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NEW YORK, SATURDAY, DECEMBER 3, 1910.

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The New Committee on Signals

At the suggestion of President Brady, of the American Association, the Transportation & Traffic and the Engineering associations have decided to appoint a joint committee to study and report on signals for interurban electric railways. The art of signaling as applied to electric railways is in its infancy and this new committee cannot be expected in the first year of its existence to do more than to recommend a few fundamental requirements for adequate and safe systems of signals. This by itself, however, would be of very great benefit to the electric railway industry. In view of the recent action of the convention of the National Association of Railway Commissioners in adopting a recommendation for the enactment of laws requiring interurban electric railways to be equipped with adequate block signals, the appointment of a joint committee on signals has come none too soon. To be of help to the industry the railway association must keep ahead of the times in matters of this kind. The conclusions of the committee will have great weight with those companies which are or soon will be considering the installation of signals and it is to be hoped that they may be instrumental in staving off hasty and unreasonable legislative action.

Courtesy in Travel

No person can travel to any extent on the rapid transit lines in the large cities of this country, or even on many trolley lines, without being impressed by the frequent—we might say general—disregard by passengers of many of the most ordinary rules of courtesy and politeness. This thoughtlessness, to use a complimentary term, is displayed in the scramble for seats on a crowded car or train when it stops to receive passengers. The rush hour is well named, because at that time, at every stop, there is a rush for seats in which the strongest and those that are best able to stand usually win. Women and aged people are pushed aside by young men and boys and have to take what is left or else stand. This condition is a comparatively recent development in this country, and, whatever its cause, should be thoroughly discouraged. The Boston Elevated Railway has recently taken the initiative in this reform and has installed signs at its stations and in its cars with the heading, "Women first, please." Underneath are the words: "The company respectfully requests male passengers to give women precedence at stations. Much complaint is made that men and boys board cars before they reach entrance stops." The request may not be obeyed, but at least it is a step in the right direction and might be copied elsewhere to advantage. Then, if the signs are not effective, conspicuous offenders against the decency of travel should be arrested. We believe that the term "disorderly conduct" is broad enough to cover the offense and that most judges would take pleasure in assisting to suppress this nuisance by imposing severe sentences upon those brought to trial.

Meeting of the Railway Business Association

The striking similarity in general conditions between the steam railroad and electric railway industries was strikingly exemplified in the character and tone of the speeches at the banquet of the Railway Business Association last week. Both industries are confronted with increases in the cost of labor and material, and both are endeavoring to secure authority to increase their rates. As opposed to this demand, charges are made that the transportation companies, to a greater or less extent, are overcapitalized. The Railway Business Association, whose object, broadly speaking, is to bring about a better understanding of railroad conditions by the public, was fortunate in being able to secure as speakers at its annual banquet last week such representative men as the president of the Baltimore & Ohio Railroad, the head of the H. B. Claflin Company and the chairman of the Interstate Commerce Commission, representing, respectively, the railroad company, the shipper and the arbitrator between them. Each speaker, of course, presented simply his individual views, but each had studied the question thoroughly, and it is interesting to note that their views did not differ radically from one another. Indeed, it has always been our belief and contention that this would be the case when broad-minded men carefully examined the economic problems of the steam or electric railway field. These questions are not those of sentiment, but of facts, and greatly divergent conclusions cannot be reached by whatever path one follows in attempting their solution.

The Losses of Initial Operation

Eli M. West, receiver of the Columbus, Delaware & Marion Railway, calls attention, in the report published in another part of this issue, to the apparent low operating ratio which prevailed prior to his appointment. He states that operating expenses were made abnormally low by the arbitrary charge of "all sorts of expense items, such as coal, interest, etc., as betterments or additions to property." Mr. West adds that, in spite of the fact that the property had deteriorated and was really not in a condition in which it was safe to operate, expenditures amounting to about $57,000, almost all of which were properly chargeable to operating expenses, were listed as betterments. At first thought the practice of compelling the capital account to stand the cost of items that are purely operating expenses appears to deserve unqualified censure. As a rule, no satisfactory explanation of such a course can be made. In the case of a new system, however, it is at least an open question whether losses of initial operation due to the necessity of developing the business to a satisfactory point are not fairly chargeable to the cost of the property. Of course, to expand the period of "initial operation" in a forlorn attempt to make a prosperous property out of a road that will never have sufficient traffic to justify its existence would cause only a postponement of the day of reckoning and a fall that would be greater when it did occur. The Wisconsin Railroad Commission, in some cases affecting public-utility properties, has held that the expense of building up the business until it yielded a reasonable return could properly be considered as a part of the capital cost. If such a plea, however, is to be made in the case of any property, it is reasonable to expect that the items of this nature should be carried separately and be distinguishable in the accounts, not only in the early stages of operation, but also in the later years.

LONDON ADVERTISING LITERATURE

Americans have the reputation of being the most aggressive and enterprising advertisers in the world, so that it is somewhat curious to find that one of the most extensive campaigns carried on by electric railway companies in advertising for traffic—if not the most extensive—has been conducted in London. We have published typical examples of the posters and other advertising literature issued by the Underground Electric Railways Company, Ltd., of that city, and in this issue present reproductions of others which have been brought out during the past year. Two things stand out strikingly in the series which has been published. One is the artistic character of the advertisements. There is nothing mediocre about the execution either in their design or in their printing. The other is the care with which each considerable class of patrons has been signaled out for conversion. The theater patron, the attendant at lectures, the shopper, the churchgoer, the museum visitor, the city resident who is thinking of moving into the suburbs or can be induced to do so by argument, the stranger in the city who wishes to know the location of the hotels and other points of interest, the person who wants to learn the quickest route to the different steam railroad stations, the excursionist, the man who simply wants to take a pleasant walk in the suburbs—all are remembered. The literature gotten out for each class is made convenient to carry and is as complete as possible as regards the information which will be required by the person for whom it is prepared.

Although the advertising published has been designed with direct reference to the needs of the underground electric railway system of London, many of the suggestions can be used by other companies and in other cities. Some of them, it is true, are applicable only to underground or heavy traction service. Thus, in some of its posters the company makes a very striking point of the advantage of the underground system over surface systems in the rapidity of passenger transportation, especially during the winter when the London fogs settle down like a blanket over the city and impede traffic on the surface. But other suggestions and arguments are as useful in any American city, and for the suburban or interurban line as well as for the road in the large city.

Advertising methods of all kinds have improved greatly during the past 10 years, and it is well known that the business of designing advertisements is followed now by a great many persons as a profession—indeed, it is often dignified by writers on the subject as a science. Display announcements which several years ago would have been thought good are now considered crude and inartistic. Independently of the business value or absence of value in an advertisement, any person who uses bill posters or other display advertising on the streets owes a duty to the community to make the announcement artistic and attractive. The passerby cannot avoid seeing what is thrust upon his attention, and if bad taste is shown by the advertiser the feeling of resentment inspired in some persons will often more than counterbalance the benefits secured in attracting the attention of others.

The series of advertisements of the Underground Railways of London also illustrates the proper attitude for anyone to take when preparing advertising literature, whether to secure traffic or for any other purpose. It is to put himself as nearly as possible in the position of the person whom he is addressing, and

then he will know the arguments and the information which such a person should have. Thus, if the average man is considering several suburban towns as a residence, he wants to know something of the cost of living in each, the taxes charged, the advantages in the way of schools, churches, clubs or other recreations, the time required to travel to and from his proposed residence to his place of business, and the cost of railroad fares.

CONCERNING COAL ANALYSIS

A recent important publication of the Bureau of Mines takes up the question of the relation of the composition of certain coals to their combustion and heat value. It deals especially with the volatile matter of the coal in its bearing on practical calorific usefulness. In particular it is a study of the nature of the volatile components of coal which have an important effect on the value of the fuel. The general principles involved as regards fuel composition are familiar enough, but few people adequately realize the very important difference which can be made by varying the character of the gaseous content. It is not so much the quantity of the volatile matter as its particular character that determines what is going to happen when combustion is undertaken. The ordinary calorimetric methods which insure the complete combustion of the material contained in the bomb are hence at times very misleading.

In the report in question the particular point brought to light is the large proportion of positively deleterious volatile matter contained in certain coals, largely CO and CO_2. When one remembers that the steaming tests made at St. Louis show 2 per cent drop in efficiency for each 0.1 per cent CO in the flue gases the difference between theoretical calometric results and some practical results is amply explained. The coals of the bituminous formation running all the way up from pure lignite are often particularly bad in their volatile components. One Western coal, for instance, showed nearly 36 per cent of volatile matter, not counting 11 per cent of water, and of this 19.5 per cent was CO and a little over 6 per cent N. As against this a first-class Pocahontas coal in a volatile content of about 21 per cent showed of this amount only 3.2 per cent CO and 1.2 per cent N. Not only do such coals vary widely in the fixed carbon, as everybody knows, but still more widely in the usefulness of their volatile constituents. If all the consumable volatile matter were utilized the disparity would be less marked, but with ordinary methods of combustion a good deal of the CO gets away and the heavier hydrocarbons are also likely to escape in part, not only losing efficiency but producing a large amount of smoke. The lower grades of Western bituminous coal, which with increasing use of the fuel supply must become more and more important, are particularly difficult to burn, not only on account of their unfavorable composition but from the fact that they give up their volatile matter at a more moderate temperature than the later coals, so that there is an extremely good chance of losing much of it up the chimney unconsumed or only partly consumed. These facts not only make it desirable to look carefully into the methods of coal analysis employed in sampling coal, but also lay emphasis upon the more familiar proposition that a very careful study must be made of furnace design before the poorer coals can be successfully used. With their characteristic of yielding volatile matter at moderate temperatures special care must be taken not only to give a plentiful oxygen supply but to give it under conditions favorable to rapid combustion, preheated if possible. Coal of this sort cannot be burned at a high rate per unit of grate surface without incurring great danger of very serious loss of efficiency. It can be burned, in spite of its undesirable characteristics, at a very moderate rate of combustion and with adequate air supply and air space. The same conditions that will insure smokeless combustion, which is quite possible even with the low-grade coals, are favorable to keeping up the efficiency in spite of the nature of the volatile matter. Some of the low-grade coals, however, give fairly good yield of by-products of coking, particularly ammonia and high-candle-power gas, so that they are likely to come into greater use than heretofore in this indirect way. In fact, one of the best coals in this particular was a Western specimen containing only about 51 per cent of fixed carbon but in its volatile matter yielding 5.7 per cent of illuminants.

Any process of coal analysis which ignores or passes lightly over the particular nature of the volatile matter seems likely to lead to results of dubious practical value, particularly when it is applied to some of the coals of the later formations which one day must become perhaps the principal reliance of the world for industrial purposes. It is somewhat difficult to say what methods are best suited to bringing out the practical relative values of such coals, as we are now fortunately familiar mostly with the coals of higher grade. Certainly complete combustion in a calorimeter tends to credit the poorer coals with more than practically belongs to them and by an amount that is a function of the particular quality of coal under test, so that no suitable correction is easy to make. It looks very much as if in sampling coals one would have to apply much more complete analysis than has been usual, particularly analysis of the volatile matter. There is also much to be said in favor of experimental steaming tests, not necessarily on a large scale, but with apparatus in which the flue gases can be conveniently estimated and studied and the amount and temperature of the air supply thoroughly regulated. The practical use of low-grade fuels comes down to proper furnace construction and enlightened methods of burning. Granted these, one has an immense extension of the fuel supply which every year will become of greater and greater industrial importance. It is a pretty poor coal that will not yield on complete combustion more than two-thirds the calories furnished by an equal weight of very high-grade coal. The problem of economical power production in the future lies in no small degree in such judicious methods of burning as shall utilize something like a due proportion of this possible output. At present the disparity of steaming power between a very good coal and a very poor coal is altogether out of proportion to the ultimate calories obtainable.

In connection with the general subject of fuel it may be of interest to refer to the tests with North Dakota brown lignite made by the Technologic Branch of the United States Geological Survey. The furnace used was of the semi-gas producer type, externally resembling a Dutch oven. Its most striking features were the deep-set grate and the construction of the space between the bridge wall and the end of the prolonged fire-brick arch. The results of the tests showed that under proper conditions lignite may be used with fair economy under boilers that generate their full rated capacity.

MERIT AS A REQUIREMENT FOR COMMISSION SERVICE

A committee report adopted by the National Association of Railway Commissioners at its last annual meeting expresses the opinion that there is great need for placing emphasis upon the simple elementary proposition that State commissions should be organized on the basis of merit. To the commissions and to those who appoint their members we urge the study of this proposition. The wholesome discussion of the subject written for the committee by Prof. B. H. Meyer, of the Railroad Commission of Wisconsin, was published in the Electric Railway Journal of Nov. 26, page 1064. If the report had included a description of the businesslike organization of the Wisconsin commission it would have cited an example that would be helpful to some of those to whom the suggestion was directed.

Merit in organization implies merit in men. The statement attributed to Governor-elect Dix of New York that he wanted experienced men on the commissions is the expression of a thought which exists in many minds and is based on a desire for practical results. It suggests the fact that while the principle of regulation may be a permanent feature of government, the details of the men and methods to conduct the supervision are still in an experimental stage in some States.

We believe that an advance will be made if both the commissions and their employees shall include some men with practical experience in one or more of the classes of public-utility properties over which jurisdiction is assumed in the name of the public. With the higher standard toward which the commissioners appear to be tending, there ought not to be any serious bar to the interchange of men between commissions and companies.

Long corporate service should not prohibit men forever from serving the public, and public service with a commission should not bar the way to corporate service. Reasonable co-operation between the companies and the representatives of the public will effect with a minimum loss of time a practical improvement in conditions, and the absence of such co-operation is a calamity that should be averted. A number of commissions need to have a keener appreciation of the problems of the companies than they have yet displayed, and it is equally evident that many companies, if they are to progress with the times, need to revise their ideas about the rights of the public that they serve.

Neither the employer of public servants nor the employer of corporate servants can expect to secure efficient aid without paying remunerative wages. Although the New York public service commissions law has set a new mark of liberality, public service ordinarily has paid less than corporate service. An even greater bar, however, to the diversion of capable and fair-minded corporate servants to public life has been the uncertain tenure of office which confronted them. Political expediency has been so often the motive in appointments to public office that frequently employees of merit have become discouraged in public service and have retired voluntarily or grown inefficient because the spirit of the organization was unbusinesslike and the discipline lax, while promotion was the result of "pull" and not of ability.

No self-respecting man would want to take office with a commission and find that all that was desired of him was a knowledge that could be used to press the companies harder, without regard to their rights; and we presume that before the commissions can secure many men combining character, ability and experience in public-utility management they will have to overcome some reluctance based on apprehensions of that nature. As a commissioner, a man of practical experience would have abundant opportunity for independence of action, although his opinions might not be upheld by a majority of his colleagues; but as an employee, with no statutory power, he might find himself completely deprived of all opportunities except those imposed by irksome and arbitrary orders of superiors.

Public life and corporate history are full of instances that show that it is in the man and not the training that the rare ability desired for some particular purpose may be found. But commissions will undoubtedly be strengthened as they increase in the understanding of the every-day practical needs of the companies and they can be aided greatly by the advice of experienced men within their ranks. More co-operation and merit, with less antagonism and inefficiency will help in the solution of problems.

THE TOLEDO SITUATION

The preliminary steps that have been taken in negotiations between the Toledo Railways & Light Company and the city of Toledo for a renewal of railway franchises indicate slight progress. The tangible steps include a report by public accountants employed by the city and a complete inventory by engineers representing the company of the physical property devoted to railway purposes. They do not give, however, any indication of the probable basis of settlement.

Representatives of both the company and the city wish a settlement and early improvement of the railway system. The advantage of a settlement without undue delay is evidently recognized by both interests. Cities in which long delay has intervened between the expiration of one franchise contract and the commencement of another have suffered by the inevitable restriction of railway development which attends such delay. It is hoped that the long period of uncertainty which has prevailed in other places will not become part of the record which Toledo will make in this matter.

It is essential to an understanding of the real condition in Toledo that the franchise situation and the financial status of the company be made plain. On Nov. 9, 1910, the franchise rights of the company on 9 miles of street, out of a total of 68 miles of streets on which cars are operated in the city limits, are claimed by the city to have expired. These rights covered sections in the important central business districts. No controversy has arisen over the operation of cars in this district. The city, to protect its position, has given formal notice that the franchises have expired and an arrangement will probably be perfected whereby the company will pay a rental until a final settlement is made.

The near termination of the contract with the city was the immediate cause of the present adverse financial position of the company. A default in interest on the consolidated mortgage 4 per cent bonds accompanied an announcement that the company was unable, because of the early maturity of franchises, to dispose of securities either to fund floating debt or to provide cash with which to meet maturing funded obligations. A committee representing holders of these bonds was appointed immediately and it has secured deposits of a majority of the outstanding issue. As the interest due on these bonds on July

1, 1908, and on subsequent interest dates is in default, and the bonds, though due as to principal on July 1, 1909, are also unpaid, the control of the company is at present practically in the hands of this committee.

While some financing is, therefore, an imperative part of the future program of the company, capital is also needed for rehabilitation purposes. After an exhaustive investigation it was estimated that to provide proper service commensurate with the future needs and increase in population of the city the company should spend in the period of five years, beginning on Jan. 1, 1909, a total of $3,000,000 for rehabilitation purposes. Some of the improvements suggested have been made since that date. The cost has been defrayed in part by funds available because of the default in interest on the consolidated mortgage bonds. In the calendar year 1909 $210,000 was expended toward the recommended improvements and during the present year about $550,000 additional will be applied in this way. In two years, therefore, one-quarter of the improvements estimated to be necessary in five years will have been made.

The report of Nau, Tanner & Rusk, the accountants employed by the city of Toledo, which has been filed with the City Council, contains information relating to earnings, expenses and schedules. The accountants took the position that without a valuation of the property a correct solution of the Toledo problem could not be found. Albion E. Lang, president of the Toledo Railways & Light Company, in a letter discussing this assertion, stated that if the authorities thought it advisable to agree upon a method of reaching a valuation of the street railway properties as a factor in a comprehensive solution of the problem, he was willing to submit all data to a board of engineers upon whom the company and the city might agree. In other words, the problem was assumed to be one on which engineers should pass. Later, at the repeated request of the city authorities, Mr. Lang submitted an inventory of the portion of the physical property used for railway purposes. A letter of Ford, Bacon & Davis, which accompanied the inventory, was published in the ELECTRIC RAILWAY JOURNAL of Nov. 12, 1910, page 990. It represents, presumably, the position which the company will take if the city authorities adhere to their apparent present plan of relying in part upon the results of a valuation.

It is an evidence of foresight that the company has prepared itself for possible emergencies by giving such study to the subject that it will be ready to enter upon negotiations based on a valuation, if an agreement to follow that course is made. We have referred frequently to elements of value of a non-physical nature which should be considered in an appraisal of the complete property of a street railway company, and repeat that the intangible elements may easily reach a large percentage of the total amount that can be ascertained by an appraisal which takes into account only the purely physical or present visible items of property.

Under the laws of Ohio the only franchise arrangement which can be effected between the city and the company will be for a limited term. It is unfortunate that the law does not provide for the unlimited franchise whose wisdom Mr. Lang and other executives of street railway companies praise. The Toledo company needs a status of recognized solvency and a definite franchise contract, and the city needs a railway system with ample resources and credit in order that it may provide necessary improvements.

THE CASE OF THE COMMUTER

It has long been a complaint among steam railroad companies that their commuter business in the neighborhood of large cities is unremunerative. It was this claim that led to the recent advance in commutation fares about New York, but, according to the testimony presented at the hearings before the Interstate Commerce Commission last week, the railroads are still losing money on this business. Indeed, one company claimed that even at the new rates the loss amounted to 5 cents per passenger, and others stated that their roads would be in better financial condition if they entered New York City through a desert. This statement certainly sounds remarkable to an electric railway operator who is accustomed to look upon territory as becoming more lucrative from a traffic standpoint with any increase in density of the population.

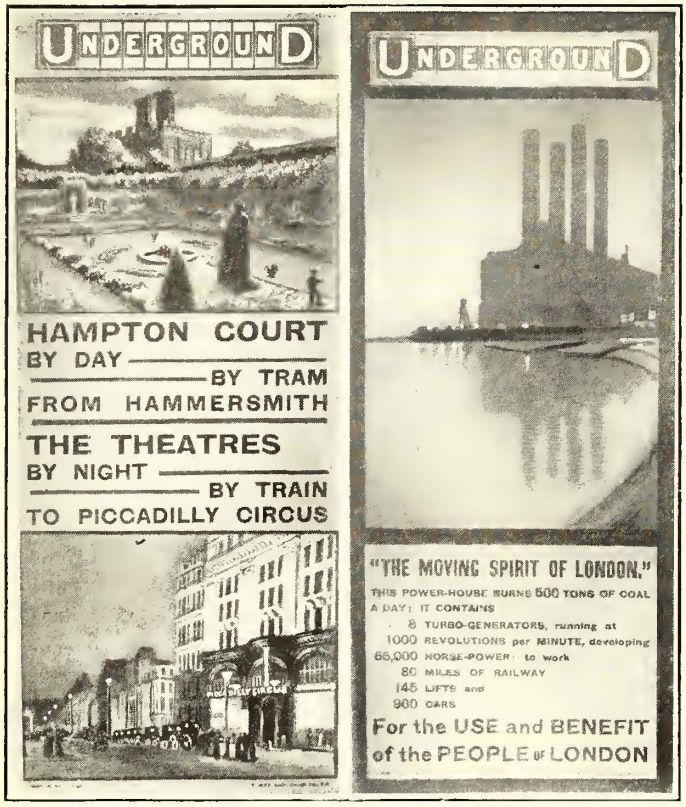
In the absence of detailed figures of operating expenses and receipts, which will be filed later with the commission, we have no intention of analyzing the question of profit from this business. But we do think, in view of some of the testimony elicited, this a very appropriate time to call attention to one very large factor in the cost of suburban steam railroad operation which is often ignored in comparisons between it and the cost of electric railway service. This is the expense of passing a suburban passenger through a steam railroad trunk line terminal. Some years ago one of the officials of the Pennsylvania Railroad testified that it cost the company 3 cents for every passenger brought into or taken out of the Broad Street Station at Philadelphia, and in the published reports of the hearing last week one manager was quoted as saying that on his road the average commuter traveled about 14 miles and that it cost to pass him through its Jersey City terminal 75 per cent of the expense of carrying him to his destination after he was on the train.

It is easy to understand that with through business a commodious terminal station with waiting rooms and extensive baggage facilities is necessary, and that even suburban steam railroad operation requires large and expensive switching yards and storage tracks. But the conclusion from these facts, as we see them, is not to abandon the commuter service, but to operate the suburban trains by electricity. It would then be easy either greatly to reduce the expensive terminal space required or to eliminate this charge altogether by distributing the passengers by rapid transit lines through the city. To avoid terminal charges of 6 cents, or even of 3 cents, for each suburban passenger, a railroad could afford to invest a considerable sum in electrical equipment, even without regard to any other advantages of electrical operation.

The plan of abolishing the terminal station, as outlined above, is indeed the plan proposed by the Pennsylvania Railroad, so far as the bulk of the commuters fram Newark is concerned, as this traffic, when the line of the Hudson & Manhattan Railroad is extended to Newark, will not pass through either the Jersey City station of the Pennsylvania Railroad or that at Thirty-second Street, New York. Instead, it will be carried under the former station to the existing distributing points in New York on the McAdoo tube. The cost of handling the commuters on the other New Jersey lines served by the McAdoo tubes will also be reduced, so far as the railroads are concerned, because as more commuters use the tubes they no longer pass through the stations or use the ferries, and both the latter are thereby relieved for the greater accommodation of those who are obliged to patronize them.

RECENT ADVERTISING FOR TRAFFIC IN LONDON

Several articles have appeared in past issues of this paper in regard to the vigorous advertising campaign for traffic conducted by the group of roads represented by the Underground Electric Railways Company, Limited, of London. This company controls the London United Tramways Company, the District Railway in London, and several of the deep tube lines. The most extended article on the advertising campaign of the company published in a previous issue appeared in the ELECTRIC RAILWAY JOURNAL of Dec. 4, 1909. This advertising, which consists of posters, pamphlets, circulars and practically every other kind of printed matter, has been marked by great originality, and the pictorial designs used have been not only striking but so artistic as to attract wide attention and favorable comment in poster art circles. In preparing its posters the company has utilized the services of artists having a very high reputation in London. The other advertising literature published by the company has also been of a high grade, and it is pleasing to note that the results, in the opinion of Albert H. Stanley, general manager of the company, have been very satisfactory. In fact it has proved so successful in stimulating traffic that the company has continued the policy and has published a variety of new posters and other matter during 1910. It is the intention in this article to describe and illustrate a few of the new designs used during the past 12 months.

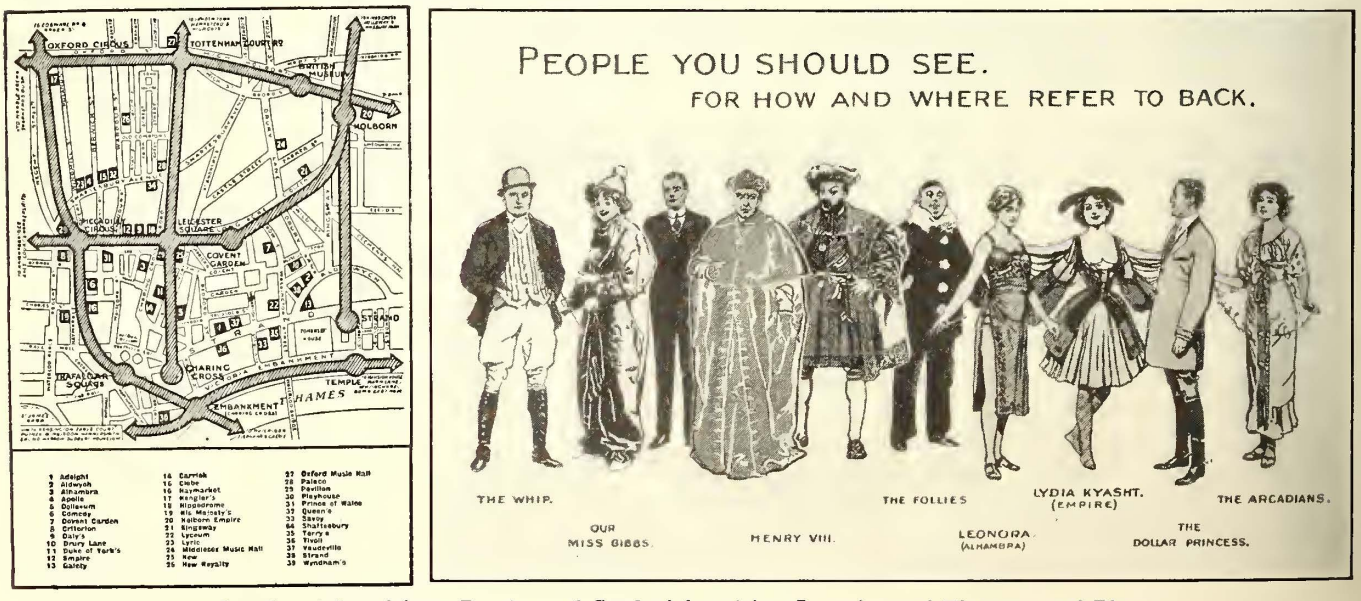


London Advertising—Traffic Posters, Original Size 8½ in. x 20½ in.

POSTERS

The largest posters issued by the company measure 24 in. in width by 40 in. in height and are mounted on special billboard frames at the entrance and inside of the stations and in other public places. In these posters maps appear frequently or else schematic diagrams showing the routes of the systems operated by the company and the points of interest which can be reached by them. Others are of a pictorial character only. Three of the large posters of the size mentioned, and also two smaller posters 8½ in. wide by 20½ in. high, published recently, are reproduced herewith. One of the smaller posters advertises the service given to Hampton Court, a historic palace formerly occupied by royalty but now a public art gallery and museum, located in a beautiful park in the suburbs of London. The other small poster gives a view at night of the power station of the company and describes briefly its equipment and the work done by the energy supplied by it in transportation service "for the use and benefit of the people of London."

The three larger posters illustrated are samples of a number of posters of this kind recently used by the company. They are of course printed in colors, which are not shown in the photographic representations of them. One is intended to advertise the suburban service of the company and encourage residents of the city to secure homes in the suburbs. It gives a conversation between a town mouse and a country mouse, and the latter tells the town mouse to live like him in fresh air and freedom. Another presents a picturesque view of a suburban electric train of the company on the top of a high hill. A third illustrates the difficulties and delays of transportation by bus and carriage, and even on foot, on the street surface, while travelers on the underground road are carried quickly and comfortably to their destinations.



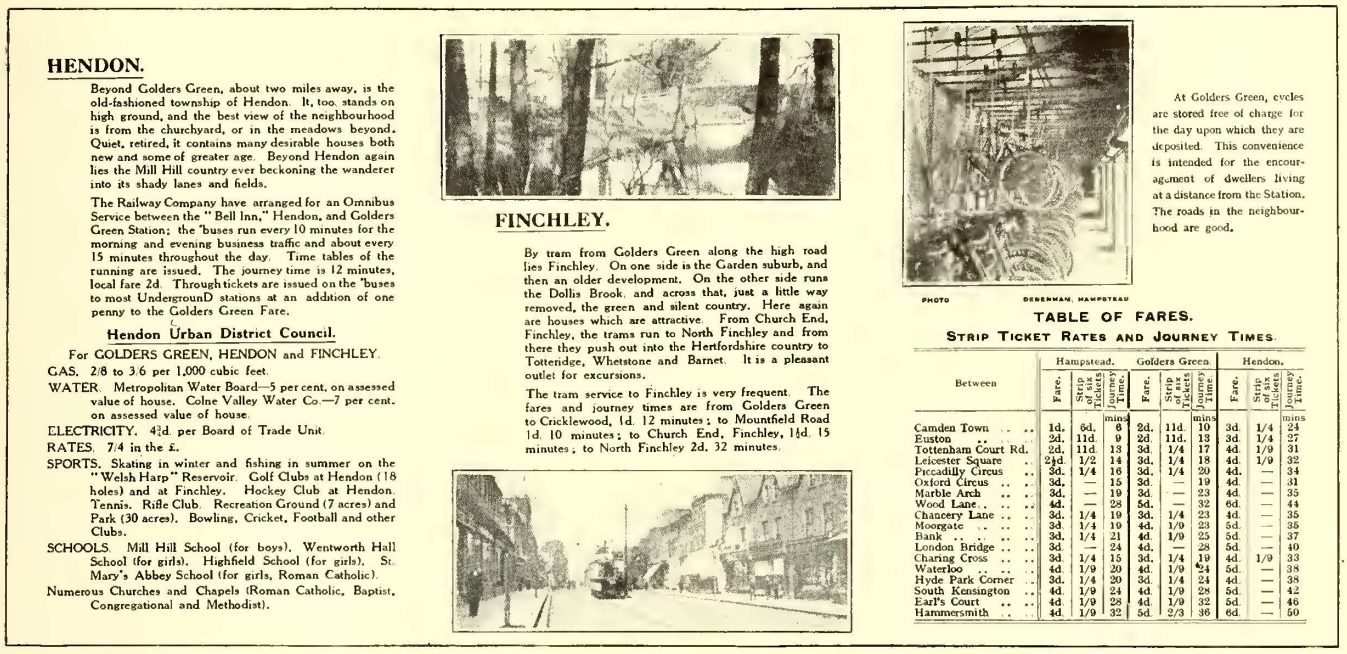
London Advertising—Portions of Cards Advertising Locations of Theaters and Plays

THEATER ADVERTISEMENTS

In addition to general advertising designed to reach all grades of traffic, the company has very successfully conducted a campaign of special advertising designed to reach among others the attendants at theaters, university and other public lectures.

churches, etc. It would be impossible in the confines of one article to describe all of the circulars issued to appeal to each of these different kinds of traffic. A few of the more striking of them will be mentioned.

One pocket card shows diagrammatically the location of the



HENDON.

Beyond Golders Green, about two miles away, is the old-fashioned township of Hendon. It, too, stands on high ground, and the best view of the neighbourhood is from the churchyard, or in the meadows beyond. Quiet, retired, it contains many desirable houses both new and some of greater age. Beyond Hendon again lies the Mill Hill country ever beckoning the wanderer into its shady lanes and fields.

The Railway Company have arranged for an Omnibus Service between the "Bell Inn," Hendon, and Golders Green Station; the 'buses run every 10 minutes for the morning and evening business traffic and about every 15 minutes throughout the day. Time tables of the running are issued. The journey time is 12 minutes, local fare 2d. Through tickets are issued on the 'buses to most UndergrounD stations at an addition of one penny to the Golders Green Fare.

Hendon Urban District Council.

For GOLDERS GREEN, HENDON and FINCHLEY.

GAS. 2/8 to 3/6 per 1,000 cubic feet.

WATER. Metropolitan Water Board—5 per cent. on assessed value of house. Colne Valley Water Co.—7 per cent. on assessed value of house.

ELECTRICITY. 4½d. per Board of Trade Unit.

RATES. 7/4 in the £.

SPORTS. Skating in winter and fishing in summer on the "Welsh Harp" Reservoir. Golf Clubs at Hendon (18 holes) and at Finchley. Hockey Club at Hendon. Tennis. Rifle Club. Recreation Ground (7 acres) and Park (30 acres). Bowling, Cricket, Football and other Clubs.

SCHOOLS. Mill Hill School (for boys). Wentworth Hall School (for girls). Highfield School (for girls). St. Mary's Abbey School (for girls, Roman Catholic).

Numerous Churches and Chapels (Roman Catholic, Baptist, Congregational and Methodist).

FINCHLEY.

By tram from Golders Green along the high road lies Finchley. On one side is the Garden suburb, and then an older development. On the other side runs the Dollis Brook, and across that, just a little way removed, the green and silent country. Here again are houses which are attractive. From Church End, Finchley, the trams run to North Finchley and from there they push out into the Hertfordshire country to Totteridge, Whetstone and Barnet. It is a pleasant outlet for excursions.

The tram service to Finchley is very frequent. The fares and journey times are from Golders Green to Cricklewood, 1d. 12 minutes; to Mountfield Road 1d. 10 minutes; to Church End, Finchley, 1½d. 15 minutes; to North Finchley 2d. 32 minutes.

PHOTO DEBENHAM, HAMPSTEAD

At Golders Green, cycles are stored free of charge for the day upon which they are deposited. This convenience is intended for the encouragement of dwellers living at a distance from the Station. The roads in the neighbourhood are good.

TABLE OF FARES.

STRIP TICKET RATES AND JOURNEY TIMES.

Between	Hampstead.			Golders Green.			Hendon.		
	Fare.	Strip of six Tickets	Journey Time.	Fare.	Strip of six Tickets	Journey Time.	Fare.	Strip of six Tickets	Journey Time.
			mins			mins			mins
Camden Town	1d.	6d.	6	2d.	11d.	10	3d.	1/4	24
Euston	2d.	11d.	9	2d.	11d.	13	3d.	1/4	27
Tottenham Court Rd.	2d.	11d.	13	3d.	1/4	17	4d.	1/9	31
Leicester Square ..	2½d.	1/2	14	3d.	1/4	18	4d.	1/9	32
Piccadilly Circus ..	3d.	1/4	16	3d.	1/4	20	4d.	—	34
Oxford Circus	3d.	—	15	3d.	—	19	4d.	—	31
Marble Arch	3d.	—	19	3d.	—	23	4d.	—	35
Wood Lane..	4d.	—	28	5d.	—	32	6d.	—	44
Chancery Lane	3d.	1/4	19	3d.	1/4	23	4d.	—	35
Moorgate	3d.	1/4	19	4d.	1/9	23	5d.	—	35
Bank	3d.	1/4	21	4d.	1/9	25	5d.	—	37
London Bridge	3d.	—	24	4d.	—	28	5d.	—	40
Charing Cross	3d.	1/4	15	3d.	1/4	19	4d.	1/9	33
Waterloo	4d.	1/9	20	4d.	1/9	24	5d.	—	38
Hyde Park Corner ..	3d.	1/4	20	3d.	1/4	24	4d.	—	38
South Kensington ..	4d.	1/9	24	4d.	1/9	28	5d.	—	42
Earl's Court	4d.	1/9	28	4d.	1/9	32	5d.	—	46
Hammersmith ..	4d.	1/9	32	5d.	2/3	36	6d.	—	50

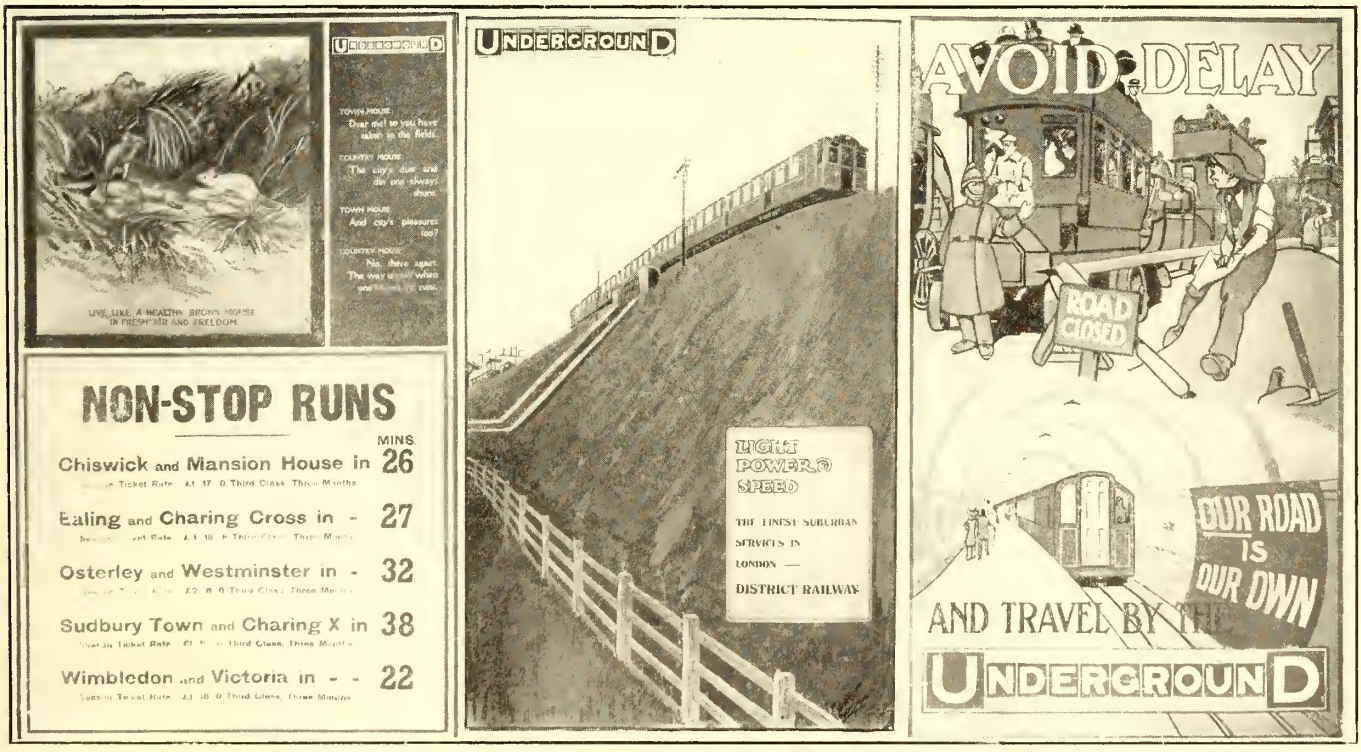
London Advertising—Three Pages from Circular Descriptive of Suburban Residence Towns

39 principal theaters, music halls and museums in the theater district of London, and the location of the lines and stations of the company. On the back of this card is a notice of the late theater trains run by the company to different destination points in the city. Another card gives the names of the plays

folder bears the motto: "It is no longer he who runs may read, but he who travels underground may learn all arts and all knowledge."

ADVERTISING FOR SUBURBAN TRAFFIC

This article would not be complete without a description of



London Advertising—Traffic Posters, Original Size 24 in. x 40 in.

being conducted at the different theaters and the names of the nearest underground station. On the back of this card is a colored sketch, reproduced herewith, of a number of the principal characters at eight of the leading theaters in London. A list of University of London Extension lectures is printed on

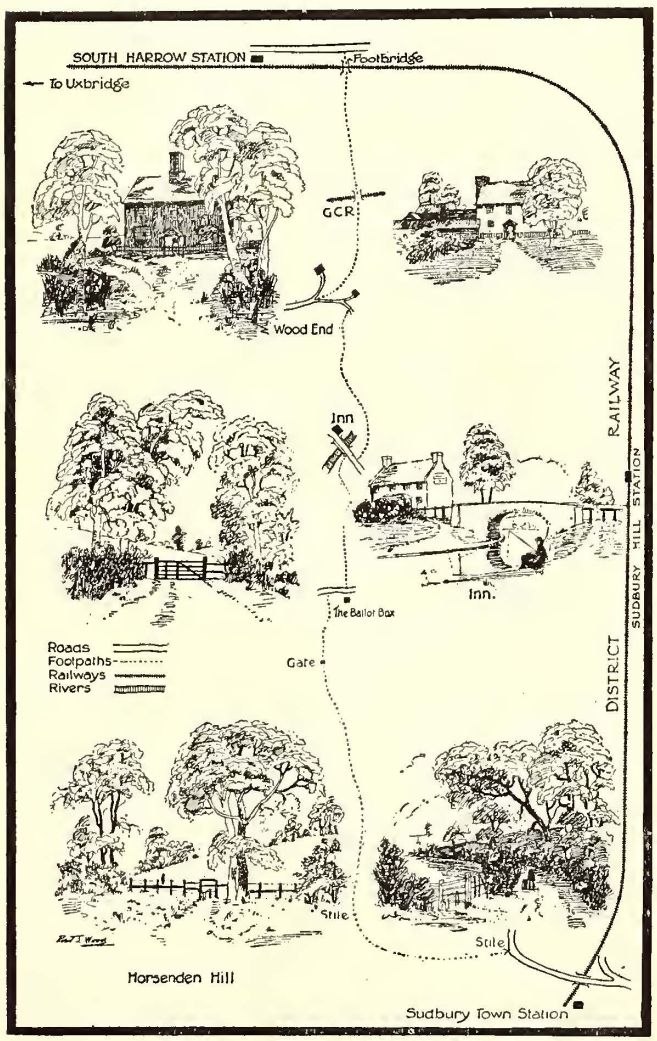
some of the circulars recently issued by the company for the development of suburban traffic, both of the excursion and commuter class. Among the former is a series of leaflets devoted to country walks around London. These are printed on single sheets 5 in. x 7½ in. One side has an inviting de-

scription of a walk. The pedestrian is told how to reach the starting point by the District Railway and the station at which he should alight. He is then told just what route he should take and particulars are given of the points of historic and other interest of the localities through which he will pass.

INSTITUTIONS.	Evenings and Time.	Nature of Work.	Nearest UNDERGROUND Station.
Birkbeck College, Chancery Lane, E.C.	Mon.-Fri. 6	University Courses, Science Art, etc.	Chancery Lane or Temple
Borough Polytechnic, Borough, S.E.	Mon.-Fri. 7	Technical and Trade Schools, Engineering, Science, etc.	Elephant or Borough
Beaufoy Institute, Princes Road, S.E.	Mon.-Fri. 7.30	Technical Classes Preparatory to Polytechnics	Kennington
Barnsbury Park Centre, N.	Mon.-Fri. 7.15	Commercial and Art	Caledonian Road or Highbury
Battersea Polytechnic, Battersea Park Road, S.W.	Mon.-Fri. 7	Science, Engineering, Art, Women's Subjects, etc.	Change at Victoria
Camden School of Art, Camden Road, N.	Mon.-Fri. 7	Arts and Crafts	Caledonian Road
Central School of Arts & Crafts, Southampton Row	Mon.-Fri. 7	Arts and Crafts	British Museum or Holborn
Clapham School of Art, High Street, S.W.	Mon.-Fri. 7	School of Fine Art	Clapham Road
City of London College, Moorfields, E.C.	Mon.-Fri. 6.30	Commercial, Science, Art	Moorgate
College for Working Women, 7, Fitzroy Street, W.	Mon.-Fri. 6	First Aid, Nursing, Hygiene, etc.	Warren Street
University of London—East London College, Mile End Road, E.	Mon.-Fri. 7	University Courses, Science, Arts, Engineering	Mile End or Stepney Green
Hammersmith School of Arts and Crafts, Lime Grove, W.	Mon.-Fri. 4.30	Arts and Crafts, Trade School for Girls	Shepherd's Bush
"Hugh Myddelton" Centre, Clerkenwell, E.	Mon.-Fri. 7	Commercial and Art	Farringdon Street
University of London—King's College, Strand, W.C.	Mon.-Fri. 6	Art, Science, Engineering, Medicine, Law, Architecture, etc.	Strand or Temple
Kennington Road Centre, S.E.	Mon.-Fri. 7.15	Commercial	Oval
Leathersellers' College, Tower Bridge Road, S.E.	Mon.-Fri. 7.30	Leather Manufacture, Dyeing, Dressing, etc.	London Bridge
"Marlborough" Centre, Draycott Avenue, S.W.	Mon. Thur. 7.15	Commercial and Art	Sloane Sq. or Brompton Rd.
Montem Street Centre, Tollington Park, N.	Mon.-Fri. 7	Commercial and Art	Finsbury Park
Myrdle Street Centre, Commercial Road, E.	Mon.-Thur. 7.15	Commercial and Art	Whitechapel
Northampton Polytechnic Institute, Clerkenwell, E.C.	Mon.-Fri. 7	Artistic Crafts, Engineering, Aeronautics, Technical Optics, Horology, etc.	Angel

London Advertising—Card Tabulating Public Lectures and Nearest Underground Station

Finally, there is a statement of the fares charged on the railway in going to the starting point and returning home. On the other side of this leaflet is a pictorial map of the route. One of these maps, that of "Country walk No. 8, from South



London Advertising—Back of Leaflet Descriptive of a Suburban Walk

Harrow to Sudbury on the Fields," is published. Such a system for describing walks has a number of advantages over the usual method of publishing the information in book form, because a single sheet is easy to carry in the pocket and easy to consult while on the trip, and when the pedestrian returns home it can be thrown away.

The other guide referred to is a small pamphlet designed to benefit the city resident who is considering moving into the country. The introduction says:

"If you are seeking a house, why not follow the Underground out of town? If you live on a main line, you use the Underground from the railway terminus to your place of business. Why not use it the whole way and travel in a through train? It makes town much more accessible, and must make traveling cheaper.

"The Underground Services are all-day services. The trains are so frequent that there is scarcely any need to hurry to catch particular trains. It is just as convenient to go and come between the suburb and the town in the middle of the day as in the morning and evening busy times. This is an advantage to your family."

The rest of the pamphlet is devoted page by page to a statement of the facts which a person who was considering moving into the town described would like to have, that is, some information in regard to the character of the town, the cost of living and the cost of transportation. Each description is accompanied by a half-tone illustration of the town described. The character of the description is illustrated from the following, which relates to Wimbledon:

"The neighborhood is fully developed, with good shops, cafés, schools, churches and chapels, and a public library. The houses at Wimbledon are of the better class. Houses at more moderate rents can be obtained at Wimbledon Park (£40 to £60), while at Merton and Raynes Park there are houses or flats for those of moderate means.

"Rates: Wimbledon Urban District, 6s. 10d. in the £.

"Water: Metropolitan Water Board, 5 per cent on assessed value of house.

"Gas: 2s. 10d. per 1000 cubic feet.

"Electric Light: 4½d. per B. of T. unit.

"Sports: Wimbledon and Wimbledon Park golf clubs, All-England lawn tennis courts, skating on the large ponds on the Common and in Wimbledon Park, many sports grounds of various kinds.

"The District Railway provides a 15-minute service of trains throughout the day, with six trains hourly and non-stop trains morning and evening for business men. The journey time between Wimbledon and Mansion House for these trains is 33 minutes.

"The season ticket rates are low. A third-class 3 months' ticket between Wimbledon and Charing Cross costs £1 18s. 0d., and Mansion House £2 5s. 6d."

NEW PUBLIC SERVICE BUILDING IN NEWARK

The Public Service Corporation, Newark, N. J., has recently moved its offices to its new building at the corner of Broad Street and Bank Street. The building is a twelve-story structure, having a frontage on Broad Street of 75 ft., and a depth of 160 ft., with an extension on the second and third floors reaching to Halsey Street and Academy Street.

The basement will be used for testing and show rooms, which will be equipped with all the newest gas and electric supplies. The first nine floors are for the general and executive offices of the railway, gas and electric companies. On the tenth floor is an assembly room, 34 ft. x 67 ft., which will seat about 300 persons. Also on this floor are a small private dining- and a larger one to be used by the executive and junior officers respectively.

The eleventh floor will be used for the employees' dining-room, where about 625 persons will have luncheon daily. The company calculates, by paying $25,000 a year toward the expenses of this dining room, that meals can be purchased by the employees for one-half actual cost, or about 15 cents apiece.

The top floor will be used as the kitchen for all dining-rooms, and will be equipped with gas and electric cooking devices.

DEVELOPMENT OF THE OFFICE OF SUPERINTENDENT OF THE DAY, BOSTON ELEVATED RAILWAY COMPANY

BY EDWARD DANA, ASSISTANT TO THE SUPERINTENDENT OF TRANSPORTATION, BOSTON ELEVATED RAILWAY

In the ELECTRIC RAILWAY JOURNAL for July 3, 1909, brief mention was made of a recent development in Boston in connection with the specialized study of traffic conditions by the establishment of an office filled by a so-called superintendent of the day, for the purpose of concentrating at a single central point the authoritative handling of the entire elevated subway, tunnel and surface system of the Boston Elevated Railway, upon which are operated nearly 52,000,000 revenue car-miles per year.

Form 3400-8-10-500

BOSTON ELEVATED RAILWAY COMPANY

Surface Cars Reported Defective Causing Delay or Accident and Derailment

5 A. M. ..... 19 TO 5 A. M. FOLLOWING DAY

..... SUPT. OF DAY ..... SUPT. OF DAY

TIME OF DELAY	TIME REPORTED	Car No.	Car House	Location of Delay or Accident	Min. Del.	Reported Cause	REMARKS: Lines Affected or Diverted

Superintendent of Day—Fig. 1, Form for Recording Defects Causing Delays of Over Three Minutes and Derailments

Form 3395-250

BOSTON ELEVATED RAILWAY COMPANY

Collisions With VEHICLES Reported 5 A. M. ..... 19 to 5 A. M. Following Day

..... SUPT. OF DAY ..... SUPT. OF DAY

Time of Coll. / Time Reported	Car Colliding	Conductor / Motorman	Owner and Driver and Address	Location of Accident	Min Del	REMARKS. Particulars, Damage, Injuries, Etc.

Superintendent of Day—Fig. 2, Form for Reporting Accidents to Vehicles

Form 3396-250

BOSTON ELEVATED RAILWAY COMPANY

Collisions With CARS Reported 5 A. M. ..... 19 to 5 A. M. Following Day

..... SUPT OF DAY ..... SUPT. OF DAY

Time of Coll. / Time Reported	Car Colliding	Conductor / Motorman	Car Hit	Conductor / Motorman	Location of Collision	Min Del	REMARKS. Particulars, Damage, Inquiries, Etc.

Superintendent of Day—Fig 3, Form for Reporting Collisions of Cars

Form 3397-250

BOSTON ELEVATED RAILWAY COMPANY

Collisions With PERSONS Reported 5 A. M. ..... 19 to 5 A. M. Following Day

..... SUPT. OF DAY ..... SUPT. OF DAY

Time of Coll. / Time Reported	Car Colliding	Conductor / Motorman	Name and Address of Persons Collided With	Location of Accident	Min Del	REMARKS. Particulars, Injuries, Etc.

Superintendent of Day—Fig. 4, Form for Reporting Collisions with Persons

The office is filled by a different man each day, the list being composed of division superintendents, chief inspectors and representatives from three of the general offices, the total number on the roster being 20. Each man serves approximately three times in two months. The hours of duty are from 8:00 a. m. to 8:00 a. m. the following day. The period was made one of 24 hours to allow sufficient time to get thoroughly in touch with conditions and carry through an entire day, which could not be accomplished with a shorter tour of duty. It will be seen that for the time being each incumbent of the office is leaving his own particular duties behind him and gaining slowly but surely an accurate knowledge of the various parts which go to make up the system and by so doing is himself becoming a broader thinker. The energetic man, when matters are running smoothly, has an opportunity to improve his time through study.

It might prove of interest to examine the details and methods of this office which have been developed after nearly two years of existence. Primarily, the superintendent of the day is the mouthpicce of the superintendent of transportation and he has no authority except such as may be delegated to him by his superiors from time to time. His chief cause for existence is to keep in touch with conditions and bring about uniformity of operation throughout the system, as well as to secure quick, concerted action when an emergency arises, and he has nothing to do with the regular schedule. In this way he may be of undisputed value in securing normal conditions in the shortest space of time.

Now a word as to the actual detail. A general log is kept on a sheet of plain ruled paper, 8½ in. x 14 in., with two ruled columns, one for the time matters are reported and the other for the subject; the rest of the sheet is used for the notes.

Such matters as do not have a classified place on the other forms are entered on this log sheet. Matters which lend themselves to ready classification are noted on card forms 6 in. x 12 in. (Figs. 1 to 8), to each matter being given a distinctive color. These are filed in a desk box easily accessible when a report comes in, thus minimizing the time necessary to receive a report and saving work through the need of but one copying and this on a form covering all important points. The divisions have been instructed to report occurrences just as called for by the form and in this way no time is lost over the telephone.

Forms 3395, 3396 and 3397 (Figs. 2, 3 and 4) are ruled in very nearly the same way, being used respectively for collisions with vehicles, a salmon card; cars, a buff-colored card; and persons, a blue card. As these cards are ruled on both sides it is rarely necessary to use more than one and never more than two in one day. Form 3393 (Figs. 5 and 6) is, so to speak, a compound one. One side is used for a tabulation of heater signals displayed at different periods by divisions, as well as the weather and rail conditions. The reverse side is used for the sand car or wagon operation, a record being made of every time a sand car goes out or comes in, the district covered and the division sending it out.

Form 3400, Fig. 1, a green card, is used for all surface cars reported defective causing delay or accident of over 3 minutes and derailments. These cards date from 5:00 a. m. in the morning to 5:00 a. m. the next morning, in other words they start approximately with the first cars in the morning.

Form 3402 (Figs. 7 and 8) is also used for different purposes, fire alarms being noted on one side and excavations on the reverse. In this connection it is the duty of the superin-

Form 3393-7-10-500

BOSTON ELEVATED RAILWAY COMPANY
Heater Signals Displayed, Weather and Rail Conditions

Below 20° Fahr — Signal 3
Between 20° and 32° Fahr — " 2
Above 32° Fahr — " 1 or 0

Date 191

	Division 1		Division 2		Division 3		Division 4		Division 5		Division 6		Division 7		Division 9	
	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.
Period 1 First Car to 9 a.m.																
Period 2 9 a.m. to 3 p.m.																
Period 3 3 p.m. to 6.30 p.m.																
Period 4 6.30 p.m to Last Car																

	Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail
1 a.m.				7 a.m.				1 p.m.				7 p.m.			
2 "				8 "				2 "				8 "			
3 "				9 "				3 "				9 "			
4 "				10 "				4 "				10 "			
5 "				12 "				5 "				11 "			
				Noon				6 "							

Superintendent of Day—Fig. 5, Form for Tabulating Heater Signals, Weather and Rail Conditions

SAND CAR OR WAGON OPERATION. ..... } Supt. of Day

Date 191

Out	In	District	Div.	Out	In	District	Div.	Out	In	District	Div.

Superintendent of Day—Fig. 6, Form for Recording Sand Car Operation

Form 3402-9-10-250

BOSTON ELEVATED RAILWAY COMPANY
FIRE ALARMS

Supt. of Day ..... 5 A. M. ..... 5 A. M. Following Day ..... Supt. of Day

Alarm Sounded	Box	Fire Located At	REMARKS—Interference with Traffic, etc.

Superintendent of Day—Fig. 7, Form for Recording Fire Alarms

EXCAVATIONS

Div.	Nature of Excavation	Location of Excavation	Watched by No. of Men	Lighted

Superintendent of Day—Fig. 8, Form for Recording Excavations and Men Assigned to Them

tendent of the day to make sure that all excavations affecting the company are properly watched and lighted at 1:00 a. m.

Form 6142, Fig. 9, is not a card form but a block 8 in. x 11 in., used only in winter for the hourly reports of snow plows

The information available in the office is of the broadest character. On the wall there are a large map of the territory comprising the entire system with the tracks shown in red; a large map of the tracks in Division 8, the central district;

Form 6142-2-10-500

BOSTON ELEVATED RAILWAY COMPANY — Snow Storm No.

BUREAU OF OPERATION. OFFICE SUPT OF TRANSPORTATION — Started

DATE ..... SNOW PLOW OPERATION — Ended

	Div. 1			Div. 2			Div. 3			Div. 4			Div. 5			Div. 6			Div. 7			Div. 9			Total	
	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Plows	Lev's.
A.M. 1																										
2																										
3																										
4																										
10																										
11																										
12 M																										

REMARKS:

Supt. of Day ..... Supt. of Day

Superintendent of Day—Fig. 9, Form for Recording Hourly Reports of Snow Plows

operated in each division. The form shown in Fig. 10 is the heading of a sheet 14 in. x 9½ in., used for recording the various notices placed on the bulletin boards at any of the 25 car

a map showing the boundaries of each emergency district; a map of the grades and signals in the East Boston Tunnel; a framed chart of the night car service; a framed special car

Date _____ Notices on Bulletin Boards.	Div. 1			Div. 2					Div. 3			Div. 4			Div. 5		Div. 6				Div. 7						Div. 9			
	Grove Hall	Dorchester	Forest Hill	Ch. Hill	Lenox St.	Box. Crossing	Sewall St.	Jamaica Pl.	Milton	Neponset	Park St.	Tunnel	Eagle St.	Chelsea	Dorch. St.	North. Point	Chas. Neck	Everett	Clar. Hill	Summer St.	Salem St.	Mt. Auburn	Watertown	Murray St.	Arl. Hgts.	River St.	No. Camb.	Allston	Oak Sq.	Reservoir	Boulevard

Electric Ry. Journal

Superintendent of Day—Fig. 10, Form for Recording Notices Posted on Bulletin Boards at Different Car Houses

Form 3990-10-15-250

CAR HOUSE..... CAR DEFECTS MONTH OF..... 19

BODY	Total		Total		Total
Bell		Tr. Pole		Charged	
Bell Cord		Tr. Cord		Cir. Breaker	
Cards, Adv. & Pub		Tr. Base		Contactors	
Curtain		Tr. Wheel		Controller	
Cushion		Tail Lights		Fuse Box	
Dasher		Ventilator		Fuses	
Door, Car		MECHANICAL		Headlight	
Door, Pneumat.		Air Brake Fuse		Hea er or Sw.	
Door, Vest.		Air Brake		Main Mtr. Sw.	
Draw Bar		Air Gauge		Master Cont.	
Draw Bar Rest		Air Compressor		Motor	
Fender		Air Pipe Leaks		Motor Flash	
Fender Castings		Air Valves		Motor Susp.	
Floor		Axle		Lamps	
Glass		Brake Dog		Lead Wires	
Gong		Brake Handle		Lt. Sw. or Fuse	
Grab Handle		Brake Rod		Pump Governor	
Hand Strap or Rail		Brake Shoe		Relays	
Lifeguard		Brake Staff		Resistance	
Reg. Clocks		Brakes		Reverser	
Reg. Cord		Gear and Casing		Rheostat	
Reg. Cord Hanger		Hot Box		Sign Lights	
Roof Leaks		Shaking		Gauge Lights	
Running Board		Snow Scraper		MISCELLANEOUS	
Sand Box or Spout		Springs, Journal		Clothing Caught	
Seats		Squealing		In Collision	
Seat Arm		Wheel		Derailed	
Side Bar		Bolster		Paint Sticky	
Signs		ELECTRICAL		Dirty	
Step or Hanger		Bucking		Slow	
Tr. Catcher		Cable			

Superintendent of Day—Fig. 11, Form Used at Car Houses for Recording Car Defects

houses on the system. All important matters affecting cars en route, such as diversion of cars, oil on rails, important street work necessitating cars running with caution, are posted in chalk on large bulletins in plain sight at each car house.

tariff; a framed fire alarm schedule; a bulletin board composed of removable strips of white cardboard with ½-in. black letters of important telephone numbers such as emergency hospitals, city departments, etc.; a similar board for tracks which

for one reason or another are closed to operation, and at the bottom of this bulletin are slides for important notices which run over from one superintendent of the day to the other.

In addition to the above, which are all on the walls, there are accessible:

A file of all current transportation matters.

A file of the daily layout for the road department.

Blueprints of the entire track layout of the system.

All general orders and bulletins.

All rule books.

A book of city traffic regulations.

A book of emergency routes for the diversion of cars in the congested district.

A street directory.

Route books.

Various literature of connecting roads.

A list of bridges over which the heavy cars on the system cannot operate.

A list of all station masters, starters and their hours of duty.

A list of street inspectors, with districts, hour of duty and call boxes.

A card timetable of all lines which run throughout the day on the system.

Memorandum blocks for claims, complaints and special cars, which are used after the offices close for the day.

Lastly, a standard clock, thermometer and fire alarm tapper.

All special cars are checked up by the superintendent of the day a short time before they are due to pull out from the car house, and in this way the liability to error is reduced to a minimum. Dasher posters are also regulated from the office so that no posters will be displayed after their expiring date.

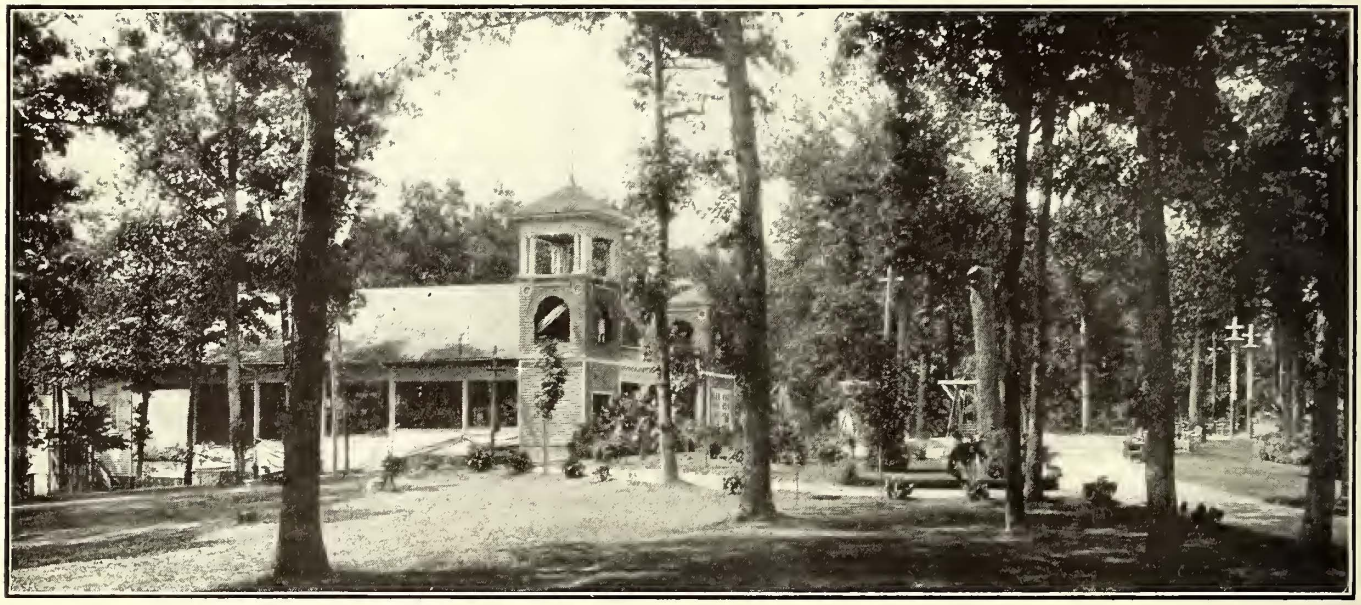
A recent addition to the duties has been the checking up of all disabled cars. Each morning there is received the report from the starters of the 25 car houses giving the disabled cars of the day previous and the causes. These are entered on form 3410, Fig. 11, there being one card for each car house. At the end of the month these are totaled in the office of the superintendent of transportation. An accurate record of all car defects is secured which can then be checked with the mechanical department.

It will be seen, therefore, that there has developed a well-equipped office, relieving the superintendent of transportation of an enormous amount of detail, thus permitting his attention to broader fields and also exercising a very valuable function of taking up many loose ends and stimulating the proper performance of duty in transportation matters by division officials.

ATTRACTING PARK BUSINESS IN LYNCHBURG, VA.

The Lynchburg Traction & Light Company, of which R. D. Apperson is president and general manager, operates a pleasure resort known as Rivermont Park. No admission is charged to the park. The latter is only 2 miles from the center of Lynchburg, but owing to the hilly character of this section practically all of the visitors come on the company's cars. In addition to the staple amusements for summer parks, such as free dancing and moving pictures, theatrical performances at nominal charge, penny arcade, bowling alleys, pool rooms, etc., the company tried recently two interesting departures which were very successful. One of these was to give in the park casino illustrated concerts by means of a string quartet and Victor Gold Seal opera records. The musicians and the hornless instrument known as an auxetophone were placed amid artistically grouped palms so that the whole effect was very pleasing. These concerts were given on Sunday afternoons and on weekday evenings. They were followed by moving pictures and dancing on weekday nights.

The other novelty which the company tried was to have the Salvation Army hold services at the park on Sunday nights, accompanying them by stereopticon views of Bible history. It took some time to convince the Salvationists that this scheme would be desirable, but after the first meeting they were very enthusiastic over it. The company gave the use of the park to the Army without any charge whatever while two Salvation Army girls accepted offerings at the gates.



Casino at Rivermont Park, Lynchburg, Va.

Mr. Apperson is also president of the Roanoke Railway & Electric Company, which operates a resort known as Mountain Park. The latter place is operated along quite different lines from the one at Lynchburg, as Roanoke has a cosmopolitan population. Thus, vaudeville is one of the most popular features at Roanoke, whereas it has not been at all successful at Lynchburg.

"North Dakota Lignite as a Fuel for Power-Plant Boilers" is the title of Bulletin No. 2, just issued by the Bureau of Mines. This bulletin describes a series of tests with brown lignite at the pumping plant of the United States Reclamation Service at Williston, N. D. The furnace was of the semi-gas producer type. The results of the tests on the lignite show that this fuel, though generally considered unsatisfactory, may be used with fair economy under boilers that generate their full rated capacity. The tests were conducted by the Technologic Branch of the Geological Survey, which is now a part of the Bureau of Mines. The authors of the bulletin are D. T. Randall and Henry Kreisinger.

TRACK DEPARTMENT STANDARDS OF NEW YORK STATE RAILWAYS

A number of standard designs of track and right-of-way structures have recently been adopted by the Rochester interurban lines of the New York State Railways. These standards have been designed by B. E. Tilton, engineer of maintenance of way, and are being gradually installed on the Rochester & Eastern Rapid Railway and the Rochester & Sodus Bay Railway as part of the regular maintenance work. It is the intention to have the track and structures of both of these railways completely standardized in the near future.

The standards which have been adopted may be divided into special track signs, standard track construction details and miscellaneous standards relating to the track department.

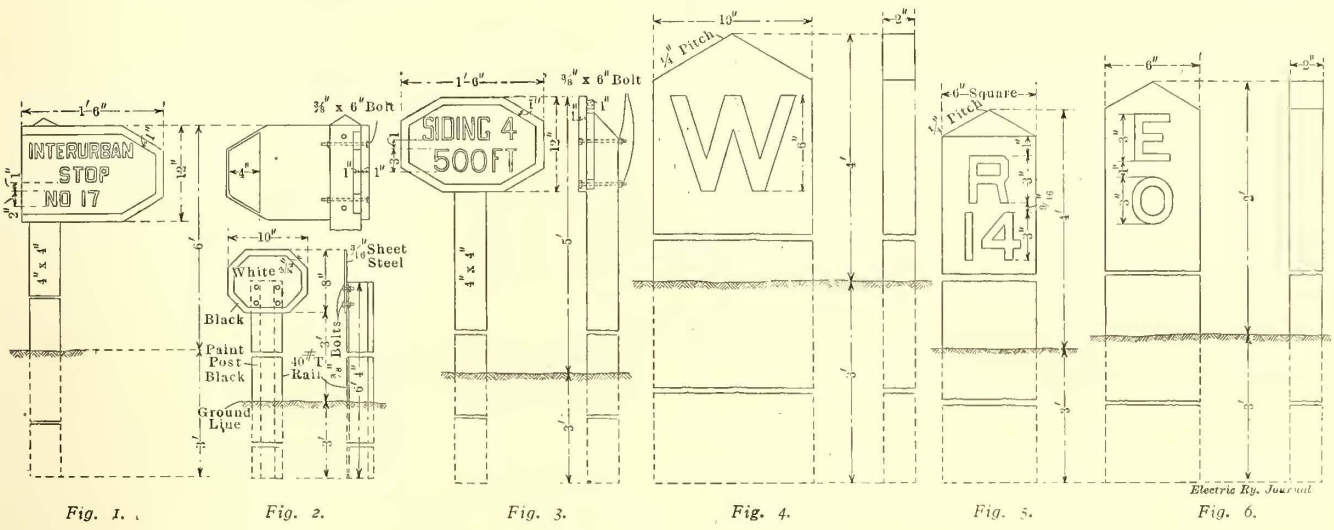


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6.

Figs. 1 to 6—Standard Signs

STANDARD TRACK SIGNS

A number of typical standard track signs are illustrated in the accompanying engravings. The following brief descriptions of a few of the standard signs may be of interest.

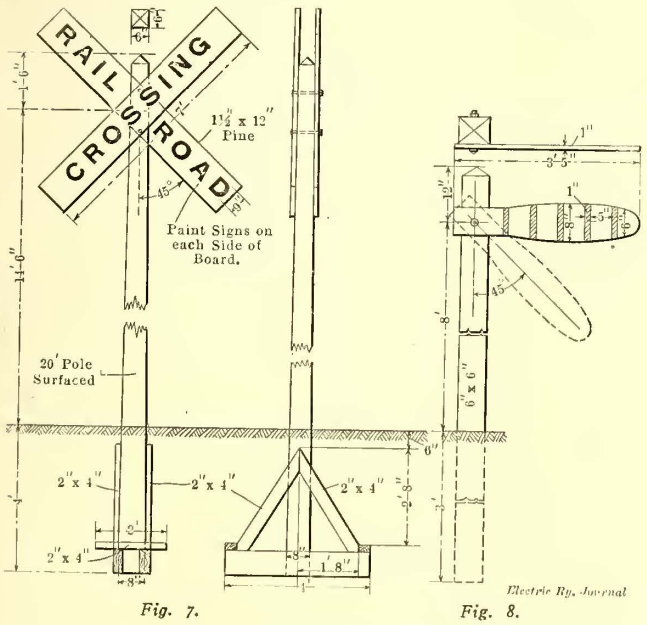


Fig. 7. Fig. 8.

Figs. 7 and 8—Standard Signs

The sign erected at all highway crossings where interurban cars stop is shown in Fig. 1. The post is set 8 ft. to one side of the center line of the track on the far side of the highway. When the track is located in the center of a street in a village the sign is placed back of the curb line. The letters, which are 2 in. high, are painted black on a white field, surrounded by a black border 1 in. wide. The post and the back of the sign are painted black.

The section boundary sign is similar in shape to the stop sign, but is smaller, being 8 in. x 12 in. and mounted on a 3-in. x 3-in. post, 4 ft. above the ground. The word "Section," with the number of the section below it, is painted in black letters 1½ in. high on a white field, with a 1-in. black border. The back of the sign and the post are painted black. This sign is also placed 8 ft. to one side of the center line of the track.

The standard siding shown in Fig. 3 is placed 500 ft. in advance of each siding as a marker. The letters, which are 3 in. high, are white on a black field surrounded by a white border. The post and the back of the sign are painted black.

The yard limit sign, used to warn cars entering yard limits, is of the same size and shape as the siding sign. It is 5 ft. high and is located on the right-hand side of the track 8 ft. out from the center line so that it can be seen from cars entering the yard. The letters are 4 in. high, painted white on a green field with a white border. The post and back of the sign are black.

The trespass sign placed at all highway crossings and at points where private right-of-way begins is the same size and shape as the siding sign and has printed on one side the words "Private Right-of-Way; Trespassing Forbidden." The letters are 1¼ in. high, painted black on a white field with a black border.

The town-line sign is placed at all points along the route where town boundaries intersect the right-of-way. These signs consist of two boards of the same size and shape as the siding sign mounted back to back on the top of a 4-in. x 4-in. post 5 ft. above the ground. On each board are painted the words

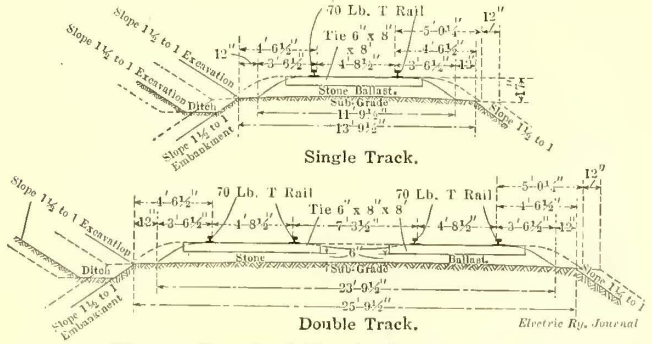


Fig. 9—Standard Track Cross-Sections

"Town Line" in black letters 1¼ in. high with the name of the town below in black letters 2 in. high. The field is white, surrounded with a black border 1 in. wide.

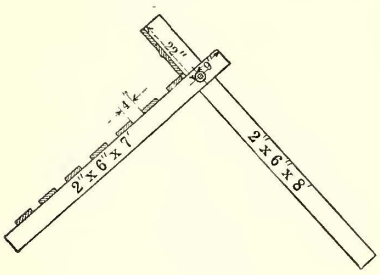
The post for marking the right-of-way boundaries is made of oak, 4 in. x 4 in., set 3 ft. in the ground and projecting 3 ft. above the ground. On all four sides of the post are painted

the letters "R of W." The capital letters are 2 in. high and the small letters 1¼ in. high. They are painted black and the body of the post is painted white. These posts are placed along the right-of-way at places where there is no fence.

Where the speed of cars is limited in passing through a village a slow sign is placed alongside of the track 500 ft. from the village limits. This sign is made of 2-in. x 10-in. oak plank on which is painted the letter "S." The post is set in the ground 3 ft. and projects above the ground 4 ft. It is painted black on all four sides and the letter "S" is painted white.

Rochester, and below it the number of miles to the terminal. The letters are black and are 3 in. high; the posts are painted white. The standard mile post is shown in Fig. 5.

On certain curves, where a maximum speed of 20 m.p.h. or less is the limit for safe running, a curve signal illustrated in Fig. 8 is used. This signal, which is in the shape of a semaphore arm 3 ft. 5 in. long and 8 in. wide, is painted green with 1-in. vertical black stripes. When the arm is mounted in the horizontal position it indicates a curve above 15 deg., over which the maximum running speed is 10 m.p.h. For curves



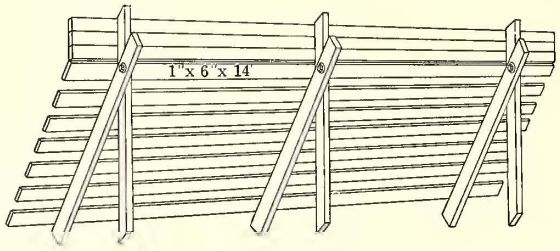


Fig. 10—Standard Portable Snow Fence

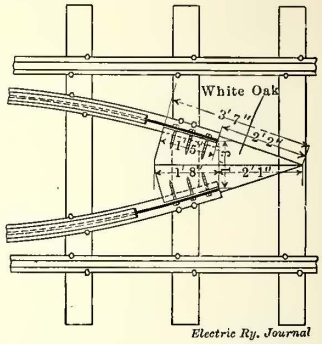
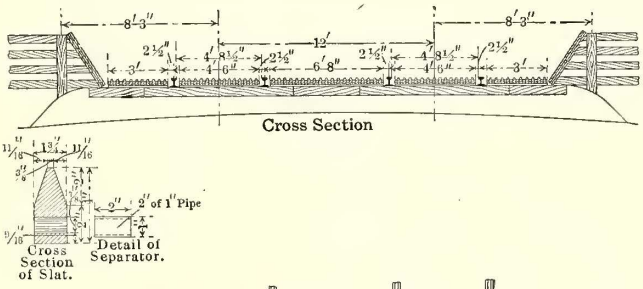


Fig. 11—Guard Rail Point Block

The whistle sign shown in Fig. 4 is the same as the standard slow sign except that it has the letter "W" painted in white on a black ground. It is placed 1000 ft. in advance of all public highway crossings at grade.

One of the most difficult tasks in maintaining interurban track is to preserve accurate and uniform superelevation of the outer rails on curves. A standard superelevation post is now being used on all curves of the Rochester interurban lines for the guidance of section foremen. Such a post is shown in Fig. 6. Four of these posts are used for each simple curve, whether spiraled or not. A post marked $\frac{E}{o}$ is placed near the beginning and end of each curve on the tangent track, indicating zero superelevation. Similar posts are also placed at the



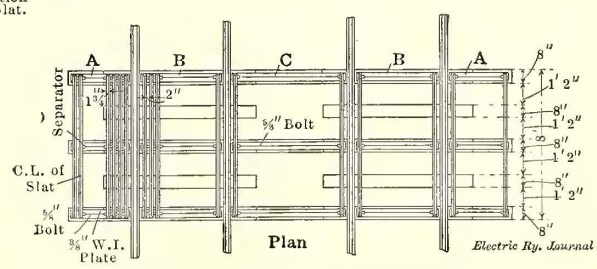


Fig. 12—Wooden Cattle Guard

beginning and end of the true circular curve and the amount of superelevation is painted on them below the letter "E," as for example, $\frac{E}{2\frac{1}{2}}$. On the back of the post marking zero superelevation is painted the number of the curve. These superelevation posts are white and the letters are 3 in. high, painted black.

The standard mile post is of oak, 6 in. x 6 in., set 8 ft. out from the center line of the track with the faces at an angle of 45 deg. with the center line. On each of the faces nearest the track is painted the letter "R," indicating distance from

above 10 deg. and below 15 deg., on which the maximum speed is 20 m.p.h., the arm is placed at an angle of 45 deg. from the horizontal. These signs are mounted 500 ft. in advance of the curves for which they serve as a warning signal.

All bridges on the interurban lines are numbered and near each bridge a standard bridge number sign (Fig. 2) is mounted on the right-of-way near the track. The sign consists of a piece of 3/16-in. sheet steel, 8 in. x 10 in., bolted to the base of a short piece of old T-rail, set vertically in the ground. The face of the sign is painted white with a black border ¾ in. wide and the number of the bridge is painted in black figures 3½ in. high.

The standard highway crossing sign is shown in Fig. 7. The letters are 9 in. high and are painted black on a white ground.

TRACK DETAILS

The standard cross-section of roadbed for single and double track is shown in Fig. 9. The full lines indicate the present cross-section of slope and ballast and the dotted lines indicate the outlines which are being used in all new construction and which are being attained gradually in ballasting and in general track maintenance.

The standard rail rest used for supporting extra rails along the right-of-way is made of oak, 10 in. x 12 in., and the top is shouldered so as to support three rails. For supporting rails

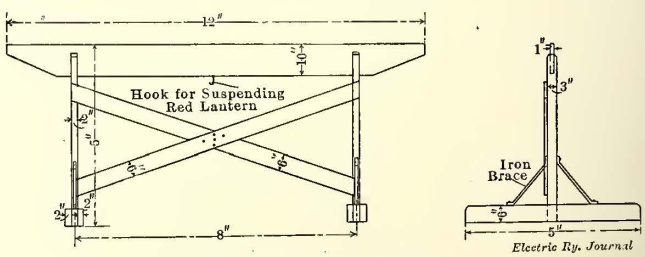


Fig. 13—Street Barrier

33 ft. long two posts set 17 ft. apart are used. For supporting 60-ft. rails three posts set 21 ft. apart are used.

Guard rails of the same height as the track rails are used on all bridges. They extend 50 ft. beyond the bridge on each side and are brought together at their ends with a white oak point block shown in Fig. 11. The guard rails are gaged 5 in. inside of the track rails and are spiked to every other tie. Where a short radius curve leads on to a bridge the guard rail is drawn out to 1½ in. from the gage line of the track rail and is continued on around the curve. The oak guard rail point is placed on tangent track in all cases.

Wooden cattle guards are being installed at all intersections with public highways. The details of construction of these guards are shown in Fig. 12.

Much trouble is experienced from drifting snow in Western New York and portable snow fences of the design shown in Fig. 10 are extensively used to protect cuts and other places where snow accumulates. These fences are made in sections 14 ft. long and are self-supporting. They can be stored or transported flat and are quickly set up or taken down.

RECORDS OF WHEEL GUARD INSTALLATIONS IN BROOKLYN

The Brooklyn Rapid Transit Company is installing at present a total of 2563 wheel guards of the H-B, Hipwood and Parmenter types. In this connection the car equipment department devised the tabular record reproduced herewith to keep track of the shipments of these guards as received at the Thirty-ninth Street and Fifty-second Street shops. Columns are provided on this record for the classification of the type of

Type of Life Guard	Schedule	TYPE OF CAR	No. of Cars	CAR NUMBERS	Date Cars Measured	DELIVERY 1910 June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A	A	Standard Closed Brill M.T. Truck	504	300-369, 370-394 396-399 500-550, 552, 554 555, 557, 560, 561 566, 567, 570-577, 579 700-786 1700-1799, 1900-1949 2100-2199			15	300	189			
	B	Convertible Brill M.T. Truck	1	787			1					
	C	Standard Closed Standard O-45 M.T. Truck	2	796, 797			2					
	D	Standard Closed Peckham 14-D-5 M.T. Truck	20	1-20			20					
	E	Semi-Convertible Brill M.T. Truck	7	789-795			7					
	F	Semi-Convertible Standard O-45 M.T. Truck	100	2500-2599	5-24-10	100						
	G	Semi-Convertible Brill M.T. Truck	250	2700-2764, 2766-2787 2791-2794, 2796-2799 2900-2999, 3100-3154	5-24-10	200	50					
	H	Semi-Convertible Peckham 14-D-5 M.T. Truck	204	3155-3199, 3300-3399 3500-3554, 2788-2790 2795			204					
	I	Convertible	452	3555, 3556 3700-3799, 3900-3999 4100-4199, 4300-4349 4500-4599	5-24-10	152	150	150				
	J	Parlor Car	1	Columbia			1					
	K	Double Truck Open	495	455-499 800-899, 1000-1099 1200-1299, 1400-1499 1600-1649					111	200	184	
			2036			452	450	450	300	200	184	
B	L	Single Truck Closed	8	1-8		8						
	M	" " "	95	100-194	5-27-10			95				
	N	Single Truck Open	6	14-19		6						
	O	" " "	163	1800-1899 2000-2062				27	34	34	34	34
			272			14		122	34	34	34	34
C	P	Double Truck Open	255	200-299, 400-454 600-699					255			
			255						255			

Brooklyn Rapid Transit Schedule Showing Delivery of Wheel Guards for Various Types of Cars.

car, the number of each type, the car serial numbers, the delivery dates and, finally, a series of ruled sections corresponding to the total number of equipments for each group of cars. These sections are filled in as the corresponding equipments are received, so by a glance at the chart one can see immediately just what proportion of the order has been filled to date.

A daily report of the guards as installed on specified types and numbered cars is sent to the superintendent of equipment from the two shops mentioned. Copies of this report are transmitted at once to the transportation department and to the claim agent. The daily reports are assembled on a progress sheet which shows the car numbers, the date when the cars went in and out of the shops and their types. These progress reports are sent monthly to the Public Service Commission of the First District and also to the interested departments of the railway.

The annual report of the State Railroad Commission of Michigan for 1909 has been issued. In all 88,848 men are employed by all railroads operating in the State. The total passenger fares collected by electric roads doing an interurban business were $9,723,832.

HEARING ON SERVICE AND VENTILATION IN BROOKLYN

A hearing was held before Commissioner McCarroll of the Public Service Commission of the First District of New York on Nov. 21, 1910, on the motion of the commission to investigate the question of improving and adding to the service and equipment of the Brooklyn Union Elevated Railroad, Nassau Electric Railroad, Sea Beach Railway and the South Brooklyn Railroad. G. H. Backus, as counsel, conducted the case for the commission and W. S. Menden, assistant general manager of the Brooklyn Rapid Transit Company, appeared for the companies. Mr. Backus said the Brooklyn Rapid Transit Company, which controls the companies previously mentioned, contended that tests made in the presence of representatives of the commission to determine the ventilation of the convertible cars in use on its elevated lines showed that the cars were well ventilated and established the fact that the complaint about insufficient ventilation was caused by temporary conditions at the beginning of October when the cars were converted into closed cars and the weather continued to be more than usually warm.

Walter E. Johnson, chief draftsman of the mechanical department of the Brooklyn Rapid Transit Company, said he had made readings in the convertible cars with an anemometer and from these readings he had calculated the amount of air taken in and exhausted from these cars. Streamers were also installed in the cars opposite the ventilators and photographs of them were taken to indicate the circulation of the air.

William G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, said that the tests made by Mr. Johnson convinced him that the convertible cars were properly ventilated. Tests were made of cars equipped with 10 ventilators, 12 ventilators and 14 ventilators. Fourteen ventilators, the largest number possible, were installed and the intake of fresh air per passenger per minute was 922 cu. ft.

Clifton W. Wilder, electrical engineer of the commission, said that the accepted standards of ventilation varied from 5 cu. ft. per minute per person to 50 cu. ft. per minute per person. He considered the ventilation adequate and if more ventilators were installed per car the movement of air would not be so positive.

Mr. Menden said that the company was considering putting some movable sash in the car, so that some of the windows could be lowered if necessary. The hearing was then closed.

SETTLEMENT OF BROOKLYN TRANSFER CASE

After further testimony had been offered before the New York Public Service Commission of the First District in regard to the new transfer system of the Brooklyn Rapid Transit Company subsidiary surface railway companies an agreement was made whereby the complaint was withdrawn upon the promise that certain modifications would be made in the regulations. Accounts of the hearings before the commission in this case have been published in the Electric Railway Journal of Oct. 29, Nov. 5 and Nov. 19, 1910.

At the hearing on Nov. 15 E. G. Connette, transportation engineer of the commission, testified that his department had investigated all of the complaints that had been received in relation to the transfer system. He was prepared to make recommendations covering approximately 23 or 24 complaint points. These covered a large part of the complaints, those which were the most important and which should be remedied. They covered four fundamental locations in the transfer system. One was reached by a reverse direction trip, but Mr. Connette thought the people in this particular district, who were now required to pay 10 cents fare, should have one fare with transfer privileges. This could be arranged with full protection to the company by the issue of duplex tickets. Mr. Connette presented a statement showing the changes which he recommended. These changes, together with those that had already been made by the companies, would take care of practically 75 per cent to 80 per cent of the complaints which had been received. Some of the remaining complaints were considered unfounded and unwarranted.

Under examination by Grosvenor H. Backus, assistant counsel for the commission, Mr. Connette stated that he considered all of the changes essential to reasonable and adequate service by the several defendant companies in order to provide a 5-cent fare to passengers going in the same general direction for a distance, not unreasonable, which would ordinarily be covered by a 5-cent fare. Passengers could now travel between some of the points involved for a 5-cent fare, but only by long, circuitous routes. From an operating point of view it was to the advantage of the company to carry passengers by the shortest routes possible.

C. D. Meneely, secretary and treasurer of the companies, testified that the modifications which it was proposed to install would, he thought, with one exception, be established by Nov. 21. A statement presented by Mr. Meneely showed that the number of transfer privileges which existed under the old transfer system was 5147. The number under the new system was 3210, a reduction of 1937. The 1937 withdrawals consisted of 231 on account of illegal stop-overs; 266 two-ride routes; 551 on account of reverse directions or three-ride routes; 878 limitations of free rides on routes involving two or more companies; unnecessary transfers, 11. The use of transfers for stop-overs was never intended under the law. Wherever lines of two companies exchanged transfers at a point the transfer was limited to a cash fare and the second transfer or third ride was eliminated.

A map, prepared under the supervision of the franchise bureau of the commission, showing the streets in Brooklyn over which two or more street railway companies operate jointly, was submitted in evidence. George D. Yeomans, counsel for the companies, objected to the introduction of the map, but the objection was overruled by Commissioner McCarroll. Exception was taken to the ruling.

At a subsequent hearing on Nov. 17 Mr. Backus stated that representatives of the company had told John J. A. Rogers, the complainant, that they would be willing to adopt the suggestions made by Mr. Connette on Nov. 15 if Mr. Rogers would withdraw his complaint.

Commissioner McCarroll said that the withdrawal of the complaint was a question for Mr. Rogers to decide, but it was for the commission to determine what should be done as a result of the investigation.

On Nov. 23 Mr. Yeomans stated that, subject to the wishes of the commission, it had been agreed that the companies would make the changes suggested, that Mr. Rogers would withdraw his complaint and that the matter should be closed.

Mr. Rogers stated that the causes of his complaint would be removed if the companies modified their schedules in accordance with the recommendations of the commission, and he asked for an order directing that the modifications be put into effect and that as to other matters the complaint be dismissed.

Mr. Yeomans said that the companies would consent that the suggestions of Mr. Connette and Mr. Meneely be ordered put into effect.

Commissioner McCarroll said that the proper method would be for Mr. Meneely to state what changes it was proposed to make and the commission would then consider the case and make such order as seemed to be required. Mr. Meneely, therefore, stated the proposed changes in detail.

The hearing was then closed.

ANNUAL DINNER OF THE RAILWAY BUSINESS ASSOCIATION

The annual diner of the Railway Business Association was held at the Waldorf-Astoria, New York City, on Nov. 22, 1910 President George A. Post presided, and addresses were made by Hon. Martin A. Knapp, chairman Interstate Commerce Commission; Daniel Willard, president Baltimore & Ohio Railroad; John Claflin, president H. B. Claflin Company, and Thomas A. Daley, the editor of a Philadelphia newspaper.

Mr. Willard, the first speaker, referred to the hazards involved in financing the first railroads. Capital was difficult to obtain, and some railroads failed. Others earned large rewards or there would have been no railroads. It is claimed that in these early days rebates were granted, that the railroads exercised a controlling influence in some legislatures through the issue of free transportation or the payment of money, that some of the railroads were overcapitalized, and that large individual fortunes were made by improper, if not illegitimate, practices in that connection. Doubtless there was sufficient cause for complaint. To hold otherwise would be to hold that the men engaged in railway affairs were not subject to the same human limitations and weaknesses that are known to be the common heritage of mankind. The feeling aroused by these practices finally found expression in laws, notably in the Interstate Commerce Act. Mr. Willard said that, as a result of legislation, rebates and unjust discrimination have disappeared, or, if not altogether, then relief could be found in existing laws. He considered no additional law necessary in that direction. In regard to the claim that the American railways are overcapitalized, he quoted the capital per mile of track for railroads in different countries. American roads were the lowest in the list. To keep pace with the development of the country the additional investment of $1,000,000,000 per year would be absolutely necessary for at least a number of years. During the last 10 years the railroads had spend enormous sums for improvements, such as reducing grades, eliminating curves and enlarging terminals to offset the constantly increasing cost of operation. The possibilities of future economies resulting from further similar expenditures were largely exhausted, so that if costs continue to increase the only way to meet the situation was by an increase in rates. A great deal had been said in regard to what constituted a fair and reasonable return on money invested in railway securities. If the railroads were finished and no new capital was needed it might then be of interest to discuss what rate of interest or dividends should be paid in the future on money borrowed in the past. But the railroads were not finished and a large amount of new capital was required by them. This money would not be obtained if the man who had money was told simply that he would be paid a fair rate. He would insist upon having not what others thought would be a "fair" rate, but what he himself considered a satisfactory rate, and in reaching that conclusion he would be influenced by many elements, which, taken as a whole, constituted credit.

In conclusion Mr. Willard said that he thought that the rail-

roads should keep out of politics and, through their proper officers, should co-operate as far as possible with the Interstate Commerce Commission. He thought that in the minds of railroad managers there was a feeling of hesitancy and uncertainty about the future. Possibly that feeling was not justified, but the question was how it could be corrected. He thought that the way to bring this about would be for the people to adopt a liberal policy in future legislation and possibly to try what could be done under the existing laws.

Mr. Knapp made a long, interesting speech, saying, in part:

"If our country is to grow and prosper as it ought, if its untold resources are to be developed and its swelling numbers find profitable employment, we need and must have railway earnings sufficient for three things:

"First—A return on railway investments of such amount and so well assured as to attract and secure the necessary capital—an enormous sum in the aggregate—to improve existing roads and to construct without delay thousands of miles of new lines in fruitful districts now destitute of any means of transportation. It is a matter of common knowledge that the output of traffic for the fiscal year 1907 exceeded our entire carrying capacity on land and water. With the rapid increase of population and of productive efficiency—that is, with a greater army of workers and better industrial organization—the volume of that vear ought to be and will be nearly doubled in another decade if we can provide for prompt and proper distribution.

"Second—The payment of liberal wages to an adequate number of competent men. This not only to insure increasing skill and reliability in a service which is all the while becoming more exacting and on which the safety and comfort of the public constantly depend, but also because of the very great influence of railway wages upon the compensation of labor in every other sphere and grade of private employment.

"Third—The betterment of existing lines so as greatly to augment their serviceableness to the public, as can in varying degree be done everywhere, without unnecessary and undesirable increase in capitalization. Every dollar borrowed to improve a road now in operation involves a permanent addition to the interest charge which the public is required to pay; the improvement from current earnings puts no lien upon the property, but rather augments its value and usefulness, and by adding to the security of the capital already invested tends to a lower rate of interest upon that capital."

In discussing the question of a reasonable return on money invested in railroad properties, he said that without specifying any exact rate or rates he considered that the return should be sufficient to encourage capitalists greatly to extend the railroad facilities in all parts of the country.

Mr. Claflin spoke as a shipper interested as an investor not only in the wholesale merchandise business, but also in retail merchandise stores throughout the country. He stated, as an example, that a retail business in the Far West with sales of about $1,000,000 per annum would pay freight and express rates from the East of about $25,000 per annum. If the freight rates should be raised 12 per cent the increased expenses to this store would be about $3,000 per annum. He thought that the retail merchants would find that their prosperous years coincided largely with the years of railway extension and improvements and their unprosperous years with railway retrenchment. and he believed that if the increase in freight rates mentioned by him would mean the prosperity of the railroads the profit of the retail business cited would be far greater than the $3,000 mentioned. With a business further east, or near the Ohio River, the gain to the merchant would be materially greater. Merchants wanted, of course, the best rate for transportation which they could get, but recently many of them had been thinking more about the quality of the service and the prosperity of allied interests than about the rate.

At the annual meeting of the Railway Business Association the following officers were elected: President, George A. Post; vice-presidents, H. H. Westinghouse, C. H. Cutler, W. H. Marshall, E. S. S. Keith, A. H. Mulliken, O. P. Letchworth, A. M. Kittredge; treasurer, Charles A. Moore.

WEAR OF RAILWAY MOTOR GEAR AND PINION TEETH—CAUSES AND SUGGESTED MEANS OF RELIEF*

BY T. W. WILLIAMS, GENERAL ELECTRIC COMPANY

The early 15-hp motors used cast-iron gears and rawhide pinions. Later pinions were made of alternate strips of rawhide and steel. Finally, cast steel replaced cast iron for the gears and forged steel rawhide for the pinions.

Many factors enter into the causes for wear of gear and pinion teeth. The most important are the following: The proper selection and treatment of steel; the effect of wear of axle and armature bearings causing improper alignment of gear and pinion teeth; the proper methods of lubrication.

The following comments with respect to these causes for wear are perhaps worthy of attention.

THE PROPER SELECTION AND TREATMENT OF STEEL

Until recently untreated machine-steel forgings were used exclusively for pinions and cast steel for gears. An examination of such gear or pinion teeth when outworn shows that the metal has been squeezed from the face of the teeth and has flowed over the sides and the top, especially in pinion teeth. The ductility of such steel is high and any peening action will make it flow very readily. Gear teeth are cut to a curve that assures a rolling motion between the meshing members, but this rolling motion no longer exists as soon as the curved teeth become flattened out from peening. Instead there is introduced a grinding action which causes the increasing ratio in wear of teeth during the life of gears. The increase in the life of gear and pinion teeth has been brought about by two different treatments of steel—oil-quenching and case-hardening.

OIL-QUENCHING TREATMENT

The first treatment involves the use of steel containing about 0.7 per cent carbon, heating it to a predetermined value and quenching it in oil. Before treatment such steel has approximately the following physical characteristics:

Tensile strengtb	85,000 lb. per sq. in.
Elastic limit	40,000 lb. per sq. in.
Reduction in area	40 per cent
Elongation	18 per cent
Hardness	120

After the heat treatment the physical characteristics would be changed to the following values:

Tensile strength	120,000 lb. per sq. in.
Elastic limit	85,000 lb. per sq. in.
Reduction in area	30 per cent
Elongation	15 per cent
Hardness	300

This treatment serves two purposes: First, it practically doubles the strength as revealed by the difference between the elastic limits before and after treatment; second, it also more than doubles the degree of hardness. This increased hardness, however, can be obtained only at a sacrifice to ductility, or, in this case, a reduction in area value. Great ductility is a cause of the peening action which readily distorts the teeth.

It may be urged that if the ductility is reduced the metal may be so brittle that it will break when it receives some unusual blow. Undoubtedly it will, but this objection can be answered by making the elastic limit of the metal high enough to take care of any strain to which the motor can subject it.

CASE-HARDENING TREATMENT

Since a lack of ductility with a corresponding high elastic limit and extreme hardness tends to increase the life of gear and pinion teeth, the furthest step in that direction would seem not to be amiss. Such results can be obtained by using the case-hardening or carbonizing treatment, whereby free carbon is impregnated into the face of the steel to be hardened.

Several methods are employed to impregnate the carbon. Perhaps the best known process is to place the untreated pinion or gear in a metal box containing bonedust, after which the box is placed in a furnace and kept at a predetermined heat for several hours, the time depending on the depth the hardness is required to penetrate the metal. As the bonedust is carbon-

*Abstract of a paper read before the meeting of the Central Electric Railway Association, Dayton, Ohio, Dec. 1, 1910.

ized, the free carbon impregnates the face of the teeth to about 1 per cent on the surface, but the proportion gradually tapers off to the original quantity at a depth of about 0.1 in. below the surface. After this process has been completed, the metal while still at a bright heat is plunged into cold water to harden the face of the steel.

Steel with a very low carbon content is necessary for this case-hardening process because the object is to make the face of the teeth very hard (and necessarily brittle), but to keep the center tough in order that it may act as a shock-absorbing cushion. Steel containing 0.2 per cent combined carbon is unaffected in its hardness characteristic when heated and quenched in water, but after 0.3 per cent and over of carbon is introduced the hardness increases with the added content of carbon. Since the carbon introduced from the outside source decreases in amount as it goes toward the center of the tooth, a gradually increasing ductility necessarily obtains in the same direction. It is practically impossible to obtain the true physical characteristics of the carbonized portion of this metal, but they are approximately as follows:

Tensile strength	140,000 lb. per sq. in.
Elastic limit	135,000 lb. per sq. in.
Reduction in area and elongation	2 per cent or 3 per cent
Hardness	625

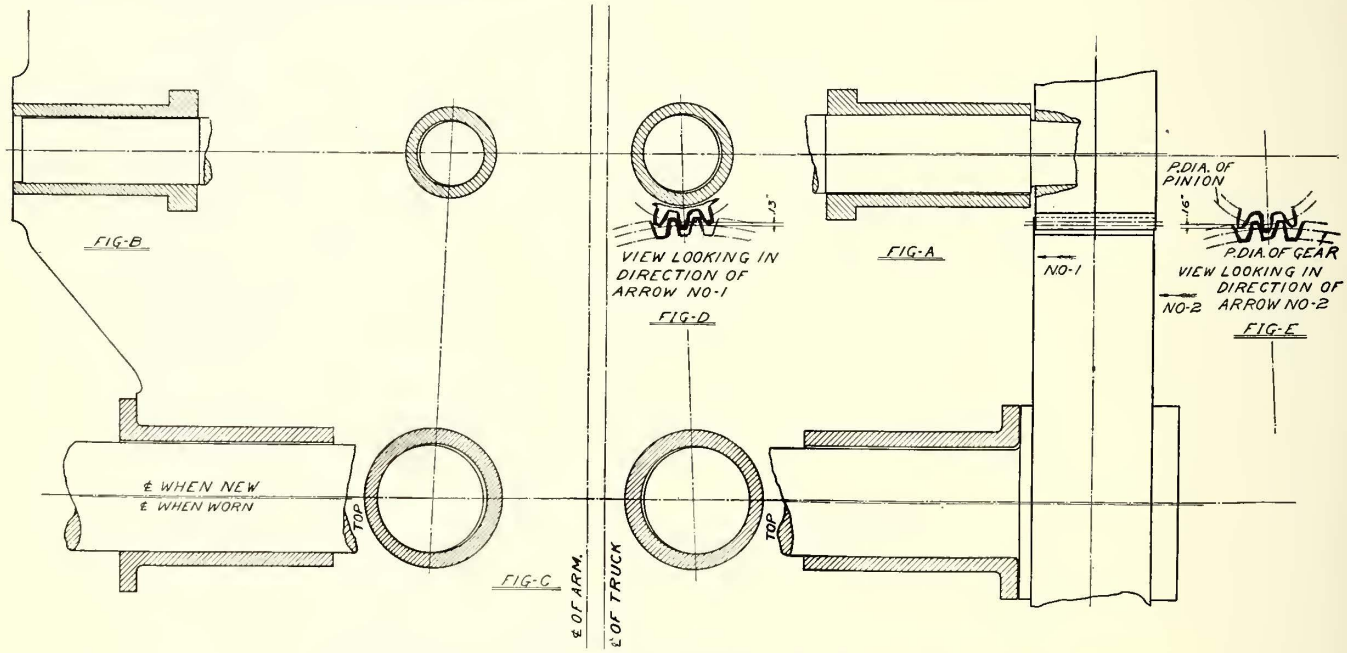
Here is a case where the hardness is doubled again, for it is over twice the figure for the oil-hardened steel previously mentioned. On the other hand, the brittleness has greatly increased, but to offset this the elastic limit has been raised from 85,000 lb. to 135,000 lb., or higher than the tensile strength of the oil-hardened steel.

It remains to be demonstrated that carbonized steel gears and pinions have sufficient tooth strength to meet the heavy service demands for which high-carbon, oil-treated steel has proved adequate. However, the results so far attained strongly indicate that by reason of its long life carbonized steel will be generally used for street railway and interurban service.

THE EFFECT OF WEAR OF ARMATURE AND AXLE BEARINGS

The wear of gear and pinion teeth would be greatly reduced if it were possible to place a bearing on each side of the gear and pinion, because under present conditions, when power is transmitted from the pinion to the gear, the armature and axle shafts tend to spring away from one another. The accompanying drawings show in detail the very disadvantageous way gears and pinions have to operate when the armature bearings have worn 1/16 in. and the axle bearing ⅛ in. In Fig. A the armature-shaft bearing adjacent to the pinion has worn on the side which is further from the axle, while the bearing at the other end, Fig. B, has worn on the side near the axle. This allows the pinion teeth to take a position at an angle to the gear teeth, which means that the end of the teeth nearer the motor do most of the work while the pitch lines at the other end of the gear and pinion teeth are so far apart that they do not transmit their share of the energy. At the same time the axle bearings on which the motor is mounted have worn on the side away from the motor, Fig. C. Figs. D and E show the unsatisfactory condition under which a new gear and pinion would have to operate if they were mounted on the axle and armature shafts when the bearings had worn ⅛ in. and 1/16 in. respectively. Fig. D shows the end of the teeth near the motor—here the middle pinion tooth is meshing with the gear tooth and the pitch circles have to spread apart 0.13 in. Fig. E shows the other end of the same teeth—here it will be seen that the middle pinion tooth does not touch the gear tooth by 1/32 in., while the pitch lines have spread 0.16 in.

If a soft-steel gear and pinion were used in this case it



Views Illustrating the Effect of Bearing Wear on Gears and Pinions.

would be only a short time before they aligned themselves on account of the rapid peening action at the meshing end. It is a question what would happen to the case-hardened product under similar circumstances, especially if the tooth were heavily loaded. Common sense would certainly dictate the installation of new bearings when the gears and pinions are renewed.

Both tooth wear and bearing wear would be largely eliminated if a gear and pinion could be mounted on each side of the motor. Such a scheme would be particularly beneficial where an extreme width of gear face is necessary in the case of large-capacity motors, but unfortunately these motors now occupy nearly all the available space between the wheels.

The question, then, is what portion of the motor can be shortened to allow room for the second gear and pinion. Obviously neither the bearings nor the commutator can be shortened, so that only the armature is left. Now, if the length of the armature is shortened, the diameter must be proportionately increased. Under existing conditions the clearance between the bottom of large motors and the roadbed is a minimum. Hence the increased diameter of the armature would necessitate an expensive redesign of the trucks and an increased diameter of wheels; in other words, the increased expense of manufacture would be greater than any saving possible in the bearings and gearing.

LUBRICATION AND METHOD OF LUBRICATION

The lubrication of meshing teeth in a train of gears is quite different from the lubrication of bearings. No lubricant can prevent the peening action on the teeth; it can only prevent

grinding caused by actual friction. The teeth would run satisfactorily in a bath of machine oil if they could be cut by the epicycloidal or two-curve method, which would provide a true roll, and if the faces of the teeth were very hard. Unfortunately a single-curve or involute tooth has to be employed on account of its greater strength at the base and this design does not offer an absolutely true rolling motion. (The epicycloidal teeth cannot operate unless the distance between the gear centers remains constant.) To overcome this defect of the involute tooth there must be used a lubricant which will act as far as possible as a cushion between the meshing members. The lubricant must also be of such consistency that it will adhere to the faces of the teeth, forming a coat strong enough practically to prevent the faces of the meshing teeth from touching one another. Gritty matter blown from the roadbed into the gear case has a very hurtful effect on the life of gear teeth. A lubricant which is able to fulfil the conditions mentioned has characteristics greatly in its favor. Gear cases are designed to hold the gear grease and so take care of the proper lubrication of the gear and pinion. The present designs are not dustproof. To make them so would entail increased weight and expensive machining.

Soft-steel gears run against hard-steel pinions and vice versa do not show the best results for the hardened product because the gritty matter which has drifted into the gear case becomes embedded in the face of the soft tooth and laps the hardened tooth. Where hardened gears and pinions are run together trouble from grit does not seem to be so great. Doubtless the present design of gear cases will be good enough, owing to the general trend of master mechanics to recommend the hardened gearing.

The writer offers the following suggestions, to sum up, in answer to the question of how to obtain long life for gears and pinions:

Use the hardest metal possible in the teeth consistent with an elastic limit higher than any strains that can be imposed upon them. Do not let the armature or axle bearings wear more than 1/16 in., less if possible. Use a heavy clinging gear grease that is unaffected by ordinary limits of atmospheric temperature. Keep the gear cases as dustproof as possible.

RECENT DEVELOPMENTS IN CAR HEATING AND VENTILATION*

BY H. S. WILLIAMS, CHIEF ENGINEER, PETER SMITH HEATER COMPANY

The latest development in heaters for electric cars is a system combining heating and ventilation. This has been brought about by the long-felt need for proper ventilation, particularly on crowded city cars. Deck sash ventilators have failed to meet these requirements. This demand for ventilation is but a part of a general movement for better sanitary conditions. Already at least one State and several of the larger cities have taken the matter up, and through by-laws and ordinances have established standards for both heating and ventilation to which the railway companies must conform. It is also noticeable in current discussions on the arch roof for cars that the subject of ventilation is one of the main points considered in connection with it.

The early electric cars were without vestibules and the doors and windows fitted loosely. Consequently, enough air leaked in to supply all that was needed for ventilation. Through the introduction of closed vestibules, double floors, double windows and weather strippings the cars have become more nearly airtight, hence the leakage of air into the car is largely cut off and other means must be tried in order to supply the required amount of ventilating air.

HEATING AND VENTILATING REQUIREMENTS

Three conditions must be satisfied in meeting the requirements of heating and ventilating cars: First, the heat within the cars must be maintained at a given point; second, sufficient fresh air must be introduced to keep the air up to a standard of purity, and, third, it must enter without producing a disagreeable draft. An electric car is one of the hardest places to heat and ventilate. It is exposed on all sides. It has a large proportion of glass, which means that a relatively large amount of heat must be supplied to make up that lost by surface radiation. Furthermore, a car meets many conditions of exposure and shelter, so that its conditions are not uniform.. It runs at full speed one minute and stands still the next; doors are opened and closed at irregular intervals and for irregular spaces of time; it is full of passengers at one time and almost immediately afterward it is empty. Then, too, opinions differ widely as to the proper temperature to be maintained.

For example, the city of Chicago requires its cars to be heated to 50 deg. Fahr.; the Massachusetts Railroad Commission requires that the street cars under its jurisdiction shall be heated when the temperature of the atmosphere is less than 40 deg. above zero and that the temperature be maintained in the cars at a point not lower than 40 deg. nor higher than 50 deg. A common standard among operating companies is to maintain 60 deg. Fahr. This standard of the Massachusetts Railroad Commission will be found fairly satisfactory for city service, but not sufficient for interurban service, where long rides at high speed are the rule. For the latter service the temperature within the car should be maintained at about 65 deg. Owing to the fact that travelers in winter are heavily clothed, this temperature will be found quite satisfactory. For extremely long runs, however, where the traffic compares with steam train service the temperature should be 70 deg.

After having determined the temperature which should be maintained in the car, the next problem is to determine the necessary quantity of heat. It is difficult to determine this quantity theoretically owing to the many variable factors encountered. For example, the heat to be supplied depends upon the temperature to be maintained, the amount lost through radiation from the car body, the amount supplied to make good that lost by the air used for ventilation and the number of people in the car. The heat lost through radiation is in turn dependent upon the material of which the car is built, thickness of walls, proportion of glass installed, whether double windows are used or not and the speed of the car.

The heat required to supply that lost by ventilating air includes the heat lost by warm air within the car which escapes through ventilators and the heat which is used to warm the air leaking in through the doors and around the windows. It will be readily seen that this is a difficult quantity to determine with accuracy, as it depends upon car speed, frequency and number of stops, whether windows and doors fit tightly or not, number of ventilators open and many other minor details. The number of passengers in a car has a larger bearing upon the heat required than is usually supposed, because passengers enough to occupy half the seats will radiate sufficient heat from their bodies nearly to make up that lost by ventilating air. The average person gives off heat every hour equivalent to 400 b.t.u. Therefore, 10 passengers will supply per hour an amount of heat approximately equivalent to ½ lb. of coal or to 1 kw-hour.

TABLE I—RADIATION LOSSES AND OTHER DATA ON FOUR LENGTHS OF CLOSED CARS

Length of car-body	B.t.u. for radiation only.	Cu. ft. ventilating air per minute	B.t.u. for ventilation loss	Total b.t.u. required per hour	Passenger radiation	Net b.t.u. required per hour
20 ft.	31,280	133	9,100	40,380	8,000	32,380
30 ft.	44,696	200	13,700	58,396	12,000	46,396
40 ft.	58,103	266	18,200	76,303	16,000	60,303
50 ft.	71,509	330	22,750	94,259	20,000	74,259

The quantity of heat lost by radiation may be obtained theoretically by means of well-known formulas. The writer has

*Abstract of a paper read before the meeting of the Central Electric Railway Association at Dayton, Ohio, Dec. 1, 1910.

computed the heat lost per hour for four different lengths of cars, based upon the construction of a thoroughly modern car of the closed type. These figures are given in Table I.

This table is based upon the quantity of heat necessary to maintain a temperature of 60 deg. Fahr. during zero weather. Consequently it shows nearly the maximum amount of heat required for the various sizes of cars selected. In the figures given in the second column account has been taken of heat given off by enough passengers to form approximately two-thirds of a seated load in each case.

In order to determine the value of double car windows from a heating standpoint, the saving of heat units has been computed and is shown in Table II.

TABLE II—HEAT SAVING DUE TO THE USE OF DOUBLE CAR WINDOWS

Car body length	B.t.u. required	B.t.u. saved by double windows	Per cent saving
20 ft.	32,380	4,238	13.0
30 ft.	46,396	6,360	13.7
40 ft.	60,303	8,450	14.0
50 ft.	74,259	10,600	14.3

This shows that by use of double windows, under ordinary conditions, a saving of from 13 per cent to 14 per cent of the cost of heating may be effected.

Owing to the extensive use of steel sheathing for car sides it is well to note its effect on heating when the steel is not protected and is in contact with the heated air within the car. It may be determined theoretically that under such conditions 22 per cent more heat is required than if wood were used or if the steel were protected or insulated from the warm air within the car.

To obtain the best results from the heating equipment on city cars it is unquestionably the best to employ a man to take care of the fires and to hold him responsible. This insures more nearly uniform results and greater economies, as this man may be thoroughly taught to become an expert in his line. This removes the care of the fires from the car crews entirely. Some operating men go so far as to advocate locking the heaters in such a manner as to prevent any one from regulating the fires other than the one responsible for their care. Such a procedure would hardly be feasible on long interurban runs.

THEORETICAL AND PRACTICAL VENTILATION STANDARDS

It is entirely impracticable to secure absolutely perfect ventilation on electric cars, as the apparatus would be too cumbersome and very expensive to operate. The practical thing is to strike a happy medium and use apparatus that will give good ventilation at a fair cost. An eminent authority gives 1800 cu. ft. of fresh air as the quantity which should be supplied per hour to every person in a room. To heat this amount of air would entail the use of bulky apparatus and the cost of operation would be unreasonably high. The Chicago Board of Health, which has gone into the subject of ventilation very exhaustively, has set a standard which requires the amount of air to be delivered into the car to be approximately 14 per cent of the amount required for perfect ventilation. It realizes that this amount does not impose undue hardship on the operating company, and, on the other hand, the public is given good air

TABLE III—AMOUNT OF AIR WHICH SHOULD BE DELIVERED TO A CAR ACCORDING TO IDEAL CONDITIONS AND THE RULES OF THE CHICAGO BOARD OF HEALTH.

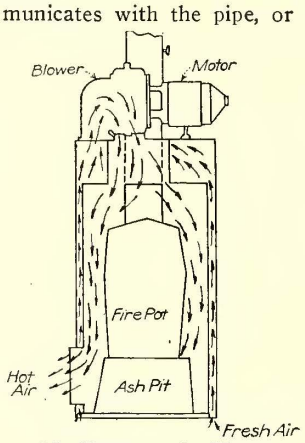
Length of car body	No. of passengers	Cu. ft. of fresh air per hour at 1,800 cu. ft. per pass	Cu. ft. fresh air per hour at 14 per cent of theoretical requirements
20 ft.	52	93,600	13,100
30 ft.	78	140,400	19,050
40 ft.	104	187,200	26,200
50 ft.	130	234,000	32,750

to breathe. On this basis the writer has prepared Table III, giving the amount of outside air which should be delivered to a car to give perfect ventilation and also that required to ventilate it according to the Chicago standard. This tables assumes a standing load equal to a seating load and consequently represents nearly maximum conditions. Therefore, if the amount of air shown in the fourth column of this table is delivered the results will be a ventilation far above the standard at all times except during rush hours.

As noted before, the railways are now considering the adoption of a type of car in which the monitor roof will be modified to a great extent. If this change is made it will mean an improvement in heating, because a large glass area will be eliminated. The adoption of the arch roof or any of its modifications will make it necessary to provide for the entrance of fresh air and the exit of foul air without producing a disagreeable draft in the car.

COMBINED HEATING AND VENTILATING APPARATUS

A description of apparatus in which ventilation is combined with the heating will not be out of place in the discussion of this subject. Its essential parts are a coal stove, surrounded by air chambers, and a motor-driven blower, to circulate the air across the heating surface and to force it out into the car. The construction of the heater proper may be more easily understood by reference to the accompanying sectional view. From this it will be seen that the stove or combustion chamber is surrounded by two sheet-steel casings which form two air chambers. The blower, which is mounted on top of the heater, has its intake connected with the outer air chamber, the lower end of which communicates with the atmosphere through suitable holes cut in the car floor. The discharge from the blower is connected to the inner air chamber, which in turn communicates with the pipe, or duct, that leads into the car, and serves to distribute the heated air. Consequently, when the blower is started fresh air is drawn from outside the car and in passing through the outer air chamber is partly heated, then going through the blower the air is driven into the inner chamber against the heated surface of the stove and thence into the interior of the car. So it will be seen that the air has a long continuous passage over the heating surface. It will also be noted that the circulation is so designed that the air just before leaving the heater passes over the hottest part of the combustion chamber. Hence, owing to the large area of heating surface, the manner of circulation and the fact that a large volume of air is forced through the heater, the efficiency of the apparatus is very high and the operating cost correspondingly low.



Air Currents in Heater-Ventilator Equipment.

From experience it has been found that it is necessary to distribute the hot air from one side of the car only. This is due to the method of forcing the air out of the distributing duct in a horizontal direction, which means that the current of hot air will carry across the floor to the opposite side of the car. Another advantage of forcing the hot air across the floor is that it keeps the passengers' feet warm, and this is the secret of successful car heating. The current of hot air sweeping across the floor also tends to keep it dry—an effect which is highly desirable. The distributing duct usually consists of a rectangular galvanized-iron pipe, in which small openings are cut at points about 2½ ft. apart to insure an equal distribution of the hot air throughout the car.

In addition to the economical and effective heating given by this apparatus it has the great advantage of securing the proper amount of ventilating air and bringing it into the car without undesirable effects. If the same amount of ventilating air were introduced in the same manner without being heated the disagreeable and dangerous drafts which would be experienced would condemn the system, but, as the air is heated, the effect is quite the reverse. Another feature in the ventilating system is that the fresh air is introduced at the proper point, that is, at the floor line. Since this air is warm and under pressure it must rise, mix with the foul air and carry the latter out of the top of the car. Thus the system is positive, for if fresh air is forced into the car continuously the foul air must leave.

WOOD PRESERVATION*

BY A. L. KUEHN, GENERAL SUPERINTENDENT, AMERICAN CREOSOTING COMPANY

It is quite natural to assume, in view of the great amount of steel and concrete which is taking the place of wood in all manner of structures, that the use of wood is greatly on the wane. It is a startling fact, however, that the actual use of wood is on the increase. The adoption of steel and concrete buildings, steel poles, steel furniture and steel cars seems to be of little avail in materially checking the use of wood per capita in this country. The following information on the consumption of wood per capita was compiled from the United States Census reports and from the National Lumber Manufacturers' Association's report of 1910:

Year.	Lumber per capita in U. S.
1850	220 ft. B. M.
1860	250 ft. B. M.
1870	340 ft. B. M.
1880	360 ft. B. M.
1890	380 ft. B. M.
1900	460 ft. B. M.

This is also the experience of the older European countries, which have for a century been confronted with a shortage of wood, and, notwithstanding the shortage, have been required to meet an increased use. It is pertinent to state, however, that whereas the present consumption per capita here is in excess of 400 ft. board measure, it is only 60 ft. to 75 ft. board measure in Europe.

In the face of the increasing use of wood, we have a waning timber supply. The annual consumption of lumber is about 40,000,000,000 ft., board measure, cut from about 8,000,000 acres of forest. At this rate the present forest areas are estimated to last variously from 40 to 60 years. It is quite evident that the greatest efforts must be made to stop and prevent wastes and to procure the maximum utilization of wood. Wood preservation is playing a highly important part to produce this end, even at the present time, and it will continue to do so to a much greater extent. Wood preservation is generally understood to play its part in that properly treated timber lasts longer than untreated timber. However, its greatest effect lies in the fact that timbers which have had little or only a limited use heretofore are made available.

THE CAUSES OF DECAY OF WOOD

The decay of wood is due to the growth of fungi, which are plants of low order. They require for their development moisture, air and a proper degree of warmth, but the spores are not killed when kept in low temperatures. When the temerature is raised to 50 deg. Fahr. or 60 deg. Fahr. the latter immediately develop. Generally speaking, fungi and spores are killed by temperatures over 175 deg. Fahr.

The basis of wood preservation is the introduction into the wood of poisonous substances which will kill fungi. Copper sulphate, mercury chloride, zinc chloride and dead oil of coal tar are all poisons which will prevent fungus growth. More than a century ago European countries began to experience a timber shortage and about that time active work was begun to prolong the life of exposed timber. The British were most active, because of their great number of wooden ships. Sir Humphry Davy recommended mercury salts; Thomas Wade, in 1815, recommended copper salts, iron salts and zinc chloride. The early activity was in the use of poisonous salts. By 1840 timber preserving was fairly well on its way in England.

Corrosive sublimate was used in several places for preserving wood in the eighteenth century, but preservation of timber by its use was patented by J. H. Kyan in 1832. It was used for about 50 years to a limited extent.

Preserving timber by sulphate of copper was patented by Margary in 1837, but its use was not very extensive on account of the action of the sulphate on the containing vessels.

The use of chloride of zinc in a wood-preserving process was patented by Sir William Burnett in 1838. The method was called "Burnettizing."

The use of dead oil of coal tar (creosoting) in timber preservation was patented by John Bethell in 1838.

The first methods of applying the preservatives consisted of brushing, painting or steeping. About 1830 M. Breant invented an apparatus for applying preservatives, consisting of a closed cylinder in which the wood was placed, the voids filled with the preserving fluid and pressure applied to inject the fluid into the wood. Bethell adopted the method and from this time the modern timber-preserving practices really date.

The results obtained by corrosive sublimate, sulphate of copper and chloride of zinc in the early stages seem to have been varying, but good enough to warrant their use for some time. However, by 1885 creosote was practically the only preservative in use in England, which is the case at the present time.

The first impetus in America to the demand for preserved wood came after the census of 1880. Previous to this time numerous trials had been made of all the preserving methods heretofore mentioned. Notable among these are the Kyanizing of chestnut track ties by the Northern Central Railroad in 1838, the Burnettizing of track ties by the Cambridge Railroad in 1835, and the Burnettizing of track ties in 1866 by the Chicago, Rock Island & Pacific Railway. A most notable record in this country is that of timber preserved for bridges on the New Orleans, Mobile & Texas Railroad (now the Louisville & Nashville) in 1876, 1877 and 1878. This timber was creosoted at works at West Pascagoula, Miss. A considerable amount of this timber is still in place. At the present time there are 76 wood-preserving plants in this country, of which 46 use creosote exclusively; and of the remainder all but 18 use creosote to some extent.

PREPARATION AND KINDS OF WOOD USED

Wood requires proper preparation before it can be successfully treated. The sap or moisture must be removed to such an extent as to allow proper penetration of the preservative. In general, the proper method to prepare the timber for treatment is to air-season it. This not only maintains the strength of the timber, but allows a more uniform distribution of the preservative. The sap wood of all timber can be completely penetrated if air-seasoned, but it has not yet been possible to penetrate the heart wood of all timbers. The principal woods treated in this country are: yellow pine; red and black oak and other oaks of these species; beech; elm; fir; red, black and tupelo gum; hemlock; maple and ash. The time required for sufficient air-seasoning to allow proper treatment varies for the different woods. For pine this period is from 4 to 6 months; for oak 8 to 12 months. This time also depends upon weather conditions. The different woods have various resistances to penetration by the preserving liquid under pressure, and it is necessary that the several species be properly segregated so that each may be subjected to its proper period of treatment.

PRESERVATIVES USED

The preservative used by most wood-preserving plants is creosote. At the beginning of the present era of wood preservation in this country the principal preservative used was chloride of zinc (Burnettizing). This was due, of course, to its cheapness in first cost. The objection to chloride of zinc is that it is soluble in water and will be leached out of the wood. The ordinary solution used consists of 2 per cent to 4 per cent, by weight, of the chloride of zinc dissolved in water. The strength of the solution is gaged by the amount of solution which is taken up by the timber. The strength must not, however, exceed 5 per cent, as a strong solution will injure the wood. To prevent leaching several methods were used to put a coating, insoluble in water, on zinc-treated timber. Notable among these methods was the Wellhouse process, which consisted in coating the timber with a solution of tannin and glue. This process has now been practically abandoned. The life of timber and ties treated by chloride of zinc is given as from 10 to 14 years.

Creosote oil, which is recognized as the best wood preserva-

*Abstract of a paper read before the Central Electric Railway Association, Dayton, Ohio, Dec. 1, 1910.

tive, is the product of distillation of coal tar. It is a by-product in the manufacture of coal-tar pitch. It is pretty well determined that a heavy oil—that is, one in which the light fractions are reduced—is the most desirable. It has been found that when the treated wood is exposed to the air the light fractions rapidly evaporate. The heavy creosote oil, in addition to its antiseptic qualities, carries with it also the property of waterproofing, which is valuable in the prevention of decay. The American Railway Engineering & Maintenance of Way Association has adopted as standard a specification for creosote oil which specifies a heavy oil. The specification is as follows:

"The oil used shall be the best obtainable grade of coal-tar creosote; that is, it must be a pure product of coal-tar distillation and must be free from admixture of oils, other tars or substances foreign to pure coal tar; it must be completely liquid at 38 deg. C., and must be free from suspended matter; the specific gravity of the oil at 38 deg. C. must be at least 1.03. When distilled according to the common method, that is, using an 8-oz. retort, asbestos-covered, with standard thermometers, bulb ½ in. above the surface of the oil, the creosote, calculated on the basis of the dry oil, shall give no distillate below 200 deg. C., not more than 5 per cent below 210 deg. C., not more than 25 per cent below 235 deg. C., and the residue above 355 deg. C. if it exceeds 5 per cent in quantity must be soft. The oil shall not contain more than 3 per cent water."

The proper amount of creosote oil to be injected depends upon the use to which the timber is to be put and also upon the kind of timber. In bridge structures and places where the replacement is difficult higher quantities are used than in track ties. In pine timber it is possible to inject more oil than in the red oaks. The customary way to state the quantity of oil is to give the average number of pounds per cubic feet of timber. In general, present practice in this country is to use from 7 lb. to 10 lb. per cubic foot for track ties and from 10 lb. to 18 lb. for poles, bridge and structural timber. In some cases as high as 24 lb. per cubic foot has been used in pine for wharves and piling, which are subject to the attack of marine borers.

The principal object in using large quantities of oil in timber is to obtain depth of penetration. A distinct advance has been made in methods of injecting the oil (which will be described later on) by which depth of penetration may be obtained without the use of such large quantities of oil. However, it is conceded that it is not good practice, even with these methods, to go much below 7 lb. or 8 lb. per cubic foot as an average because in practical operation there will be, even with the greatest care in segregating the species of wood, a great variation in the pieces treated.

Crude petroleum oil is now being tried to some extent where, on account of long hauls, creosote is very expensive. A notable example of this is its use by the Atchison, Topeka & Santa Fé Railroad on its western lines. Petroleum has no antiseptic qualities, so its protection against decay must necessarily depend upon its waterproofing qualities. The examples of this are as yet too recent to justify any general conclusion.

METHODS OF APPLICATION AND PROCESSES

The modern timber-treating methods consist, essentially, in the injection of the preserving fluid into the wood under pressure. Some use still is made of the dipping methods. Notable among these is what is known as the open-tank process of creosoting, in which the timber is placed first in hot oil and then in cold oil. This has, however, only a very limited use, and only wood which is easily penetrated, such as sap pine, can be used. The pressure used in injecting the fluid depends upon the kind of wood. Well-seasoned sap pine can be completely penetrated with creosote oil with pressure as low as from 50 lb. to 60 lb. per square inch. Red oak requires from 150 lb. to 175 lb. per square inch. Proper temperatures are necessary during the treatment. This temperature must be kept low enough to avoid injury to the wood; a good limiting temperature is about 200 deg. Fahr. With creosote oil the element of heat is most important, because the oil becomes more fluid as it is heated.

The method of treating timber with zinc chloride is as follows: The timber to be treated is placed in a closed cylinder or retort. A vacuum is then produced in the cylinder and maintained for 20 to 30 minutes. The chloride of zinc solution is then introduced and the voids in the cylinder are filled. When the cylinder is full, pressure is applied and maintained until the proper amount of solution has been injected. The surplus solution is drained off and the timber removed.

An interesting modification of the zinc chloride treatment to prevent the leaching out of the zinc chloride was developed in Germany some years ago by the Ruetgers Works. This consisted in making an emulsion of the zinc chloride solution and creosote oil. The oil remained on the outside and was to form a protective coating. This process, however, has since been abandoned in Germany, but is being used in this country to some extent in what is known as the Card process. This consists in keeping the oil and water solution agitated by a centrifugal pump.

The creosoting process which was followed up to about 1904 was exactly that introduced by Bethell in England in 1838. This is as follows: The timber, when air-seasoned, is placed in the retort and a vacuum produced and maintained for 20 minutes to 30 minutes. The creosote oil is then introduced without breaking the vacuum until the cylinder is filled. Pressure is then applied until the proper amount is injected. The surplus oil is then drawn off and the timber removed. When green timber is treated it is steamed before applying the vacuum.

By the Bethell process the portion of the wood which is penetrated is filled with oil as nearly as possible. It has been called "the full-cell creosoting method." In 1903-4 there was developed in this country a method by means of which a portion of the surplus oil in the cells and voids of the wood is removed. This allows a deeper penetration with a given quantity of oil. This is the Lowry process used by the American Creosoting Company. Almost simultaneously a similar method was developed in Germany by Rueping. These methods, on account of the removal of the oil, have been called "the partially filled or empty-cell processes."

In the Lowry creosoting process air-seasoned timber is placed in the closed cylinder and the oil is introduced to fill the cylinder; pressure is then applied until a proper penetration has been secured. The surplus oil is then quickly drained off and a vacuum applied to reduce the oil first injected to the specified quantity. The oil is then again drained from the cylinder and the timber removed. In the Rueping process air pressure is applied before introducing oil into the cylinder. The oil is then introduced without reducing the air pressure and further pressure produced to inject the oil on top of the air pressure. After the injection is completed the pressure is released and the air in the wood forces out the free oil.

WOOD-PRESERVING PLANT

The modern wood-preserving plant consists primarily of one or more impregnating retorts. They are steel-plate cylinders 6 ft. or 7 ft. in diameter and from 100 ft. to 150 ft. long. The ends are fitted with doors which can be tightly closed. The cylinders are fitted with running rails on which are run small tram cars loaded with timber. There are also steam coils in these cylinders to allow accurate manipulation of the temperature. Tanks are provided which are placed either above or near the cylinders connected to them by pipes. The preserving fluid is held in these tanks for charging and filling the cylinder. These tanks are essentially measuring tanks in which the amount of preservative used is measured. The necessary pressure and vacuum pumps are provided for the manipulation of pressure and vacuum. The plant further includes a haulage system for handling the timber and also the necessary power plant. The modern plants, of course, are provided with large seasoning yards. A most important part of the plant equipment consists of proper devices for measurements of the preservative used. This is accomplished by means of tank floats with accurate registering means. In the plants of the writer's company this measurement can be easily made to within one-half of 1 per cent.

THE DEVELOPMENT OF PASSENGER TRAFFIC *

BY W. O. WOODARD, TRAFFIC MANAGER CHICAGO, LAKE SHORE & SOUTH BEND RAILWAY

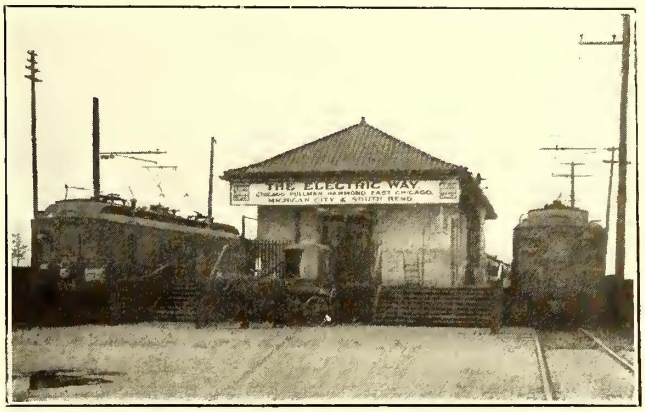
The electric railway magazines recently issued special editions on the subject of traffic which contained many able articles covering both passenger and freight traffic. Since our line does not handle freight at present, I will devote my remarks to passenger traffic.

One important thing which electric railways do is to change their schedules without giving the public due notice. I know of one electric railway which recently changed its schedule without notice to the public other than one brief newspaper notice, nor was the new timetable distributed until a week after the change became effective. This action naturally caused many complaints.

The electric railway which can operate the same schedule the year around is very fortunate. However, with us physical and traffic conditions will not permit this to be done, but we do try to retain the confidence of the public by giving them due notice of any change in schedule. We make it an important matter to have the new public timetable in the hands of all agents for distribution at least three or four days prior to its becoming effective. To do this we print a card 9 in. x 11 in. which is posted in all stations and in all cars 10 days or a week previous to a change. This card informs the public of the change and also states when the new public timetables can be secured. We have had much favorable comment on this plan. On our change in schedule last spring more than 10,000 folders were distributed before the change became effective.

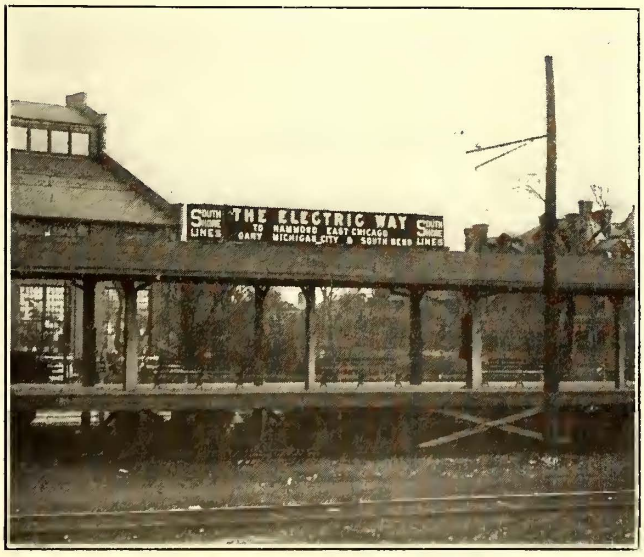
At present we are publishing an individual folder of our line, size 9 in. x 4 in., showing only the time of our trains and connections to and from Chicago via the Illinois Central suburban trains. During the past summer we devoted two inside pages to advertising Hudson Lake and its park as well as Michigan City and its bathing beach and amusement park. From the number of inquiries received we feel this advertising has given us the results we desired. In our new folder we are devoting the same two pages to half-tones and reading matter featuring our new Chicago "Special" and South Bend "Special"; also our double track, of which we now have 11 miles in operation. We also publish the same folder in vest pocket size, 5 in. x 2½ in.

The western terminus of our line is 14 miles from the heart of Chicago, but we have direct connection at this terminus with the Illinois Central suburban trains, which are operated by steam. In order to transfer passengers safely and without exposure, a viaduct has been provided from our station platform to the Illinois Central station platform over our own as well as the Illinois Central tracks. The Illinois Central suburban trains run along the lake front from Fifty-third Street north and land passengers at Van Buren Street and Randolph Street, which is within a block of Chicago's largest department stores. To advertise our line in Chicago through the daily papers would cost a large sum, and especially so since railroad advertising rates are higher than any other class of advertising. However, we use some newspaper space, mostly in the Sunday editions. A class of announcement which appeals to us is car and billboard advertising. We have cards 16 in. x 24 in. in all Illinois Central suburban cars and on all platforms we place posters 28 in. x 42 in. on billboards. These posters catch the eye of many passengers who are waiting at each platform as well as those passing by on trains. In addition to this we have display cards 18 in. x 24 in. and time cards 10 in. x 20 in. in all suburban stations, with stocks of our folders. The Illinois Central Railroad allows us one page in its suburban folder for timetable or display. We consider our display advertisement the better of the two, inasmuch as the space allowed is not sufficient for our timetable.



Painted Sign on Freight Station.

Our line parallels the tracks of the Illinois Central Railway for about two miles east of our western terminus. Within this distance we have two stations. On the roof of our Pullman station we have erected an electric sign 30 in. high by 25 ft. long, double-faced. On the roof of our Kensington station we have a painted sign of the same description and midway between these stations we have erected a painted billboard 12 ft. high and 50 ft. long. Considering the fact that 142 pas-



Electric Sign Over Platform at Pullman

Electric Sign in Front of City Waiting Room

*Abstract of a paper read before a meeting of the Central Electric Railway Association, Dayton, Ohio, Dec. 1, 1910.

senger trains are operated daily over adjacent tracks by the following lines, Illinois Central, suburban and main line trains, all Michigan Central, Big Four and Chesapeake & Ohio trains, we feel we are getting good results from this kind of advertising, so much so in fact that we are negotiating for billboards 12 ft. x 25 ft. uptown in Chicago. We also have an electric sign across the sidewalks in front of our South Bend station. This is 18 ft. long by 30 in. high and double-faced. At our Gary station we placed, across the end of the station facing Broadway, an illuminated sign 25 ft. long x 30 in. high.

Our timetable is published in the *Official Railway Guide* of Chicago on the page opposite the Illinois Central suburban time card. Under our contract with this publication we are given one front page each year for advertising purposes. This arrangement applies to all advertisers in this guide, which is published weekly.

We have contracts with many of our local newspapers on a transportation basis for carrying our timetables and other display matter. In those papers with which we do not have contracts we do not advertise our timetables, but carry excursion advertisements on a card basis. In addition to this space we carry display advertisements in a college weekly and in a baseball bulletin which is published daily during the season. A park owned by our company and leased to a park manager is located on our line at Hudson Lake. Around the lake are many cottages for rent at reasonable rates. These cottages make this place popular with Chicago people for week-end visits. In all our summer advertising we make a special feature of this resort, and with the improvements which are being made this year at this park it bids fair to become even more popular.

The greater part of our picnic business to this park is secured by personal solicitation. Out of Chicago we have been compelled to handle this business at such rates as would not appeal to the average electric railway operating single-car trains. However, as we handle the business in long trains we consider it profitable. With two or three exceptions all of our picnic and excursion business this season was handled on regular trains by attaching extra coaches. One exception to this was the operation of our 11-car train from Pullman to Hudson Lake Park, said to be the longest electric railway train ever operated for a distance of 60 miles.

In handling special business, by providing a sufficient number of cars on our regular trains we have eliminated a large per cent of cost of train operation, and also eliminated the operation of all extra trains. On last Labor Day we sold at our South Bend station 1944 round-trip tickets to Michigan City and handled this business on our regular trains, each train handling five, six or seven cars.

In advertising our new Chicago-South Bend "Special" trains, we have had post cards printed of our three-compartment cars, and show on the address side of card the schedule of these trains. Five thousand of these cards were mailed to firms and individuals in South Bend, Michigan City and Gary.

In handling all special business on our line I have endeavored to accompany these parties on both going and returning trips. This plan has been found to be very beneficial to us, since it gives the officials of the traffic department an opportunity to meet more people.

Officials of interurban railways in Indiana will be invited to attend a conference in the State House, Indianapolis, at 2 p. m. on Dec. 13, 1910, to consider the subject of operation and suggested improvements in methods. The conference will be called by Governor Marshall of Indiana. It is understood that Governor Marshall has no disposition to recommend legislation calculated to harass the interurban roads, but that he is anxious to receive suggestions from the officials. It is stated that the position of the Governor is a conservative one and that, while he desires to take any steps that may appear advisable to secure better protection, he realizes that no legislation should be enacted that would hamper the successful operation of the interurban railway systems of the State.

HEARING ON NEW YORK COMMUTATION RATES

The New York Public Service Commission, Second District, held a hearing in the United Engineering Society Building, New York, on Nov. 29, to consider complaints regarding the increase in commutation rates on the New York, New Haven & Hartford Railroad. Samuel Higgins, general manager of the New Haven road, testified that the increases in rates were the result of the large expenditure made by the company for the electrification of its terminal. Mayor Fiske, of Mount Vernon, Mayor Lennon, of Yonkers, and Thomas G. Hall, chairman of a citizens' committee of New Rochelle, testified personally or were represented by counsel to argue against the increases in rates. It was charged that the New Haven company paid the New York Central & Hudson River Railroad too large a rental for the use of the Grand Central terminal, that the resulting burden was levied upon the commuters and also that property values had depreciated on account of the increases in rates. It was testified that the New Haven company had paid the following sums to the New York Central company for the use of the Grand Central terminal: 1907, $560,000; 1908, $1,082,000; 1909, $1,060,514, and 1910, $1,131,000. These sums included the rental of the Grand Central terminal and the operating expenses.

After the conclusion of the hearing the following statement was issued by the New York Central company in reference to the contract for the use of the terminal:

"In connection with the evidence introduced by the New Haven road to-day, showing that a charge was made by the New York Central & Hudson River Railroad against the New York, New Haven & Hartford Railroad of $0.0394 for each commutation passenger brought into Grand Central terminal by the New Haven road, it is desired that the public understand that the relations between the New York Central and New Haven roads are the relations of landlord and tenant—the New York Central leasing to the New Haven and the New Haven leasing from the New York Central the privileges of entry into Grand Central terminal, including trackage facilities to Woodlawn.

"All of these relations are set forth in a contract agreement dated July 24, 1907. The charges made by the Central and paid by the New Haven are based strictly on a proportionate charge for the operation of Grand Central terminal, including station and tracks. North of Fifty-seventh Street the charge is so much per passenger; south of Fifty-seventh Street it is a proportion of the operating expense of the terminal distributed according to the actual use made of such terminal by the respective parties to the agreement.

"But the point to be borne in mind is that all charges made by the Central and paid by the New Haven for Grand Central terminal are proportionate charges of the expenses of the terminal, based upon the actual use made by the New Haven railroad of such terminal.

"The entire contract is available at any time for representatives of the press who may desire to see it."

Similar complaints regarding increases in commutation rates on the New York Central road will be taken up at another hearing.

REFUND BY A CONSCIENCE-STRICKEN PASSENGER

The Michigan United Railway, of Jackson, Mich., recently received the following letter with 60 cents inclosed: "Eight years ago a company of three boarded a city car near the end of the line, riding three or four blocks, and not being called upon for our fares left the car without paying. Occasionally I have been reminded of it, but have dismissed it from my mind as of trivial moment. There was no thought of defrauding the company at the time. Recently I have been again reminded of it and am inclosing 60 cents, the scriptural measure of four-fold, as restoration to the company of what should have been theirs. (Signed) One Who Wants to Be Right with God and Man."

VALUATION OF THE CHICAGO CONSOLIDATED TRACTION PROPERTY

The principal figures of the valuation of the property of the Chicago Consolidated Traction Company were published in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 3, 1910, page 374. This valuation was made by Bion J. Arnold and George Weston, as a traction valuation commission, for the purpose of determining a value to be incorporated in the new ordinance granting authority to the Chicago Railways Company to purchase the property of the Consolidated company and to rehabilitate it. In a letter addressed on Aug. 10, 1910, to Alderman M. J. Foreman, chairman of the local transportation committee of the City Council, Messrs. Arnold and Weston stated that the property was found to be in such physical condition that it would be necessary to make certain deductions for deferred maintenance in arriving at the physical valuation. The figures stated by Messrs. Arnold and Weston in this communication are as follows:

	With paving	Without paving
Value of physical property as a "going" concern	$4,078,057.69	$3,446,549.88
Value of intangible property as a "going" concern	751,325.77	751,325.77
Total value of physical and intangible property as a "going" concern	$4,829,383.46	$4,197,875.65
Deductions due to ordinance requirements:		
(a) Robey Street, on account of isolation of tracks due to prior expiration of ordinance	$3,277.68	
(b) Removal of tracks from streets at expiration of ordinances as required	91,063.00	
Total deductions	94,340.68	94,340.68
Total values after deductions	$4,735,042.78	$4,103,534.97

The letter adds that, at the request of Walter L. Fisher, special traction counsel of the city, a valuation was made in which all franchise and paving values were eliminated and only such property included as could be utilized in the rehabilitation. This value was found to be $3,037,818.56.

In a subsequent letter, dated Aug. 17, 1910, Messrs. Arnold and Weston stated to Alderman Foreman that they had taken into consideration the basis of settlement suggested at a meeting on Aug. 12. The premises upon which the figures were to be based were as follows:

1. No intangible values to be returned.

2. The valuation of the physical property, including paving, to be made on a rehabilitation basis, that is, such value to be returned for the various items composing the property as presumably could be certified to by the board of supervising engineers, Chicago traction, on the assumption that the Chicago Railways was purchasing the property of the Consolidated company and the paving the same as if it were purchasing rails or other material from manufacturers and that it was to be allowed to use such paving, rails, etc., as had remaining life until such life was realized.

I.	Track	$1,121,216.38
II.	Electric power distribution	693,481.95
III.	Rolling stock	195,118.77
IV.	Power plant equipment	417,886.81
V.	Tools, supplies and furniture	71,999.52
VI.	Buildings	265,417.00
VII.	Real estate	84,228.00
VIII.	Paving	437,226.70
		$3,286,575.13
	Legal expenses, carrying charges and contingencies, 5 per cent	164,328.76
		$3,450,903.89
	Conducting work, furnishing equipment and brokerage, as per ordinance of Feb. 11, 1907—15 per cent	517,635.59
	Total	$3,968,539.49

To the amount thus obtained an additional charge for legal expenses, carrying charges and contingencies of 5 per cent was to be added instead of 10 per cent as included in the original figure of $3,037,818.56 (this 5 per cent deduction being included in the 15 per cent hereafter mentioned), the sum thus obtained to be the amount to which the board of supervising engineers could certify.

Upon these premises, the figures showed a total of $3,968,539.49, divided as shown in the accompanying table.

Subsequently Messrs. Arnold and Weston confirmed these figures comprising the value of the property as it would be appraised under the terms of the ordinance recommended for passage by the committee subject to the deductions for which the ordinance provides. They also confirmed the figures given in the letter of Aug. 10 as the values based on the same principles as those followed in the valuations of the Chicago City Railway and the Chicago Railways Company in 1906 and adopted by the ordinances of 1907. In the lower valuations all franchise values were excluded and the physical property was appraised at its value for rehabilitation purposes.

The letters quoted and the detailed exhibits of the physical property of the Consolidated company inside the city limits as of Nov. 1, 1909, accompanying the valuation report, have been published in book form. The introduction to the book gives an analysis of the premises adopted and the methods used in determining the values. The property was divided into eight divisions, as shown in the foregoing, but further subdivisions were made. Track, for instance, was subdivided into tangent track, track special work, track on bridges, tangent track in car houses and yards and track special work in car houses and yards. An abstract of the statement of methods followed in the valuation follows:

TRACK

Tangent Track.—The track in this section was divided into classes, according to the varying weights and types of rails and the styles of construction. Under each class an estimate was made of the cost of material and labor required to reproduce the track new at the time of this valuation under the original specifications; and to this amount has been added 15 per cent for organization, engineering, incidentals, etc. Data were obtained from detailed examination of the track in the field, in which the length of rail, kind of joints, type of rail and substructure were determined. Additional information was obtained from the track map in the office of the company and from representatives of the company.

All distances shown are the actual field measurements. Special work was excluded in the determination of tangent track lengths.

In depreciation of the track, three factors were considered: (1) The condition of joints. (2) The condition of ties, including ballast. (3) The wearing life of the head of the rail. From examination it was found that none of the rail would have to be discarded on account of broken or defective wagon treads.

Present value of rail, excepting joints, was determined in terms of the wearing value remaining in the head of the rail. To determine the height of the head of the rail, measurements were taken along the track with a specially constructed vernier device, by means of which the actual distance between the head and the tram was obtained in sixty-fourths of an inch. These measurements were obtained at frequent intervals on each section, sufficient number being taken to determine the average height of the head of the rail. From this determined height was deducted the scrap height of 40/64 in., the remainder representing the present wearing value of the rail. In this method the depreciation of rail is entirely independent of the life of the track substructure.

All joints were depreciated on the assumption that it would be necessary to renew them at some time in order to realize the full wearing value of the head of the rail and that at the time of renewal the ends of the rail would be cut off and the life of the rest of the rail lengthened thereby.

The average life of ties and joints was taken for all old tracks at 20 years, and the normal depreciation was determined by application of this depreciation rate to the age of the property as determined.

In many respects the property had not received ordinary maintenance and the estimated amount of deferred maintenance was segregated in making up valuations of the property as a going concern. The application of the method of in-

dication of the deferred maintenance on track was as follows:

In case of rails the present value of the rail was determined by readings indicating the wear of the head, and from these readings the remaining wearing value of the rail was computed. In case of bad alignment of rail the additional depreciation due to this condition was expressed in terms of a percentage of the wearing value. It was estimated that with proper maintenance the life of substructure and joints should be 20 years, and where improper maintenance was evident one or two years were added to the age as determined from the records, this being equivalent to depreciation of this part of the property for a period of time in excess of its actual life. Each line was considered separately in application of this additional depreciation.

In the case of Class A and Class A1 track, built recently and corresponding to type 2A and type 3 of the board of supervising engineers, the average life of the substructure was taken as 25 years. The welded joints were assumed to have the same life as the rail.

Track Special Work.—Each piece of special work was measured, listed and sketched. There was added to the cost of the layout the cost of ties, ballast, excavation, labor and miscellaneous items.

It was found that most of the layouts, excepting 9-in. manganese cross-overs, were in bad shape, and that some of the layouts were field-built. A scrap value of 25 per cent of the cost new was placed on all special work, except the 9-in. manganese cross-overs and the new 9-in. curved rail, which were put in during the summer of 1909 and were not depreciated.

Track on Bridges.—The cost of track on bridges includes the cost of rail laid, together with that of miscellaneous track material used in bridge construction.

Track in Car Houses and Yards.—The track was measured in detail, and unit estimates were made of the cost to construct new. A scrap value of 25 per cent of the cost new was allowed in all houses and yards, except Edgewater house.

Track Special Work in Car Houses and Yards.—Each house layout was measured and listed and sketch of layout made. The cost of these layouts was determined by the same method used with tangent track special work. Excepting the Edgewater house, all layouts were listed at a value of 25 per cent of the cost new.

ELECTRIC POWER DISTRIBUTION SYSTEM

This system was divided into overhead trolley construction, feeder system, electrical track bonding and conduit system.

The exhibit includes a detailed estimate of all poles, cross span construction, fittings, trolley wire, feeder wire (positive and negative), feeder attachments and supports, track bonding, cable wire, etc., together with special work construction at the curves and in car houses.

In computation of the cost new of all the equipment, the actual cost of material and labor was estimated at the time of valuation, and to this was added 15 per cent for organization, engineering and incidentals.

The detailed inventory of the entire system was made by inspection, and quantities, kinds, conditions and character were noted in detail. Depreciation of the various parts was determined by inspection, tests and measurements. In many instances it was impossible to obtain from any source correct information as to the age of the various parts. Owing to insufficient maintenance of the system during the past few years, an abnormally high depreciation has resulted, consequently it was necessary to depreciate these parts on their condition as found by inspection.

In calculation of the life of poles the condition of setting, thickness of metal at setting time and the upkeep were taken into consideration. It was necessary to apply different averages of life for the various sections.

The average length of life of a cedar pole was determined from pole renewals and inspection of poles in place to be 20 years. Iron poles set in concrete were figured on the basis of 40 years' life.

Trolley.—In calculation of the wearing life No. 0 wire was assumed to have a wearing value of 80.5 lb. per 1000 ft., and No. 00 wire of 106.8 lb. In a few instances, where the trolley wire had reached the estimated wearing value, and was in need of renewal, but still in service, it was indicated as having "excessive wearing value."

Feeders.—On account of the absence of data on the year of installation or renewals of feeders, and on the interchange of wire from and to the various sections, each section was inspected to determine the present worth and the depreciation of insulation fixed accordingly.

It was deemed essential, after examination of the companies' records, that all feeder be shown as found on March 1, 1910, the time of inspection; and that the companies' present records be taken for work done between Nov. 1, 1909, and March 1, 1910.

Bonding.—The various types of track and special work were inspected, and the quantity, size and kind of wire, etc., used were noted in detail, and in depreciation the life of 20 years was taken.

ROLLING STOCK

Cars and car equipment were divided into groups according to the type, style, maker and age. A typical car body was taken from each of these groups, and general specifications covering this type were prepared, from which a unit cost for each group was obtained. Similarly unit costs new were obtained covering all parts of the equipment such as motors, trucks, and miscellaneous car equipment. From these unit costs for all parts of the rolling stock equipment total values of cost new were determined, and 5 per cent was added for organization, engineering and incidentals.

To determine the present value of all parts of the equipment, including car bodies, motors, trucks and miscellaneous car equipment, a thorough inspection was made, and a depreciation was applied based on their type and suitability for service.

In order to valuate the amount of the deferred maintenance on car bodies, a ruling of the valuation commission was applied, namely, that 25 years should be taken as the average life of all car bodies in service a part of the year, such as open car bodies in service during the summer season, or closed car bodies in service during the winter, and 20 years as the life of car bodies in continuous service. The difference between actual present value of the car bodies as depreciated by inspection and the value determined by application of the above average depreciation rate was considered to be the deferred maintenance.

The entire rolling stock equipment of the company was listed, and the cost new and present value determined. The equipment was then proportioned between the portions of the line outside and inside the city in proportion to the car miles operated inside and outside the city by small single-truck cars, this estimate leaving out of account the car-miles operated inside and outside with rented double-truck cars.

To the total present value 5 per cent was added for organization, engineering and incidentals, as was done with the cost new.

POWER PLANT EQUIPMENT

A detailed inventory was made of all boilers, pumps, engines, generators, piping and accessories, and values were fixed in accordance with present prices.

Each piece of apparatus was inspected to determine its present condition, and a list of all heavy repairs obtained from the chief engineers of plants.

Each machine was depreciated and account was taken of present physical condition and extent of heavy repairs made throughout the life of the machine and the character of the service performed.

Rates of Depreciation.—The annual rates shown in the table on page 1113 were used. Apparatus was depreciated at these rates down to 20 per cent of its wearing value, the wearing value being determined by subtraction of the scrap value from the cost new. All power plant equipment was considered as worth 20 per cent of its wearing value as long as it was in operating condition.

TOOLS, SUPPLIES AND FURNITURE

A detailed inventory was made in the field of all tools, supplies and furniture at the various plants, car houses and office. These were appraised in the office, the depreciation being fixed from notes and values set while in the field.

BUILDINGS

Detailed measurements were made and detailed inventory taken of the kinds and amount of materials required to reproduce buildings. These quantities were estimated at prices as of Nov. 1, 1909, to which was added 15 per cent for organization, engineering and incidentals. Buildings that had not been properly maintained were depreciated by application to each division of the building cost of a depreciation factor determined by inspection. Buildings that had been properly maintained were depreciated uniformly at the rate of 1½ per cent per annum.

RATES OF DEPRECIATION ON POWER PLANT EQUIPMENT

	Per Cent
Machinery foundations	Note
Coal and ash handling machinery	7
Fuel oil handling machinery	4
Grates and stokers	Note
Boilers and settings	3½-4
Breeching and connections	3½-10
Stack	3
Heaters	4 -5
Water purifying apparatus	3
Pumps	5
Air compressors	4 -5
Engines	3 -5
Condensers	4
Piping and covering	4 -4½
Generators	3 -8
Switchboard and generator leads	3
Miscellaneous items	3 -5

NOTE: Machinery foundations were depreciated at a percentage determined from the life of the apparatus supported.

The fixed parts of stokers depreciate very little and the moving parts and grates very rapidly. As the moving parts are renewed and maintained in good condition, 10 per cent of the wearing value of stokers was depreciated at 20 per cent per year for 2½ years, and 90 per cent of the fixed parts at 5 per cent per year during the life of the machine.

Engines and generators that had been rebuilt or had had extensive repairs were credited with the cost of repairs at the time they were made and this cost was depreciated at the same rate as machines on which repairs were made.

REAL ESTATE

The valuation of the real estate was made by William A. Bond and the values submitted were those determined by him.

PAVING

Actual measurements of pavement at various parts were made, and the cost to reproduce was determined from the cost of labor and materials as of date of this valuation. Only the actual width of paving was considered, the width of the head and tram of the rail being excluded in the square area listed. The items of excavation and concrete base, when used, were included in the cost of track, and do not appear as part of the paving cost.

The various sections of pavement were depreciated by inspection of their present condition, from which the present value was been determined.

CAPITAL ACCOUNT VALUE OF PROPERTY

The capital account value of the property was determined on the basis of premises included in the ordinance under which the Chicago Railways acquired the part of the property of the Consolidated company inside the city limits. Under these premises the values to be returned were made the values for rehabilitation purposes. In compliance with the ordinance, certain rehabilitation work must be done at once, and additional rehabilitation work within the succeeding one or two years. In case part of the property is to be rehabilitated on or before Feb. 1, 1911, the scrap or second-hand value at that time was determined, and to this value was added an amount equal to the wearing value of the property from Nov. 1, 1909, to Feb. 1, 1911; the sum is the present value for rehabilitation purposes as of Nov. 1, 1909.

In the case of the portions that are to be rehabilitated during 1911 a similar procedure was adopted, two years' additional wearing life being added to the scrap or second-hand value of the property as of Nov. 1, 1911, to determine the present rehabilitation value. Similarly for property rehabilitated during the year 1912 three years' wearing life was added.

In case of property, such as track, on which semi-rehabilitation is contemplated, namely, the provision of a new substructure under rails that are not sufficiently worn to require removal, the going value was returned as the rehabilitation value. The company will realize the full remaining wearing value in the rail, ties and substructure. The ties have already been depreciated to an amount which corresponds to their present condition, and in case of removal whatever life remains would be realized in the form of a small percentage of ties that can be used for renewals elsewhere.

This method was applied to all parts of the property which must be rehabilitated in order to comply with the ordinance. It was estimated that approximately 29 miles of track would be rehabilitated before Feb. 1, 1911, that 22.56 miles would be rehabilitated in 1911, that 0.87 mile would be rehabilitated in 1912, and that 39.59 miles would be semi-rehabilitated, the date at which this latter work is done having no bearing on the value returned for the property. The rest of the track, consisting of 15.27 miles recently rebuilt under specifications of the board of supervising engineers, 15.21 miles that is considered satisfactory in its present condition, and 0.587 mile that is to be removed from the street, completes the total track mileage inside the city.

Further requirements of the ordinance as to rehabilitation contemplated that ultimately not more than 50 closed and 50 open single-truck motor cars should be operated by the company. The rehabilitation value was returned on the assumption that the company might permanently retain in operation the 100 cars referred to, that it may retain in operation for one year 72 cars in addition to the above, that it might retain in operation for two years 36 cars of the 72, and that it should immediately dispose of all remaining passenger car equipment at second-hand or scrap value. Similarly, the company is allowed to retain such sprinklers and sweepers as are in satisfactory condition at their present value, and is required to dispose of the balance at second-hand or scrap value. The passenger cars, in this case, were proportioned between the lines outside and inside the city in proportion to small cars operated outside and inside. The miscellaneous cars that have been retained were proportioned between the lines outside and inside in proportion to track mileage.

It was assumed that the California Avenue power plant will still be operated, and for this reason it was given its going value for rehabilitation purposes. The operation of the Edgewater power plant is not economical and it was assumed that it will be discontinued as soon as substations can be provided, and for this purpose this power plant equipment was given its second-hand value as of 1911, to which was added two years' wearing value of the plant as a whole to determine the rehabilitation value as of Nov. 1, 1909.

The present value of paving was allowed in case of streets recently rebuilt, as well as streets on which track is to remain in its present condition. On streets where the track is to be rehabilitated the second-hand value of the paving was returned as the rehabilitation value.

The remaining exhibits, including electric power distribution, supplies, tools and furniture, buildings and real estate, were returned at the same value for rehabilitation purposes as was assigned them in the case of the property as a going concern.

The book has a total of 713 pages and includes various exhibits containing details of work and photographs of cars and diagrams showing the electrical power distribution and the location of power plant equipment, etc.

An abstract of the ordinance relating to the rehabilitation of the property of the Consolidated company, which was passed by the City Council on Oct. 10, 1910, was published in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 22, 1910, page 887. The ordinance grants to the Chicago Railways Company, which is to purchase the property of the Consolidated company at foreclosure sale, the right to construct, maintain and operate certain extensions and additions of its lines of street railway. Property to the value of $235,709.10 is scheduled as property of the Consolidated system which the Chicago Railways may elect not to acquire.

MEETING OF RAILWAY COMMISSIONERS

Abstracts of some of the reports presented at the meeting of the National Association of Railway Commissioners in Washington, D. C., were published in the issue of the Electric Railway Journal for Nov. 26. Portions of some of the other reports of committees which were presented and considered at the same meeting are given below:

COMMITTEE REPORT ON RATES AND RATE MAKING

George F. Montgomery, Georgia Railroad Commission, presented the report of the committee on rates and rate making. The report was in part as follows:

"If the business of the carrier was confined to a single character of service, or if in the performance of its service to its patrons it brought into play in every instance all of its property, it could be ascertained with a degree of accuracy what proportion of the total expense of operation any given service absorbed. But where the property of the carrier extends over and through a large number of States, and where its business is not confined either to State or interstate business, or to any one commodity, but where it daily carries shipments of hundreds of different commodities between its hundreds of stations, and where the quantity of movement in any given commodity and between any given stations is constantly changing and with those changes there is a constant change in the proportion of its property used, how hard it is to ascertain what charges are just and reasonable on the fair-return-on-value basis. The apportionment of the total value of the property of any carrier according to the property used in a specific instance upon an exact basis is impossible, and if it is impossible to determine exactly the value of the property employed in a given case, and to get at the value as nearly as possible some allowance is made somewhere along the line in the scientific working out of rates, the science falls with the allowance. And to what extent will any known science help in making rates which are affected by water competition or commercial conditions, which oftentimes necessarily disarrange any fixed method of making rates? But, granting that reasonable and just rates can be reached by scientific methods, if this theory is to be observed with every change in value of the property devoted to any given service, the charges for that service must be correspondingly changed, and the task of making rates in this manner would hardly be finished in any case when by reason of changed conditions revaluations and new rates would have to be made. Thus the plan is impracticable, even if it should enable the making of rates in such manner that the property employed in each and every instance would earn its fair return.

"As to the value-of-the-service theory and the plan of making rates as high as the traffic will bear and the plan of making such rates as will permit of a free movement of freight and free business intercourse between the patrons of the carrier and the general public, hardly more than one valuable thing could result were these plans adopted and practised, and that would be improved service, because of the carriers being certain to receive such returns from their operations as to enable them to furnish the best of service and facilities.

"The question which rate-making authorities ought to consider is not merely the saving of railway companies from bankruptcy, but where the service rendered by the carrier is altogether satisfactory let not the giver of the service be envied a remunerative measure of profit.

"Your committee offers the following suggestions for the making of a mileage tariff and for the making of a classification of freights and special or commodity rates not based on a mileage scale, but made to meet such competitive conditions of transportation or commerce as may be found to exist:

"1. Adopt a mileage tariff by fixing first class and then arrange all other classes on a percentage relation to first class.

"2. Adopt a classification to govern the tariff by classifying such articles as are universally accepted to be articles of first-class freight and then classify all other articles in relation thereto.

"3. Wherever transportation or commercial conditions make necessary a departure from the mileage-tariff basis adopt special or commodity rates.

"Your committee is of the opinion that no fixed rule can be observed, but that after all, as in the successful doing of all things, it is a matter of judgment based on experience. Rate making is no new work. Tariffs and classifications after the same fashion used to-day were in effect many years before any State created a railroad commission. It is not a matter of experiment now. The experimental period has passed. The same system now employed has been in use since the early history of railroad operations. If no rate had ever been made and we were now called upon to invent some rate-making plan, scientific methods of mathematical calculations might then serve our purpose well. But we have seen how the existing plan works, where it fits well and where it does not, and, as stated, it is a matter of judgment, supported by an honest purpose, to keep the good and remove the bad."

SHIPPERS' CLAIMS

William Kilpatrick, Illinois Board of Railway & Warehouse Commissioners, read the report of the committee on shippers' claims on common carriers. In part the report said:

"Through unjust and inefficient treatment on the part of the carrier and unjust claims on the part of the shipper, both have come to approach the matter of claims in an antagonistic and retaliatory spirit, which will be dispelled only by a realization on the part of both that undue advantages obtained through claim settlements are as obnoxious to the law as any other form of discrimination."

The report was adopted.

CAR SERVICE

Halford Erickson, Wisconsin Railroad Commission, read the report of the committee on car service and demurrage. The report showed the probable effect of an increase of the time for loading and unloading upon average mileage of freight cars per day and said in part:

"The facts certainly raise the question whether at this time we are warranted in recommending any change that may cause such drastic increases in the expenses of transportation as would result from any considerable increase in the free time allowed for the loading or unloading of cars. The carriers are ordinarily entitled to reasonable rates for the services they render; and such rates, in one way or another, they are undoubtedly in a position to obtain, at least in the long run. This simply means that increases in the expenses may have to be made up from increases in the rates and that the burden of such changes as those caused by the increase of this free time will ultimately have to be borne by the consumers. In view of these facts, it would seem that extensions of the free time should not be granted unless justified by necessity rather than by convenience."

The report was received and ordered printed.

UNIFORM CLASSIFICATION

F. M. Cockrell, Interstate Commerce Commission, presented the report of the committee on uniform classification. The report, referring to provisions in the act of June 18, 1910, amending the interstate commerce laws, said:

"These provisions seem very clearly to give the Interstate Commerce Commission full authority to prescribe such a classification with reasonable rules and regulations. It is respectfully recommended that the Interstate Commerce Commission take the necessary steps to secure at as early a day as practicable the uniform-classification rules and regulations which the law quoted makes it the duty of carriers to establish and observe; and when such work has been prepared that the commission give to the commissions of the various States and all parties interested an opportunity to be heard before the final adoption of a uniform classification."

DELAYS IN ENFORCING STATE COMMISSION ORDERS

A. T. Siler, Kentucky Railroad Commission, read the report of the committee on delays attendant upon enforcing orders of State railroad commissions, which, in part, was as follows:

"The orders of State railroad commissions and of the

Interstate Commerce Commission are of a public nature and affect the interests of the public generally and should be entitled to consideration in advance of private interests. These delays are so general and have wrought so much harm and dissatisfaction that your committee is of the opinion that some vigorous, positive steps should be taken by this convention that will awaken new interest in these cases, and to that end your committee submits to the convention for its adoption the following resolution, which resolution has heretofore been adopted by this same convention at one of its annual meetings:

"'*Resolved,* That this convention respectfully request the Supreme Court of the United States, if it has power, to adopt a rule by which causes which involve the validity of orders of any State railroad commission shall be placed upon the calendar as soon as the record is filed in that court and at once be advanced and set for argument during the pending term; and if the court finds that it has not jurisdiction to regulate this matter by rule, then we recommend that Congress pass such legislation requiring the advancement of such cases.

"'*Resolved further,* That a copy of this report be furnished to the Supreme Court of the United States, and that the various members of the several State railroad commissions be requested to call the attention of their members in Congress to this report and recommendation, and solicit their support of any measure which has for its object the placing of this line of cases in a condition for a more speedy trial.'"

The resolution was adopted by the convention.

GRADE CROSSINGS AND TRESPASSING

George W. Dickinson, Michigan Railroad Commission, read the report of the committee on grade crossings and trespassing on railroads, which was in part as follows:

"In some States the law prescribes a division of the expense between the interested parties, the States in some cases sharing in such expense. By reason of the variety of the conditions presented, we do not feel that any hard and fast rule can be equitably applied, otherwise we would recommend assessing at least 25 per cent of the expense of this work to the State. In one case the street may be occupied by an electric line, or some interurban line may use the overhead structure together with the steam road. For this reason we believe authority to determine not only the necessity for the separation but also to apportion the expense of the same should be given the railroad commission of the State, which, being free from political or other influence, could act without bias. We believe, however, that the State should bear a certain portion, say not to exceed a certain per cent or fixed sum in each case.

"We make the following recommendation: 'That in States now having no law governing conditions under which grade separation shall be made, or not requiring any given number of crossings to be separated each year, the legislators of such State have the matter properly placed before them, with suggestions as to what is needed, that they may enact laws granting to the commission of their State the necessary power to act; that they be given discretionary power to require each railroad in their State to separate a certain number of grades, in proportion to their mileage, each year.'

"To this end we recommend that a committee of this association be appointed to prepare such data and suggestions as they deem best for presentation to the Legislatures of the several States; that said committee be composed of one member of the railroad commission of each such State and they be authorized to formulate and present such suggestions as such committee may deem proper and as will tend to a uniformity of the laws on this subject in the different States.

"In the year 1909, in Michigan, there were 8357 street and highway crossings at grade; protected with gates and flagmen, 600; protected with electric bells, 270; unprotected, 7487; separation of grades, 360; showing about 13 per cent protected and 4 per cent separated. In the same year there were steam railroad crossings at grade, 500; electric railroad crossings at grade, 500; protected by interlockers or derails, 260; unprotected, 240; separation of grades, 150.

"In the building of improved highways the people now recognize that a part of the main thoroughfares, known as county highways, should be, in part, paid for by the county as a whole, and no reason exists why, if such roads are so important for the use of the people of a county as a whole as to justify a burden on the county, the county as a whole should not pay a part of the cost of the elimination of a dangerous crossing thereon. Cases may frequently arise where an important highway only crosses through an extreme corner of a town or village and where very few people of that municipality use the road. The advantages arising from the abolishment of such a crossing would not accrue to the town itself except in a very small way, but would accrue to the adjoining towns and the county generally.

"The statute ought to provide that any municipality and steam railroad, and, if necessary, street railroad, subject to the approval of the State commission, could voluntarily contract for the abolishment of crossings within a municipality. All over the country municipalities are now contracting with steam railroads for the abolishment of crossings, and in each case a special act is required. The general law ought to be such that such contracts, with the approval aforesaid, could be carried out without special legislation.

"There is no provision in a great many States having grade-crossing laws for the abolishment of crossings of interurban high-speed lines. The tremendous growth of these high-speed interurban lines is resulting in the same conditions that arose at the time steam railroads were constructed. The laws relating to grade crossings ought to apply to high-speed interurban lines, as there is practically no difference between the present methods of construction and operation.

"The State laws are very diversified as to who can institute the application, but the statute should provide that the proceedings can be commenced either by the State public service commission or by any municipality interested or by any steam or street railroad occupying the crossing.

"Your committee well realizes that the elimination of grade crossings in cities and villages where the volume of travel on the railroads and in the streets is very large and where land necessary for such improvements is very expensive is the most serious financial problem which our railroads and the public have to face jointly, and with the rapid increase of business it becomes more pressing every year, but if we realize our duty and responsibility and realize that the protection of the general public is a burden we must bear and which must therefore receive our serious consideration, we must not relax in our efforts to bring about such conditions as will represent the largest measure of safety in the least possible time."

The recommendation of the committee for the appointment of a general committee was carried after a slight change had been made in the phraseology of the report with the intent of giving representation to each State that has a railroad commission.

COMMITTEE ON LEGISLATION

The report of the committee on legislation was presented by the chairman, Ira B. Mills, Minnesota Railroad and Warehouse Commission. It was in part as follows:

"The committee recommends that as soon as possible the States not having commissions pass laws establishing them, and suggests that the laws of Wisconsin or New York might be taken as a model. Under recent decisions it would be well to examine very carefully the statutes of the different States, with a view of seeing if the rate-making power given by them will stand the test."

Judson C. Clements, Interstate Commerce Commission, spoke of the importance of a friendly co-operative spirit and willingness to confer between the Interstate and the State commissions.

Edward M. Bassett, New York Public Service Commission, First District, said that the Constitution put under the federal government the control of commerce between the States. The Interstate Commerce Commission was only fulfilling its particular function when it did this work right up to what it conceived to be the twilight zone of federal authority. And, on

the other hand, the State commissions did their work under the powers not delegated to the federal government in the United States Constitution when they performed their functions right up to the limit of the twilight zone. But there was a twilight zone that had to be patiently worked out and greater light thrown upon it.

RAILROAD STATISTICS

Prof. Henry C. Adams, in charge of statistics and accounts, Interstate Commerce Commission, presented the report of the committee on railroad statistics. The committee repeated recommendations which were contained in the report of the previous year, but, through inadvertence, were not formally presented to the convention. Modifications of the Interstate Commerce Commission form of annual report were suggested. The committee wrote a letter of inquiry regarding the date of the fiscal year to State railway commissioners and carriers subject to the jurisdiction of the Interstate commission. The replies did not indicate any strong desire in favor of a change of the date for closing the fiscal year. A bill passed by the last Congress permits the Interstate commission by order to substitute Dec. 31 as the date for closing the fiscal year. The committee submitted the classification of additions and betterments and the form of general balance sheet statement promulgated by the Interstate commission for steam railroads and called attention to the fact that the general system of accounts for steam railroads prescribed by the Interstate commission and approved and accepted by the State commissions still lacks an authoritative classification and definition of income items. On the subject of assignment of revenues and expenses of railways by State lines the committee said in part:

"This question of the separation of operating revenues and operating expenses by State lines—as also a separation for interstate and intrastate traffic—has long engaged the attention of the railway commissioners and the carriers. In 1907 your committee met with a committee representing the Association of American Railway Accounting Officers, for the purpose of considering this question, and, as the result of their joint labors, there was worked up a complete and comprehensive plan for the separation of operating expenses by State lines. From the point of view of expenses exclusively, the rules then adopted are now regarded by your committee as in the main satisfactory.

"The difficulty, however, arises when it is attempted to assign operating revenues by State lines in such a way as to secure a correct statement of net revenues from operation. The embarrassment arises from the fact that some States have expensive terminals, whereas other States are relieved from the necessity of bearing the expenses incident to such terminals; and it would be manifestly unfair to assign expenses to the State where the expense is in fact incurred, and to assign revenues according to a mileage pro rata basis. As a step toward the solution of this difficulty, it was recognized that it would be necessary to apply the principle of constructive mileage in the localization of railway revenues, and the chairman of your committee was instructed to correspond with the representatives of the States for the purpose of learning whether or not the States would approve the application of the rule of constructive mileage for the localization of revenues. Nothing very definite resulted from this investigation and largely on that account the attempt to formulate any definite rule for the application of the principle of constructive mileage was abandoned.

"The committee is able to report some progress in that provision has been made for a general investigation of the location of especially expensive terminals, of the arbitraries which are allowed by carriers on account of such terminals, of contracts which result in the establishment of arbitraries on account of other kinds of disabilities, and other pertinent items of information.

"The question at issue is one which touches not only the work of railroad commissioners, but the taxing agencies of the States as well; and the question has arisen as to the likelihood of the acceptance by the States of any uniform rule for localizing the operating revenues and operating expenses of railways in case such a rule can be worked out as would commend itself to the members of this convention.

"So far as the majority of States are concerned, there is no serious reason why a uniform rule approved by this convention should not become generally effective. However, there are a few States whose taxing laws or administrative practices must be modified in greater or less degree before a rule for assigning revenues and expenses by State lines could be universally adopted, provided the interests of taxing commissioners as well as of railway commissioners are to be considered by such a rule."

THE WORK OF THE BOARD OF PUBLIC UTILITIES OF LOS ANGELES

The Board of Public Utilities of Los Angeles, Cal., has submitted to the Mayor of Los Angeles a report covering its work from the time of its organization, late in December, 1909, to June 30, 1910. The original commissioners appointed by Mayor Alexander on Dec. 20, 1909, were Meyer Lissner, whose term of office expires on June 30, 1912; Frank J. Hart, whose term of office expires on June 30, 1911, and Paul Haupt, whose term of office expired on June 30, 1910. On March 18, 1910, Mr. Haupt resigned, and J. M. Hunter was appointed to serve out his time. Mr. Hunter was later reappointed to serve until June 30, 1913. Mr. Lissner has been elected president of the board. On Jan. 5, 1910, the board appointed Theo. B. Comstock executive officer and secretary with the official title of engineer of the board. The members of the board serve gratuitously. The sum of $12,000 a year is appropriated for salaries and other expenses involved in the work of the board. The principal duties of the board as prescribed in the ordinance which created the body follow:

"1. To investigate each year the affairs of all persons, firms or corporations operating or maintaining water, electric lighting, power, gas or telepehone systems, or street railways, of interurban railroads, or other public service utilities in Los Angeles, and compile such data as may be necessary to determine the proper charges for the service furnished or supplied, as provided in the charter of said city, or otherwise by law. Such data shall include a valuation of the physical properties, a detailed statement of gross and net earnings and of expenses, and the capitalization and indebtedness thereof, and such other matters as the board may deem proper, and shall also include such facts and figures as may be obtainable regarding the operation and maintenance of similar systems and utilities in other municipalities.

"2. To recommend to the City Council, prior to the first day of March of each year, a schedule of charges for the services specified in subdivision 1 of this section.

"3. To investigate complaints against the service or the charges of any person, firm or corporation operating any public service utility in Los Angeles, and to recommend legislation or action to executive officers of the city whenever in the judgment of the board such legislation or such action may be necessary.

"4. To superintend the inspection of all public utilities and services in Los Angeles, as to their compliance with their franchises and with law and the ordinances, their service and charges, and their treatment of the public, and from time to time to recommend such legislation or executive action as may be required.

"5. To prepare and keep a detailed and indexed record of all public service franchises granted by the city that are now in existence or that may hereafter be granted, showing the date, location, term thereof, and all other essential facts, and a similar record, so far as practicable, of all other public franchises exercised in Los Angeles.

"6. To report to the City Council in June of each year the essential facts and figures concerning the aforesaid public utilities operated and maintained in Los Angeles, comparing their charges and character of service with those of similar utilities in other municipalities."

The report of the board for the six months ended June 30, 1910, contains 194 pages. According to the report the board has 18 water companies, four gas companies, three electric companies, two telephone companies and four electric railways under its jurisdiction. The 31 companies involved have "combined physical property amounting to $65,000,000 or more." A digest of the report of the board relating to street railway affairs follows:

"The subject of transfers is not specifically covered by the Constitution of California nor by the codes or statutes. No specific provision of the City Charter relates directly to transfer requirements. There are demands for transfers in some instances from interurban to city lines and vice versa. At present only two or three of this class are allowed, although there are other cases in which exchange service appears to be reasonably justifiable.

"Early in 1910 a study of the situation was undertaken by this board. There were found some 25 car connections where transfers were not allowed, which came within reasonable demand of the patrons of the lines operated by the Los Angeles Railway. After full discussion, the conditions of the board were, in the main, conceded by the company and these additional transfers are now regularly issued.

"It has been the policy of the board to present the facts to the railroad officials in such manner as to enlist their co-operation, and we believe that they are now inclined to meet the legitimate demands of the people to a greater extent than formerly.

"The investigations of the board have clearly shown that the crowding of cars, which has caused much complaint, is largely the result of conditions which are peculiar to Los Angeles.

"In a city growing as rapidly as Los Angeles it is impossible for city officials or the officers of corporations to look ahead far enough to provide for all contingencies in advance of actual requirements. There must necessarily be periods of radical reconstruction in methods and equipment, and very serious problems are involved in the practical handling of traffic while such work is under way.

"The whole subject is receiving earnest and thoughtful consideration on the part of the board and its engineer in consultation with other city officials and with duly accredited representatives of all the street railways.

"The term of grant for street railway is not limited by State laws, but the City Charter of Los Angeles allows not more than 21 years. Spur track grants are made revokable at will of the city authorities by legislative enactment. Certain other conditions, as the payment of 2 per cent of gross earnings annually, beginning with the fifth year of operation; the method of application, the bidding for and granting of franchises, and the mode of reversion to the city, if demanded at end of term, are all covered in the statutes of California, leaving to the city the enforcement of its own edicts regarding operation, traffic regulation, transfers and other matters, exclusive of fares, which also are now prescribed in the statutes.

"With a view to securing attention from those best fitted to advise the board and to get full expression of the opinions of both sides in matters open to controversy, a resolution was passed by the board in April providing for a traffic conference to include the members of the board and the officers of the railways and railroads operating in Los Angeles. The time of the board and its staff has been so steadily occupied, however, that it has not been possible to convene the traffic conference up to the date of closing this report. The engineer of the board has made preliminary studies of some of the questions which will soon be brought up for discussion, and the valued experience of the city engineer and city attorney has been freely drawn upon in such matters as have required immediate attention in this regard.

"The expansion of the city limits of Los Angeles has been so extensive recently as to change materially the relations of the interurban lines without equivalent increase of earning capacity. For this reason, although technical application of the law may be supposed to warrant enforcement of 5-cent fares over any and all lines to the city limits, it has appeared to this board that full and fair consideration of all interests is proper before rigidly enforcing this regulation. The board has made progress in bringing the facts into clear light, and we confidently expect to reach satisfactory conclusions for report to the Council within a short time.

"The board is satisfied that there is anything but a public demand for the cessation of freight traffic. On the contrary, the business community and the people generally desire that it shall be given freedom to expand and continue development along healthy channels. But it is evident that some provision must be made ere long for distinct arteries to be devoted mainly or wholly to the circulation of freight and express within the city. The elimination of grade crossings is intimately interwoven with this, and other important questions must be considered coincidently. Negotiations looking to settlement by give-and-take concessions will accomplish better and more speedy results than any other method of procedure."

MEETING OF RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission, appointed by President Taft to consider the issue of railway stocks and bonds, held its first public hearing in Washington, D. C., on Nov. 28. All of the members of the commission were present, as follows: President Arthur T. Hadley, of Yale University, chairman; F. N. Judson, of St. Louis; Frederick Strauss, of New York; Walter L. Fisher, of Chicago, and B. H. Meyer, of Madison, Wis.

Judson C. Clements, member of the Interstate Commerce Commission, testified at the first hearing. He said in part:

"The Interstate Commerce Commission believes that a physical valuation of the railroad properties of the United States is the first step toward adequate regulation of rates; and I believe the same principle applies to the establishment of a basis for the control of stock and bond issues."

It was also stated by Commissioner Clements that he opposed the measure introduced in the last Congress to regulate the issue of securities because he thought that it did not embody all the features which should be included in a law on this subject. He objected to the provision that no new road should be allowed to sell its stock and bonds below par. He thought that any official body with control of railroad securities should be authorized to allow the issue of such securities at less than par when lower prices were justified.

At a hearing on Nov. 29 testimony was offered by Chairman W. P. Hall and Clinton White, of the Board of Railroad Commissioners of Massachusetts. James F. Jackson, former chairman of the Massachusetts commission, also testified.

Mr. Hall advocated a physical valuation of railways. He admitted that there were difficulties to overcome, but said that it was possible to arrive at approximate values. The Massachusetts commission had been able to secure satisfactory results. Mr. Hall said that if a new national commission was created it should deal only with new issues and that actual values should be the basis of all new issues. He said that short-term notes as well as stocks and bonds should be considered, for the effect of such notes was to increase the floating debt.

"The Effect of Keyways on the Strength of Shafts," by Herbert F. Moore, has just been issued as Bulletin No. 42 of the Engineering Experiment Station of the University of Illinois. This bulletin records the results of tests made to determine the relative strength of solid shafts and shafts with keyways. Various sizes of shafts were tested, and for each size of shaft the weakening effect of keyways of several proportions was determined. Tests were made on shafts subjected to twisting only and on shafts subjected to twisting and bending at the same time. The results show that the weakening effect of keyways of the usual proportions upon the strength of shafts is considerable, a square keyway of the usual size causing a reduction of about one-sixth in the strength of the shaft. Free copies of Bulletin No. 42 may be obtained from W. F. M. Goss, University of Illinois, Urbana, Ill.

NEW CONVERTIBLE CARS FOR TORONTO

The Toronto Railway has adopted a new double-truck convertible car of the type shown in the accompanying illustration. The new cars, of which 16 out of 50 are in service, are to be used in connection with the prepayment fare system, inaugurated on the Yonge Street line on Nov. 27. This change from the portable fare box system hitherto in use was adopted for the entire Toronto system on Dec. 1. Special pay-as-you-enter fare boxes have been installed on the Yonge Street route and will be placed on several of the other lines; but pending the construction of a sufficient number to cover all the lines in the city, the company is making use of its regular hand box in connection with the prepayment system.

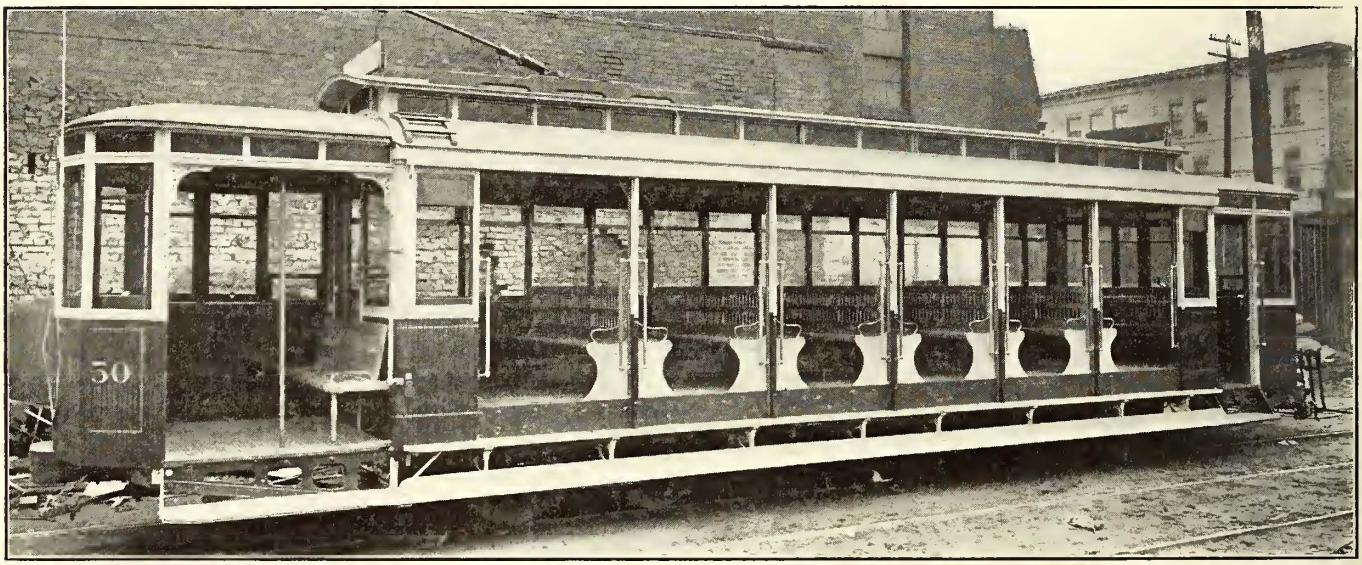
The new car, called Class 1300, has a body 30 ft. long and an over-all length of 44 ft. 9 in. As a closed car this vehicle seats 38 passengers and as an open car it seats 70 passengers. The general design is the invention of the company's master car builder, M. Power, under whose direction all the cars of this type are being built in the company's shops. The following descriptive details were furnished through the courtesy of R. J. Fleming, general manager.

The vestibule also has an outside mirror to give the motorman a clear view of the whole car side.

The back vestibule is made very convenient for prepayment operation. To facilitate the Toronto practice of leaving by the front door, Mr. Fleming conceived the idea of dispensing with the front door or bulkhead, leaving almost all the end open. This gives excellent operating results as well as extra capacity both winter and summer.

The cross-seats used in summer are placed longitudinally for winter use, and covered by a cushion. A leg is required only at the extreme end of each length of cross-seats, the center supports consisting of truss-rods underneath the seat. Since very few legs are required the space under the seats is left open, thus giving the interior of the car a very sanitary appearance. A clear passage in and out is given by a space left at each door. The seat backs are very light to handle as each side has two sections. They rest on the seats, being securely held by means of clips with which they are engaged. The tops of these seats are secured by gate hooks to facilitate removal.

For summer use the side sections of the car are removed. The cross-seats are placed in position and supported by lugs on the panels and car wall, and held in place by buttons.



Toronto Convertible Car When Open.

The bottom framework is of semi-steel construction. The side sill-plates are placed on the extreme outside of body, reinforced by an inside angle under which the wheels are allowed to curve. This angle carries all the cross-floor supports, which are reinforced by truss rods. The only platform steel comprises the two light outside platform supports, made on the cantilever principle and reinforced on the bottom side by a light angle. The platform centers are supported by adjustable trusses which have their bearing on the bottom of the cantilever under the car-body sill. In this position the weight is cared for by the ordinary platform suspension bolts.

The front of the car is fitted with a wide sliding door, operated by the motorman and locking each time it closes. Two switch-irons are inserted in the floor over the rails, while alongside of these irons there is placed a metallic frame containing plate glass. This frame is so constructed as to open in order to be cleaned. Through this device the motorman can see the switch; furthermore, the frame prevents the cold from entering the car. The platform rail behind the motorman has a double purpose inasmuch as it separates the motorman from the passengers and provides a location for the sandbox, the open lid of which serves as a comfortable seat for the motorman. The placing of the sandbox in such a position prevents dampness and makes it easy for the operator to see the condition of the sand at all times. A curtain is suspended from the roof over the platform rail. When this blind is drawn down light from the car cannot interfere with the view of the motorman. The Wooden backs are dropped into slotted castings, making a cool and comfortable seat. The bottom running board is attached by means of suitable suspension castings and connected to both platform steps. The second running board is contained in the wall of the car; it makes a support for the sections in winter and also acts as a guard to prevent the car from being sidewiped by wagons.

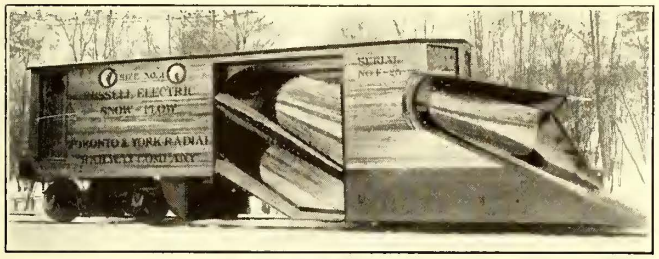
By a special switch, controlling an extra number of lamps, additional lights can be provided during the rush hours to give the conductor better facilities for handling fares and transfers.

Each car will carry four GE-80a 40-hp motors equipped with open-hearth, cut-steel gears and pinions. The new gear cases are of pressed steel replacing the old type heavy malleable-iron cases. All of the motors operate with "Le Carbone" brushes. The resistances are of the Toronto Railway standard, removable grid type. The rest of the electrical apparatus includes a K-6 series-parallel controller and M.R.-type automatic circuit-breaker; General Electric standard car lightning arresters and Toronto Railway roller-bearing trolley stands with a Shelby seamless steel trolley pole. The Consolidated buzzer system, operated from the power circuit, is used in place of batteries.

The trucks are the Curtis D-2 type manufactured by the Canada Foundry Company. They have all-steel frames and swinging bolsters. The braking equipment consists of the Magann storage air and the National Brake Company's hand brake for an auxiliary. All of the new cars have Watson [illegible]tomatic fenders.

SNOW PLOW FOR HEAVY INTERURBAN SERVICE

The Russell Car & Snow Plow Company, of Ridgway, Pa., has recently built for the Toronto & York Radial Railway Company, Toronto, Ont., a snow plow of the type of its well-known steam-road plows. As shown in the accompanying cut this plow is provided with wing elevators and flanger, which are operated by air under the control of the motorman. It can be propelled by a locomotive attached to the power bar by means



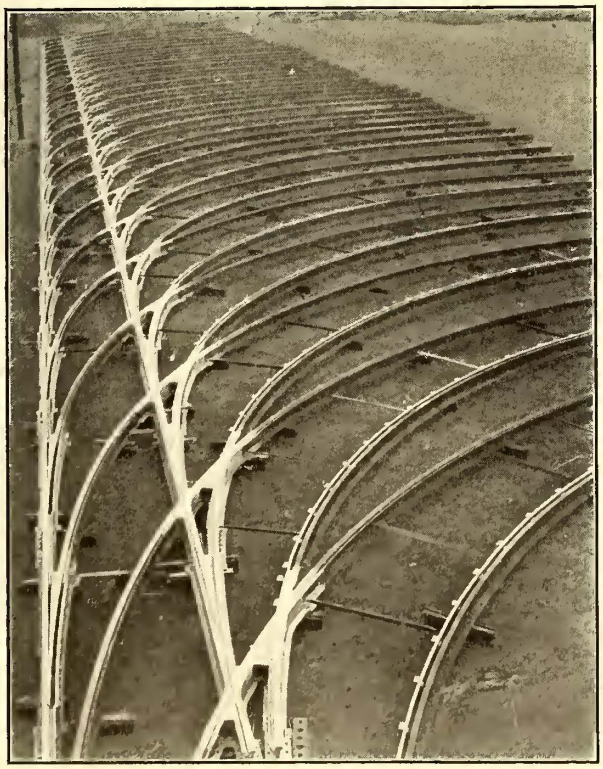
Snow Plow for the Toronto & York Radial Railway.

of an automatic coupler at the rear of the plow or by motors attached to the trucks. The trucks are of the "Russell" B-6 all-steel type for inside-hung motors.

The dimensions of the plow are as follows: Height over all, 12 ft.; weight of moldboard, 8 ft. 5 in.; length over all, 32 ft.; extreme width of body, 10 ft. 1 in.; extreme width of wings extended, 14 ft. 1 in.; width of bit, 9 ft. 4 in.; approximate weight, 50,000 lb.

A REMARKABLE TRACK LAY-OUT IN LEEDS, ENGLAND

Edgar Allen & Company, Ltd., Sheffield, England, have recently completed for the Kirkstall Road car house of the Leeds



Leeds Track Layout.

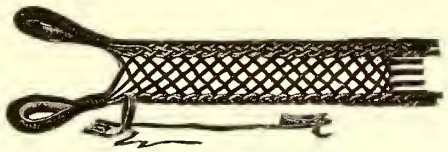
City Tramways what is believed to be the largest piece of track work of this class yet constructed as one lay-out in England. The lay-out as assembled at the works was 346 ft. long 48 ft. wide.

As shown in the accompanying cut, all of the switches on the main track couple together without intervening rails, thus reducing the number of joints. All the switches are 75-ft. radius center track. All the left-hand switches are movable. The right-hand side consists of compound open switches and crossings cast in one piece and repeated throughout, thus standardizing the work. All curves off the main track are 35 ft. radius, spiralized to suit the varying distances of the pits in the car house, thereby standardizing the castings as far as possible. All the curved tracks are fitted on the inside rail with Holt's patent guard rail, of which over 1200 ft. was required. This rail is rolled in 20-ft. lengths as a miniature type of bull-head rail, in order that it may be reversed to double the life. Special cast-steel fishplates are fitted to the castings at the places to which the guard is connected.

The total weight of the lay-out is approximately 85 tons, the switches and crossings comprising over one-third of the total weight. The rails used in the lay-out were rolled by Walter Scott, Ltd., of Leeds, to the new section adopted by the Leeds City Tramways. They weigh 105 lb. per yard. The plans of the lay-out were prepared by J. B. Hamilton, general manager, and R. B. Holt, permanent way engineer, of the Leeds City Tramways.

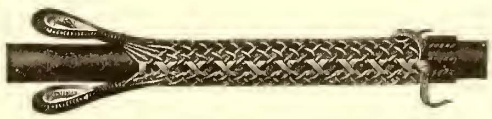
WIRE OR CABLE GRIPS

The "Gem" wire or cable grip, shown in the accompanying cuts, is made by the Perfection Electrical Manufacturing & Supply Company, Brooklyn, N. Y., in various forms and sizes to suit the conditions of underground and overhead wire installations. It is made of coarse-strand steel wire because fine-strand wire wears out too readily and because the tangents the coarse strands make with the cable give an ideal gripping condition. The flaring ends form a funnel-shape entrance for the cable end, which makes the application of the grip instantaneous. The grip can be slipped on in one second, the hauling rope applied and the pull begun. Its usefulness is not limited to a single wire or to lead-covered cable alone, for it can be used to pull in a three-wire feeder or a larger number of wires. No wire or lead-covered cable is destroyed in the pulling operation. On an average the same grip can be effectively used about 20 times in a gritty duct.



Split Grip Open.

A single-eye type is used for underground purposes where a simple pulling operation is to be made. This grip is also used for pulling aerial wires or cables that cross pole tops. The double-eye grip has the advantage of being able to take hold at any point when slipped on from the end. On releasing the grip by pulling the end opposite the eye or funnel-shaped end it can be slid along to the next holding point. The double-eye type is used especially for pulling out cable already installed and for tailing-in. Where the grip cannot be applied at the



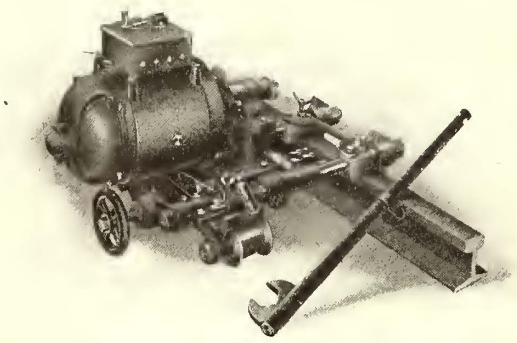
Split Grip Applied

end and a hold is desired at an intermediate point there is used the double-eye split grip illustrated. This grip is so constructed that it can be laced on at any point desired. The split type is particularly valuable for handling live cables and taking up slack at turns in aerial construction.

The grips are made in three different styles, as described, and 13 sizes, giving an equipment for pulling every size and combination of wires that will fit into the various size conduits from ½ in. to 4 in.

MOTOR DRILL FOR BONDING

The accompanying illustration shows the improved No. 22 motor drill now made for twin-terminal bonds by the American Steel & Wire Company, Worcester, Mass. This drill is of the four-spindle type, simultaneously boring all four holes in the head of a rail for this company's standard twin-terminal bond. Two men can easily operate this machine and drill holes for eight joints per hour. This reduces the cost of installing the twin-terminal bonds to a very low figure. The machine, as shown, makes a very compact and efficient portable drill. It is a well-developed, high-speed tool, made of high-grade steel and



Four-Spindle Motor Drill for Bonding

provided with ball bearings to reduce friction and to endure the very severe conditions of track work.

The motor will operate directly on a 600-volt trolley circuit. The internal windings are thoroughly protected and insulated. The armature shaft is geared direct to the drill spindle. The machine has two small carriage wheels which can be placed on the rail to move the tool along easily from joint to joint.

CORRUGATION REMOVAL WITH THE NICHOLS GRINDER

It will be recalled that several years ago H. B. Nichols, chief engineer of the Philadelphia Rapid Transit Company, constructed a machine for removing corrugations which was described and illustrated in the Electric Railway Journal of April 3, 1909, page 649. Owing to the satisfactory results secured in Philadelphia the commercial rights for using this machine elsewhere were taken over by William D. Gherky, of Philadelphia. The following paragraphs give particulars of what has been done with this machine in other cities, both for the removal of corrugations and the grinding of joints.

The Public Service Railway Company, Newark, N. J., has been using the rail grinder for the past two years, during which period it rehabilitated 6500 ft. of rail on different lines. Some of the corrugations were almost ⅛ in. deep and it would have been necessary to renew the rails if it had not been possible to grind out the depressions. One great advantage of the grinder was that it could be used without interfering with the regular operation of cars.

The Brooklyn Rapid Transit Company first put the grinder on during 1909. It has since removed over 20,000 ft. of corrugations and is still in service.

The United Railways & Electric Company, of Baltimore, eliminated corrugations on approximately 6700 ft. of track up to the early part of November, 1910. The contract with Mr. Gherky calls for the treatment of 16,813 ft. of rail in all. The average depth of the corrugations removed is from 1/16 in. to 3/32 in. The grinder has not been used for battered joints in Baltimore. The company is a firm believer in electric welding and any joints requiring attention are given proper treatment when welding operations are under way.

The New York State Railways, Rochester, N. Y., used this grinder in 1909 to treat 3033 ft. of track. In addition to this, the machine ground 235 old pounded joints. No measurements were made of the depth of the corrugations, but they were deep enough to be annoying.

Another large Eastern company, which does not wish to be quoted, states that it has ground out 3804 ft. of rail and 897 joints. Work with the machines is progressing elsewhere in cities not mentioned in the foregoing paragraphs.

All the work has been done with machines built according to the original design. Mr. Gherky, however, has introduced changes and improvements, intended principally to quicken the action of the machine and to increase its output. Machines of the latest design now under construction will turn out from a third to a half more work, tending thereby to a reduction in cost. To handle the growing business better, Mr. Gherky and his associates have incorporated and are greatly increasing their working facilities. After Jan. 1, 1911, the business will be handled by the Railway Track-Work Company, of which Mr. Gherky is president, William B. Goodall secretary and A. M. Aardini treasurer.

IMPROVEMENTS IN THE BLAKE DISPATCHER SIGNAL

Several slight improvements have been introduced in the dispatchers' signals which the Blake Signal & Manufacturing Company is installing on the lines of the Illinois Traction System. As will be remembered, the Blake system of dispatchers' signals depends upon the operation in the signals of pendulums of different lengths corresponding to master pendulums in the dispatcher's office. To bring these pendulums to rest promptly the company has added a check at the base of each pendulum. This check is drawn out of the way of the lower end of the pendulum rod by means of a coil, which is in multiple with the coils acting upon the pendulum to make it swing and is, therefore, synchronous with them, but is automatically thrown into engagement when the current conveying the impulses to the pendulum is cut off. This improvement tends to make the action of the signal more positive and eliminates the voltage regulating relays which were formerly a part of the dispatcher's equipment. The improvement also permits the signals to be operated much more rapidly in succession.

On the Illinois Traction lines the signals are being mounted in a novel way. Special iron stands are used for their support instead of transmission or line poles. The purpose of this change is to obtain a more rigid support than is possible with a pole set in loamy soil. The base of the steel-pole support is set upon a 5-ft. section of 8-in. or 9-in. steel channel to which it is guyed on each side from a point about 6 ft. from the base of the pole. The pole with this broad base is then set 6 ft. in the ground with the channel in a horizontal plane and at right angles to the track. This form of construction is considered more firm than a concrete base and less expensive.

The company further advises that it has made a contract with the Illinois Traction System for placing its improved signals from Decatur through Champaign, Urbana and Danville to Ridge Farm. This places one of its improved signals, mounted on steel poles, at every siding and "Y" on 260 miles.

NEW THERMIT JOINTS AT HOLYOKE

During the last few weeks the Goldschmidt-Thermit Company has been installing about 100 of its new joints in Holyoke and Northampton. This is the joint completely welding the web of the rail, as described by F. Lange, chief engineer of the Goldschmidt-Thermit Company, at the convention of the American Electric Railway Engineering Association at Atlantic City, and published on page 718 in the Electric Railway Journal for Oct. 12, 1910. Altogether about 60 joints in the straight tracks were cast on the lines of the Holyoke Street Railway and Northampton Street Railway, and about 40 compromise joints. These companies have always been enthusiastic over the Goldschmidt-thermit joint, and the Holyoke Street Railway was one of the first to install them. Winter conditions in Holyoke and Northampton are severe, and the company believes that the test given these joints during the winter will demonstrate their value for similar climatic conditions elsewhere.

LONDON LETTER

(From Our Regular Correspondent)

The London County Council recently received 25 visitors from Paris, comprising members of the Conseil Municipal de Paris, who represented omnibus companies and engineers. The side slot, central slot and surface contact traction systems are in use in Paris, but as the systems there are to be transformed the delegates to London included members of the Technical Commission of Control of the Works Department and members of the Municipal Commission. The methods of execution of public works and the various methods of paving employed in London were studied. Several conferences were held and visits were made to the car houses and to such points in the tramway system as the Elephant and Castle, where traffic is greatly congested.

The highways committee and the improvements committee have submitted to the London County Council a list of tramways for the construction of which they recommend that Parliamentary powers should be sought. Some of these schemes are for the construction of new tramways. The total cost of constructing the lines recommended amounts to £1,178,900, with £346,860 for improvements. Much opposition, however, is being encountered. Paddington has decided to exercise its right of veto, and the Hampstead Borough Council is opposed to the plan.

As has already been stated in this letter, several towns have obtained powers from Parliament to install trackless trolley systems and the Leeds Tramway committee has recommended the purchase of four motors and chassis at £600 each and of omnibus bodies at £100 each. The Keighley Corporation intends to apply to Parliament this session for permission to install a trackless system through Bingley, and the Bushey and Watford Urban Councils are trying to formulate a plan for a trackless trolley to connect these towns.

The Hull Tramways have done so well during the past five years, having made a net profit of more than £122,000, that there is a general feeling that the system should be extended immediately.

The Liverpool Corporation Tramways have had a very successful year, even the record year, 1907, having been surpassed. Perhaps one of the most interesting features of the report concerns the first-class cars. These cars have proved very successful, and the residents on other tramway routes have asked that first-class cars be placed on their particular routes. Sir Charles Petrie, the chairman of the tramways committee, in referring to the subject, said that he felt one class of people deserved to be catered to quite as much as another. If people were willing to pay for better accommodations there was no reason why they should not have them, particularly if it paid the committee to provide them.

The Board of Trade has intimated to the Town Council of Torquay that it will renew the license to continue the Torquay trams, which are operated on the Dolter surface contact system. This concession is merely a temporary one, as it has been decided to substitute the overhead trolley system for the surface contact system. An amicable arrangement will probably be made soon between the tramway committee and the Torquay Tramways Company, and the conversion of the system and the work of extending the service to Paignton will then proceed.

The Bournemouth Town Council has decided to substitute the overhead system for the conduit system in use in the center of the town. Three thousand pounds will be saved annually by this change. Bournemouth was the first town in the United Kingdom to introduce the conduit system. Previous to the corporation constructing the tramways many efforts had been made to secure rights to run tramways through Bournemouth, but they were all unsuccessful, because it was feared that the appearance of the town would be spoiled. When the corporation itself took up the question, however, the conduit system was adopted, and J. G. White & Company constructed a model system. The cost of operation, however, has been too great for a town of the size of Bournemouth and with the better knowledge of the working of the overhead trolley in other towns Bournemouth has concluded that the overhead system is not necessarily ruinous to a health resort of even its importance.

As a result of the amalgamation of the Bakerloo, the Piccadilly and the Hampstead tubes a number of through fares on a reduced scale have been made available. It is now possible to travel from Edgware Road to Waterloo for 2½d. and from King's Cross, Knight's Bridge or Baker Street to Waterloo for 2d. There are also new penny fares which provide longer rides, the reduction in fares in many cases being as much as 50 per cent. One of the objects of the companies has evidently been to foster Knight's Bridge as a shopping center and encourage traffic to that point.

A syndicate has been formed to build an electric railway between Worthing and Brighton. The general purposes committee of the Brighton Corporation has, however, passed a resolution against the construction of tramways in the borough. Encouraged by the small plurality by which the corporation rejected the tramway, the promoters intend to proceed with the application for Parliamentary powers.

As a result of the resignation of J. H. Rider, of the London County Council, J. K. Bruce, the present traffic manager, has been promoted to deputy chief officer at a salary of £1,000 a year, and an assistant is to be appointed at a salary of £600 a year to take charge of the traffic work. As regards the electrical work of the department, now that the Greenwich generating station is practically completed, an assistant will be placed in charge of the electrical section at a salary of £800 a year. The present assistant electrical engineer will be promoted to the new position.

About a year ago the London County Council installed the G. B. surface contact system on the route from Whitechapel to Bow as an experiment, and after many vicissitudes it was removed and the overhead system substituted. At that time remarks were made in the papers regarding the system by Sir John Williams Benn, formerly one of the progressive members of the London County Council. An action has recently been brought by the G. B. Company for alleged libel and slander in connection with these remarks, as the company claims that its business has been ruined since the system was removed from this route. The result of the suit will be of uncommon interest, as the G. B. Company has maintained that it was not permitted a fair opportunity to show the merits of the system; that the system installed between Whitechapel and Bow was a modification of its system, and that W. Mordey, the expert who was employed to look into the matter, reported that the system could be operated successfully.

Negotiations have been concluded between the London County Council and the City Corporation about the proposed St. Paul's Bridge, which is to be built in the vicinity of the present Southwark Bridge, and which is to have approaches leading into St. Paul's churchyard. The corporation has agreed to allow the tramways to be brought over the new bridge and will widen the eastern side of St. Paul's churchyard by pulling down the block of warehouses between the churchyard and Old Change. The Council will contribute half the cost of this widening, which is estimated at £600,000.

The Morley Corporation is about to construct the tramlines necessary to connect Morley with the Leeds system, and has asked J. B. Hamilton, the general manager of the Leeds Corporation Tramways, to help in a consulting capacity. The Leeds Tramways Committee has agreed to ask the City Council to allow Mr. Hamilton to accede to this request.

News of the death of Sir J. Clifton Robinson in New York on Nov. 6, 1910, made a profound impression in London and throughout the Empire. Practically all the important daily papers carried obituaries in which the career of Sir Clifton was reviewed at considerable length. One of the papers in a leader, "The Man That Counts," said: "If there had never been such a person as Sir Clifton Robinson, we should have had electric tramways all the same. They became inevitable as soon as the electric motor was a commercial possibility, but without this man, who saw the great possibilities of the new scheme, and who was able to persuade others to take his view, how many years should we have had to wait for that which is ours to-day, which has, indeed, become so much a part of our daily life that we have ceased to regard it as a novelty, or even to wonder at it, or to feel any particular sentiment of gratitude with regard to it."

A. C. S.

News of Electric Railways

1911 Mid-year Conference of the American Electric Railway Association

Friday, Jan. 27, 1911, has been selected by the executive committee as the date for the mid-year conference of the executive heads of the member companies of the American Electric Railway Association. The meeting will be at the headquarters of the association, 29 West Thirty-ninth Street, New York. These meetings are executive in character, and are open only to those authorized, under the by-laws of the association, to attend. In the evening of the same day the visiting officials will be invited to become guests of the American Electric Railway Manufacturers' Association at a banquet to be held at the Hotel Astor. Speakers prominent in public and business life will address those present. On Thursday, Jan. 26, 1911, the day preceding the mid-year conference, a meeting of the executive committee and of various committees of the association will be held at the office of the association in New York.

Service in Cleveland

J. J. Stanley, president of the Cleveland (Ohio) Railway, was quoted as follows by the Cleveland *News* in its issue of Nov. 28, 1910:

"The service being given by the Cleveland Railway is rotten. The officials of the company are doing all in their power, however, to give the best possible service under the existing conditions, but I can see no way out of the difficulty. In the first place our equipment is entirely inadequate. For three years extensions and improvements of the system were neglected. Now the company cannot keep pace with the growth of the city.

"We need at the very least 150 more cars and need them immediately. Our operating force of men should be increased by 500 or 600 men. For power plants alone we need more than $1,000,000. We need better tracks, more car houses and more and better equipment of a general nature. To bring our service up to what it should be we need immediately all these things that I have named. But our hands are tied. When the settlement was made it was agreed that when such improvements were needed they should be made out of money secured by the sale of stock. But it is an absolute impossibility for us to sell the issues we have made. We must sell stock at par while investors may go to the Cleveland Stock Exchange and buy it at $97. Possibly the chief reason that we cannot sell our stock is that the rate of interest it bears is not high enough to attract investors. In the last analysis 3-cent fare is undoubtedly responsible for the existing state of things and the wretched service that the company is obliged to give."

Transit Affairs in New York

William G. McAdoo, president of the Hudson & Manhattan Railroad, conferred on Nov. 22, 1910, with Comptroller Prendergast and President Mitchel of the Board of Aldermen and with Chairman Willcox of the Public Service Commission in regard to his original proposal to operate a modified tri-borough subway system, and it is expected that Mr. McAdoo will submit another proposal which will include a plan to operate two elevated extensions of the tri-borough in the Bronx and the Fourth Avenue route in Brooklyn.

Mr. McAdoo said that the conferences were intended to produce a better understanding of the offer of his company, and to assure the public officials that he was willing to meet them half way on all the questions that might be raised in connection with it. It is understood that Mr. McAdoo discussed with Mr. Mitchel and Mr. Prendergast, among other things, their desire to have the city in a position eventually to add the Hudson & Manhattan's loop from Thirty-third Street to the Grand Central by way of Forty-second Street and Sixth Avenue to the tri-borough system, provided the Broadway local link was constructed as proposed by the McAdoo companies.

The Comptroller and the President of the Board of Aldermen issued together this statement:

"We think this conference will be productive of an amplification of Mr. McAdoo's offer. We are confident that arrangements to operate the Fourth Avenue route may be made. Our conference with Mr. McAdoo was known to Chairman Willcox of the Public Service Commission."

On Nov. 23, 1910, Mayor Gaynor addressed a letter to H. R. Towne, president of the Merchants' Association, in which he said:

"I shall be most glad to see your suggestions carried out that the Chamber of Commerce and the Merchants' Association appoint a joint committee to consider the various subway routes, plans and offers which have been and may hereafter be submitted, and assist the public authorities to a wise selection.

"Some are talking of an expenditure of $180,000,000 or $200,000,000 by the city in the building of subways immediately, or within five years, as glibly and nimbly as though the city actually had that much credit available. But the fact is that the city has now an available credit of only $57,000,000.

"If some company would put in all the capital needed over and above the $57,000,000 which the city has available the subway difficulty would be solved and the work of construction could go on in all of the boroughs simultaneously, instead of piecemeal. Under the provisions of the law applicable to the case the subway would belong to the city from the start whether built by city money or private money on the limited franchise term which the city gives.

"Some persons, again, are so prejudiced against the present subway company on account of the crowded condition of its cars that they scorn any proposition of that company for the building of additional subways to relieve the congestion. This sounds odd, but it is woefully true. The committee you propose can do good work in dissipating all of these errors and prejudices and stop all bickering."

Both Comptroller Prendergast and President Mitchel of the Board of Aldermen commented on the Mayor's letter. Mr. Prendergast said:

"Nearly every member of the Board of Estimate pledged himself to a municipally built and controlled subway system before election. Every man has a right to change his views, but his judgment in doing so and the sufficiency of his reasons for so doing are subjects for judgment by the people.

"We have practically $60,000,000 available, and it was planned all last spring by the Transit Committee of the Board of Estimate, whose members are the Mayor, Comptroller and President of the Board of Aldermen, that an outlay of $20,000,000 a year would enable the city to construct what is absolutely necessary in the way of a new system.

"To urge now that the $60,000,000 available and such additions as may be available in the next five years are not sufficient for a transit system suggests a pessimistic view of the city's financial ability not justified by facts.

"I am opposed to the city furnishing its present available funds for subways in any partnership with any interest which eliminates the possibility of an independent system. It is now important that the city decide whether it shall be independent of existing systems or whether it is going to surrender its independence."

Mr. Mitchel said:

"I am pledged to an independent municipally owned subway whose integrity shall be maintained, and I believe other officials are pledged likewise. I know that $57,000,000 was pledged by the Board of Estimate for such a system.

"I do not agree with the idea that $57,000,000 only is available, for I know that more millions will be realized from the increased borrowing capacity. I recollect that it was the sense of the Board of Estimate that more money would be available each year for transit development, and that, too, while providing for current needs. I recollect also that every member of the board, when a candidate for his present position, was convinced that money could be found for an independent system.

"It is time for the people to see the situation clearly. The pressing demand is for an independent, integral system, such as is fairly well outlined by the tri-borough plan. That plan is far from perfect and its details must be studied with care, but the underlying idea is right."

Samuel Rea, second vice-president of the Pennsylvania Railroad, said that the offer of the Hudson & Manhattan Railroad would not provide transit for the west side or for the Pennsylvania station. He insisted no person with intimate knowledge of the transit problem will believe a two-track line under Broadway from Herald Square to Tenth Street, with a moving platform to the Pennsylvania station, offers any more conveniences to the west side than do existing lines.

The terminal station of the Pennsylvania Railroad in Seventh Avenue, between Thirty-second and Thirty-third Streets, New York, was opened to pasengers between New York and points south, west, and southwest at 9:30 p. m. on Nov. 26, 1910, just 2 hours and 32 minutes before the first regular passenger train to pass through the Pennsylvania's Hudson River tunnels was scheduled to leave the new station. The first train to leave the new station was a local for Perth Amboy, N. J., and intermediate points. This train was dispatched two minutes after midnight. It was followed 20 minutes later by a through train for Philadelphia, Baltimore, Washington, Jacksonville, Atlanta, Birmingham, New Orleans and other cities in the Southeast and Southwest. At 1 a. m. the first express to start from Manhattan Island for Philadelphia left the station. The new schedule provides for the operation of 116 trains in and out of the station on weekdays and 89 on Sundays.

Association Meetings

Street Railway Association of the State of New York—Syracuse, N. Y., Dec. 6 and 7.

Central Electric Traffic Association—Indianapolis, Ind., Dec. 12, 13 and 14.

Massachusetts Street Railway Association—Boston, Mass., Dec. 14.

New England Street Railway Club—Boston, Mass., Dec. 22.

American Electric Railway Association—New York, N. Y., Jan. 27, 1911.

Statute Creating Ohio Railroad Commission Is Claimed to Be Unconstitutional.—In the case of the Baltimore & Ohio Railroad against the Railroad Commission of Ohio before Judge Kinkead, attorneys for the company recently argued that the law creating the commission is not constitutional because it confers legislative and judicial powers upon the members.

Election Result in Detroit Settled.—The final figures of the city canvassing board of Detroit, Mich., on a recount show that William B. Thompson, Democrat, was elected Mayor of Detroit over Proctor K. Owens. In the recount Mr. Owens made a total gain of 11 votes and Mr. Thompson lost 129, making Mr. Owens' net gain 140. The original count gave Mr. Thompson a plurality of 5287, but the recount reduces it to 5147.

American Association Papers.—The American Electric Railway Association has just republished in pamphlet form for distribution among the members the papers read at the convention of the association at Atlantic City, N. J., Oct. 10 to 14, 1910, by James F. Shaw, Frank R. Ford, Patrick Calhoun, Charles V. Weston, Joseph A. McGowan and G. E. Tripp. The pamphlet also contains the report of the committee on Interstate Commerce Commission affairs, presented at the same meeting. The pamphlet is entitled "Publicity, Problems and Progress."

Meeting of New England Street Railway Club.—On account of the regular date for the meeting of the New England Street Railway Club coming on Thanksgiving evening the executive committee changed the date of the meeting to Nov. 30, 1910, at the American House, Boston, Mass. The program for the evening included the presentation of papers entitled "Freight and Express Possibilities for Electric Railways," by C. V. Wood, vice-president of the Electric Express Company and traffic manager of the New England Investment & Security Company, Springfield, Mass.; George H. Dunford, general express and freight agent of the Old Colony Street Railway, Brockton, Mass., and C. T. Battey, manager of electric express of the Union Street Railway, New Bedford, Mass.

Grand Trunk Railway to Electrify Lines in Montreal.—It was announced at Montreal, Que., on Nov. 18, 1910, that the plans for elevating the tracks of the Grand Trunk Railway from the Bonaventure station of the company in Montreal to St. Henri, which are being prepared for submission to the Board of Railway Commissioners at a meeting to be held at Montreal shortly, embrace a scheme for handling all traffic within the city with electric locomotives. Steam engines will be detached from trains entering Montreal from the east at St. Lambert and from the west at St. Anne's. It is proposed to secure power from St. Timothy, where the plant of the Canadian Light & Power Company is situated. The Grand Trunk Railway will apply to the Dominion Parliament at the present session for authority to raise funds for electrification. The direct-current system will be used.

Pittsburgh Committee Studies New York and Philadelphia Subways.—The members of the sub-committee of the committee on subways of the Council of Pittsburgh have returned to Pittsburgh after inspecting the subways in New York and Philadelphia with a view to obtaining ideas of possible application to the rapid transit problem in Pittsburgh. A. G. McConnell, chairman of the committee, is quoted as follows in an interview with him which was published in the Pittsburgh *Dispatch:* "We have collected enough data to be of great h[illegible] project comes up before the C[illegible] here that I firmly believe Pit[illegible] transit within three years. F[illegible] mittee were so impressed with [illegible] and the manner in which crowds are handled that they have made up their minds to work zealously to relieve Pittsburgh of its transit congestion."

Decision Regarding Right of Interurban Railway to Parallel Steam Railroad.—In the ELECTRIC RAILWAY JOURNAL of Nov. 26, 1910, page 1077, reference was made to the decision of the Appellate Court of Indiana in the injunction suit brought by the Lake Shore & Michigan Southern Railroad against the Chicago, Lake Shore & South Bend Railway, in which is was alleged that the high-tension wires of the Chicago, Lake Shore & South Bend Railway interfered with the transmission of messages over the telegraph lines of the Lake Shore & Michigan Southern Railroad. This suit was originally brought in the Circuit Court of Elkhart County, which denied an injunction. The Appellate Court, which is a court of last resort, has sustained the trial court. In the previous reference to this case it was made to appear that the plaintiff had appealed from the finding of the Appellate Court, whereas the case was appealed to the Appellate Court from the Circuit Court.

Revision of National Electrical Code.—Norman Litchfield, secretary-treasurer of the American Electric Railway Engineering Association, has issued the following announcement of the meeting to revise the National Electrical Code: "The biennial meeting of the electrical committee of the Underwriters' National Electric Association will be held in March, 1911, in New York. The day and place of the meeting will be announced later. As usual the provisions of the National Electrical Code as they now exist will be the principal matter for consideration, and you are requested to forward to the undersigned, on or before Jan. 1, 1911, any desired changes in or additions to the code, so that they may be transmitted promptly to the Underwriters' National Electric Association. As heretofore, the meeting will be open to all interested, and such persons will not only be welcome, but are urged to be present and give the committee the advantage of their experience and advice."

Columbus Dynamiter Apprehended.—Alfred N. Strader, who is accused of perpetrating dynamite outrages during the strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, was arrested at Princeton, W. Va., on Nov. 17, 1910. Strader was arraigned in court on Nov. 21, 1910, and held in default of $8,000 bail to appear for hearing on Dec. 7, 1910. Immediately after Strader's arrest it was reported that half a dozen other men who feared that they would be connected with the dynamiting outrages had left Columbus. On Nov. 22, 1910, Charles Davis, a switchman on the Toledo & Ohio Central Railroad, was arrested on the charge of complicity in the

dynamiting. Witnesses for the defense in the trial of George W. Brady, alias Gerald O'Leary, charged with shooting and wounding two women and a girl during the strike, were examined on Nov. 22, 1910. Harrison Christ and Ernest Hameter were acquitted on Nov. 22, 1910, of the charge of stoning cars. These are the first acquittals secured in these cases.

New Governor of Pennsylvania on Railroad Commission.—In a newspaper interview which he gave recently John K. Tener, Governor-elect of Pennsylvania, supplemented in part as follows the statements made by him in his pre-election speech delivered at Norristown on Nov. 4, 1910, in which he referred to the question of enlarging the powers of the Railroad Commission of Pennsylvania: "I have not thought of any new regulation nor have I had time to think out any means of making the State Railroad Commission a more powerful, not to say arbitrary, tribunal. But this I do think and know—a commission that merely suggests that an error or an omission be remedied or supplied and has no power to enforce its recommendations is worse than no commission at all. I want to see the commission armed with the power to compel a railway to remedy defects, not merely to suggest that faults be eliminated. If a railway cannot keep up its lines in the manner they should be kept up it should get out of business. The public makes it possible for that railroad to operate, and the railroad should serve the public first and serve it well." The speech made by Mr. Tener at Norristown was referred to in the Electric Railway Journal of Nov. 19, 1910, page 1037.

San Francisco's Municipal Railroad Tax.—Judge Seawell has declared invalid the tax of $720,000 which was levied in 1906 by the Board of Supervisors of San Francisco to rebuild the Geary Street, Park & Ocean Railroad as a municipal line. Since this tax was levied a bond issue has been authorized for the reconstruction of the Geary Street Park & Ocean Railroad and bids for material have been received by the Board of Public Works. From the bids received those of the Pennsylvania Steel Company and the Lorain Steel Company have been taken under advisement. The offers were to supply approximately $130,000 worth of steel rails. The Pennsylvania Company offered to supply steel grooved girder rails per long ton at $34.25 and steel guard rails at $44.25. These prices were f. o. b. for railway shipments from the points of manufacture. For delivery to ship's side at New York, Philadelphia or Baltimore the offer was $38.40 for both types, and for delivery at San Francisco the prices were $50 and $60 respectively. The Lorain Company offered to deliver grooved girder rails on cars at its plant for $36.90 a long ton and the guard rails for $46.90; to deliver at ship's side for $38.40 and $48.40 respectively, and to deliver in San Francisco the prices were the same as those of the Pennsylvania Steel Company.

Cleveland Subway Suits to Be Pushed.—Attorney James E. Matthews, acting for David Evans, a taxpayer, is preparing to push the suit which has been brought in the Supreme Court to test the validity of the recent grants to the Cleveland Underground Rapid Transit Railroad for the construction of underground lines in Cleveland. Mr. Matthews stated that the same situation prevails in relation to the suit of George B. Harris against the city, in which the validity of the first subway ordinance was attacked. While the Evans suit involves only the claim that the City Council has a right to repeal the subway ordinances and that its action on Jan. 17, 1910, was according to law, the Harris suit is much broader. It questions the right of the old Council to pass the subway ordinances by simply dividing into two parts the old ordinance which the people had voted down at the polls. Mr. Harris says that if the combined contentions in the two suits are wrong a City Council can enforce its dictates by simply making minor changes in measures that have been repudiated at the polls. Mayor Baehr would not commit himself upon the amendments to the subway ordinances proposed by the Chamber of Commerce, and stated that he would prefer to await the result of the suits now pending. If the Supreme Court should hand down a decision adverse to the subway grants then the vote would be null and there would be no need of amendments. On the other hand, should the court uphold the grants, the suggestion will probably be acted upon by the city authorities.

Financial and Corporate

New York Stock and Money Market.

Nov. 29, 1910.

After a week of extreme stagnation in the Wall Street market selling was insistent on Nov. 28 and prices declined from three to six points on the active issues. To-day the market was irregular and less active than yesterday, and slight recoveries were recorded. For many days there has been a feeling of insecurity among traders, and while the decline is attributed to the pessimistic utterances of James J. Hill, it was not unexpected.

The market for bonds continues very slow, while the money market is easy and rates are cheap for demand loans. Quotations to-day were: Call, 2@2½ per cent; 90 days, 4@4½ per cent.

Other Markets

In the Philadelphia market the traction shares are merely marking time, waiting for a definite agreement upon refinancing plans. There are still fairly liberal sales of Rapid Transit and Union Traction, but there is no definite tone or direction to prices.

In Chicago there is still considerable movement in Railways certificates, especially Series 1 and 2. Prices have displayed much strength. Series 1 during the week has sold as high as 92½, and Series 2 has touched 26⅜.

Both Massachusetts Electric and Boston Elevated continue to be active in the Boston market. Almost every day sees trading in these issues, but the prices remain practically unchanged.

There has been little trading in traction securities in the Baltimore market during the week. Some United Railways bonds are still bought and sold at former prices.

Quotations of various traction securities as compared with last week follow:

	Nov. 22.	Nov. 29.
American Railways Company	43	a43
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a90	a90
Boston Elevated Railway	a129½	127½
Boston & Suburban Electric Companies	a16½	*16½
Boston & Suburban Electric Companies (preferred)	a72	a72
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a41	a40
Brooklyn Rapid Transit Company	78	76⅜
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83⅛	82⅝
Capital Traction Company, Washington	a128	a128
Chicago City Railway	*170	a180
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a82¼	a92
Chicago Railways, ptcptg., ctf. 2	a22¾	a25½
Chicago Railways, ptcptg., ctf. 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a6	a6½
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a74	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railway	a57	a54½
General Electric Company	156¼	a155⅞
Georgia Railway & Electric Company (common)	a118	*118
Georgia Railway & Electric Company (preferred)	a88	*88
Interborough-Metropolitan Company (common)	20⅞	19⅝
Interborough-Metropolitan Company (preferred)	56	53¾
Interborough-Metropolitan Company (4½s)	80⅜	80
Kansas City Railway & Light Company (common)	a21¼	a21¼
Kansas City Railway & Light Company (preferred)	a75	a75
Manhattan Railway	141½	140
Massachusetts Electric Company (common)	a20½	a19½
Massachusetts Electric Companies (preferred)	a88¾	86
Metropolitan West Side, Chicago (common)	a21	21
Metropolitan West Side, Chicago (preferred)	a68	*68
Metropolitan Street Railway, New York	*22	19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*65½	61½
Northwestern Elevated Railroad (common)	a22	a22
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	45½	a45
Philadelphia Company, Pittsburg (preferred)	42	a42
Philadelphia Rapid Transit Company	a18	a18½
Philadelphia Traction Company	*82	*82
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs.	a101	a101
Seattle Electric Company (common)	a107½	a107¼
Seattle Electric Company (preferred)	a103	*103
South Side Elevated Railroad (Chicago)	a65	*65
Third Avenue Railroad, New York	a12¾	10⅝
Toledo Railways & Light Company	*10	a8
Twin City Rapid Transit, Minneapolis (common)	108½	a109½
Union Traction Company, Philadelphia	a41¾	a43½
United Rys. & Electric Company, Baltimore	a15	a14½
United Rys. Inv. Co. (common)	*14¾	*14¾
United Rys. Inv. Co. (preferred)	57	*57
Washington Ry. & Electric Company (common)	a34	a33½
Washington Ry. & Electric Company (preferred)	a87½	a87½
West End Street Railway, Boston (common)	a90½	a90½
West End Street Railway, Boston (preferred)	*100¾	*100½
Westinghouse Elec. & Mfg. Co.	71⅜	69
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	*124
Westinghouse Elec. & Mfg. Company (1st pref.)	124	*124

a Asked. * Last sale.

Earnings of New York City Companies.

The New York Public Service Commission, First District, has issued a statement showing the earnings of the street railway companies under its jurisdiction. The accompanying table has been compiled from the statement of the commission. It gives the earnings of the principal companies for the year, and also the total results of all the street railway companies in the city. The totals shown in the tables include results of a number of companies which are not shown in detail in the statement published herewith.

EARNINGS OF STREET RAILWAY COMPANIES OPERATING IN NEW YORK CITY DURING YEAR ENDED JUNE 30, 1910, AS REPORTED BY PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT

	Hudson & Manhattan	Interborough Rapid Transit Co. — Elevated Division.	Interborough Rapid Transit Co. — Subway Division.	Interborough Rapid Transit Co. — Total.	Brooklyn Rapid Transit Co.	Metropolitan Street Railway (Receivers)	Third Avenue Railroad System (excluding Yonkers Railroad)	Coney Island & Brooklyn	New York & Queens	Total for all companies (including minor companies)
Passenger revenue	$2,141,999	$14,684,845	$13,435,535	$28,120,381	$20,455,130	$12,929,259	$6,924,738	$1,451,507	$1,013,888	$75,949,252
Freight, mail, etc., revenue	9	38,378	8,269	46,647	291,589	.....	10,382	1,283	6,050	411,700
Total transportation revenue	2,142,008	14,723,224	13,443,805	28,167,028	20,746,719	12,929,259	6,935,120	1,452,790	1,019,938	76,360,952
Advertising and other privileges	89,036	250,000	207,500	457,500	157,645	240,820	85,000	12,905	6,907	1,096,340
Sale of power	4,461	32,209	279,951	312,159	.....	.....	754,289	.....	3	1,075,236
Other street railway operating revenue	1,953	49,710	1,250	50,960	444,134	47,038	287,294	4,978	3,069	888,384
Total street railway operating revenue	2,237,459	15,055,142	13,932,506	28,987,648	21,348,498	13,217,117	8,061,704	1,470,672	1,029,918	79,420,911
Maintenance of way and structures:										
Actual expense	120,982	778,508	670,049	1,448,557	1,519,328	2,033,671	691,949	170,557	89,729	6,280,472
Depreciation reserve	81,653	71,117	a 5,605	65,513	a 72,256	.....	.....	.....	1,284	180,336
Maintenance of equipment:										
Actual expense	40,122	844,490	712,964	1,557,454	1,866,488	1,059,154	412,965	111,519	69,119	5,454,738
Depreciation reserve	52,239	37,076	79,257	116,333	123,419	72,000	.....	.....	1,670	404,470
Power:										
Operation of power plant (gross)	199,934	1,037,967	1,134,813	2,172,810	1,920	b 1,040,334	527,228	c 79,672	c 8,617	d 4,278,181
Power bought and exchanged	e 43,005	.....	.....	.....	2,704,243	a 243,910	661,566	29,787	239,012	3,756,557
Injuries and damages	26,806	170,024	147,003	317,027	855,533	f 1,314,388	312,072	107,910	99,294	3,163,907
Operation of cars	400,218	2,849,864	1,714,630	4,564,494	5,109,629	3,450,997	1,836,530	492,309	304,626	17,015,809
Traffic and other general expenses	92,146	467,645	303,309	770,954	709,733	529,674	467,081	110,078	62,343	2,911,676
Total operating expenses	971,095	6,256,693	4,756,450	11,013,143	12,818,637	9,256,309	4,909,792	1,011,831	875,694	43,451,148
Taxes	g 210,341	1,525,142	225,280	1,750,422	1,291,149	1,265,116	520,121	80,519	67,787	5,254,037
Operating income (profits)	1,056,023	7,273,307	8,950,776	16,224,083	7,239,312	2,755,691	2,631,791	378,322	86,437	30,715,727
Non-operating income	882,656	25,635	385,389	411,024	401,625	186,839	25,855	2,026	a 348	h 2,036,694
Gross income (or profits)	1,938,679	7,298,942	9,336,165	16,635,107	7,640,938	2,942,531	2,657,646	380,348	86,089	32,752,421
Interest	i 1,759,827	98	2,298,530	2,296,627	3,630,267	590,000	676,467	155,069	252,727	9,723,288
Rent for lease of road	.....	5,851,080	2,181,204	8,032,284	2,285,758	1,810,661	.....	100,000	.....	12,228,703
Other rent deductions	119,682	6,577	2,543	9,119	302,490	202,449	195,469	33,502	44	960,886
Other deductions	39,881	.....	212,930	212,930	.....	5,009	.....	.....	.....	296,353
Total deductions	1,919,390	5,857,754	4,695,206	10,552,960	6,218,515	2,608,119	871,936	288,571	252,771	23,209,229
Net corporate income (or profits)	19,290	1,441,188	4,640,959	6,082,147	1,422,423	334,412	1,785,710	91,777	a 166,682	9,543,192

a—Decrease, loss or negative.
b—Horse-power, $203,473; electric power plant, $836,861.
c—Electric power plant.
d—Including $3,836,149 for electric power plant, $1,920 for cable power plant and $440,112 for horse-car stables.
e—Credit on account of power supplied to terminal buildings.
f—Including $569,955 reserved for unsettled claims, etc.
g—On properties operated.
h—Includes income from outside operations as follows: Hudson & Manhattan Railroad's terminal building, $870,069; Richmond Light & Railroad Company's lighting department, $111,226.
i—On capital employed in operation.

Report of the Columbus, Delaware & Marion Railway.

A report of Eli M. West, receiver of the Columbus, Delaware & Marion Railway, Columbus, Ohio, covering the fiscal year ended Aug. 6, 1910, has been filed in the common pleas court of Franklin County, Ohio. A statement of A. F. Elkins, auditor, which accompanies the report, shows the following earnings and expenses for two years:

FISCAL YEAR ENDING AUG. 6

GROSS EARNINGS

Main Line (Interurban):	1910	1909
Cash fares	$97,481	$83,294
Tickets	93,087	87,085
Chartered cars	2,245	2,836
Mileage	6,403	6,656
Freight	22,446	20,627
Express	5,721	2,536
Milk	7,563	5,723
Package and baggage	742	791
United States mail	233	250
Light and power	6,556	4,399
Rent of land and buildings	314	104
Advertising	708	735
Rent of track and terminals	3,003	2,455
Newspapers	776	562
Other sources	1,309	1,297
	$248,587	$219,350
Delaware (Railway)	8,719	5,769
Marion (Railway and Light)	101,831	89,845
Total	$359,137	$314,964

COST OF OPERATION

Main Line (Interurban):	1910	1909
Maintenance of way and structures	$22,691	$10,556
Maintenance of equipment	13,191	10,237
Operation of power plant	32,996	35,146
Operation of cars	43,326	39,102
General expenses	32,362	30,648
	$144,566	$125,689
Delaware (Railway)	11,629	7,171
Marion (Railway and Light)	50,190	46,330
Total	$206,385	$179,190
Income from operation	$152,752	$135,774
Fixed charges	140,197	137,699
Other deductions	8,272	.....
Net income	$4,283	*$1,925

*Deficit.

The cost of additions to the property during the year was $26,953.

Mr. West says in his report in part:

"It may be needless for me to tell you that the track had been neglected. The average life of ties is about eight years, provided they are of good quality and what are termed first-class ties. Unfortunately, the ties in most of this track must have been of an inferior quality when the line was built. The track has been built about eight years, which would necessitate the removal of nearly all the ties to put it in first-class condition, but from what I can learn very few of the ties had ever been renewed prior to the receivership, consequently it was necessary to replace approximately 10,831 ties, at a cost of 70 cents per tie, including labor, to insure safety. The lack of ballast has shortened the life of ties on this road, and in many places they were laid in mud, no ballast to speak of having been supplied.

"The Green Camp branch had not been operated for some time prior to the appointment of the receiver, and the business would not warrant its operation in my judgment. I would recommend, if no legal complications would arise, that this branch be taken up. There are timbers in the bridge, trolley wire, poles and rails that could be used on the main line. The ties on this branch are of poor quality and of very litle use. The bridges along the main line are generally in poor condition and were really dangerous until needed repairs were made. They have been materially strengthened by renewal of timbers at a cost approximately of $3,000, and I feel sure they are safe for the winter. Eventually these bridges should be replaced by culverts and filled.

"The output of current has been increased during the past year, due to more cars. The loss of power could be greatly reduced by bonding the rails. The rail bonding is in a deplorable condition, and the track between Delaware and Marion has never had but one rail bonded.

"The shops at Stratford—while there is a good deal of machinery to make needed repairs—are not large enough,

and it is a source of expense at all times to make repairs and is costing considerably more to maintain our equipment, due to this condition.

"The passenger cars had been neglected and had reached a point where extensive repairs were necessary.

"The Delaware City cars were found unsafe to operate, and in many of them passengers could not ride on rainy days without the use of an umbrella. The public would not ride, and the fact that there were only four cars which filled the line made it impossible to maintain any schedule. These cars have all been overhauled and repainted and are now safe for operation, and patronage has increased.

"The Marion City cars were also in bad condition and, with the returns from junk picked up along the road, five cars were purchased of the Cleveland Railway for about $800 each, including a thorough going-over through the shops, painting, etc. The old city cars in Marion have been thoroughly gone over and painted in our shops and are now in good condition. I have also purchased another closed car to fill the lines in Marion with a 10-minute schedule. This has materially increased our earnings in Marion.

"A readjustment of our rates has had the effect of producing a better feeling along the road, which, in my judgment, is the best asset we have and which the road never before enjoyed.

"When this road was turned over to the receiver it was being operated with verbal orders and was the only interurban road in the State that did not use written orders. To change this system, in order that the cars might be operated with the least possible danger, necessitated the purchase of order blanks and the installation of telephone booths along the line, large enough to permit the trainmen to write their orders under cover. This was done at no little expense.

"The men were working without a standard rule book and there was a constant disregard of orders, due to ignorance and lack of definite rules to guide them. These were purchased and a copy furnished to each employee.

"The freight rates were raised and our reports will show increased earnings. This company had a contract with the Wells-Fargo Express Company and was handling the express at a substantial loss to this company. The contract was canceled, the mileage cut in half, and the express company now pays on a mileage basis.

"The earnings from this business are over $500 per month, as against $200 per month last year.

"Wages have of necessity been increased on the line in the various departments, from the track men to the heads of all departments.

"The road has been extremely fortunate in the small number of accidents since its receivership.

"By making some needed changes and alterations, our insurance was reduced about $900 a year, with an expenditure of about $200.

"Prior to the receivership a nominal sum of $50 per month had been paid by the Prospect Lighting Company for current furnished by this company. The contract called for 2 cents per kilowatt, but no meter had ever been installed to measure the current. After installing a meter, the revenue was increased to an average of $95.41 per month. I have instructed our attorney to bring suit to collect the amount due this company since the contract was made. Power had been furnished the Columbus, Marion & Bucyrus Railroad since its operation, as well as terminal facilities, and passengers were carried over the tracks of the Columbus, Delaware & Marion Railway in Marion by the Columbus, Marion & Bucyrus Railroad. Little had ever been paid this company for such service prior to the receivership. Since that time between $600 and $800 per month has been collected.

"The court is already familiar with the apparent low operating expense prior to the receivership. This operating expense was kept abnormally low by charging all sorts of expense items, such as coal, interest, etc., to betterments or additions to property. In spite of the fact that the property was being allowed to deteriorate and was, in fact, not safe for operation, the books for the year just prior to the receivership showed charges of about $57,000 which were listed as betterments. I am convinced that almost every dollar of this was properly chargeable to operating expenses, and that this property is now being operated at a smaller per cent than ever in its history."

Bloomsburg & Millville Street Railway, Bloomsburg, Pa.—The Commonwealth Trust Company, Harrisburg, Pa., has filed a bill in equity against the Bloomsburg & Millville Electric Railway to foreclose a mortgage for $250,000, given in 1905, on which the company has defaulted in the payment of interest.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The directors of The Indianapolis & Cincinnati Traction Company, incorporated as the successor to the Indianapolis & Cincinnati Traction Company, as noted in the Electric Railway Journal of Nov. 26, 1910, page 1079. have organized as follows: C. L. Henry, president and general manager; T. F. Rose, vice-president; J. F. Wild, secretary and treasurer. Judge Carter, of the Superior Court, has confirmed the sale of the property of the Indianapolis & Cincinnati Traction Company to J. J. Appel, representing the bondholders.

Interstate Railways, Philadelphia, Pa.—The stockholders of the Interstate Railways have ratified the plan to issue $1,000,000 of preferred stock at par, the proceeds to be used to liquidate the company's floating indebtedness and to pay overdue interest and the coupons due on the bonds in February. The stockholders of the American Railways have ratified an arrangement by which the 4 per cent bonds of the Interstate Railways held by the American Railways are to be returned to Edward J. Moore and Caleb F. Fox and others. The American Railways holds about $1,700,000 of the 4 per cent bonds of the Interstate Railways acquired in exchange for its own 4½ per cent debenture bonds on a basis of par for the latter to 50 per cent for the former, in accordance with a plan for taking over the properties of the Interstate Railways, which was abandoned. The American Railways is unwilling to accept the preferred stock plan as a bondholder. The proposed basis of exchange provides that the bonds of the Insterstate Railways shall have the February coupons attached and the bonds of the American Railways the July coupons or be accompanied by the cash equivalent. According to the Philadelphia *News Bureau*, it is intended, if the re-exchange is effected, to retire the debentures of the American Railways which were issued for this purpose only. Up to Nov. 22, 1910, about $740,000 of the proposed $1,000,000 of preferred stock issue of the Interstate Railways had been subscribed.

Ocean Shore Railway, San Francisco, Cal.—At the instance of the committee which represents the bondholders of the Ocean Shore Railway Judge Van Fleet, of the United States Circuit Court at San Francisco, has postponed the sale of the property of the company under foreclosure until Jan. 17, 1911. The committee representing the bondholders has requested the deposit of bonds of the company with the Union Trust Company, San Francisco, Cal., under the terms of a new plan which provides for the issuance by a successor corporation after foreclosure of the following securities: $3.500.000 of first mortgage bonds, $5,500,000 of second mortgage 5 per cent bonds, $500,000 of 5 per cent non-cumulative preferred stock and $8,500,000 of common stock.

Railways Company General, Philadelphia, Pa.—The directors of the Railways Company General have declared an extra cash dividend of 5 per cent on the $700,000 of stock of the company, payable on Dec. 2, 1910, to holders of record on Nov. 21, 1910. The company has paid five quarterly dividends of 1 per cent each. In September, 1909, an initial cash dividend of 10 per cent was distributed. It was recently voted to change the date of the annual meeting from the third Monday in September to the third Monday in February and also to change the date of the fiscal year from June 30 to Dec. 31.

Springfield (Mass.) Street Railway.—The Railroad Commission of Massachusetts has approved the consolidation of the Springfield & Eastern Street Railway and the Springfield Street Railway and has authorized the Springfield Street Railway to increase its stock not more than $900,000 and to exchange this stock share for share for the stock of the Springfield & Eastern Street Railway.

Wilmington, New Castle & Southern Railway, New Castle, Pa.—The sale of the property of the Wilmington, New Castle & Southern Railway under foreclosure, to which reference was made in the Electric Railway Journal of Nov. 12, 1910, page 1007, has been fixed for Dec. 23, 1910.

Traffic and Transportation

Reduction in Fare Ordered Between Albany & Rensselaer

The Public Service Commission of the Second District of New York has decided that the United Traction Company, Albany, N. Y., is entitled to charge only 5 cents fare between Albany and Rensselaer and has required the company to notify it not later than Dec. 10, 1910, whether or not it will desist from charging the present 6-cent fare and accept the order. The complaint was made in behalf of the Rensselaer Chamber of Commerce. The rulings of the commission, made in an opinion written by Commissioner Decker, are summarized as follows:

"1. The contract entered into April 29, 1895, between the Albany & Greenbush Bridge Company and the Albany Railway furnishes no basis for a determination that the railway company or its successor, the Cohoes Railway, was to act as agent of the bridge company in the collection of a bridge toll of one cent per passenger carried in the cars of the railway company.

"2. When the Albany Railway, subject to the laws of the State at the time and thereafter in force, undertook to become a common carrier of passengers by electric railway between Rensselaer and Albany such undertaking involved the carriage of passengers upon a bridge across the Hudson River, and as such common carrier between the two cities and over the bridge known as the Albany and Greenbush Bridge it has assumed the obligations and enjoys the privileges of a common carrier corporation.

"3. The fact that in 1897 Rensselaer granted a franchise to the Albany Railway conditioned upon a 6-cent fare between Rensselaer and Albany cannot be held to constitute a contract which forecloses the Legislature from exercising thereunder its dominant control of this and every other railway corporation of the State in respect of fare to be charged or service to be rendered.

"4. The regulation by the Legislature in 1864 of passenger fares for the Albany Railway was merely an exercise of the power of restraint by the State that is never exhausted and which has been further exercised by the Legislature in the Barnes act of 1905 as applied to this line and again in the way of general and systematic regulation in the public service commissions law of 1907 and its amendment in 1910.

"5. In this case complainant invokes chapter 358 of the laws of 1905, which became effective May 1, 1905, and is known as the Barnes act, under which the fare for the transportation of passengers by electric railway between Rensselaer and Albany is limited to 5 cents per passenger. The respondent, Cohoes Railway, is charging 6 cents per passenger, one cent of which under the contract of its predecessor, the Albany Railway, with the old Albany & Greenbush Bridge Company is paid to the bridge company as a license charge for a right-of-way across the bridge. This rental or license charge is one-fifth of the total 5-cent fare prescribed by the Barnes act and is plainly a large addition to what would be the ordinary cost of service and is actually in addition to the cost of construction, maintenance and operation of the track and electrical equipment upon the bridge.

"No question is raised in this case as to the reasonableness of the present 6-cent fare. The sole contention is that the respondent is limited to a fare of 5 cents under the Barnes act of 1905. Under sections 49 and 57 of the public service commissions law this commission is directed to secure enforcement of provisions of law applying to common carriers which it finds to have been violated. In rate cases the main function of the commission is to pass upon the reasonableness or justness of the challenged rate. In this case the commission is held by the complaint and character of the case solely to determine whether the 5-cent fare fixed by the Barnes act applies to respondent under all of the circumstances. The complainant is seeking to have an act of the Legislature enforced and respondent is here contending that the act in question is unconstitutional. Such a case, which is one peculiarly for action by the courts, may be raised before the commission only under and because of the provisions for the enforcement of laws applying to common carriers set forth in sections 49 and 57 of the public service commissions law above quoted. *Held*, that the Barnes act of 1905 applies to the transportation by the respondent of passengers between Rensselaer and Albany, and it is the duty of the commission to require respondent, the Cohoes Railway, to put in force a fare of 5 cents between Rensselaer and Albany in conformity with the provisions of said act and to comply generally with the requirements of that statute."

Operating Statistics of the New York City Railways.

The table published herewith showing the operating statistics of the principal street railway companies in the various boroughs of Greater New York for the year ended June 30, 1910, has been compiled from a statement issued by the New York Public Service Commission for the First District.

OPERATING STATISTICS OF NEW YORK CITY RAILWAYS FOR YEAR ENDED JUNE 30, 1910, AS REPORTED BY PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT

Company.	Miles of track	Passenger cars operated	Passenger car hours	Passenger car miles (active)	Car seat miles	Total revenue car miles	Number of transfers	Number of passenger fares
Hudson & Manhattan Railroad	12.879	140	319,184	5,482,809	241,243,599	5,542,601	.....	42,839,979
Interborough Rapid Transit Company	199.970	2,402	7,002,899	112,260,905	5,587,547,128	113,905,006	.....	562,788,395
Elevated division	118.030	1,573	4,237,634	62,504,996	3,000,239,808	63,646,232	.....	293,826,280
Subway division	81.940	829	2,765,265	49,755,909	2,587,307,320	50,258,774	.....	268,962,115
Brooklyn Rapid Transit System	582.640	2,911	8,780,971	77,939,345	3,729,559,287	79,584,829	151,279,806	415,277,754
Metropolitan Street Railway, receivers	159.480	1,453	(a)5,095,062	36,916,774	(b)1,344,513,893	37,737,542	120,762,597	260,555,516
Third Avenue Railroad System (excluding Yonkers Railroad)	242.743	793	3,181,789	24,147,886	1,084,662,313	24,361,227	36,392,652	138,494,167
Coney Island & Brooklyn Railroad	47.190	174	717,011	5,988,572	292,212,932	6,022,140	5,382,403	30,052,084
New York & Queens County Railway	74.010	121	541,824	4,868,179	210,070,544	5,054,635	8,265,276	20,277,770

(a) Estimated by Bureau of Statistics and Accounts on basis of seven and one-third car miles per car hour, electric, and 5975 horse car; (b) estimated by Bureau of Statistics and Accounts on basis of ratio of car-seat miles reported October to June to car miles.

Withdrawal of Residents' Tickets in Baltimore

The United Railways & Electric Company, Baltimore, Md., has withdrawn from sale the special residents' tickets sold on one of its suburban lines. An explanation of the reasons for this action has been published by the company in the newspapers of Baltimore. It is in part as follows:

"First—In a case recently before the commission certain residents of Ellicott City complained, among other things, that they did not have a special rate like that enjoyed by the residents of Catonsville. The commission decided that the regular Ellicott City rate was not unreasonable, but at the same time expressed the opinion that any special rate limited to residents of a particular place was a violation of the law. Neither before nor after this decision did the company seek or desire or welcome any change of the existing conditions. The commission, however, had the right to expect and did expect the company to stop violating the law without waiting for a specific order to that effect.

"Second—It has been thoughtlessly urged and repeated that the commission did not order the withdrawal of the special rates. Since, however, the law, as necessarily construed by the commission, forbids any special rate limited to residents, it is obvious that all residents' books had to be withdrawn from sale; and it is further obvious that the special rates enjoyed by residents could only be continued by making them applicable to all riders between the same termini.

"Third—In all cases the residents' rates were of long standing, and, while unprofitable to the company, they in-

volved a comparatively small number of riders. But to have made these reduced rates applicable to all riders would have been to increase an existing loss to the extent of crippling the service.

"Fourth—The company has received from some users of residents' books suggestions made in a friendly spirit and intended to meet the difficulty. Unlike the ease of a steam railroad or an interurban electrie line, a suburban railway is compelled by the obvious necessities of the case to employ the fare-zone system. It is natural enough that a person living just beyond a fare-zone line should object to paying an additional fare, but it is obvious that wherever the zone line is established there will be some one living a little beyond it. The length of a fare-zone must depend not so much upon distance as upon the riding population in the zone; in other words, the life of a suburban railway company depends upon its earnings per car mile and not per track mile. The fare in a sparsely settled zone, if reasonable service is to be supplied, would necessarily have to be more than the fare in a thickly settled zone of the same length.

"In conclusion, this company calls attention to the fact that it operates a large system with many ramifications, and that it is more or less impossible to satisfy all of its patrons in the matter of fare charges.

"In recent years large sums of money which would otherwise have gone to the security holders have been applied to increasing the frequency, efficiency and dependability of the service. The continuation of such a service is incompatible with any reduction of rates; and, while it may be conceded that the residents who have heretofore enjoyed reduced rates are entitled to consideration, it is also true that they constitute but a small portion of the entire riding public. It would seem reasonable, therefore, that the question involved should be discussed temperately and with a recognition of the fact that the public service law and not the company's choice has caused the disturbance of the pre-existing conditions."

Rules to Govern Operation in Montreal.

The Public Utilities Commission of Quebec has ruled as follows as a result of an investigation which it conducted recently of 20 street railway accidents in Montreal:

"1. No further cars of the single truck pattern are to be placed upon any of the routes without permission of the commission.

"2. The number of such cars must be reduced each year by 50, and if sufficient reasons are shown such cars will be permitted to operate.

"3. All cars 30 ft. or more in length and weighing 25,000 lb. must be equipped with air as well as hand brakes.

"4. Cars on severe grades must also be equipped with emergency brakes.

"5. As soon as the cars are so equipped and have the 'H-B' or other type of automatic mechanical drop wheel guard with apron attached to the truck, fender shall be removed.

"6. Draw guards must not project from the platform of cars.

"7. All projecting iron or steel bumpers must be removed.

"8 Speed limit of 8 m. p. h. must be adhered to.

"9. All accidents must be reported to the commission immediately with all necessary information.

"10. Cars must be thoroughly examined as to all parts of their equipment before going out, and no defective cars shall be taken out.

"11. If an accident occurs, motormen must report at nearest station.

"The above work and alterations must be carried out within four months as to double-truck cars, and within ten months on all other cars. The work is to be done to the satisfaction of the engineer of the eommission."

Changes in Routine and Discipline in Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company, through William Seibert, superintendent of surface lines of the company, has announced the following modifications in the routine covering the service of employees and in the handling of discipline, effective Dee. 1, 1910:

"1. The serviee is divided into the following periods:

"(a) Student period. From date of appointment to completion of instruction.

"(b) Probational period, which covers three months from date of appointment and ineludes student period.

"(c) Permanent period, which begins after completion of probational period.

"2. Reappointed employees.

"If previous service with the company in the position to which reappointed covers a period of three months, an employee will be passed at onee to the permanent period of service as soon as there is seen to be no further need of instruction.

"If previous service with the company in the position to which reappointed is less than three months, employee will be required to serve a full probational period of three months before entering upon the permanent period.

"3. During service in probational period employees will receive no credits, nor will demerits be given unless for flagrant violations necessitating discharge. Diseipline will be administered in the form of admonitions and a record kept of all violations reported, based upon which and upon the general qualifications the employee will be released from service or passed to his permanent period upon the recommendation of his assistant superintendent, approved by the superintendent of surfaee lines.

"4. If retained in service at the end of the probational period an employee will then receive the bonus, fixed at time of appointment, to cover time breaking in.

"5. An employee will be discharged upon aceumulation of 80 demerits net.

"6. On or before the accumulation of 40 demerits net an employee will be cautioned and shown his personal reeord."

Transfer Complaint Dismissed in Pittsburgh.—The Railroad Commission of Pennsylvania has dismissed the complaint of A. Mezovitz regarding the transfer system of the Pittsburgh Railways because those who signed the petition which Mr. Mezovitz presented were not residents of the territory ineluded in the complaint.

Seats for Motormen in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company proposes to equip its cars which are fitted with air brakes with seats for the motormen. The men will not be permitted to use the seats, however, within the territory bounded by the Delaware River and the west bank of the Schuylkill River, and between Girard Avenue and South Street.

Through Freight Between Louisville and Indianapolis.—Through freight service by electric railway between Louisville and Indianapolis has been arranged as a result of negotiations between the Louisville & Southern Indiana Traction Company, New Albany, Ind., and the Indianapolis, Columbus & Southern Traction Company, Columbus, Ohio. Heretofore freight has been carried out of Louisville by electric railway only as far as Seymour.

Heating Cars in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has notified the State Railroad Commission that the surface cars of the company will be heated this winter whenever the temperature reaches 40 deg. Fahr., except during the rush hours. Heretofore the cars have been heated when the thermometer registered 35 deg. Fahr. In a letter to the commission the company says that the power required to operate ears during the rush hours is so great that none can be spared for heating.

Depot Advertising Sign.—The Louisville & Northern Railway & Lighting Company, Louisville, Ky., has developed a profitable advertising medium in connection with its depot on Third Avenue, near Walnut Street, Louisville. A large sign has been erected in the depot and spaces on it have been divided and sold to the leading local advertisers. The company is furnishing statistics of the number of passengers who enter and leave the depot, so as to show the value of the spaees on the sign to advertisers.

Complaint Against Jersey Central Tracticn Company Dismissed.—The Board of Public Utility Commissioners of New Jersey has dismissed a complaint alleging failure of the Jersey Central Traction Company, Keyport, N. J., to run a car in connection with the boats of the New Jersey

Central Railroad which arrive at Atlantic Highlands at 5 p. m. and 6 p. m. The board finds that the complaint is not sustained and that the company provides such connections as may reasonably be required in view of the necessities of the service along the line as a whole.

Increase in Wages in Hamilton, Ont.—The Dominion Power & Transmission Company, Limited, Hamilton, Ont., has increased the wages of all the men employed on the lines of the Hamilton Street Railway and the Hamilton Radial Electric Railway 2 cents an hour, the increase to take effect on Dec. 4, 1910. The employees of the Hamilton Street Railway now receive 16, 18 and 20 cents an hour and the employees on the Hamilton Radial Electric Railway 17 cents and 18 cents an hour. The employees have extended the agreement under which they work from April, 1912, until April, 1914.

Freight Service Over the Northern Electric Railway.—In the ELECTRIC RAILWAY JOURNAL of Oct. 22, 1910, page 892, mention was made of the daily two-car freight service established by the Northern Electric Railway, Sacramento, Cal., from points in Butte County to Sacramento in conjunction with the Western Pacific Company and thence to San Francisco. In regard to this service S. W. Russell, general freight and passenger agent of the company, says: "We made no arrangements for any return loads from San Francisco and no special arrangements were made for the going loads. We have a vineyard located on our line and the grapes were disposed of in San Francisco. Consequently the arrangement with the Western Pacific Company. We have also hauled a very heavy tonnage of hay the same way."

New Terminal Facilities for Chicago, Lake Shore & South Bend Railway.—It it stated that the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has purchased nine acres of property adjoining the Illinois Central Railroad's depot at Pullman, Ill., where the Chicago, Lake Shore & South Bend Railway parallels the Illinois Central Railroad and where there is a joint platform for the exchange of passengers. The substantial growth of interurban traffic on the Chicago, Lake Shore & South Bend Railway necessitated the purchase and the station will become an important transfer point for street car patrons after the 111th Street extension of the Calumet & South Chicago Railway is completed. It is understood that the Chicago, Lake Shore & South Bend Railway will build a local station and lay out extensive storage and terminal tracks on the new property. The company has recently completed the work of double-tracking a considerable section of its line between Gary and Pullman.

Near-Side Stops in Baltimore.—As announced in the ELECTRIC RAILWAY JOURNAL of Nov. 26, 1910, page 1081, the United Railways & Electric Company, Baltimore, Md., began stopping its cars on the near side of the street on Nov. 25, 1910, in compliance with an ordinance passed by the City Council recently. The United Railways & Electric Company favors the ordinance, and W. A. House, president of the company, in commenting on the operation of the system is reported to have said: "What is now most needed is the permanency of some such system. It has been changed five times since 1891, when the first rapid transit cars were run in the city. It is but natural the patrons should at first become confused. The company did what it could to advance the passage of the ordinance which enforced the present method. It did this because it created a uniformity in the system. When the public once understands this we believe we can operate with fewer accidents and with little or no confusion."

Cincinnati Employees Impressed with Necessity of Being Courteous.—On Nov. 24, 1910, Robert E. Lee, superintendent of the Cincinnati (Ohio) Traction Company, conferred with about 1,000 motormen and conductors of the company and impressed upon them the necessity of being courteous to passengers on all occasions. Passengers frequently were inconsiderate, but the conductors should smile and look pleasant and restrain any desire to resent an insult. A pleasant, polite, accommodating and cheerful set of employees would win the good will of the public when other methods failed. The men were careful in these matters and must continue so to retain their reputation and that of the company. Mr. Lee cautioned the men about drinking while on duty. Any accident that might occur would be charged to drunkenness if the employees were seen to enter saloons while in uniform. After requesting the men to operate their cars still more carefully, he told them that they need not feel insecure in their positions, and that his office was always open to them for a conference.

Increase in Wages in Brooklyn Effective in January.—The Brooklyn (N. Y.) Rapid Transit Company on Nov. 23, 1910, announced an increase of practically 5 per cent in the wages of its trainmen, to date from Jan. 6, 1911, in recognition of the increasing efficiency of its employees as indicated by the merit system of the company, the intelligent attention given by the men to the many new questions relating to transfers, their general courtesy to the public and their care of the company's interest. The announcement was addressed to the trainmen of the Brooklyn Rapid Transit System by J. F. Calderwood, vice-president and general manager of the company, who directed the attention of the men who are ambitious for advancement to the importance of a record consistently free from demerit marks, as the company desires to make appointments from the ranks when filling vacancies in the transportation department. The bulletins addressed to the men which announce the change refer in detail to certain changes in the grading of the men under the merit system of discipline which is used by the company. The general plan of promotion for efficiency according to this system was published in the ELECTRIC RAILWAY JOURNAL of Jan. 15, 1910, page 126, in connection with the increase in wages announced by the company at that time.

Boston Elevated Railway Reprints Advertisements.—The Boston (Mass.) Elevated Railway has had printed in pamphlet form the advertisements which appeared in the Boston daily newspapers between Sept. 28, 1910, and Nov. 2, 1910, on "what the Boston Elevated has done for rapid transit." References to this series of advertisements appeared in the ELECTRIC RAILWAY JOURNAL on Oct. 15, 1910, page 856, and Nov. 19, 1910, page 1045. The preface that appears in this pamphlet follows: "The Boston Elevated Railway by a series of maps and explanatory notes published in the Boston daily newspapers between Sept. 28 and Nov. 2, 1910, gave to the public detailed information in relation to the additions to the street railway and rapid transit system that have been provided since it began operation in January, 1898. Much has been accomplished. The company means to give to this community the most adequate system and the most satisfactory service that can be provided. The co-operation of public authorities and the support of public opinion are essential in this undertaking. Believing that the maps and explanations contain a great deal of matter necessary to an intelligent understanding or study of the situation, the company has reprinted the same in this form, which is more suitable for preservation and more convenient for consultation than were the original advertisements in the newspapers."

Attempt to Limit Car Capacity in Kentueky.—The South Covington & Cincinnati Street Railway, Covington, Ky., has secured a restraining order in the Circuit Court of Kenton County, Ky., to prevent the City of Covington and its officials from enforcing an ordinance recently enacted for the regulation of the street railway traffic. The ordinance provides that the number of persons carried in a car shall be limited to one and one-third times the seating capacity of the car, except upon certain holidays; that railings shall be placed on both platforms so as to facilitate loading and unloading; that the cars shall be cleaned and fumigated once a week, and that the temperature shall never be permitted to go below 50 deg. Fahr. The chief of police is instructed to delegate a policeman to see that the ordinance is not violated. In its petition the company asserts that the city has no power under its charter to pass such an ordinance; that the ordinance is an unreasonable and unlawful regulation of the business of the company, and that the company cannot exclude from its cars passengers from Cincinnati bound for the other side of the river nor exclude those bound for Cincinnati who board the cars on the Kentucky side in order to comply with the regulation limiting the number of passengers to a car. The company also contends that it would be impossible to accommodate traffic during the rush hours under the terms of the ordinance. The hearing for a permanent injunction was set for Dec. 2.

Personal Mention

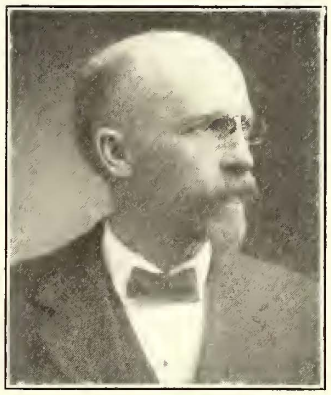
Mr. A. M. Bemis has been appointed general manager of the Oklahoma Railway, Oklahoma City, Okla., to succeed Mr. W. A. Haller, resigned.

Mr. Edward Goepper has been elected vice-president of the Cincinnati (Ohio) Street Railway, which is leased to the Cincinnati Traction Company, in order to afford Mr. John Kilgour, the president of the company, more leisure time, there having been no vice-president heretofore to act in Mr. Kilgour's absence.

Mr. A. J. Becht has been elected secretary and treasurer of the Cincinnati (Ohio) Street Railway to succeed James A. Collins, deceased. Mr. Becht has been secretary of the Cincinnati & Hamilton Traction Company for some years. This property is leased to the Ohio Traction Company and is operated as the Millcreek Valley Division of that company. Mr. Becht has also been assistant cashier of the Citizens' National Bank, Cincinnati, which position he will resign, effective on Jan. 1, 1911.

Mr. John Leisenring has been appointed signal engineer of the Illinois Traction System, Peoria, Ill. Mr. Leisenring's general experience in steam and electric railway signal work since he finished his college engineering course has included construction and maintenance signal work on the Lehigh Valley Railroad in New Jersey and the Hudson & Manhattan Railroad, operating the tunnel system between New Jersey and New York City. After serving through the construction period Mr. Leisenring was appointed signal engineer of the Hudson & Manhattan Railroad in July, 1910. He resigned from this position to become connected with the Illinois Traction System. The headquarters of the signal department of the Illinois Traction System will be at Peoria during the time that the recently purchased automatic block signals are under construction.

Mr. A. S. Kibbe has resigned as chief engineer of the American Railways, Philadelphia. His resignation took effect Nov. 30, 1910, and the office was abolished on that date. Mr. Kibbe has not yet fully decided on his future plans, but will probably engage in consulting engineering work, after a short rest. He has occupied the office which he has just resigned for the past 11 years. During this time Mr. Kibbe has had engineering charge of the construction and operation of the electric railway, lighting and power plants of the American Railways, which comprises about 350 miles of track and 15,000 kw capacity in power stations. For four years previous to his connection with the American Railways Mr. Kibbe was engineer of construction of William Wharton, Jr., & Company, and built the Fairmount Park Railway, Philadelphia. He was born in Albany, Aug. 8, 1865, and received the degree of civil engineer from the Rensselaer Polytechnic Institute in 1886. After two years' work in civil engineering, principally in connection with the Champlain Canal, he was appointed special assistant to the New York State Engineer in August, 1888, and was engaged in a number of important undertakings in connection with State surveying and water supply and regulation. In April, 1892, he resigned from the State Engineering Department to engage in electric railway work as engineer and superintendent of the Woodbridge & Turner Engineering Company, and was engaged in the construction of a number of electric railways, among them the Paterson Central Railroad of New Jersey, the Washington, Alexandria & Mt. Vernon Railway, the Chester (Pa.) Traction System and portions of the system of the People's Traction Company, Philadelphia. He severed his connection with the Woodbridge & Turner Engineering Company in September, 1895, to become engineer of construction of William Wharton, Jr., & Company, as previously mentioned. Mr. Kibbe is a member of the American Society of Civil Engineers.



A. S. Kibbe

Mr. Charles Remelius resigned Nov. 21, 1910, as superintendent of rolling equipment, Public Service Railway, Newark, N. J. Mr. Remelius has had a long experience in electric railway and mechanical work, having been connected with the Cleveland City Railway Company, the Detroit United Railway, the Indianapolis Traction & Terminal Company, the St. Louis Transit Company and the Brooklyn Rapid Transit Company. He became connected with the Brooklyn Rapid Transit Company in 1904 and was associated with that company as master mechanic of the surface division until he became connected with the Public Service Railway. Mr. Remelius is an inventor of note as well as an expert on railway mechanical matters, and has made a number of important inventions in brakes and other appliances for electric railway service. He has not announced his future plans.

Mr. W. A. Haller has resigned as general manager of the Oklahoma Railway, Oklahoma City, Okla., to enter the engineering field again. Mr. Haller was born in Pittsburgh in 1871. He was educated in the local schools in that city and entered railway work in 1897 with the West End Traction Company, Pittsburgh. In 1900 he became connected with Sanderson & Porter, New York, N. Y., and was employed by them in the reconstruction of the Galveston Railway, on general engineering work in their New York office and on the reconstruction of the property of the New Orleans Railway & Lighting Company from 1904 to 1908. Mr. Haller was next connected for nine months with the Mobile Light & Railroad Company, Mobile, Ala., and redesigned and reconstructed the power house of this company and supervised the laying of considerable track on steel ties. He became connected with the Oklahoma Railway in March, 1909, as general manager in charge of engineering, construction and operation.

OBITUARY

Robert W. Tayler, judge of the United States Circuit Court for Northern Ohio, mediator in the settlement of the street railway situation in Cleveland and author of the grant under which the Cleveland Railway is operating, died in Cleveland on Nov. 26, 1910. Judge Tayler was born at Youngstown, Ohio, in 1852, and was a son of Robert W. Tayler, State Senator and Auditor of Ohio and Comptroller of the United States Treasury from 1863 to 1878. He was graduated from Western Reserve University in 1872 at the age of 19 years. The following year he taught school at Lisbon, Ohio, and for the two succeeding years he was superintendent of the school at that place. He next became editor of the *Buckeye State* at Lisbon. In 1877 Judge Tayler was admitted to the bar, and engaged in the practice of law at East Liverpool, Ohio. In 1880 he was elected prosecuting attorney of Columbiana County, and in 1894 was sent to Congress from the Eighteenth District and was re-elected three times. Subsequently he became a member of the law firm of Arrel, McVey & Tayler, Youngstown, Ohio. This firm acted as counsel for the Mahoning Valley Traction Company, and Judge Tayler made a study of traction affairs while counsel of this company which served him well later on. In 1905 he was appointed to the Circuit Court for the district of Northern Ohio by President Roosevelt. Judge Tayler's greatest service to the people of Cleveland was in the settlement of the street railway controversy which had resulted from the attempt of Mr. Tom L. Johnson as Mayor of Cleveland to force the Cleveland Electric Railway to operate at a 3-cent fare. Judge Tayler decided a number of legal questions during the Goff-Johnson negotiations, and when the referendum vote was taken which resulted in the management of the railway property being taken out of the hands of the city administration Judge Tayler appointed the receivers for the company. In October, 1909, he agreed to preside at hearings to settle points in dispute between the company and the city. This work was completed on Dec. 14, 1909, and on Dec. 18, 1909, Judge Tayler announced his decisions and sent to the City Council the draft of a franchise. Judge Tayler was buried from Trinity Cathedral on Nov. 29, 1910. Out of respect for the man and the work which he did to bring about a settlement of the street railway controversy, every car of the Cleveland Railway was stopped for five minutes as the funeral cortege left the Cathedral.

Construction News

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

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

RECENT INCORPORATIONS

***Owens River Valley Electric Railway, San Francisco, Cal.**—Application for a charter has been made in California by this company to build an electric railway in the Owens River Valley. Capital stock, $200,000. Headquarters: San Francisco. Directors: Curtis Hillyer, E. A. O'Brien, G. Carter, R. C. Pardoe and T. W. Forsyth, all of San Francisco; M. R. Jones, Oakland, and D. D. Oliphant, Berkeley.

***Porter, Chesterton & South Shore Railway, Indianapolis, Ind.**—Application for a charter has been made in Indiana by this company to build an interurban electric railway between Porter and Chesterton to a junction with the main line of the Chicago, Lake Shore & South Bend Railway, near Baileytown. Capital stock, $40.000. Directors: C. N. Wilcoxon, F. J. Lewis Meyer, C. E. Palmer, F. M. Childs and J. M. Chillas, all of South Bend.

***Bowling Green & Northern Railroad, Frankfort, Ky.**—Application for a charter has been made in Kentucky by this company to build a railway from Bowling Green to Leitchfield. Capital stock, $30,000. Incorporators: B. F. Gardner, M. H. Crump and C. H. Felton.

Hagerstown & Clear Spring Railway, Hagerstown, Md.—Incorporated in Maryland to build a 25-mile electric railway to connect Hagerstown, Clear Spring, Md., and Mercersburg, Pa. Preliminary surveys have been made and rights-of-way are being secured. L. F. Downs, New York, N. Y., and James B. Kreps, Hagerstown, are interested. [E. R. J., Nov. 19, '10.]

Georgia & Carolina Railway, Spartanburg, S. C.—Chartered in South Carolina to build a 120-mile railway from Augusta, Ga., to Spartanburg, S. C., via Hamburg, Saluda, Edgefield, Newberry, Glenn Springs and Pacolet. Capital stock, $100,000, to be increased later to $2,500,000. Officers: Allen W. Jones, Midville, Ga., president; A. E. Padgett, Edgfield, secretary; William E. Jackson, Augusta, and J. W. Thurmond, Edgefield. [E. R. J., Sept. 24, '10.]

FRANCHISES

***Haywards, Cal.**—I. B. Parsons has applied to the town trustees for a franchise to build a 4-mile electric railway over certain streets in Haywards.

New Britain, Conn.—The Connecticut Company has received a franchise from the Council to build double tracks on certain streets in New Britain.

Paducah, Ky.—The Paducah Traction Company has applied to the Council for a franchise to build an extension to its line from Paducah to Tyler and Fisherville via Mechanicsburg.

Shreveport, La.—The Shreveport Traction Company has received a franchise to build an extension to its line through the Colonial Hill subdivision.

Clear Spring, Md.—L. N. Downs and H. L. Kirby, representing the Hagerstown & Clear Spring Railway, Hagerstown, have received a franchise from the Commissioners to build an electric railway through Cumberland Street in Clear Spring. This is part of a plan to build a 27-mile line to connect Hagerstown, Clear Spring, Md., and Mercersburg, Pa. [E. R. J., Nov. 19, '10.]

***Hattiesburg, Miss.**—W. S. F. Tatum and W. O. Tatum have applied to the Council for a franchise to build a street railway in Hattiesburg.

Lebanon, Ore.—The Albany Interurban Railway, Albany, has received a franchise from the City Council to build an electric railway through Lebanon. It will connect Albany, Sweet Home, Lebanon, Brownsville and Holley. P. A. Young is interested. [E. R. J., Nov. 19, '10.]

Butler, Pa.—The Butler Passenger Railway has applied to the Council for a franchise to construct a 750-ft. viaduct on Center Avenue, Butler, to span the Bessemer & Lake Erie Railroad and the Baltimore & Ohio Railroad tracks.

Somerset, Pa.—The Somerset & Rockwood Street Railway has received from the Council a two-year extension to its franchise, in which to begin construction of its proposed railway in Somerset County. J. A. Berkey, president. [E. R. J., Feb. 20, '09.]

Johnson City, Tenn.—The Johnson City Traction Company has asked the City Council for a franchise to build a 1½-mile extension of its tracks on Main Street to the Southwest addition and the Normal School in Johnson City.

Beaumont, Tex.—The Beaumont-Porth Arthur Interurban Electric Railway has received and accepted a franchise from the Council to build an electric railway from Beaumont to Port Arthur. Q. D. Polk is interested. [E. R. J., Nov. 19, '10.]

***San Antonio, Tex.**—J. A. Logwood has received a franchise from the County Commissioners to build an electric railway on the Corpus Christi road from Harlandale.

Tacoma, Wash.—The Tacoma Railway & Power Company has received a franchise from the Council to build an extension to its tracks on North Thirty-fourth Street, between Madison Street and Stevens Street, Tacoma.

TRACK AND ROADWAY

Nanaimo General Electric Railway, Nanaimo, B. C.—A by-law is being prepared authorizing this company to build an electric railway over certain streets in Nanaimo, B. C. [E. R. J., Aug. 27, '10.]

Los Angeles-Pacific Railway, Los Angeles, Cal.—This company has completed surveys for its 10-mile extension to connect Hollywood and Van Nuys via Cahuenga Pass and Lankershim. No contracts have been made yet, and it is not known when construction will begin.

Pacific Electric Railway, Los Angeles, Cal.—This company has begun work grading on its proposed extension from Pomona to Claremont.

Santa Rosa & Clear Lake Railroad, Santa Rosa, Cal.—This company has awarded contracts for grading for its proposed 56-mile electric railway to connect Santa Rosa and Clear Lake via Burke, Markwest, Kellog and Mount St. Helena. [E. R. J., Sept. 11, '10.]

***Roswell, Ga.**—R. G. Broadwall, J. B. Wing and associates are said to be promoting plans to build an electric railway to connect Creighton and Cummings via Roswell and Atlanta. [E. R. J., Mar. 26, '10.]

***Albany, Ill.**—S. B. Dimand, J. W. Dinnun, C. E. Peck and James Beach are promoting a plan to build an electric railway through Albany from the tri-cities.

Decatur Southern Traction Company, Decatur, Ill.—This company has raised $1,500,000 for construction purposes, and it is expected that work will soon be begun on its projected 35-mile railway to connect Decatur, Macon, Assumption and Pana. H. C. Simmons, Virden, secretary. [E. R. J., July 30, '10.]

Illinois Light & Traction Company, Streator, Ill.—This company is planning to build an extension of several miles from Ridgefarm to Sharon.

Beech Grove Traction Company, Indianapolis, Ind.—This company has awarded the contract to D. J. Welch and John McGregor for ballasting and track-laying on its line between Indianapolis and Beech Grove. Work is to begin at once. All grading has been completed and the poles are up. C. F. Smith, secretary. [E. R. J., Sept. 17, '10.]

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company is said to be considering the purchase of automatic track-circuit block signal protection.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company is said to be contemplating the purchase of automatic track-circuit block signal protection.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company, which purchased the Crooked Creek line, connecting Lehigh with Webster City, a distance of 17 miles, will electrify it at once. It will also construct a spur from Gypsum to Lehigh to connect it with the main line, thus giving new means of transportation between Webster City, Lehigh and Fort Dodge. J. L. Blake, manager.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company expects to build a 16-mile extension of its

line to Fort Riley. Joseph T. West, 217 Yuma Street, Manhattan, purchasing agent.

Salina Street & Interurban Railway, Salina, Kan.—This company is considering plans for building an extension of its line in Salina. H. C. Smithers, president.

Paducah (Ky.) Traction Company.—This company is planning extensions of its lines to Tyler, Mechanicsburg and Fisherville. It has applied to the cities for the necessary franchises.

Shreveport (La.) Traction Company.—This company has begun double-tracking the extension of its line on Southern Avenue in Shreveport. All material is on hand.

Mexico (Mex.) Tramways.—The National Congress has passed a bill authorizing this company to construct two important extensions. One of the proposed lines will connect Mexico City and Pueblo, a distance of 125 miles, and the other will extend from Mexico City to Toluca, a distance of about 45 miles. Preliminary surveys have been made. Construction will begin soon.

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.,—This company has awarded the contract to the Heintz-Young Construction Company, St. Louis. Mo., for building the railway from Mexico to Hereford, a distance of about 20 miles. It will connect Perry, Mexico City, Santa Fe, Hereford, Columbia, Fulton and Mokane. Mathias Crum, president.

Syracuse (N. Y.) Rapid Transit Railway.—This company is considering plans for double-tracking its line through Liverpool.

Berwick & Nescopeck Street Railway, Berwick, Pa.—This company has resumed work on the construction of its line through Nescopeck.

Clarion & East Brady Electric Railway, Clarion, Pa.—This company has awarded the contract to Ridge Brothers Company, Pittsburgh, Pa., for grading the first 6 miles of its proposed 30-mile railway to connect Clarion, Reidsburg, Sligo, Rimersburg and East Brady. Work will be begun at once. G. E. Arnold, Clarion, president. [E. R. J., Oct. 29, '10.]

West Penn Railways, Pittsburgh, Pa.—This company has awarded the contract to Reagan & Lynch, Uniontown, for building the extension of its line from Juniata to Bitner.

Quebec Railway, Light & Power Company, Quebec, Que.—This company has completed and placed in operation its extension to Bergerville. A further extension has just been completed to the convent at Sillery.

Johnson City (Tenn.) Traction Company.—This company has decided to build a 1½-mile extension of its line on Main Street to the southwest addition and the normal school in Johnson City.

***Bay Shore Rapid Transit Company, La Porte, Tex.**—This company has begun the preliminary surveys for an electric railway to connect La Porte and Houston, via San Jacinto. O. L. Allen and Charles M. Boren are interested.

***Texas City, Tex.**—Fordyce Ridley, Galveston, and associates are reported to be promoting a plan to build a 5-mile street railway in Texas City from Bay Shore to Texas City Heights.

Grafton (W. Va.) Traction Company.—This company will build a 6-mile extension of its line from Grafton to Pruntytown.

SHOPS AND BUILDINGS

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company will place contracts during the next two weeks for building a division car house with a capacity for 24 cars at Granite City. C. F. Hewitt, East St. Louis, superintendent.

St. Joseph Valley Traction Company, Elkhart, Ind.—This company has awarded the contract to S. J. Stowe for building a car house near the city depot on North Martha Street in Angola.

Chicago, Lake Shore & South Bend Railway, South Bend, Ind.—This company has purchased a 9-acre site adjoining the Illinois Central Railroad Company's depot property at Pullman, Ill., on which it will build a local station and lay out extensive storage and terminal tracks.

Atchison Railway, Light & Power Company, Atchison, Kan.—This company has begun work building a concrete machine shop at Falls City.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company is preparing plans for a passenger and express depot to be built in Syracuse. The cost will be about $10,000.

Western Ohio Railway, Lima, Ohio.—This company has begun the construction of a new freight depot at Lima. It will cost about $12,000. The Western Ohio Railway and the Ohio Electric Railway occupied a freight station jointly until the former erected a new station. The Western Ohio Railway retained its present passenger station.

Janesville Traction Company, Madison, Wis.—This company has begun preliminary arrangements for building its car house in Janesville. [E. R. J., Nov. 19, '10.]

POWER HOUSES AND SUBSTATIONS

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—This company will place contracts during the next three months for building a modern 2000-kw power plant. All communications are to be sent to T. C. Roberts, Pueblo, superintendent.

Capital Traction Company, Washington, D. C.—This company has awarded the contract to the Clarke-Winston Company, Georgetown, for the 1700 piles to be used in building the foundation of a power house to be built on Thirty-sixth Street and M Street in Georgetown. Work has been begun.

Augusta-Aiken Railway & Electric Company, Atlanta, Ga.—This company will supplement its present local power plant in Augusta by a steam plant, developing 3000 additional hp.

Southwest Missouri Electric Railroad, Webb City, Mo.—This company is building a substation in Joplin. The cost, including machinery, will represent an expenditure of about $20,000. A. H. Rogers, Webb City, general manager.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has completed plans for a new power plant to be built at what is known as the Gorge Bridge, on the Cuyahoga River, where a dam will be constructed. It is probable that the present plant at Arkon will be retained for some time after the new one is put in operation. Under present plans the construction work on the new building will be begun during 1911. The cost of the plant is estimated to be about $1,500,000.

Mount Vernon (Ohio) Electric Railway.—This company is building a new power house at Mount Vernon. A. J. Darrah, superintendent.

Port Arthur & Fort William Railway, Port Arthur, Ont.—This company will purchase a 500-kw motor-generator during the next six weeks.

Clarion & East Brady Electric Railway, Clarion, Pa.—This company is receiving bids for a new power plant complete with equipment. The plant will consist of the following: Three 500-kw turbo-generator sets, condensing steam pressure, 200-lb. either vertical or horizontal, three 350-hp vertical or horizontal water tube boilers; fuel is gas or soft coal; three surface condensers, vacuum pump, open feed water heater, two boiler feed pumps, either duplex or multistage, driven by steam turbine; three 20-kw exciter sets, six motor-generator sets, three circulating pumps, hot well pump, transformers and substation equipment. G. E. Arnold, Clarion, president.

West Penn Railways, Pittsburgh, Pa.—This company is making extensive improvements at its Connellsville power house, which will double the capacity of the plant. It is stated that eventually the company will erect a new power house near Speers.

Galveston-Houston Railway, Houston, Tex.—This company is having the General Electric Company build four switchboards complete with the entire equipment, including meters, instruments, electrolytic lighting arresters, disconnecting switches and oil switches. One board of 10 panels will go in the main station and one of six panels in substation No. 2, which is located in the main station. In substation No. 1 and No. 3, which are each 14 miles distant from the main station, there will be a switchboard of six panels. The power will be generated at 2300 volts, transmitted at 33,000 volts and used in railway work at 600 volts.

Manufactures & Supplies

ROLLING STOCK

Interstate Traction Company, Duluth, Minn., is considering the purchase of two cars.

Manhattan City & Interurban Railway, Manhattan, Kan., is planning to purchase several new cars.

Lexington (Ky.) Railway has purchased two sets of M. C. B.-27 double trucks from The J. G. Brill Company.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont., is considering the purchase of four pay-as-you-enter cars.

Southern Wisconsin Railway, Madison, Wis., has ordered four 20-ft. 8-in. semi-convertible cars from the American Car Company.

Great Falls (Mont.) Street Railway has purchased a standard snow sweeper from the McGuire-Cummings Manufacturing Company.

Western Ohio Railroad, Lake Shore Electric Railway and Fostoria & Fremont Railway jointly will purchase four passenger cars and a number of freight cars, according to advice from F. D. Carpenter, general manager, Western Ohio Railroad.

Twin City Rapid Transit Company, Minneapolis, Minn., expects to build about 75 single-end closed cars at its own shops during the next few weeks. They will be 46 ft. 8 in. long for interurban and city service and will be equipped with safety gates.

San Juan Light & Traction Company, San Juan, Porto Rico, has ordered 10 30-ft. center-aisle open cars mounted on No. 39E trucks from The J. G. Brill Company. The cars that are now used by this company will be remodeled into the pay-as-you-enter type.

Richmond & Henrico Railway, Richmond, Va., has ordered 16 closed cars from The J. G. Brill Company instead of 20 cars, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 12, 1910. The cars will be of the pay-as-you-enter type, 32 ft. long and will be mounted on Brill 39-E trucks.

British Columbia Electric Railway, Vancouver, B. C., expects to add to its equipment 122 new cars. Orders for 30 of these cars have been placed already with car building companies. A number will be built in the company's own shops. The new equipment will be divided approximately as follows: 50 city passenger cars, 30 interurban passenger cars, 3 combination passenger and baggage cars, 1 baggage car, 2 chair cars, 25 freight cars and 4 locomotives.

TRADE NOTES

Pittsburgh Steel Products Company, Pittsburgh, Pa., has appointed Richard R. Harris general manager of sales, in charge of all products.

Union Switch & Signal Company, Swissvale, Pa., has moved its western district office to 1041 Peoples' Gas Building, Chicago, Ill.

R. M. Campbell, formerly eastern sales manager of the Peter Smith Heater Company, Detroit, Mich., has resigned his position with that company.

Ackley Brake Company, New York, N. Y., has shipped a large number of Ackley brakes to the tramway systems of Lima, Peru, and Valparaiso and Santiago, Chile. Another order for 60 brakes has also been shipped to Japan.

Nachod Signal Company, Philadelphia, Pa., has received orders recently from the following railways for its automatic signals: American Railways, Philadelphia, Pa.; Los Angeles Pacific Company, Sherman, Cal.; Illinois Traction System, Peoria, Ill.; Lewistown & Reedsville Electric Railway Company, Lewistown, Pa.; Michigan United Railways Company, Jackson, Mich.; Lehigh Valley Transit Company, Allentown, Pa.; Chattanooga Railway & Light Company, Chattanooga, Tenn.; Wheeling Traction Company, Wheeling, W. Va.; East St. Louis & Suburban Railway, East St. Louis, Ill.

Pittsburgh Engineering Agency, Pittsburgh, Pa., has formed a business company to take over the foreign and territorial representation of the Associated Bureau Service, comprising the several bureaus of technical references, engineering research, industrial commissions and American trade catalogs. Offices were opened in the Bessemer Building, Pittsburgh, Pa., on Dec. 1, 1910. The first and last-named bureaus will be operated in the interest of the engineering profession and industrial corporations gratis, upon reciprocal reporting arrangements, the aim being to develop an effective central clearing house of technical intelligence and service.

Pay-As-You-Enter Car Corporation, New York, N. Y., has recently licensed a number of southern railways to build and operate pay-as-you-enter cars. The Georgia Railway & Electric Company is now building 20 double-truck pay-as-you-enter cars, and it is expected that nine of these cars will be in operation about Dec. 15. The Norfolk & Portsmouth Traction Company has placed an order for 10 double-truck cars; the Richmond & Henrico Railway has ordered 16 new cars and the Columbia Street Railway, Light & Power Company, Columbia, S. C., has just placed four pay-as-you-enter cars in operation and is remodeling all of its other cars to this type.

Baldwin Locomotive Works, Philadelphia, Pa., have appointed S. A. Bullock manager of the electric railway truck department, succeeding J. R. Dickey, resigned. Mr. Bullock has been connected with this department of the Baldwin Locomotive Works for a number of years. Previous to his connection with the Baldwin Locomotive Works he was master mechanic of the Louisville & Atlantic Railway and chief draftsman of the American Car & Foundry Company at Berwick, Pa. His new position is one of rapidly-growing importance owing to the advances which the Baldwin Locomotive Works are making in the construction and sale of trucks for electric railway service.

ADVERTISING LITERATURE

Ohmer Fare Register Company, Dayton, Ohio, has issued a small booklet entitled "Responsibility," calling attention to the merits of its indicating, recording and printing fare registers.

J. A. Fay & Egan Company, Cincinnati, Ohio, has issued a 384-page catalog illustrated with a large number of half-tone engravings. The catalog describes all the latest woodworking machinery manufactured by this company.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued circular No. 1137 on the principles of construction and operation of watt-hour meters. It describes the latest form of Westinghouse type C induction watt-hour meters, with micrometer light-load adjustment and permanent magnets so arranged as to be permanent, both in position and strength. The ball and jewel type of bearing and other features are described and illustrated, also a method of meter testing without the use of a stop watch.

The J. G. Brill Company, Philadelphia, Pa., prints in the Brill Magazine for November a biographical sketch of Calvin G. Goodrich, president of the Twin City Rapid Transit Company and the Duluth-Superior Traction Company. The sketch is accompanied with an excellent portrait of Mr. Goodrich as a supplement. Among the feature articles are the following: "Conditions Which Government the Type of Car for City Service—Sydney, Australia;" "Pay-As-You-Enter Cars for the Northern Texas Traction Company," "New Rolling Stock for the Boston & Maine Railroad," "Cars for the Trenton (N. J.) Street Railway" and "Passenger Coaches for Porto Rico."

General Electric Company, Schenectady, N. Y., has issued a new edition of its bulletin, No. 4602-B, on the subject of automatic voltage regulators for direct-current generators. The company has also issued bulletin No. 4782 entitled "Direct Current Exciter Panels," which illustrates and describes exciter panels for use in connection with alternating current generator panels when for any reason separate control of the exciter is desired. Another bulletin, No. 4786, issued by the company under the title of "Signals, Auxiliary Apparatus and Materials," describes a simple and reliable motor signal having a single mechanism suitable for either two-position or three-position operation in either the upper or the lower quadrant. This standard mechanism is also applicable to either top or bottom mast operation with but slight modifications. The bulletin contains nearly 90 pages of information, including exterior and interior views of the signal and a detailed description of the signal and apparatus used in connection with its operation.

TABLE OF MONTHLY EARNINGS.

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table sh be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various fina years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Oct '10	$208,342	$113,371	$94,971	$43,367	$51,604
	1 " " '09	184,815	100,800	84,015	44,114	39,901
	10 " " '10	2,045,748	1,123,229	922,519	433,528	488,991
	10 " " '09	1,818,987	988,530	830,457	437,456	393,000
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., Oct. '10	49,593	20,041	29,552	13,734	15,818
	1 " " '09	49,173	20,041	29,132	12,965	16,167
	4 " " '10	216,472	87,53	128,933	54,645	74,288
	4 " " '09	210,051	84,894	125,167	52,449	72,708
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Sept. '10	33,781	17,331	16,450	9,084	7,366
	1 " " '09	34,836	18,957	15,878	8,069	7,809
	12 " " '10	410,968	240,704	170,264	104,216	66,049
	12 " " '09	397,272	223,798	173,474	101,026	72,448
CHAMPAIGN, ILL. Illinois Tr. System	1m., Sept. '10	529,291	296,457	232,834	.....	.....
	1 " " '09	455,137	254,141	200,996	.....	.....
	9 " " '10	4,404,389	2,588,747	1,815,642	.....	.....
	9 " " '09	3,870,153	2,224,972	1,645,181	.....	.....
CHICAGO, ILL. Aur., Elgin & Chic. R. R.	1m., Oct. '10	154,359	85,783	68,576	33,799	34,797
	1 " " '09	137,663	73,772	63,891	29,413	34,477
	4 " " '10	677,075	344,049	333,027	132,441	200,586
	4 " " '09	618,116	302,583	315,533	117,077	198,457
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., Oct. '10	31,818	*16,397	15,421	8,083	7,338
	1 " " '09	29,467	*16,846	12,622	7,828	4,794
	10 " " '10	301,199	*155,443	145,756	80,690	65,065
	10 " " '09	271,673	*145,431	126,242	75,428	50,814
Lake Shore Electric Ry.	1m., Oct. '10	105,075	*55,941	49,135	34,669	14,465
	1 " " '09	94,255	*49,754	44,501	35,453	9,047
	10 " " '10	1,018,739	*529,101	489,638	347,678	141,961
	10 " " '09	929,316	*489,445	439,871	344,547	95,325
Cleveland, Southwestern & Columbus Ry.	1m., Oct. '10	93,188	51,256	41,932	27,926	14,006
	1 " " '09	81,524	51,392	30,132	26,358	3,774
	10 " " '10	849,659	480,563	369,096	280,341	88,755
	10 " " '09	748,517	458,613	289,904	248,141	41,763
DALLAS TEX. Dallas Electric Corporation.	1m., Sept. '10	119,804	75,538	44,266	26,013	18,253
	1 " " '09	107,570	74,512	33,058	25,109	7,949
	12 " " '10	1,426,433	935,236	491,197	320,133	171,064
	12 " " '09	1,277,466	803,271	474,195	338,863	135,332
DETROIT, MICH. Detroit United Ry.	1m., Oct. '10	821,954	523,058	298,846	178,429	120,417
	1 " " '09	724,792	471,500	253,292	155,972	97,320
	10 " " '10	7,963,091	5,008,484	2,954,607	1,689,549	1,265,058
	10 " " '09	6,796,430	4,174,033	2,622,397	1,565,480	1,056,917
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., Oct. '10	95,278	50,295	44,983	24,066	20,917
	1 " " '09	87,235	51,503	35,732	20,757	14,975
	10 " " '10	906,006	511,111	394,895	202,649	192,246
	10 " " '09	810,837	481,486	329,351	188,847	188,847
EL PASO, TEX. El Paso Elec. Co	1m., Sept. '10	54,846	31,384	23,463	8,215	15,247
	1 " " '09	50,501	29,874	20,627	8,185	12,442
	12 " " '10	634,416	365,320	269,096	101,287	167,809
	12 " " '09	574,578	366,077	208,501	94,377	114,123
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., Oct. '10	58,504	19,386	39,119	13,112	26,006
	1 " " '09	41,433	14,353	27,080	12,655	14,425
	10 " " '10	504,497	175,833	328,664	126,739	201,925
	10 " " '09	387,874	133,665	254,209	123,803	130,406
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	1m., Sept. '10	136,685	75,497	61,188	45,112	16,076
	1 " " '09	132,736	71,064	61,672	42,672	19,000
	9 " " '10	1,134,725	638,914	495,812	405,554	90,258
	9 " " '09	1,038,350	608,539	429,811	381,445	48,366
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Sept. '10	118,192	61,594	56,598	19,690	36,909
	1 " " '09	104,829	57,786	47,043	17,190	29,853
	12 " " '10	1,391,001	747,343	643,658	223,911	419,747
	12 " " '09	1,220,147	676,071	544,076	199,971	344,105
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Sept. '10	110,145	63,308	46,837	26,199	20,638
	1 " " '09	100,837	56,363	44,474	22,824	21,650
	12 " " '10	1,278,075	776,278	501,798	281,519	220,279
	12 " " '09	1,190,398	692,020	498,378	257,198	241,180
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Oct. '10	91,267	46,152	45,115	19,979	25,136
	1 " " '09	82,519	41,508	41,011	19,314	21,697
	10 " " '10	947,928	461,927	486,001	198,930	287,071
	10 " " '09	858,541	404,470	454,071	190,084	263,987
HARRISBURG, PA. Central Penn. Trac. Co.	1m., Oct. '10	68,365	50,379	17,986	.....	.....
	1 " " '09	62,773	44,555	18,218	.....	.....
	10 " " '10	691,474	493,321	198,153	.....	.....
	10 " " '09	627,520	463,195	164,325	.....	.....
HOUGHTON, MICH. Houghton County Trac. Co.	1m., Sept. '10	26,710	12,653	14,057	6,637	7,419
	1 " " '09	28,732	14,029	14,703	6,216	8,487
	12 " " '10	314,992	166,411	148,582	77,400	71,182
	12 " " '09	310,504	168,003	142,501	70,809	71,692
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Sept. '10	45,995	27,156	18,839	9,451	9,388
	1 " " '09	38,375	20,808	17,568	9,522	8,046
	12 " " '10	559,603	297,076	262,527	112,402	150,125
	12 " " '09	464,945	264,792	200,153	111,859	88,294
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Oct. '10	693,420	413,920	279,500	193,806	8
	1 " " '09	642,239	359,914	282,324	175,293	10
	5 " " '10	3,184,790	1,902,094	1,282,695	943,532	33
	5 " " '09	2,944,481	1,666,415	1,278,066	865,630	41
LEWISTON, ME. Lewiston, Augusta & Watervilie St. Ry.	1m., Oct. '10	43,090	25,928	17,162	13,780	
	1 " " '09	43,332	24,768	18,564	15,080	
	4 " " '10	217,712	116,769	100,943	54,965	4
	4 " " '09	220,686	110,113	110,573	59,310	5
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Oct. '10	411,907	282,919	128,988	47,325	8
	1 " " '09	382,395	252,877	129,518	48,783	8
	10 " " '10	3,916,035	2,740,937	1,175,098	468,973	70
	10 " " '09	3,536,497	2,319,920	1,216,578	471,754	74
Milwaukee Lt., Ht. & Trac. Co.	1m., Oct. '10	134,287	53,877	80,409	54,691	2
	1 " " '09	122,802	46,185	76,617	52,177	2
	10 " " '10	1,362,082	543,814	818,268	552,868	26
	10 " " '09	1,235,009	458,152	776,857	512,986	26
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Sept. '10	694,853	323,061	371,791	140,286	23
	1 " " '09	645,197	270,035	375,162	140,251	23
	9 " " '10	5,620,369	2,688,107	2,932,262	1,261,653	1,67
	9 " " '09	5,176,420	2,432,567	2,743,852	1,248,510	1,49
MONTREAL, QUE. Montreal St. Ry.	1m., Oct. '10	386,688	205,750	180,938	31 998	14
	1 " " '09	354,007	174,735	179,272	31 079	14
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Oct. '10	161,502	95,231	66,271	33,390	
	1 " " '09	148,992	89,193	59,799	33,023	
	10 " " '10	1,503,354	873,229	630,125	335,640	29
	10 " " '09	1,415,675	836,322	579,353	328,300	25
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Sept. '10	172,065	98,032	74,033	62,857	1
	1 " " '09	158,234	88,373	69,861	63,058	
	3 " " '10	557,798	305,585	252,213	194,298	
	3 " " '09	512,671	285,873	226,799	189,527	
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., Sept. '10	21,251	11,264	9,987	7,126	
	1 " " '09	19,096	10,895	8,201	6,613	
	12 " " '10	243,496	144,300	99,197	83,377	1
	12 " " '09	223,390	130,742	92,648	81,791	1
PENSACOLA, FLA. Pensacola Elec. Co.	1m., Sept. '10	23,265	13,960	9,305	5,207	
	1 " " '09	21,649	12,828	8,821	4,335	
	12 " " '10	262,078	154,288	107,789	58,820	4
	12 " " '09	239,858	137,181	102,677	51,865	5
PHILADELPHIA, PA. American Rys. Co.	1m., Sept. '10	339,378	.....	.....	.....	...
	1 " " '09	310,419	.....	.....	.....	...
	4 " " '10	1,436,171	.....	.....	.....	...
	4 " " '09	1,330,432	.....	.....	.....	...
PLYMOUTH, MASS. Brockton & Plymouth St. Ry.	1m., Sept. '10	11,975	7,529	4,447	1,359	
	1 " " '09	12,833	9,359	3,474	1,641	
	12 " " '10	121,012	85,186	35,826	20,756	1
	12 " " '09	129,964	90,935	39,029	22,771	1
PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m., Oct. '10	503,485	225,118	278,367	152,229	12
	1 " " '09	426,708	188,721	237,987	126,893	11
	10 " " '10	4,609,974	1,992,387	2,617,587	1,399,194	1,21
	10 " " '09	3,974,255	1,839,949	2,134,406	1,238,208	89
SAVANNAH, GA. Savannah Elec. Co.	1m., Sept. '10	51,599	32,606	18,993	18,158	
	1 " " '09	49,523	32,031	17,493	17,445	
	12 " " '10	620,179	404,526	215,653	214,652	
	12 " " '09	611,840	391,412	220,428	209,139	1
SEATTLE, WASH. Seattle Elec. Co.	1m., Sept. '10	481,158	274,705	206,453	110,933	9
	1 " " '09	568,494	305,341	263,153	106,944	15
	12 " " '10	5,633,484	3,336,054	2,297,429	1,293,999	1,00
	12 " " '09	5,592,481	3,238,318	2,354,162	1,220,796	1,13
SIDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., Sept. '10	28,835	13,113	15,722	6,148	
	1 " " '09	25,890	13,266	12,623	6,191	
	12 " " '10	317,733	170,922	146,811	73,972	73
	12 " " '09	279,498	168,163	111,335	74,020	35
TACOMA, WASH. Puget Sound Elec. Ry.	1m., Sept. '10	160,545	98,608	61,937	51,973	
	1 " " '09	179,956	107,605	72,351	48,552	27
	12 " " '10	1,903,484	1,258,100	645,384	606,082	39
	12 " " '09	1,822,449	1,208,142	614,307	553,272	60
TAMPA, FLA. Tampa Elec. Co.	1m., Sept. '10	44,969	23,909	21,059	6,018	10
	1 " " '09	47,108	27,253	19,855	4,615	12
	12 " " '10	619,255	342,639	276,616	60,077	21
	12 " " '09	582,847	352,488	230,360	55,940	17
TOLEDO, OHIO Toledo Rys. & Lt. Co.	1m., Oct. '10	239,620	129,720	109,901	75,616	3
	1 " " '09	259,097	162,861	96,237	78,452	17
	10 " " '10	2,223,255	1,263,769	959,486	727,818	2,16
	10 " " '09	2,440,147	1,516,426	923,721	769,162	15
TORONTO, ONT. Toronto, Ry.	1m., Oct. '10	379,721	188,568	191,153	.....	...
	1 " " '09	332,977	168,658	164,319	.....	...
	10 " " '10	3,575,659	1,841,335	1,734,324	.....	...
	10 " " '09	3,190,268	1,618,380	1,571,888	.....	...