avenue and 138th Street, Mott Haven and 149th Street. The commission is already advertising for bids for station finish on Sections Nos. 7 to 11, inclusive, embracing the southern part of the line, to be opened May 25.

Durham (N. C.) Traction Company.—A new office building for the Durham Traction Company is under advisement. This building will be erected in one end of the business section where a suitable location has been found on a corner plot for an excellent display of interior and exterior lighting, good display windows and salesroom. It is planned to equip the top floor for clubrooms with reading, writing and bathrooms and a few bedrooms.

Toronto (Ont.) Civic Railway.—Bids will be received until May 23, through registered post only, addressed to the Chairman, Board of Control, City Hall, Toronto, for the complete construction of a steel-frame, brick-faced tile addition to the St. Clair Avenue carhouse on Christie Street, including heating plant. Specifications and forms of tender may be obtained upon application at Room No. 311, Department of Works, City Hall, on payment of \$10, this sum to be refunded upon return of plans.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—New stations will be built by this company at Kaysville and Clinton. The plans for the Kaysville station have been completed and approved by the Council at Kaysville. The building will be 40 ft. x 90 ft., of brick construction, and will cost approximately \$5,000. The station at Clinton will be similar to the one now at Layton and will cost about \$3,500.

#### POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway Company, Ltd., Vancouver, B. C.—This company is completing the construction and equipment of its substation near Horne Payne station on the Burnaby Lake line, which was delayed two years ago.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—The City Council of Brazil has awarded a contract to this company for lighting the streets of the city for a period of three years.

Shelbyville & Frankfort Realty Company, Shelbyville, Ky.—This company contemplates the construction of two power houses in connection with its proposed electric railway from Shelbyville to Frankfort. J. W. Gudgel, secretary.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Among the improvements being contemplated by this company is the enlargement of its Lake Street substation, increasing the output by 33 1/3 per cent.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio.—This company reports that it will build a new substation at Plymouth during the summer.

Ashland Light, Power & Street Railway Company, Ashland, Wis.—This company reports that it is adding a 5000-kw. General Electric turbine to its power station in Ashland.

## Manufactures and Supplies

#### THE CAST-IRON WHEEL INDUSTRY

In view of the congested conditions of the steel market and the consequent increasing interest of railway companies in the use of cast-iron wheels, a representative of this paper recently had an interview with G. W. Lyndon, president Association of Manufacturers of Chilled Car Wheels. Mr. Lyndon was asked to state the situation in the chilled wheel industry. He said that the prices for chilled-iron wheels are practically the same as they have been for a number of years and that the factories are running from 60 to 70 per cent of their output, which is the best this industry has experienced for the past nine years. Continuing, he said:

"It is a singular fact that in this era of invention so much is said of the new things that are developed from day to day and so little attention is paid to the things that have been so conspicuously prominent in the development of the world's progress. This is precisely what is happening in the case of the chilled-iron car wheel. Ever since railroad-ing began, the chilled-iron wheel has been the one important factor in the nation's growth, because without wheels commerce could not be moved, and without the chilled-iron wheel the nation's commerce would be paralyzed.

"The 25,000,000 chilled-iron car wheels in use to-day under freight cars, passenger cars, engine tenders, street cars and on private car lines will give an idea of the magnitude of the business, serving as they do under 97 per cent of the freight cars in use and carrying the local passenger traffic of ninety-five out of every 100 cities in the United States and Canada, which operate 100 street cars or more.

"Twenty-five million car wheels represent about 8,500,000 tons of metal, and it will be interesting to know where this material comes from, its method of delivery and the economy of its use, because unless it was reliable and at the same time economical, it would not have withstood the attacks of other metals for two-thirds of a century.

"Chilled-iron car wheels were originally manufactured direct from pig iron, but as the business grew to such stupendous proportions it became necessary to economize in the use of pig iron and find a market for old worn-out wheels. This is accomplished by remelting the old wheels to the extent of from 40 to 60 per cent of the new wheel, and old wheels are as staple as sugar, commanding a fixed price per ton, and are accepted as part payment for the new wheel. It will thus be seen that when the business becomes established the question of material for the new wheel is partly provided for to the extent of some 40 to 60 per cent, and all new wheels (excepting for new cars) are sold on an exchange basis, which means that for each new wheel sold an old wheel is accepted as part payment.

"In the Association of Manufacturers of Chilled Car Wheels twenty-four manufacturers are represented, and some of these operate branch foundries, so that, taken as a whole, there are in the United States and Canada more than fifty car-wheel foundries located in many of the prominent cities from the Atlantic to the Pacific. These foundries represent a capacity of 20,000 car wheels a day, which is much greater than the demand, except during a heavy car-building season. The business, therefore, is flexible, and increased demands simply require an increase of output, but the manufacturer usually carries a heavy stock of old wheels, and in times such as these anticipates his requirements and contracts for his pig iron and other supplies ahead. Therefore, the chilled-iron car wheel manufacturers can always meet extraordinary demands, and the market conditions are not as subject to extraordinary changes as other materials. There never has been a time when the chilled-iron car wheel manufacturers were unable to meet the demands, and they can do so now even in the face of the fact that hundreds of thousands of chilled-iron wheels have been shipped to foreign countries within the past year, where they are rapidly supplanting the old European standards.



"Some cities which temporarily abandoned the chilled-iron car wheel for electric car service and experimented with other types have returned to the chilled-iron wheel, because their operation is never hampered by uncertain deliveries, which has been known to be the case with other types of wheels.

"Considered from a scientific productive standpoint, there is no metal in the iron class that is sold so cheaply as the chilled-iron wheel, and there is no metal sold in the iron group that has less fluctuation in price.

"Ever since its introduction in the year 1850 the price has gone steadily downward, and one of the principal reasons for this lies in the fact that the wheels are manufactured and distributed from so many different parts of the country. If there was one central point of manufacture, the price would be partially dependent upon the freight rate, and the freight rate in many cases is more than the profit on a shipment going to a point from 500 to 1000 miles from the factory. Therefore, with fifty car-wheel foundries located in different parts of the country, the factory that is most accessible to the point of delivery secures the business because there are no freight charges. It is thus shown upon what a small margin of profit car wheels are sold, and this economic principle has rendered their use almost universal. Every manufacturer, however, makes a special wheel and is enabled to put this wheel on the market at a higher price than the ordinary wheel. Therefore, special wheels find their way to all parts of the country."

ROLLING STOCK

Princeton (W. Va.) Power Company expects to purchase a freight car.

Citizens' Railway, Clarksville, Tenn., is contemplating the purchase of one or two cars.

Miami (Fla.) Traction Company has ordered two motor cars to be delivered in August.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, will rebuild two passenger cars.

Kensington (Md.) Railway is negotiating for the purchase of one standard sixty-passenger car.

Boston (Mass.) Elevated Railway, in a fire on the elevated lines at Forest Hills on May 11, had four cars partially destroyed.

West Chester (Pa.) Street Railway has ordered from The J. G. Brill Company two double-truck all-steel passenger cars to be equipped with 4 Westinghouse 632 B motors and Westinghouse air brakes.

Toronto (Ont.) Civic Railway, through the chairman of the Board of Control, will receive tenders until May 23 for one single-truck double-end car completely equipped, one single-truck double-end car body, electrical equipment for one single-truck car and single truck for one car.

Worcester Consolidated Street Railway, Worcester, Mass., noted in the ELECTRIC RAILWAY JOURNAL of May 13, as having received a sample prepayment car from the Osgood-Bradley Car Company, is reported as having ordered ten cars of the same type from the same carbuilder for delivery by Sept. 1.

Southwest Missouri Railroad, Webb City, Mo., noted in the ELECTRIC RAILWAY JOURNAL of April 15 as having ordered five cars from the American Car Company, has specified the following details for this equipment:

Seating capacity .....44  
 Bolster centers, length, 23 ft. 2 in.  
 Length of body .....32 ft.  
 Length over vestibule, 43 ft. 2 in.  
 Width over sills, 8 ft. 5 1/2 in.  
 Width over all .....8 ft. 11 in.  
 Height, rail to sills, 35 3/4 in.  
 Sill to trolley base, 9 ft. 4 3/4 in.  
 Body, Wood and metal  
 Interior trim, 1/4-in. polished bronze  
 Headlining .....Agasote  
 Roof .....Monitor  
 Underframe .....Metal  
 Axles .....Brill  
 Bumpers .....Am. Car  
 Cables .....G. E.  
 Car trimmings .....Brill  
 Control .....G. E.  
 Couplers .....West  
 Curtain fixtures, Curtain Supply  
 Curtain material .....Pantasote  
 Destination signs .....Hunter

Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., will shortly place in service on the Holt line an all-steel semi-convertible center-entrance car built by The J. G. Brill Company.

Toledo Railways & Light Company, Toledo, Ohio, noted in the ELECTRIC RAILWAY JOURNAL of May 13 as having ordered fifty cars from the G. C. Kuhlman Car Company, with an option to increase the number to one hundred, has exercised this option.

Detroit (Mich.) United Railway, noted in the ELECTRIC RAILWAY JOURNAL of April 22 as having ordered eight 58-ft. 3 1/2-in. single-end interurban cars from the Niles Car & Manufacturing Company, has specified the following details for this equipment:

Seating capacity .....50  
 Weight of car body, 36,000 lb.  
 Bolster centers, length, 34 ft. 2 1/2 in.  
 Length of body, 45 ft. 11 in.  
 Length over all, 56 ft. 5 1/2 in.  
 Width over sills, 8 ft. 2 1/2 in.  
 Height, rail to sills, 42 1/2 in.  
 Height, sill to trolley base, 9 ft. 3 in.  
 Body .....Wood  
 Interior trim .....Mahogany  
 Headlining .....Agasote  
 Roof, Monitor, steam coach hoods  
 Underframe .....Steel  
 Air brakes, West. A M M  
 Bumpers .....Rico anti-climbers  
 Cables .....G. E.  
 Control .....G. E. Type M  
 Couplers, Tomlinson radial M C B  
 Curtain fixtures, Forsyth No. 88 ring fixtures  
 Rex all-metal rollers  
 Curtain material .....Pantasote  
 Destination signs, Hunter  
 Fenders .....Ry. Standard  
 Gears and pinions, G. E.  
 Gongs .....Ry. Standard  
 Hand brakes .....Peacock  
 Heaters, Peter Smith hot water No. 1C  
 Headlights .....G. E. D-16-Y  
 Journal boxes, Standard C-80  
 Motors, 4 West. No. 303, inside hung  
 Registers .....Ohmer  
 Sanders, Ry. standard with O-B sander  
 valves  
 Seats, Hale & Kilburn No. 199 E E  
 Seating material, Main compartment, dark green  
 frieze plush  
 Smoker, dark green leather  
 Step treads .....Mason  
 Trolley retrievers, Knutson No. 2  
 Trolley base, U. S. No. 13  
 Trucks, Standard C-80P  
 Window fixtures, National L. W. sash locks

TRADE NOTES

Goldschmidt Thermit Company, New York, N. Y., has moved its offices from 90 West Street to the Equitable Building, 120 Broadway.

General Electric Company, Schenectady, N. Y., has received an order for motor equipment for twenty-five cars from the Kansas City (Mo.) Railways.

Ford, Bacon & Davis, New York, N. Y., have been retained as experts to examine the property of the Empire United Railways for certain bondholders.

O. D. Cleveland, Southern traveling representative of the Walter A. Zelnicker Supply Company, St. Louis, Mo., has opened an office at 910 Hennen Building, New Orleans, La.

Roller-Smith Company, New York, N. Y., announces that it has outgrown its present quarters and will move immediately to much larger offices in the Woolworth Building.

M. Welte & Sons Company, New York, N. Y., will move in the next few days to larger quarters at 667 Fifth Avenue, where they will be better equipped to handle their greatly increased business.

Terry Steam Turbine Company, Hartford, Conn., has appointed O. E. Thomas, 626 Washington Building, Los Angeles, Cal., as district sales manager for Arizona and the southern parts of California and Nevada.

W. H. Coverdale and W. W. Colpitts announce that the practice of W. H. Coverdale & Company, Inc., consulting engineers, will hereafter be conducted under the firm name of Coverdale & Colpitts at 66 Broadway, New York.

William R. Garton, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL for May 13 as having been elected vice-president of the Lansden Company, Inc., Brooklyn, N. Y., has also been appointed general sales manager in charge of engineering.

Railway Improvement Company, New York, N. Y., has received an order for 132 anti-climbers from the San Antonio (Tex.) Traction Company for use on present equipment, and also an order to equip with anti-climbers the thirty cars which are now being built for this company.

Stephen L. Coles, New York, N. Y., public utilities engineer, has opened an office at 1 Wall Street. He will specialize in the following matters: harmonizing relations between public utility corporations, the public and the press; organizing publicity and advertising departments for central stations, railway companies and manufacturers; establishment of new, and development of existing service policies for public utilities.



Stephen L. Selden has resigned as vice-president of J. G. White & Company, Inc., and has resumed the practice of law. He has associated himself with Hardie B. Walmsley and Francis L. Kohlman, heretofore the firm of Walmsley & Kohlman. The new firm will practise under the name of Selden, Walmsley & Kohlman at 61 Broadway, New York.

H. L. Brownell, public safety engineer of Chicago, formerly in charge of the safety work department of the Chicago Surface Lines, has been retained by the United Railways, St. Louis, Mo., to deliver a course of lectures on "Safety First" to the employees of the company. Mr. Brownell will also deliver a series of lectures in the parks of St. Louis under the direction of Charles M. Talbert, director of streets and sewers of the city.

Philadelphia Toboggan Company, Philadelphia, Pa., has within the last two years made a specialty of constructing for parks and resorts a type of large roller coaster which it has named the "Jack Rabbit." Several of these equipments are now under construction. The name is suggestive of the nature of the ride given the patron in the coaster trains composed of richly upholstered and finished cars. This company has supplied numerous street railways with its standard carousels and coasters. One of its finest carousels is located in Sydney, Australia. Some railway companies arrange with the manufacturer to furnish them with plans, specifications, cars, machinery, etc., and then build the structure themselves, an economical method in some localities.

#### ADVERTISING LITERATURE

National Transit, Pump & Machine Company, Oil City, Pa., has issued Bulletins 404 and 405, describing its horizontal gas engines.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-39, superseding E-36, describing and illustrating its electric grinders.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder describing the Ohmer efficiency buttons which are designed for use by the railways using the Ohmer system to offer as prizes to the men who make the best records.

American Engineering Company, Philadelphia, Pa., has issued Fuel Burning Reports, No. 1, which gives the results of a number of tests which have been made with the Taylor stoker by several railways and various other plants, using the lowest grades as well as the highest grades of fuels.

J. G. White Companies, New York, N. Y., have issued a booklet entitled "Modern Development in the Sugar Industry," announcing the organization of a sugar engineering department and the complete service which the various departments of these allied companies are prepared to render to this industry.

Hemphill, White & Chamberlain, New York, N. Y., have issued a pamphlet, "The House the Railroads Built." It is, in short, a comparison of the structure of railroad securities to the structure of a dwelling. In their conclusion the bankers say: "First mortgage bonds have been defaulted, but financial history has yet to tell of loss through the default of a properly guaranteed terminal bond."

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued a pamphlet which illustrates a tool steel pinion which has given nine times as much life as ordinary untreated steel pinions in identical service and is not nearly worn out. This company has reprinted its advertisement which appeared in the March 6, 1915, issue of the ELECTRIC RAILWAY JOURNAL and is mailing this folder with the above mentioned pamphlet.

Ohio Brass Company, Mansfield, Ohio, in the *O-B Bulletin* for March-April, 1916, prints an illustrated article on the Chicago, Milwaukee & St. Paul electrification, on which many of its materials are used. It also contains a short article on the work done by the Portland Railway, Light & Power Company during the "silver" thaw on Feb. 2 and 3, when all services dependent upon overhead wires, which were ice incased at the time, were tied up.

Railway Improvement Company, New York, N. Y., has issued a folder which contains a list showing the efficiency record obtained by a large number of electric railways

through the use of the coasting recorder. The folder also contains illustrations of prizes, consisting of a rolled-gold watch fob, a button and a pin, which were awarded to motormen of the Denver (Col.) Tramway for the highest coasting efficiency records obtained.

Charles I. Earll, New York, N. Y., is now distributing Bulletin M, describing Earll trolley catchers Nos. 7 and 10 and retrievers Nos. 4-A and 5-A. This publication is a model of its kind, for it not only describes the construction of each device in detail, but has many easily understood illustrations and full directions for installation and maintenance. Earll catchers have been on the market for ten years and Earll retrievers for fifteen years, so that those described in this latest publication are the outcome of many years of practical experience on hundreds of roads.

Armstrong Cork & Insulation Company, Pittsburgh, Pa., has issued a book on Nonpareil high-pressure covering for heated surfaces. This book describes comparative tests, as a result of which the heat losses from various sizes of both covered and uncovered pipe have been definitely fixed and tabulated. The book also contains tables, which show, in a general way, the most economical thicknesses of Nonpareil high-pressure covering to use, based on different steam costs. A complete set of specifications, covering the correct installation of the various thicknesses of covering, are also given.

Atlantic Welding Corporation, New York, N. Y., has issued a pamphlet on "Automatic Welded Rail Joints." In this process the plates are welded for their entire length to both the case and the head of the rail, the method differing from all others in the use of a traveling carriage on which the welding electrode moves at a predetermined rate of speed and along exactly the desired points. Reliance on the uncertainties of the human hand and brain is thus eliminated. The welding current is produced by a motor-generator set to avoid losses through resistors. A considerable number of these joints has already been installed on the lines of the Brooklyn Rapid Transit System and the Third Avenue Railway, New York.

W. S. Barstow & Company, Inc., New York, N. Y., have issued a pamphlet entitled "Industrial Opportunities in Sandusky, Ohio." The pamphlet contains every item of information concerning the Ohio city which would be of value to an investor seeking a location for a new industry. The information is compiled under the following headings: Population, natural resources, agricultural resources, transportation facilities, public utilities, financial resources, existing industries, factory buildings and sites, educational institutions, health conditions, religious institutions, civic improvements, labor conditions, commercial and industrial organizations, secret and social organizations, amusements and general information. This pamphlet is issued in pursuance of the Barstow policy of assisting in all possible ways the industrial development of communities in which the company operates public utilities. Similar pamphlets are in course of preparation for the other cities whose utilities are controlled by the General Gas & Electric Company, the Barstow holding corporation.

#### NEW PUBLICATIONS

The Industrial Arts Index for 1915. H. W. Wilson Company, White Plains, N. Y., and New York City. 509 pages. Price, \$7 and also on the service basis.

This is a complete index of some eighty engineering and trade periodicals. A few of the English publications are included, but for the most part the papers indexed are American periodicals. The proceedings of the A.I.E.E., A.S.M.E. and other engineering societies, as well as the publications of various government bureaus at Washington are among those indexed. The need of such an index, in view of the large number of engineering publications, is great, and the publishers have done their work in very creditable form. The annual, like the single numbers of the Industrial Arts Index, is also sold on the "service" basis, that is, depending upon the number of periodicals taken by the purchaser which are indexed in the publication. Under this plan the price varies according to the use which the purchaser can make of the index and so puts the subscriber to a few publications on the same "service" basis as the subscriber to a large number.