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OUR SERIES OF CARTOONS

The ELECTRIC RAILWAY JOURNAL believes that the most important need of the electric railways today is a better understanding by the public of the problems of the electric railway industry. But, to secure this result on any property, there should first be an equally good understanding by the company of the problems of the public. Where this mutual understanding does not exist there must be education both ways. This is the reason for the series of cartoons and editorial talks on the need of publicity departments, which have appeared in this paper during the past twelve weeks. We have not attempted to express in these editorial talks any new discoveries on the subject of public relations and publicity. We have repeated simply the old facts about methods necessary in every industry which is dependent for its success upon a favorable popular opinion, but they have been applied to electric railway conditions and have been expressed in a somewhat different way than we have used before. The series is now completed, but the importance of the subject is such that we expect to devote during the coming year a great deal of attention to the best means of improving public relations. We expect to tell how it has been done on various properties, why that method was followed and what it has accomplished. We believe that only by a better knowledge on the part of the public of the problems of the utility can that increase in fares or reduction in burdens come which is necessary so that the properties will be maintained at their highest point of efficiency and thus be of maximum benefit to the public.

INVESTMENTS IN SOUTH AMERICA

It is by no means a new thing to have a funded debt repudiated on the pretext of invalidity, as a glance back at the 1870-1884 period in state financing in this country, for instance, will clearly show. Indicating as it does, however, an unusually low standard of business ethics, repudiation always comes as a shock even to those who are not financially interested. It is thus that we are affected by the events in Bahia, Brazil, which are reported at length in the financial columns this week. To sum up the story of what is characterized by the English investors as a "disgrace," it may be said that the municipality of Bahia, after allowing unfair competition, in 1914 voluntarily offered to purchase the Bahia Tramway, Light & Power Company and entered into a contract to such end, the consideration being about \$7,605,000 of municipal bonds. Since then, it is asserted, the city has deliberately defaulted most of the fixed charges and virtually repudiated part if

not all of the bond principal. There seems to be no doubt that the English investors were legally justified in relying upon the good faith of the city, while the whole course of the city, including its neglect of the purchased property, appears to indicate a deliberate disregard of its liability. The lesson for American investors in this case is not that all South American investments should be shunned. A liberal investment of United States capital in our Southern neighbor is probably necessary to a solution of many of our national trade problems. This does not mean, however, that the investor is relieved from the responsibility of investigating all propositions with increasing care as the security-issuing bodies decrease in size and cosmopolitan influence. Naturally the investor cannot do much investigating personally, but he can seek the aid of those banks, utility syndicates or financing, engineering and management organizations that have had experience in Latin-American countries and with their people. If he is guided by the undertakings that are handled through these well-equipped institutions, he will not find the investment risk greater in South America than at home.

LESSONS OF THE BOSTON DRAWBRIDGE ACCIDENT The drawbridge accident which occurred in Boston early last month will not have been in vain if it impels such attention to safeguarding similar danger spots elsewhere that future accidents will be prevented. As far as Boston is concerned the problem of protection will undoubtedly be solved promptly and effectively. The important thing now is to capitalize the interest in the subject by applying elsewhere the wealth of information and suggestion brought out. The ELECTRIC RAILWAY JOURNAL has done everything possible to render this promptly available. The latest contribution is an article by F. W. Johnson, published in this issue, in which he analyzes some of the recommendations made in connection with the Boston case and makes some suggestions of his own which merit careful consideration. He favors, among other things, the use of safety zones in which the trolley wire is "dead"; of warning signs placed at a considerable distance from drawbridges; of positive stops with distinct markers, preferably placed in the track, and possibly of red flare lights as impressive warnings of impending danger. He especially cautions against the use of protective devices which may give a false clear indication. In his study of the subject, Mr. Johnson has also made an analysis of operating rules relating to drawbridge protection and finds little uniformity in practice. This is not surprising considering the fact that conditions differ so widely. In fact, it is doubtful if absolute

uniformity in this regard is desirable. Uniform recognition of the principles involved in such protection is, however, quite essential. The most important of these seems to be that human intelligence must in the long run be the main dependence for safety. Hence the prime consideration in any drawbridge safeguarding scheme must be to impress upon the mind of the operator on each trip the fact of the existence of the drawbridge. This can be accomplished preferably by warning devices of one kind or another just before the car reaches the danger point, with possibly the addition of an auxiliary distant warning signal. The "home" warning can well be some form of physical barrier and, as a general principle, positive stops at points plainly indicated should be made.

WHAT'S TO BE DONE WITH THIS EQUIPMENT?

So many able papers on the lack of wisdom of trying to make modern schedules with ancient equipment have been presented before electric railway associations that we were rudely shocked lately to learn how many cars and equipments of a past generation were still in service on a certain group of railways comprising a total of 2800 miles of single track. For convenience the result of the survey that was made may be stated in terms of motors.

Of 17,809 motors, 5637, or 31.6 per cent, may be classified as obsolete—namely, motors of early grease-lubricated types, hard to get at for repairs, subject to frequent burnouts and operated under harder service conditions than those to which the motors were subjected when new.

Another group, 10,787, or 60.6 per cent, may be classified as "old." These motors belong to the earlier forms using oil-lubrication—and while still fairly serviceable are not equal to making the higher speeds necessary to a more economical schedule.

Finally, a mere 1385, or 7.8 per cent, consist of motors which are modern—namely, motors with commutating poles and with self-ventilation.

We do not believe that these roads, or others like them, have clung to this inefficient equipment for sentimental reasons. In all probability, when replacement was considered, too much stress has been placed upon the upkeep cost only of old equipment and too little upon excessive transportation cost.

It is easy to show theoretically that a modern motor can be made to pay for itself in four to five years through reductions in mileage maintenance cost alone. However, the figures will not always bear analysis because some large shop costs, like labor, will not be reduced as radically as theory may often indicate. A railway shop is not a factory where a definite rate of manufacture is maintained; rather it is a place with a good deal of slack in the line. A given number of shopmen may be kept very busy after a thunderstorm or a blizzard, yet have plenty of idle time thereafter.

The really big losses due to out-of-date equipment are not in the shop, but in the operating department. If we investigate some given motor defect report, for example, we are likely to find that the repairs which cost

\$10 in the shop actually deprived the railway of \$100 on the road. Every car-mile lost means extra platform time at the very least, and there are few roads where it does not also mean that passengers will walk instead of ride. The platform labor loss alone is a formidable charge, especially on those roads where a few minutes' delay past the quarter hour calls for a half-hour's pay and so on. Time-tables on these roads naturally are made up to avoid such penalties, yet a delay of two minutes may mean payment for fifteen minutes.

It is evident, then, that just as in the case of car bodies which lack modern door, step and signal apparatus, the transportation side of equipment is far more important than the shop side. If railways will make it their business to find out what their old apparatus really costs in the way of lost revenue mileage, low schedule speeds, extra platform expense and exasperating service delays, they will be far more likely to buy new cars and car equipment on the scientific basis of making fewer cars carry more people in more comfort and with more speed.

BEHIND THE SCENES

Although the idea of commission regulation of public utilities has spread to such an extent that commissions have now been organized in forty-six states, the theory of regulation is much better known to utility operators than its detailed practices. In other words, the interest of utility operators is usually confined to the words of the principal players in the lime light, the commissioners, and little if at all to the complicated activities and heterogeneous assistants behind the scenes. Moreover, to continue the figure, utility representatives as a rule feel little concerned with plays whose setting is not laid in their particular branch of the public utility industry.

Such an attitude as indicated above, however, makes for narrow-mindedness. To understand properly the place which regulation holds in present-day life, the utility operator must take a broad view of the matter as it pertains to every utility group. Furthermore, he must know in a general way what goes on behind the scenes in commission work, for only by so doing will he fully appreciate what the practice of regulation means. We are giving our readers this week such a glimpse of the inside workings of the Public Service Commission for the Second District of New York, and we hope that the opportunity offered will not be lost. There is particularly a lesson to be learned by the utility operators, if there are such, who are still filled with an unrelenting hatred of the whole idea of regulation or who persist in using obstructive or dilatory tactics simply for the pleasure of annoying the regulatory body. Regulation is the order of the day; it is conducted as far as possible upon the same principles of efficiency and business management that obtain in the case of the utilities themselves, and the utility officer who deliberately endeavors to interfere with regulatory practices deserves just as much censure as he himself would bestow upon anyone who tried similarly to hamper the operation of his utility.

If it will do utility operators good to learn more about how a commission works, however, it will do commissioners no less good to make more of a study of utility operation. There is every ground for the belief that the many subordinates who are essential for the adequate performance of the duties of each commission are too often filled with theoretical fancies regarding utility operation and too little acquainted with existing utility practices and the reasons therefor. The impossible operating suggestions often made by so-called commission experts prove conclusively their need of practical knowledge. It is obvious that if commission employees are properly to perform their duties they must have at least as much general knowledge of operating conditions as those whom they have to regulate. They have one advantage in that in their supervisory capacity they have an opportunity to observe the practice of many properties and can pick up valuable points, but in addition they should utilize every opportunity to keep abreast of the knowledge in every utility service with which their daily round of commission work requires them to be familiar.

In this connection we believe that commission employees would greatly profit if they would take a more active part in association activities, and that the various utility associations should encourage such affiliation in every way. Another source of knowledge of current thought and practice in utility operation is, of course, the technical papers in the various fields. Both of these agencies, the associations and the technical press, are in reality university extensions for the assembling of the best ideas regarding existing practices and the promulgation of new engineering ideas in utility operation, and their educational value should be utilized to the fullest possible extent in public service commission circles.

The whole problem of regulation is to harmonize public and private interests, to develop a system whereby the welfare of the public will be promoted and private enterprises will be stimulated and have every incentive to efficiency and economy. In the solution of this problem mutual understanding and bases of thought should be the goal of both the commissions and the utilities.

GIVE ELECTRICITY ITS DUE!

Physically, the proposed electric zone of the Illinois Central Railroad which is to serve its suburban and freight-transfer traffic within the city limits of Chicago, as outlined in the last issue of this paper, displays a remarkable similarity to the New York Central Railroad's west side improvement in New York City. In each case the railroad tracks block off for 5 or 6 miles the water front of valuable park property, and the effect of the smoke nuisance set up by the steam locomotives extends even beyond the park limits, influencing the value of exceedingly desirable real estate throughout the whole vicinity. In each case, also, the remedy that has been proposed is the covering of the tracks, with the consequent change from steam to electricity, and this appears to be the only means for relief, since a right-of-way through Grant Park in Chicago as well as through

Riverside Park in New York is the only practicable method of reaching sections of the respective cities that simply must have transportation facilities.

From the standpoint of the city both of these proposed plans are eminently satisfactory. Aside from a certain amount of give and take from both sides which is necessary to the final adjustment but which is really quite unimportant in the final result, the city gets without expense that which is equivalent to the removal of the tracks. Yet it retains the transportation facilities that are absolutely essential to at least part of its industries and population. On the part of the railway there is a relief from the ceaseless agitation over the nuisance, which in New York, at least, has even reached the point of threatening the retention of local traffic rights although these may be the very life-blood of both railway and community. Ethically, the railroad, having been on the ground before the advent of a dense population made parks essential and real estate valuable, might well consider that the community should stand at least part of the expense of abating the nuisance, but since the railroad, in both Chicago and New York, has undertaken to pay for the change, it would seem that every one ought to be well satisfied if the present plans go through.

In the proposals, however, we could wish to see more emphasis laid upon the matter of changing topographical features and less upon the question of electrification. No one can, in reason, deny that a railroad, by offering to pay the immense sum required to cover some 5 miles of track, takes a very liberal and thoroughly broadminded attitude. It is quite unnecessary to call attention, in addition to the millions thus offered, to several more millions that are to be expended in electrification of some 30 miles of main line in the suburban area. Admittedly, the former is a gift. The latter is by no means so.

Electric operation has, long since, demonstrated its ability to stand upon its own two feet. In some cases, no doubt, the direct economies are insufficient to pay a full return upon the investment involved, but with these come indirect returns that must be enough to turn the balance. Invariably it has been the history of heavy electric traction that installations have been extended, not diminished, nor even left stationary in electrified mileage.

At the Illinois Central's Chicago terminal, plans for a magnificent three-level passenger station were brought out some three months ago. No doubt it is needed; if not now, at least in the near future. Should a station of the same capacity be designed for a single level (as would be absolutely necessary under steam operation) it is safe to say that the increased first cost over that of a three-level design would more than overbalance the investment for any reasonable terminal electrification. Manifestly, if the direct and indirect returns from electrification can make it a self-supporting proposition, it is hardly logical to put forward an expenditure made on that score as an additional premium upon an offer that is already most liberal. Such a procedure is not likely to strengthen the argument for the change.



DEVOE P. HODSON



WILLIAM T. EMMET

SEYMOUR VAN SANTVOORD,
Chairman

FRANK IRVINE



JAMES O. CARR

Members of Public Service Commission for Second District of New York

Regulating \$5,313,000,000 of Utilities

This Description of the Machinery of Present-Day Regulation Is Based on the Intricate but Smoothly Running Organization of the Public Service Commission for the Second District of New York

THE Public Service Commissions for the First and Second Districts of New York were organized in July, 1907, and under the authority of the enabling act they took over the functions of the Commission of Gas and Electricity and the Board of Railroad Commissioners. The Legislature gave them jurisdiction over all other corporations serving the public in any manner, with the exception of water-transportation companies. This was the first application of the theory of controlling all principal utilities by means of one state regulatory body, although in putting this theory into actual practice in New York it was

deemed expedient on account of local conditions to divide the regulatory force into two separate commissions of equal rank. The State was divided into two sections, one commission having jurisdiction over each. The First District Commission in general has control over the utilities in New York City, while the Second District Commission has control over the public service corporations in the entire State operating outside New York City, with the exception that within that city it has jurisdiction over the telephone and telegraph companies and the steam railroads running from the city through the State.

MAGNITUDE OF THE WORK

The magnitude of the work accomplished by the Second District Commission can best be understood when it is known that it has regulative powers over 928 corporations, municipalities and unincorporated persons engaged, on Dec. 31, 1915, in serving the public in some capacity or incorporated or organized for the purpose of rendering such service. Included in this total are 147 steam railroad corporations, 103 electric railway companies, six express companies, one sleeping car company, fifty-seven baggage and transfer companies,

Although the regulation of public utilities by commissions has long since passed its experimental stage, there are many who do not understand the working of the regulatory machinery. Even utility operators, as a rule, are interested in only the phase of the commission's work that pertains to their particular service group, and consequently they do not appreciate the magnitude or cost of the work as a whole or realize the intricate system that is required for the regulation of all the utilities in the state. Simply for the purpose, therefore, of showing the extent to which the machinery of regulation has been developed up to the present day, the Electric Railway Journal in this article is going to take apart the Public Service Commission for the Second District of New York—a commission that has run with marked smoothness while handling very diversified work.

three stage coach corporations, one stock yard company, 325 electric lighting companies, thirty-five coal-gas or water-gas companies, forty-seven coal-gas or water-gas and electric companies, fifty-five natural gas companies, two electric and natural gas companies, one coal-gas and natural-gas company, one electric, coal-gas and natural-gas company, twenty-five acetylene gas companies, fifteen gasoline gas corporations, twelve steam corporations, 109 telephone companies, and five telegraph and cable corporations. These detailed figures include twenty-two duplications on account of corporations which make separate

reports in two or more classes of operation or for distinct properties. All the utilities mentioned had outstanding in 1915 an approximate total of \$5,313,000,000 of securities.

This field for regulation is greater than that of any similar state commission, both in the number of persons and corporations involved and in the diversity of interests affected. While the First District Commission in New York City has a larger organization, this is due to its superimposed function of subway construction relating little to regulation. The magnitude of the Second District Commission's task, therefore, as well as the fact that it was one of the two pioneers in the regulatory field, attaches particular interest to the study of the organization which has enabled it to dispose of its work smoothly.

The work of the commission is to determine the best method of regulating the activities of all the above-mentioned utilities; to adjust, by hearings or other means, all questions that arise between these utilities and the public, and to issue such orders to the utilities as are necessary. The matters brought to the attention of the commission cover every variety of circumstances possible in connection with the operation of

public utilities. The number of applications received from persons and corporations for various authorizations and permits, and the number of complaints presented against such persons and corporations since the organization of the commission, are shown in the following table:

Formal complaints.....	1908	1909	1910	1911	1912	1913	1914	1915
Correspondence complaints.....	252	532	345	330	312	315	312	333
Total number of complaints.....	1,147	1,088	1,452	1,713	2,227	2,158	1,726	1,352
Applications from corporations.....	207	225	262	278	314	369	325	292
Total number of complaints and applications.....	1,606	1,845	2,059	2,321	2,853	2,842	2,363	1,997
Total for eight years.....	17,886							
Orders of commission to show cause, etc., 1915.....	21							

That the commission is a busy one may be judged from the fact that in the calendar year 1915 it disposed of 2184 applications and complaints. For this work 578 hearings were required, of which number 256 were held in Albany, 150 in Buffalo, eighty-four in New York City and eighty-eight in various other places in the State. Of the 352 days actively devoted to such hearings, the time of the commission was divided as follows: Albany, 152 days; Buffalo, seventy-eight days; New York City, fifty-six days, and general, sixty-six days.

The commission always endeavors to adjust its cases in an informal way, and hundreds of cases have been quickly settled by informal means. In fact, cases are made formal and hearings are held only when substantial plans of adjustment have failed by informal means. Thus, much of the work of the commission is done in connection with matters that do not receive much publicity except at the hands of the persons interested. In 1915, for example, out of the 2184 matters disposed of by the commission, only 404 represented formal complaints, while the total of correspondence complaints informally settled was 1443.

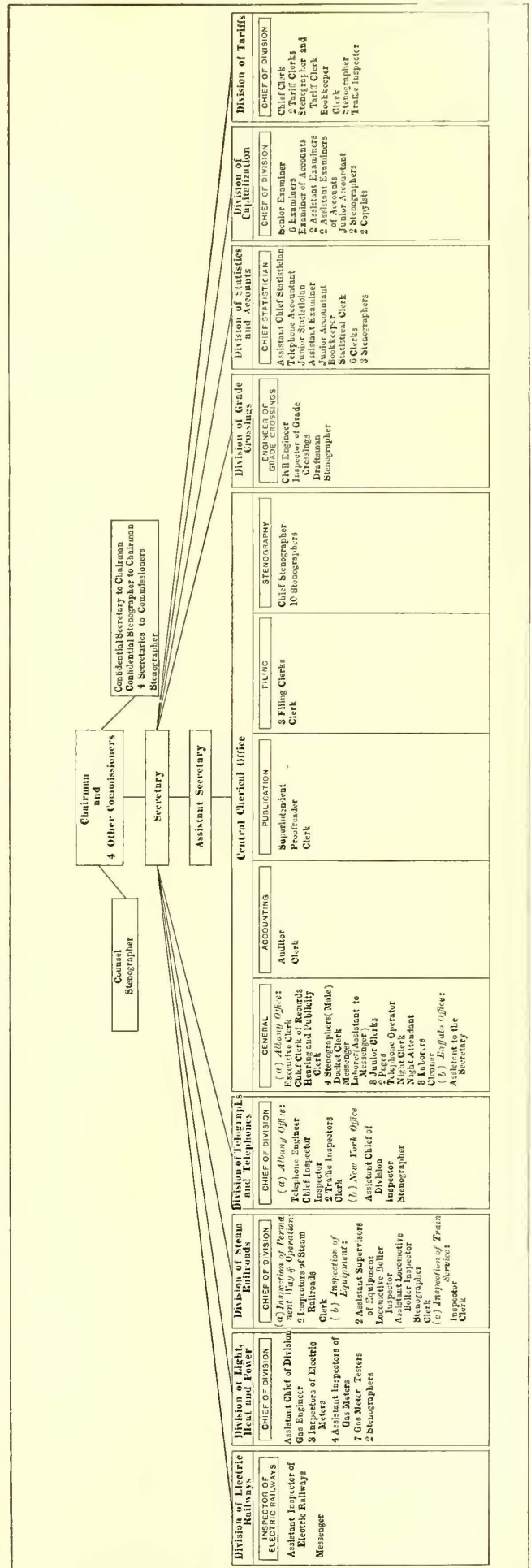
To give effect to the commission's desire that all matters possible be disposed of in the informal and more speedy way, its rules of practice are remarkably short and simple, being contained in a brochure of but a dozen pages. Moreover, the commissioners give as much personal attention as possible to matters of complaint and frequently make personal inspections, and all departments of the commission are required to give their sympathetic attention to written or personal applications for relief or information, with a view to inspiring in both patrons and proprietors of utilities confidence in the desire of the commission to attain equitable results through the least cumbersome methods.

GENERAL ORGANIZATION

The machinery that is used to carry on all this work consists of many parts. As a whole, the commission is organized in several operating units, which are as follows: (1) Commissioners—having jurisdiction over the entire organization; (2) legal staff and confidential staff to the commissioners; (3) administrative division; (4) division of electric railways; (5) division of light, heat and power; (6) division of steam railroads; (7) division of grade crossings; (8) division of telegraphs and telephones; (9) division of statistics and accounts; (10) division of capitalization; (11) division of tariffs, and (12) general clerical office.

Each of these will be described in turn, but this first section of the present article will cover only the three leading groups (1, 2 and 3) and the five following groups (4, 5, 6, 7 and 8) devoted to special classes of utilities and to grade crossings.

The accompanying chart gives the organization more in detail. The commission was fortunate in its first



COMMISSION REGULATION—ORGANIZATION CHART OF PUBLIC SERVICE COMMISSION FOR THE SECOND DISTRICT OF NEW YORK

organization, for this has remained practically intact up to the present time. Even the personnel has remained largely the same. The greater part of the employees come under the civil service system, although the heads of the various divisions in general and a few other employees are exempt. The work of the commission is well defined, and the scheme of organization in general shows a proper distribution of supervision and control. In the majority of the divisions work records are made by each employee to show the time, etc., devoted to each assignment. The routing and assigning of work to inspectors receives careful attention with a view to economy, and the several units co-operate in regard to assisting one another in field work when conditions permit.

COMMISSIONERS WITH LEGAL, CONFIDENTIAL AND ADMINISTRATIVE AIDS

The commission itself is composed of a chairman and four other members appointed by the governor for a term of five years at a salary of \$15,000 per annum each. The appointments are so regulated that one commissioner retires each year. The present members are shown in an illustration elsewhere. The commissioners have from time to time been changed with different political administrations at Albany, and no one of the original commissioners now remains. The commission has, however, escaped conspicuously political appointees, which fact has contributed materially to the unbroken maintenance of a concededly effective working force. For example, throughout the recent four years of Democratic administrations at Albany, the head of every division but one in the commission was, if anything in politics, a Republican. Though all the commissioners now serving are lawyers, this is purely incidental. Commissionerships have been ably filled by engineers and laymen.

The legal staff of the commission consists of a counsel (\$10,000), with one stenographer (\$1,080). The counsel renders opinions for the commission and for individual commissioners, brings and defends actions, prepares briefs in the appellate courts and gives advice on all legal matters connected with the commission.

The confidential staff is nominally composed of a confidential secretary to the chairman (\$2,500), a confidential stenographer to the chairman (\$1,500), four secretaries to the commissioners (\$1,500), and one stenographer. At the present time, however, the positions of confidential secretary and of secretary to one commissioner are vacant. One commissioner's secretary is assigned to the chairman at a salary of \$2,250, and the stenographer is an acting secretary to a commissioner at a salary of \$1,500. A further word of explanation need be added about only the secretary assigned to the chairman. This employee, in addition to his ordinary stenographic duties, conducts correspondence in connection with informal complaints regarding rates and regulations of common carriers and in connection with applications regarding rate adjustments filed by the carriers. He also prepares forms of various orders involving rates and regulations, etc.

The administrative division consists of a secretary (\$6,000) and an assistant secretary (\$4,500), the latter position being now vacant. The secretary is the administrative officer of the commission and has direct supervision over all divisions, which report through him to the commissioners.

DIVISION OF ELECTRIC RAILWAYS

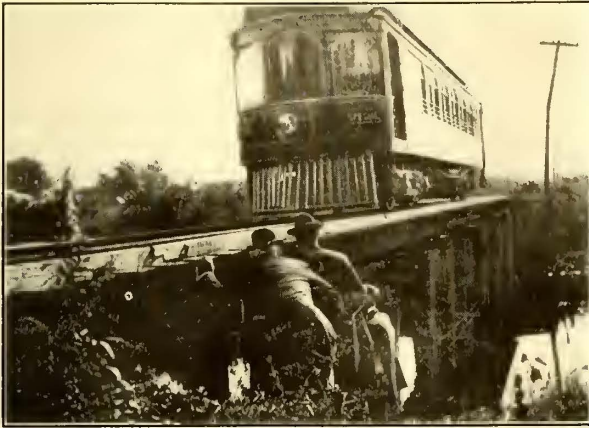
The division of electric railways inspects all such systems in the State with the exception of lines operating in New York City. The inspection covers the

physical condition of the roadbed, structures, poles, wires, power plants, etc., as well as service, accidents and other phases of electric railway transportation. The inspections are usually conducted after complaints have been filed with the commission. Intensive studies are made of traffic conditions, and reports are rendered to the commission and the railways in regard to such matters. There are three employees in this division, the electric railway inspector (\$4,500), the assistant electric railway inspector (\$1,800) and a messenger (\$900). The inspector, of course, is in full charge of all the work of the division. His assistant makes reports and recommendations only as directed.

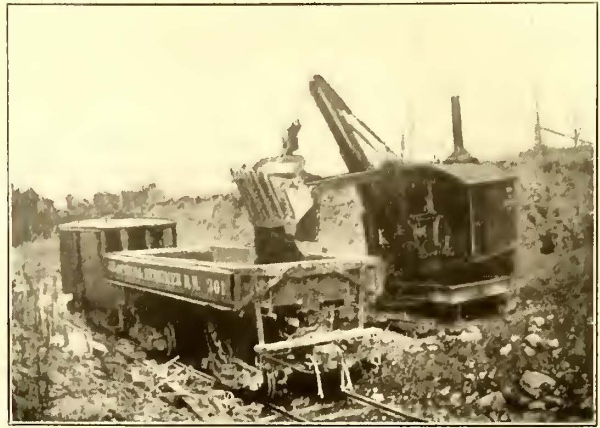
The work of this division is well shown by the report for 1915. In this year there were seventy-four operating electric railways in the territory under the jurisdiction of the commission. During the period a detailed examination was made of thirty of these companies, most of them in this group being small. In addition to the foregoing, however, twelve larger railways were partly inspected, the inspection in most cases being made by observation while the inspector was riding over the track when on these lines for other than inspection purposes. While such inspection was not complete in detail, it was sufficient in character to determine the condition of track, roadbed and structures. Where necessary, the reports on inspections contained recommendations for improvement. These were submitted to the companies interested, and in all cases compliance by them was assured. In general, it was found that the track, roadbed and structures on all of the lines except one were being properly maintained. In the case of this one, the commission caused temporary repairs to be immediately made pending permanent reconstruction and replacements. In the interval, it secured a reduction in speed of cars necessary for safe operation. The group of illustrations on the opposite page shows a few of the things that the electric railway inspector examined.

All complaints against electric railways which are classified as correspondence complaints are handled by this division. At the beginning of 1915 there were fifteen such complaints open on the records. During the year sixty-six were received, making a total of eighty-one complaints referred to this division. Of these, sixty-nine were investigated and in most cases satisfied and closed on the records, leaving twelve open at the end of the year. Of these, seven were received after Oct. 1, 1915. In addition to the correspondence complaints, the department assisted in the investigation of twelve formal complaints, one of which included a complete survey of traffic requirements and service furnished by one railway.

The division during the year investigated the collisions occurring on interurban railroads in the district and the number of persons killed and injured. The accompanying group contains a wreck photograph taken by the electric railway inspector. The division also determined the number of collisions between automobiles and electric cars. All of the latter accidents resulting in fatalities were investigated. Notwithstanding efforts to reduce accidents, there was a material increase in the number of automobile accidents occurring at grade crossings of highways and electric railways during the year. With the object of reducing the number of such occurrences, the commission caused a conference to be held between representatives of the automobile clubs and electric railway officials, at which the subject of safety of operation at grade crossings was fully discussed and a committee was appointed to consider the matter. This committee has now made definite recommendations [ELECTRIC RAILWAY JOURNAL of



Trestle on Electric Railway Line



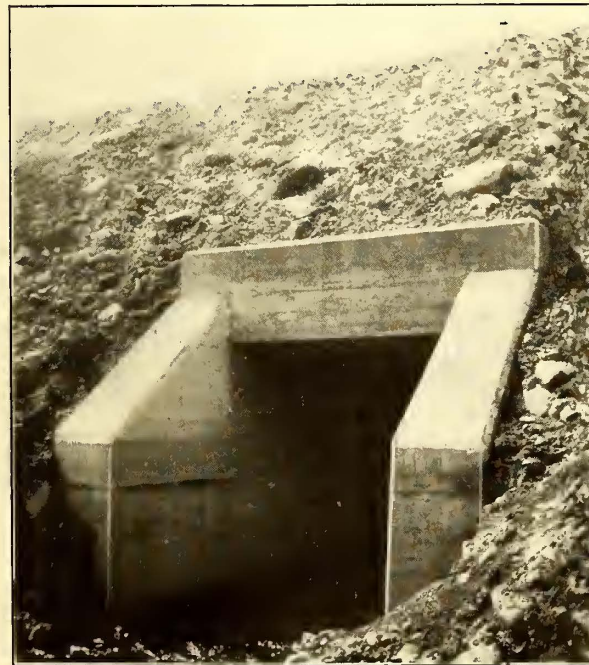
Steam Shovel and Work Car Operation



New Fill for Electric Railway Track



Electric Railway Bridge Structure



Standard Culvert Under Electric Railway Track



Collision Between Electric Railway Cars

Commission Regulation—Examples of What the Electric Railway Inspector Examines

Dec. 9, page 1221] for standard signals and improvements in surrounding highway conditions.

The jurisdiction of the commission over local transportation service, as supplied by electric railways, was extended by the Legislature of 1914 to cover the so-called jitneys, all operators of vehicles for a 15-cent fare or less in all cities of the State being required to obtain a certificate of public convenience and necessity from the commission as well as the consent of the municipal authorities. Upon the application of a jitney operator for such a certificate, the commission holds a hearing if there is any question of competition with an existing carrier or of opposition of any sort. This hearing almost invariably takes place in the city concerned. Should disputed points arise, the division of electric railways is called upon for a report. The local authorities are relied upon to see that no jitneys operate without proper authority, as this is a police function with which the commission deems itself not to be vested. Wherever unauthorized operation has been tried, it is said, prompt steps to check it have been taken by the local authorities, either in the courts or before the commission. As the commission can only appeal to the courts, however, the direct appeal by the local authorities has proved the speedier method.

DIVISION OF HEAT, LIGHT AND POWER

The function of the heat, light and power division consists of supervising and inspecting gas, electrical and steam-heating corporations and making tests of the equipment used and supplied by these companies, as well as investigating adjustments and complaints and making examinations and reports in connection with capitalization and rate cases. The division is not yet sufficiently equipped, it is said, to permit regular and thorough inspections of plant and equipment, but extensive work is done along the other lines.

The electrical work of the division covers the inspection of power plants and periodic tests of instruments and equipment used in measuring the output of electricity sold to the public. The law requires that all types of electric meters be tested and approved by this division, and it is the custom to take one or more meters of the type proposed for use and, after a thorough test, to approve or disapprove their use by the corporation. During 1915, 597 station testing standards owned and used by companies were tested, this total including 445 rotating standards, 145 indicating wattmeters, four voltmeters and three ammeters. On the complaints of consumers twenty-five electric meters were tested. A generous laboratory appropriation in the last year has enabled the division to commence the adequate equipment of its laboratory in new quarters.

Moreover, the law requires that all gas meters be tested by the commission before being placed in use. This means a test of every new meter installed by any gas corporation within the State. During 1915 gas meters numbering 121,121 were verified and sealed as correct within the allowable limit of error of 2 per cent, and 2482 were rejected. It is the work of the division also to test the quality of gas of all corporations. The tests are made without the knowledge of the supplying companies, but the results determined are furnished to them. In 1915 the division made 875 tests of gas. Up to the present, besides testing the gas for pressure, the inspectors have tested samples for candlepower, total sulphur and other ingredients. After Jan. 1, 1917, however, the photometric test will in most cases give way to a calorimetric test. As the result of a number of years of study and experiment, the commission has adopted a heating-power standard of 585 B.t.u. per cubic foot for manufactured gas. This move has been made

in view of the increasingly prohibitive cost of the enriching oils necessary to maintain gas at a candlepower standard, with the obvious passing of the flat-flame open burner for illumination in favor of the mantle burner, and the growing use of gas for cooking, heating and other domestic and industrial purposes where illuminating power is negligible and heating power essential. The gas laboratory is now being equipped with the extensive apparatus required for testing and calibrating under the new standard.

The general staff in the light, heat and power division consists of the following officials: Chief of division (\$5,000), assistant chief of division (\$3,000), gas engineer (\$3,000), three inspectors of electrical meters (\$1,200), four assistant inspectors of gas meters (three at \$1,200 and one at \$1,080), seven gas-meter testers (two at \$1,200 and five at \$1,080), and two stenographers (one at \$1,200 and one at \$1,080). The chief of the division is in charge of the general administration of the work. He also makes special investigations of accidents and for appeals in capitalization and rate cases. Complaints of all kinds, such as those arising in connection with overcharges and quality of service rendered by the gas and electrical corporations, are supervised by him, some investigations being made personally.

In general, however, the assistant chief of the bureau tends to correspondence and complaints relative to electric service, and the gas engineer to such matters relative to gas and steam-heating service. The assistant chief also directs the work of the inspectors of electric meters. These three inspectors are assigned to definite territory in the State, the work of testing the meters being done in the laboratory of the commission. These inspectors also make investigations in regard to accidents. The work of the division in conjunction with the division of capitalization and in rate cases is handled by the assistant chief in the case of electric corporations, and the gas engineer in the case of gas and steam-heating corporations, with such assistance as may be necessary from the inspectors. This work consists in checking inventories and making appraisals of all property in connection therewith.

Besides his work in capitalization and rate cases and in handling complaints, as before mentioned, the gas engineer directs the activities of the four assistant inspectors of gas meters, as well as the testers of gas meters, and apportions their work. The four inspectors make routine inspections of gas properties and tests of gas in various towns. The work requires about two hours in each town, and the inspectors visit from eight to ten places a week. Their laboratory testing of gas samples is performed at irregular intervals, probably averaging one day per week. The seven gas-meter testers test all meters and make special investigations on complaints. When a meter is tested a record is made, and if it is within the legal limits the commission seal is attached to the meter giving authority for its use. Each tester is assigned to definite territory and, under normal conditions, tests from sixty to seventy-five meters a day.

DIVISION OF STEAM RAILROADS

Prior to Oct. 1, 1915, the organization of the commission provided for a division of engineering inspection, including departments of transportation, inspection of equipment, train service, grade crossings and electric railways. On this date, however, the last two departments were placed in separate divisions under their respective names, and a consolidation of the transportation, inspection-of-equipment and train-service departments was effected to form a division of steam rail-

available for service on the railroads where a general inspection was made, 4027 were inspected.

Inspection of passenger cars has been incidental to other inspections, attention in this case being given mainly to sanitary conditions, safety appliances, air brakes and the location of emergency tubes. In the commission's opinion, the passenger equipment should be inspected as carefully as the motive power, but because of the lack of available employees only the smaller lines have been covered. In 1915 general inspection of passenger equipment was made on thirty-eight lines operating 269 passenger cars, about 64 per cent of the cars being examined.

The work of locomotive boiler inspection covers the physical inspection of boilers and the investigation of boiler accidents that have caused personal injuries, as well as the calculation of stresses, etc., on boilers and the checking of inspection statistics filed with the commission by the railroads in compliance with the law requiring that all locomotive boilers be inspected by competent men at least once every three months and a certificate filed covering each inspection. During 1915 there were reported to the commission specification cards, etc., of 9940 locomotive boilers. There were approximately 40,000 certificates of inspection filed, each of which was checked and compared with previous records. The inspectors examined 1872 boilers.

The equipment-inspection group contains the following employees: Two assistant supervisors of equipment (\$2,600), locomotive-boiler inspector (\$3,000), assistant locomotive-boiler inspector (\$1,800), stenographer (\$1,500) and clerk (\$1,200). One assistant supervisor of equipment directs the employees in the section, outlines work plans and handles correspondence. His field work consists of investigations of accidents where equipment is concerned, and such other investigations as arise upon complaints. The other assistant supervisor of equipment helps to investigate accidents caused by equipment defects, and he inspects locomotive and passenger-car equipment. The locomotive-boiler inspector and his assistant carry on all boiler examinations, the former handling all correspondence in regard thereto. The clerk keeps monthly tabulations of engine failures, compiles statements from reports, keeps a check on all inspectors as to the filing of reports, and is in charge of the files and records. The stenographer is in special charge of the files of boiler certificates and indices of all locomotive boilers.

3. *Train-Service Inspection:*

The part of the division devoted to train-service inspection checks train dispatchers' reports concerning the movement of all trains, prepares monthly reports for train-service bulletins showing the causes of delay, handles complaints relative to passenger service and station facilities, and makes special investigations as to causes of freight-train accidents and other subjects assigned by the commission. The dispatchers' reports of train movement are forwarded to the commission, but a commission representative must often go to the various offices and check the reports with the original sheets in order to discover late trains. One of the commission's monthly train-service bulletins is reproduced on page 1335. There are two employees in this section, an inspector (\$2,000) and a clerk (\$1,080).

DIVISION OF GRADE CROSSINGS

The work of the grade-crossing division consists of examining plans filed with the commission for the elimination of grade crossings, devising plans for such work, supervising construction and apportioning costs. All

applications for the elimination of grade crossings receive a hearing from the commission and are either approved or disapproved. In the case of approval, plans and specifications are made, a contract for the work is advertised and generally awarded to the lowest bidder, and the commission is kept informed as to the progress of the work. The total number of grade crossings abolished in the State through the action of the commission up to Dec. 31, 1915, was 371, of which number twenty-three applied to the calendar year of 1915. The total amount paid out by the State Treasurer up to Jan. 1, 1916, for the State's share of the cost of grade-crossing elimination was \$2,182,378, with an estimated cost of \$389,146 to the State for work authorized, either not yet completed or completed and not yet paid for.

While the commission has power to order the elimination of steam railroad grade crossings, its power over electric railway grade crossings has been confined to making operating rules therefor. In all probability, however, it is said, a recommendation will be made by the commission at the coming legislative session for a grant of additional authority over the grade crossings of highways and electric railways, as the result of conferences between railway officials, automobile club representatives and commission experts. These parties, as noted before in describing the electric railway division, have been at work the past year on standard signals for highways, electric railway cars and automobiles, and also on recommendations to give the commission power to alter the physical surroundings of electric railway grade crossings in the interest of clearer vision, perhaps apportioning the small cost in the same way as the cost of steam railroad grade-crossing eliminations is apportioned among the railroads, the State and the locality concerned.

The employees in the grade-crossing division include an engineer of grade crossings (\$4,500), a civil engineer (\$3,000), a grade-crossing inspector (\$2,000), a draftsman (\$1,400) and a stenographer (\$1,200). The engineer of grade crossings, who is the chief of the division, examines plans and specifications for the elimination of such crossings or prepares plans to be put before the commission. He checks and makes estimates on all contracts published, attends hearings and advises the commission on all grade-crossing cases, and examines all final bills and makes the distributions thereon. The civil engineer visits the localities where construction work is going on, consults and interviews railroad officials and others, criticises plans, prepares or supervises the work on estimates and assists in the final distribution of various charges. The office of this official is in New York City, and his attention is given mainly to work in that vicinity. The grade-crossing inspector inspects all work under construction, such as masonry, stone and concrete work, bridge erections, drainage, etc., and reports conditions to the chief of the division. The draftsman, besides his regular work, makes inspections in the field when necessary.

TELEGRAPH AND TELEPHONE DIVISION

The telegraph and telephone division is charged with the investigation of complaints regarding utilities under its jurisdiction, the general inspection of the physical property, the investigation of operation and management, and the valuation of companies in connection with rate and capitalization cases. All informal complaints concerning service are referred to the chief of the division for investigation and report. With few exceptions these complaints are settled satisfactorily by correspondence or through personal attention on the part of the chief or some member of his staff. More than 600 complaints and inquiries relative to service,

rates, discriminations and disputed accounts were received by the division during 1915.

The general inspection of the physical condition of the properties is made by male inspectors. The inspection work has tended toward encouraging the co-operation of telephone corporations and obtaining immediate action in the field without having recourse to formal reports and recommendations. General inspection of plant and equipment has been handicapped on account of the lack of funds and also the greater necessity of using the available men on inventory work in connection with capitalization and rate cases.

Service testing, however, forms an essential part of the inspection routine. The investigation of the operation and the management of telephone companies is performed by female traffic inspectors, who have had previous experience as traveling chief operators of telephone systems. Their work is to go into the different cities and make general observations and records as to the service rendered. These investigations include tests as to speed, accuracy, attention on the part of the operators and the time taken in each operation. The qualifications of these inspectors are such that they are capable of reporting on the inside equipment. The inspection of telegraph service is handled by male inspectors, who examine the inside and the line equipment, special attention being given to time consumed in sending and delivering messages.

The telegraph and telephone division has two offices, one in Albany and one in New York City. The employees in the Albany office consist of the chief of the division (\$4,000), the telephone engineer (\$2,800), the chief inspector of telephones and telegraphs (\$1,500), the inspector of telephones and telegraphs (\$1,200), two telephone traffic inspectors (\$1,200) and a clerk (\$1,200). The chief handles most of the correspondence regarding complaints, etc. He is also charged with the making of special investigations and spends some time traveling in reporting on formal and adjusting informal complaints. The telephone engineer is in charge of the detail work of the Albany branch, and directs the work of the inspectors. He compiles reports concerning their work and makes special investigations of both formal and informal complaints. The appraisal of most properties is done by him or directly under his supervision. The chief inspector makes general inspections of physical property and assists the telephone engineer in the inventory and appraisal of various properties. The work of the inspector in Albany is practically the same as that of his superior, and the work of the two female telephone traffic inspectors is as previously described. The clerk keeps a complete file of all complaints and correspondence, and at times assists in the checking of inventories.

In the New York office the employees are the assistant chief of the division (\$3,000), an inspector of telegraphs and telephones (\$1,800) and one stenographer (\$1,500). The assistant chief is responsible for the directing of the inspection work and the investigation of all complaints in New York City and its contiguous territory. He makes personal investigations of complaints that cannot be closed by letter or by the local inspector, and also makes studies of rates in his territory. While he reports to the chief of the division monthly on all matters pertaining to the New York office, he handles them entirely independently. The inspector in New York City does work similar to that of the two inspectors of telephones and telegraphs in Albany.

GENERAL DIVISIONS TO BE DESCRIBED LATER

Thus far attention has been turned to the three leading groups—the commissioners themselves, their legal

and confidential staff, and the administrative division—and also to the five groups charged with the supervision of electric railways, light, heat and power companies, steam railroads, grade crossings, and telegraph and telephone companies. In the organization of the commission, however, there are four more divisions, not devoted to any particular classes of utilities but doing work that in the main concerns them all. These—the divisions of statistics and accounts, capitalization and tariffs, and the central clerical office—will be described in detail in a later issue.

Boston Elevated Policies

President Brush Describes Them to Massachusetts Street Railway Association

PRESIDENT Matthew C. Brush of the Boston Elevated Railway was the guest of honor at the regular monthly meeting of the Massachusetts Street Railway Association at Young's Hotel, Boston, Dec. 20. F. A. Belden, president of the association, occupied the chair and introduced as the first speaker President P. F. Sullivan of the Bay State Street Railway. Mr. Sullivan pointed out that the occasion was the thirty-fourth anniversary of the association, and in extending the right hand of fellowship to Mr. Brush wished him the fullest success in the administration of the Boston company. In characteristic vein Mr. Sullivan contrasted conditions in the electric railway industry to-day with those prevailing under horse traction thirty years ago. "Then," said the speaker, "problems were simple, investment low and profits high. In Massachusetts the ratio of investment to income has risen from 2.5 to 1 in 1883 to 5.5 to 1 in 1913. Depreciation took care of itself in those days." Mr. Sullivan also emphasized the great difficulties in the way of providing for depreciation under the rates allowed on the Massachusetts lines of the Bay State company. Before closing he welcomed C. D. Emmons, recently made general manager of the Boston & Worcester Street Railway, to fellowship in the association.

C. V. Wood, president of the New England Street Railway Club, brought the greetings of its 900 members to Mr. Brush, after which H. H. Crapo, New Bedford, Mass., presented the guest of honor with a "Christopher," or talismanic medal of Middle Ages fame, on behalf of the association.

In response, Mr. Brush paid a high tribute to the loyalty of his friends and subordinates, and said in part: "My office door is wide open and they come and go as they please, making the business of the company their own personal concern. My job is to help them make a success of theirs, to encourage the delivery of that extra 10 per cent of effort which cannot be obtained without the kind of loyalty that you can see in a man's eye. Our problem is to encourage this loyalty in each of the 10,500 employees of the company, carrying enthusiastic devotion to duty all down the line." The speaker cited a recent instance in which a crane car operator off duty took the initiative and shortened the duration of a surface car blockade by getting permission to run out a crane car to remove a heavy girder which was interrupting traffic in the evening rush hours. Referring to co-operation in the administration of the company's affairs, Mr. Brush described the bi-weekly "council meetings" at which department and bureau heads discuss pending matters, eliminating as much correspondence as possible. Letters to the president over one page in length are tabooed. Mr. Brush then outlined the company's financial situation as presented to the special Legislative commission in recent hearings and urged his hearers to read thor-

oughly all the available printed matter on this and the Bay State case before the Massachusetts Public Service Commission.

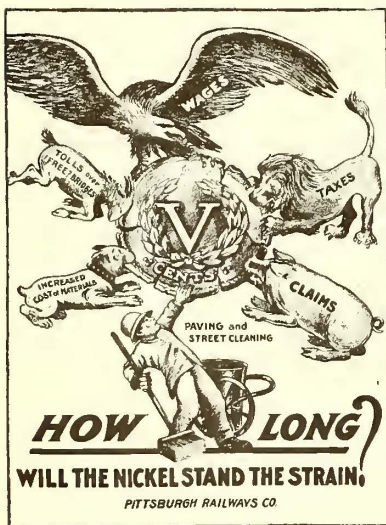
TIME TO STOP EATING HUMBLE PIE

"We are all engaged," said Mr. Brush, "in an honorable business, and it is time to stop meekly taking unjustified abuse from the public. It is easier to sit back in a hearing and keep out of trouble than to come forward, get up on our hind legs and refute with all our might attacks which are without foundation. We are in a first-class reputable business, and it is time to get over acting as though we were ashamed of it in any way. In reality, there is no business about which the public and its representatives know so much as that of the electric railway. The Massachusetts Public Service Commission goes into the affairs of the companies under its jurisdiction more thoroughly than any other commission regulating traction systems; its auditor has full authority to examine every expense voucher we possess." Speaking of the company's statement of its case before the commission, sent to all stockholders and employees, Mr. Brush said that careful inquiries indicated that 90 per cent of the employees read the statement, and thus a large body of opinion favorable to the company's case was created.

Recent Pittsburgh Publicity

Posters and Folder for Public Education and Use—
Historic Parade with Mule Car in Front

THE Pittsburgh Railways has recently been doing some public relations advertising that shows considerable thought and originality. One kind is a series of car-window posters on the theme of "How long will the nickel stand the strain?" The first poster issued several weeks ago shows various factors which are



CAN THE NICKEL STAND
THE STRAIN?

"This is the . . . car of the 150 motor cars ordered in 1915, long delayed on account of slow delivery of electrical apparatus.

"Constructive criticism is invited for assistance in the design of the next lot of cars."

This is the company's direct way of explaining the shortage of cars. Naturally Pittsburghers know about the difficulty of now getting quickly anything that is manufactured from metal, but they are not likely to connect it immediately with local railway troubles unless the matter is brought sharply to their attention.

The text of this poster is the same in all the new cars except that the number of the car in order of delivery is stenciled in. The last paragraph of the poster calling for suggestions in the design of new cars has produced quite a response. Probably a number of suggestions may be found applicable, as they come from all classes of workers in wood, steel, glass, ventilation, heating, etc.

The Pittsburgh Centennial parade, held on Nov. 3, gave the Pittsburgh Railways a timely opportunity for effective publicity. Its exhibit in the parade consisted of an old-time mule car, which bore at the sides the



HISTORIC PARADE OF CARS IN PITTSBURGH

legend, "Fare up hill 10 cents, down hill 5 cents." These fares were for a distance of $2\frac{1}{2}$ miles. The sign also pointed out that this was the kind of transportation that Pittsburgh had, not 100 years ago, but only thirty years ago. At one stage of the parade a third mule with an extra driver or postillion was added for grade-climbing help, as in the "bad old days."

Behind the mule car followed an early single-truck electric car. Then came the first semi-steel car, built in 1907 by the Standard Steel Car Company for surface operation in Pittsburgh. This car had a steel underframe, steel sides, wooden posts and a flat roof. The fourth car in the parade was the 1917 Jones model center-entrance front-exit design. It bore the slogan, "The fare is still 5 cents."

ROUTE GUIDE ALSO ISSUED

The company also issues a twelve-page folder guide, which contains a great deal of information about the system of value to the resident as well as the visitor in Pittsburgh. In the center of the folder is a two-page map of the company divided into squares, each 8000 ft. square. Each square is numbered and an index of routes on another page shows the car line which a passenger has to take to get to any square thus shown. Two other pages of the folder tell the interesting points in the city and the route to be used, list the city parks and points from which the entire city can be viewed, and give interesting sightseeing trips in and about Pittsburgh. Another page shows typical daily traffic graphs and a rush-hour chart on a typical line. A statement on another page is entitled, "Some Things the People Can Do to Improve the Service," and among the suggestions given are: "Board and alight from cars promptly," "Do not insist on unnecessary stops," "Provide legislation to keep wagons off the tracks," "Have the exact fare ready before boarding the car," "Do not block the doorway of the car," "Do not forget to ask for your transfer upon paying fare," etc.

Electric Railway Drawbridge Safeguarding

The Author Takes Exception to Some of the Conclusions of the Committee Appointed by Mayor Curley of Boston, Mass., to Investigate the Drawbridge Accident Which Occurred in That City on Nov. 7, 1916

By FREDERICK W JOHNSON

PERHAPS no single electric railway accident of the past decade has occasioned so universal a feeling of regret as did the Boston disaster of Nov. 7, 1916, wherein a surface car plunged through the open draw of Fort Point Channel bridge with a loss of some forty-seven lives. To all railway men, and particularly to those who have been identified with the development and furtherance of the safety factor in railway operation, it has seemed peculiarly unfortunate that so distressing an occurrence should have been visited upon a group of officials who, for many years now, have rendered such distinguished and conspicuous support to the movement to bring to present-day transportation methods the widest possible margin of safety, alike for the passenger, the traveler upon the highway and the employee.

The basic facts of this mishap have been so graphically set forth in the columns of the *ELECTRIC RAILWAY JOURNAL* that little is to be gained from a reiteration of them. The situation appears to have been singularly free of any unusual or extraordinary complication, as, for example, a heavy grade, an uncontrollable car, a dense fog, a blinding snowstorm, treacherous rail, or a stricken motorman. If the fact that the arc light on the bridge was extinguished is to be accepted as one of the chief contributing causes, its principal value as an aid to future guidance is to be found in the knowledge that any imperfectly designed protective device which relies solely upon electricity for illuminative purposes properly must be regarded with apprehension, for under circumstances such as these a dark sign at night may upon occasion offer precisely the same degree of actual protection as did the "dead" arc light, and no more.

STREET RAILWAY OPERATION HAS ITS OWN REQUIREMENTS

It is not enough to say that a "dark" signal is always a "danger" signal, for there is a wide gulf separating steam, subway, elevated and high-speed interurban railroading upon the one hand and metropolitan surface operating upon the other. Because of the absence of rigid signal control, the individual surface unit is in a sense a free agent between terminals. The presence of a signal or warning light in this field is rather an exception than a fixed rule. Instead of spotting lights, one's attention rather is directed to watching the movements of vehicles, studying the wishes of passengers, guardedly approaching intersecting streets and angular crossings, working out of traffic jams, observing the everchanging condition of the rail, avoiding pedestrians, conforming to traffic rules, and innumerable other duties inherently peculiar to this particular phase of railroading. It is just the difference between public right-of-way operating and private right-of-way railroading.

Small wonder, then, that the surface operator on a large system should occasionally fail to detect a "missing" light with the same facility as would one trained

in a radically different school where the accurate picking up of signals forms one of the most essential elements of the calling. And again, on the surface it is necessary frequently to transfer men at short notice from one route to another to meet the exigencies of travel, which still further interferes with one's studying the operating conditions of any particular route with the same exactitude as though operating upon but that one alone. The normally greater annual turn-over in labor upon surface lines, as compared with the other branches named, is yet another factor to consider. These points are not cited as furnishing extenuating grounds for carelessness, nor as a justification for indifferent railroading, but rather as a frank statement of facts as they actually exist, and in support of the contention that warning lights, signals or signs for surface operation should be made as conspicuous, dependable and foolproof as possible.

CLASSES OF DRAWBRIDGE SAFEGUARDING

Electric railway drawbridge safeguarding may be roughly summarized under three general classifications: (1.) High-speed interurban, subway or elevated operation. (2.) Extraordinary physical conditions, particularly those involving dangerous grades, curves or blind approaches. (3.) Ordinary city service, with the usual accompaniments of close headway, density of traffic and frequent operation of the draw.

The first of these obviously inclines toward established steam railroad procedure, while the second necessarily requires specialized protection commensurate with the imminence of the particular hazard involved. The last group, however, more readily lends itself to a somewhat plastic standardization of methods, and it is, therefore, with this phase of the problem alone that we are at present concerned. The Boston situation, in common with many others throughout the country, properly comes within the scope of this classification. Not all are susceptible of exactly the same mode of treatment, of course, because of the inevitable peculiarities of local conditions, but in the main the principal essentials of most of them will be found to bear a close resemblance one with another.

POSITIVE STOP SHOULD ALWAYS BE MADE

The first safeguard to which attention instinctively directs itself is the establishing of a fixed or positive stop for all cars approaching a drawbridge, at such distance from the draw proper as in all reasonable probability should obviate any danger of a car not being under safe control when nearing the span, and at the same time sufficiently close as to enable the operator to obtain an accurate and certain view of conditions in the immediate vicinity of the draw intersection. An examination of the official rule books issued by twenty-nine operating companies situated in various parts of the country discloses the fact that of the entire number nine specifically require an absolute stop; five treat of the general subject of drawbridges, but say

nothing of positive stop requirements, while thirteen make no mention of the subject at all. Of the last named some or even all may relate to properties having no bridges of any character upon their systems. Two other roads, oddly enough, content themselves with stipulating that cars shall be brought to a full stop whenever the draw happens to be open. Most of the roads which make no provision for a stop require that motormen shall approach drawbridges with their cars under complete control, and at speeds varying from 4 to 10 m. p. h. One company compels a double stop, the first 100 ft. from the span, and the second approximately 20 ft. Still another stipulates that the conductor shall remove the pole from the operating wire and place it upon a supplemental wire while the draw is open and the car standing. The standard code of rules for city operation as adopted by the American Electric Railway Transportation & Traffic Association does not touch upon the matter of drawbridge operation, the committee presumably viewing the subject as one which could be handled to better advantage by individual companies as a purely local operating matter.

The distance from the draw at which the positive stop is to be made varies from 50 ft. minimum to 200 ft. maximum. In some cases the exact point is fixed presumably by a sign or similar device, although it is not just clear how extensive is this practice. George W. Bishop of the Massachusetts Public Service Commission, in his recent investigation of the Boston fatality, recommends that the distance shall be not less than 50 ft. nor more than 100 ft. Excluding approaches complicated by pronounced grades, obstructed view, high speed, excessively heavy equipment, or a chronically treacherous rail, this would appear safely to meet every requirement of good railroading. In placing the stop at too great a distance from the draw, the danger may unconsciously be incurred of neutralizing the protection sought, by permitting a fast operator to acquire too great momentum in the distance intervening between the stop and the draw intersection. There is but one kind of stop that should be at all acceptable, and that is a full and complete stop. If trainmen are to be permitted to "slur" their stops, the 3-mile slowdown of to-day may become the 5-mile "safety" stop of to-morrow, with an ever-increasing tendency in the wrong direction.

SUGGESTION FOR A CONSPICUOUS "DEAD LINE"

It is seldom, indeed, that men agree in their estimates of time, speed or distance. It also is true that the average operator watches the track immediately before him with greater circumspection than he does either the poles on the curb line or the overhead construction. Therefore I make the following suggestion for definitely fixing the precise spot at which the positive stop must be made, and as an auxiliary precaution against any likelihood of one's passing a stop sign unobserved. Install as a part of the permanent pavement between the rails three transverse rows of vitrified brick set in concrete foundation, the two outside rows to be of white or yellow brick, the center of red. This would then constitute a permanent "dead line," conspicuously apparent alike to the regular or occasional operator. In some cases a different color combination might be required, especially where red brick is used for paving purposes. If it be argued that the scheme might prove less effective during the snow period than at other seasons of the year, it is to be remembered that the Boston catastrophe, as well as others of a similar nature, occurred at a time when there was no snow upon the ground. During the winter months the "dead line" could be kept reasonably free of snow and ice in exactly the same manner as curves and switches are

kept open and operative. Identically the same scheme could be utilized in safeguarding the movement of following units in electric switch operation, as indicating the point beyond which a car may not proceed until its leader is safely out of the switch.

"DEAD" TROLLEY WIRE SECTION A WISE PRECAUTION

In commenting upon the advisability of installing section insulators at a safe distance from operating spans, the report of Mayor Curley's committee has this to say: "It has also considered the wisdom of automatically cutting off the power from electric cars at a reasonable distance from the draw span before the latter is opened, but feels that this might prove dangerous in case of failure of the brakes, as the motorman would then have no opportunity of controlling the car with his reverse." Plainly, this fails to take cognizance of the very practicable method of reversing a car upon generated current. By this means a car traveling at good speed may be stopped, even upon a very appreciable grade, though the power be off the line and the brakes useless. In other words, the higher the speed the more effective the generated current reverse. But aside entirely from this phase of the problem, the query irresistibly arises, "Is it at all probable, or even possible, that the accident of Nov. 7 would have occurred had the motorman of that car been automatically deprived of power at a distance of one full city block from the open draw?" The single fact that he was able to draw current right up to the very instant when he suddenly discovered the safety gates in front of him, of itself alone made possible the deplorable consequences which followed. One of the first instincts of any motorman, even one newly employed, is to stop his car immediately upon losing his power or when his car becomes dark, for if ever there was an unmistakable indication of trouble or danger it is this.

Serious mechanical failures are of such relatively infrequent occurrence nowadays, compared with errors of human judgment, that it would appear as though the committee unwittingly has chosen the greater for the lesser evil; for in this case it is to be observed that although the motorman had the benefit of current right up until the final moment, his reverse availed him naught. It also is significant to note that the report of Mr. Bishop expressly states that "in the present instance there is no evidence that the accident was due in any way to defective brake equipment, etc." Here, then, was a situation wherein everything conducted to a fair test of the committee's preference for uninterrupted power in contradistinction to the section insulator theory, yet the worst possible result ensued. Even as a desperate last-ditch resort, the reverse undeniably is a very elusive and uncertain quantity, especially in the hands of new men.

ELECTRIC LIGHT NOT DEPENDABLE FOR NIGHT WARNING

Drawbridge danger being greater at night than during daylight hours, it follows that the means adopted for warning travelers at night should be correspondingly effective and far-reaching. The plan of utilizing automatic electrically illuminated signals admittedly is a good one, but always with the proviso that some untoward incident may not arise unexpectedly to derange the mechanism or interrupt the current. In the report of the Massachusetts Commission we find this: "A street arc light is located . . . nearly opposite the gates. This light, if kept burning at night, is of great assistance to the motorman in determining the position of the draw. The motorman claims that the light was not burning at the time of the accident. His statement is substantiated by a passenger on the car, as well as

by a person riding in an automobile, who arrived immediately after. There is further evidence that later in the evening the light went off and came on again." Here we have a striking illustration of the fallibility of electricity for the purpose in hand, that carries with it a ring of conviction that may not be denied. Cause and effect seldom have been more closely coupled. Public utilities many years ago foreswore the practice of depending upon the illumination supplied by a city's arc lights as a means of warning travelers at night of the presence of dangerous excavations or obstructions in the public highway. Electrically illuminated devices have their value in the general scheme of protection, but only as an auxiliary or secondary consideration. A more certain and more effective agent is needed if travelers by night are to be vouchsafed maximum security.

A RED FLARE LIGHT MIGHT BE USED

Departing from the stereotyped customs of years standing, it is pertinent to inquire whether we may not profitably take a leaf from the book of the mariner, who burns a Coston light at night when in need of assistance at sea. As a means for safeguarding drawbridges, the idea really is not as chimerical as it may at first seem. Immediately it becomes necessary to operate a draw, the first move to be made by the bridge-tender would be to light the "red flare." This should instantly warn everybody approaching the bridge from either end, for a distance of several blocks, at least, that the draw either is open or is about to be opened. A permanent metal holder could be provided for the "flare," placed several feet above the level of the bridge flooring. Doubtless such lights could be manufactured to burn five, ten or fifteen minutes, according to requirements. The desired degree of brilliancy also could be arrived at with some little experimentation. In any event the "flares" should be of good quality for obvious reasons. Should they be found to interfere with pilots sighting their markers accurately or to startle horses, shields might be devised to overcome these incidentals, though both belong rather to the realm of the possible than to the probable. Whether one "flare" would prove sufficient, or whether two of lesser brilliancy, one upon either side of the draw, would better serve the purpose, could best be determined in the light of actual experience.

Given a car load of passengers approaching an open draw protected by a "red flare," it is a safe prediction that if the motorman failed to make his positive stop at the required spot, he would very quickly be reminded of his delinquency once the public at large became conversant with the details of the scheme. Incidentally, motormen who fail to pass the standard color test should be excluded from drawbridge routes, for upon them the vital significance of a red bull's-eye, or a "red flare" might be wholly lost.

PRELIMINARY WARNING SIGNS DESIRABLE ALSO

Supplementing both the "red flare" and the positive-stop sign, it would seem in order to install a preliminary warning sign, to be continuously illuminated at night, approximately 500 ft. on either side of each operating drawbridge, to read something like this: "Drawbridge—500 Ft. Ahead—Reduce Speed." Such a sign should, of course, be tapped in on the "live" side of the section insulator, and if desired could specify the speed permitted in the block between this point and the positive stop. Immediately the "red flare" appears, a rule of the company should require the motormen of all cars within the block bounded by the 500-ft. sign and the positive-stop indication at once to bring their cars to a full standstill. Should the first car of the line, however, be at a point beyond or outside the 500-ft. sign, the motorman of that car should not be

permitted to pass the preliminary until the "flare" is extinguished. If this latter provision be deemed unnecessarily drastic, the whole scheme is susceptible of innumerable variations and modifications. Certain it is, however, there is nothing to be gained by allowing cars to coast into the dark area controlled by the section insulator. The real point at issue, after all, is whether these suggestions may not contain the germ thought so essential to the introduction and development of additional operating safeguards of a practicable nature.

CO-OPERATION WITH BRIDGE TENDER IS NECESSARY

A logical counterpart of the protection afforded by the adoption of the "red flare," the section insulator, the preliminary warning and the positive stop, is to be found in the possibilities of an even closer co-operation upon the part of the bridge tender than seems heretofore always to have been the case. For example, the responsible municipal authorities might be prevailed upon to lend their assistance thus: After the "flare" has been lighted and the gates closed, the draw shall not be operated until the leading car which has passed the 500-ft. sign is brought to a standstill. If, however, the first car is close to and approaching the preliminary, then the same procedure will be adhered to. On double-track bridges the same rule would apply to either side. If the company, as its contribution toward the success of the plan, will insist upon a rigid observance of the "red-flare-immediate-stop" order, there need be no resultant delay whatever to water craft. The brief interval between the lighting of the "flare" and the closing of the safety gates would be found sufficient for the plan to operate.

CONDUCTORS COULD "RUN" DRAWBRIDGE CROSSINGS ALSO

The almost universal practice of requiring conductors to "run" grade railroad crossings in the absence of flagmen opens up yet another avenue of speculative thought. If the grade crossing, why not the equally hazardous drawbridge? All that would be required would be for the conductor to advance to the point of intersection, satisfy himself that the draw was in proper position as evidenced by the matching of the rails, then give the "come ahead" signal. It is questionable, however, whether such a precautionary measure is really needed during the daylight hours. It probably is not, but its possibilities as a further step toward maximum security during hours of darkness, fog or storm are readily apparent. Perhaps some roads even now pursue this method. If so, it should be of general interest to learn just how efficacious it may have proved. In some cases the plan might entail complications of one character or another, particularly if it should necessitate the interruption of fare collections on short-haul runs during the rush period. Even this, however, would apply to but a few winter months, during which time a company watchman might be utilized for an hour or so morning and evening. The possibilities for an occasional platform accident may not appeal to the claim department officials with any considerable force, yet of the two hazards the chief precaution very properly would be directed against the greater. With certain types of cars the premature-start mishap need receive no consideration whatever, for it nominally has ceased to exist. But in any event the danger incurred would be no greater than that now readily enough assumed in the protection of electric cars on steam railroad crossings where flagmen are not maintained.

DANGERS OF FALSE CLEAR SIGNAL INDICATIONS

Of the several specific recommendations adopted by the conference called by Mayor Curley, as reproduced

in the JOURNAL for Dec. 2, that of painting drawbridge safety gates with alternate stripes of white and black, an innovation recently standardized by some of the steam roads, appears to be excellent. The idea of installing a large automatic gong interlocked with the drawbridge operating mechanism, 100 ft. distant on either side, may not prove very effective. For example, the ringing of the gong is a positive indication of danger, and its silence an equally positive assurance of safety, but a *false* assurance whenever it fails to sound a warning because of a short-circuiting of current or other derangement of the mechanism. Defective bells of this very character have been directly responsible for many serious steam railroad grade crossing collisions, although this defect has of recent years been largely overcome by the manufacturers of specialized equipment, some of which might be found to be better adapted for drawbridge protection than the simple automatic interlocked gong.

The final recommendation of the committee, "That an illuminated sign . . . reading, 'Stop When Draw Is Open,' be installed at a distance of approximately 200 ft. from each highway drawbridge, and the illuminating mechanism interlocked with the drawbridge and gong-operating mechanism," is rather curiously worded. If the draw actually is open, the sign should so indicate in positive language, instead of leaving travelers to conjecture whether it is or is not. Every traveler is willing enough to come to a stop if only he knows in advance that the draw is open; clearly the thing to do is to apprise him of the fact that it is open. The interlocked illuminated electric warning sign is subject to identically the same criticism as the automatic gong, *i. e.*, when dark because of faulty operation of the mechanism it treacherously conveys a false assurance of security to the traveler. To each preliminary or cautionary electrically illuminated sign there should be attached at night a yellow-globed oil-burning lamp or lantern, and to positive-stop signs of the same character red-globed lamps or lanterns. These colors conform to standardized signal aspects, and would serve as "an ace in the hole" in case of current failure.

It is no part of this discussion to move a blanket indictment of all electrically-operated safety devices, for entirely apart from the truly phenomenal advances made of late years in the science of railway signaling, there are many extremely ingenious and highly perfected appliances upon the market which almost hourly give abundant proof of their incalculable value as a means of adequately safeguarding life, limb and property. An effort has been made, however, to focus attention upon the futility of adopting protective devices which only partially fulfill their allotted mission. It is earnestly to be hoped that in the not distant future engineering genius will permanently supplant many of the hazards and uncertainties of the human equation with the more stable and dependable safeguards afforded by the fixed laws of applied mechanics.

Illinois Commission Issues Rules for Overhead Electrical Construction

The State Public Utilities Commission of Illinois has issued general order No. 30 establishing rules for overhead electrical construction. R. V. Prather, Springfield, Ill., is secretary of the commission. The order comprises several sections treating respectively of the following: general matters such as definitions and classifications of supply circuits; overhead construction in general; construction at crossings between wires; construction at crossings of wires over railroad tracks;

crossings of wires under railroad structures; construction for jointly-used pole lines; and general recommendations for the construction and operation of supply systems and signal systems whose lines are involved in parallel.

There are also appendices containing sag data for wires from No. 10 to No. 0000 gage inclusive, for temperatures from zero to 100 deg. Fahr., for spans from 100 to 175 ft. inclusive, and for weatherproof soft copper, weatherproof hard or medium copper, and fair hard or medium copper wire. The tables also include sags for bare hard copper and bare galvanized iron wire for signal circuits. A comprehensive table of contents renders the pamphlet very convenient for reference.

Historical Pennsylvania Pamphlet

To inform its patrons and the public in general, the Pennsylvania Railroad System has issued, in booklet form, an historical and descriptive treatise covering the territory traversed by its lines.

One of the principal objects in the publication of the booklet is to preserve, in permanent form, the most interesting and picturesque incidents connected with the settlement and subsequent development of this region, which has become the richest and most thickly populated in the United States.

Another purpose is to set forth the present character of the various portions of the territory with reference to industry, mining, agriculture and commerce. The region covered includes the principal sections of the Middle States and the Central West, together with some portions of the Southern States. A brief description is given of all the cities and of the more important towns on the Pennsylvania Railroad, east and west of Pittsburgh, with the business advantages and achievements of each.

Many of the historical incidents recorded in the book are little known and were obtained with difficulty from obscure sources to rescue them from oblivion. They relate chiefly to events in the discovery period of American history, to happenings during Colonial days, the revolution, the war of 1812, the wars with Mexico and the Indians, and the civil war, with some or all of which practically every portion of the territory traversed by the Pennsylvania Railroad System was in one way or another associated.

The book is profusely illustrated, and is accompanied by a large folding map of the territory served by the Pennsylvania System.

A Muzzle Loader

Cars of various types in operation on the same system obviously have drawbacks, but are the price that is paid for advancement. How the confusion that sometimes results from such operation as seen by the so-called man in the street is shown in this clipping from a contemporary:

"Street cars * * * are of a varied kind. Some are of the peek-a-boo or open sort. Some load passengers at the rear end only. Others receive and discharge their load at the front end. Naturally some confusion results, and waiting passengers are never sure where to station themselves to board the car hurriedly. One of the front-end cars rolled up alongside a waiting passenger early in the week. The passenger wanted a rear-end car and so placed himself. The car did not properly identify itself to him. Time was being lost. The motorman was resourceful, and sizing up the situation, poked his head out at the door and called out, 'She's a muzzle loader, old top.' The passenger understood, hopped aboard and the car went on its way."

New Power Station of Compact Design

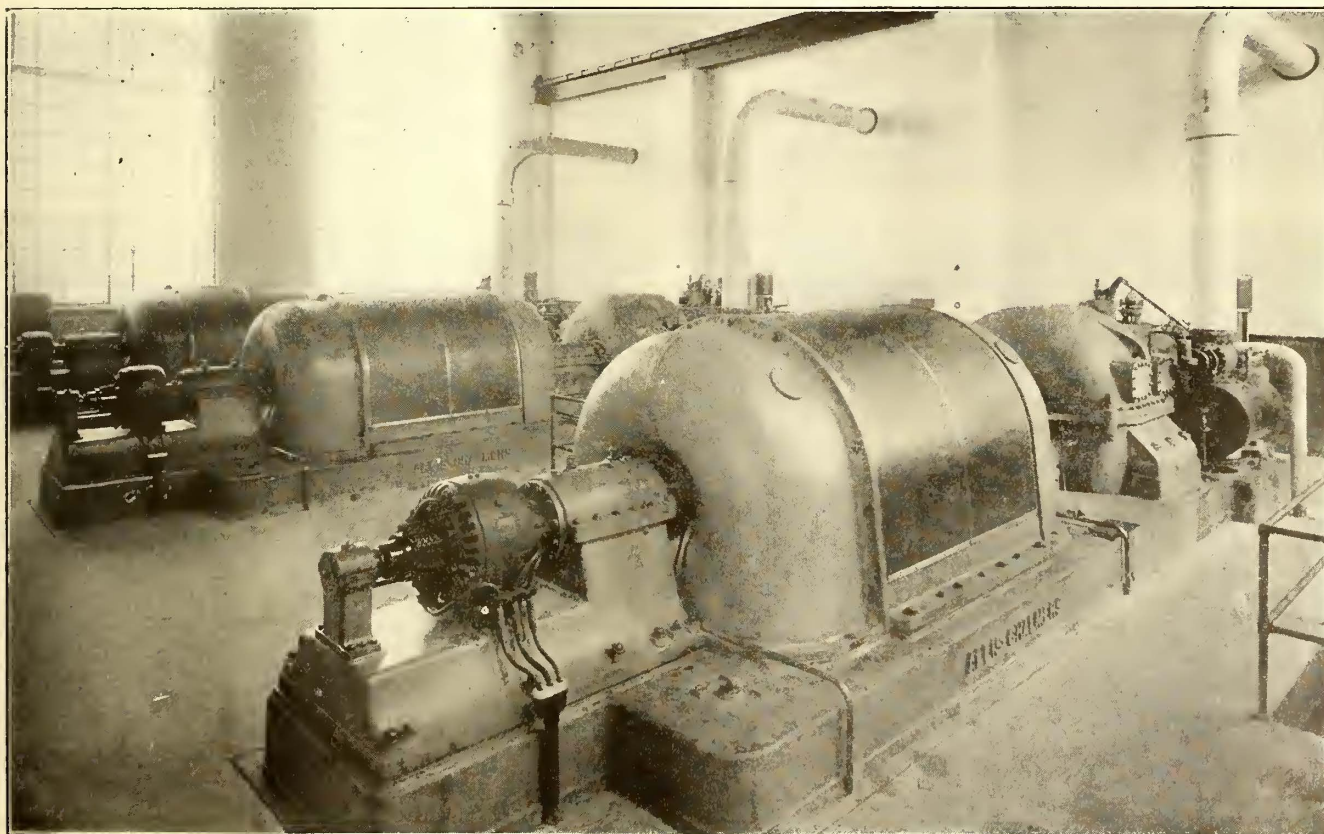
The Fremont Plant of the Ohio State Power Company, Which Supplies Energy for the Lake Shore Electric Railway, Follows the Unit Arrangement of Apparatus and Covers Practically One-Half Square Foot of Ground per Kilowatt of Capacity

THE Lake Shore Electric Railway has recently arranged to obtain its supply of energy from a new steam generating station of 15,000-kw. capacity which has just been completed by the Ohio State Power Company under rather unusual circumstances. The plant is located on the bank of the Sandusky River at Fremont, Ohio, and its output is supplemented by that of an adjoining hydroelectric station which was constructed on the same site several years ago.

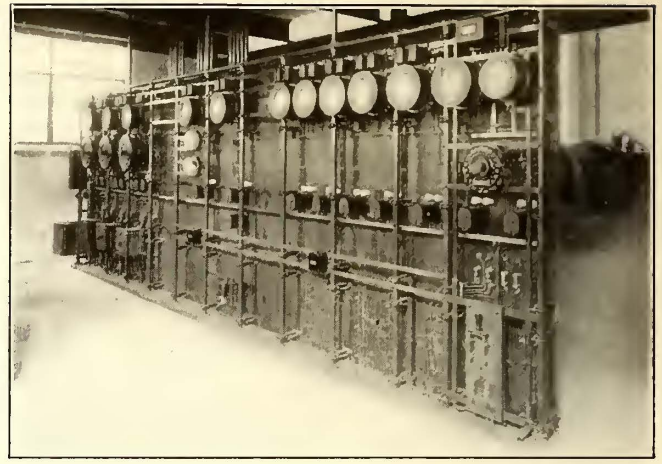
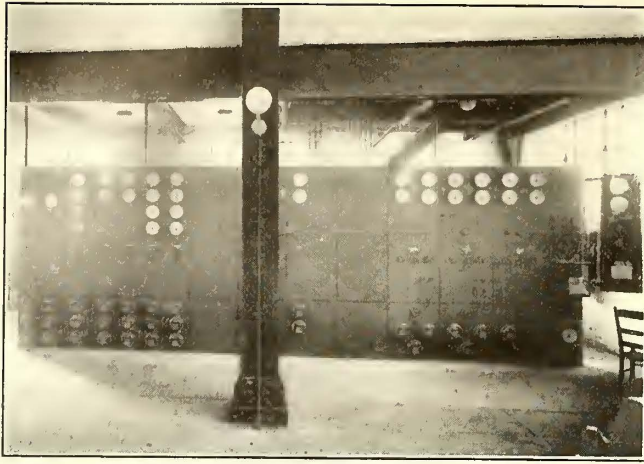
More than the usual requirements of good water supply and coal-receiving facilities governed the location of the new steam station at this particular point. Its sister station, the 3000-kw., 25-cycle hydroelectric plant, was built in 1913 by the Sandusky River Power Company, also a wholesale producer, which had arranged to supply the Lake Shore Electric Railway with a certain minimum amount of energy each month under a contract carrying a penalty clause for failure to supply this minimum. But the river, as usual, did not deliver as much power as was anticipated, and at the end of the year the penalties imposed had totalled an amount such that the Sandusky River Power Company actually owed its customer money, and it was promptly put into the hands of a receiver in order to nullify the contract. Then the Ohio State Power Company was incorporated, and this company purchased the securities of the defunct company and reissued the stock in the name of the

new company. But in order to save the \$600,000 investment in the hydroelectric plant, it was necessary to resort to some means of operating the station at its full productive capacity without the penalties under which it had previously run. The solution, briefly, was the securing of a 17,000,000 kw.-hr. a year minimum contract with the Lake Shore Electric Railway and an 8,000,000-kw.-hr. a year minimum contract with the Ohio Light & Power Company, and, with these contracts as the principal basis of financing, there was undertaken the construction of a modern steam plant large enough to carry the load and supply all energy required over and above what the hydraulic plant would develop. The new plant was planned to be a 60-cycle station, and therefore the work included also the placing of new 60-cycle generators in the water-power station.

Principal interest in the new station centers about the complete layout of the station on the unit plan to give better insurance against complete shut-down, to allow for future extensions, and to simplify the piping. A further carrying out of the unit plan appears in the complete isolation of exciter units, the installation of the potential and current transformers in the fireproof compartments for each pole of the oil switches; and the location of the two concrete stacks on the steel structure directly over the boilers. This has resulted in a generally compact layout of the station and equipment



FREMONT POWER STATION—TURBINES FOR MAIN FLOOR



FREMONT POWER STATION—FRONT AND REAR VIEWS OF SWITCHBOARD

and gives a modern plant at the lowest possible cost. The ground area covered is 0.5266 sq. ft. per kilowatt of capacity and the cubical content is 28.666 cu. ft. per kilowatt.

GENERAL LAYOUT

Promoting the idea of complete independence of each generating unit, the entire station is laid out so that a section through every 24 ft. of its length may be made to represent a generating plant complete in itself, with all its auxiliaries and a battery of boilers. The station at present is designed for three 5000-kw. units and two batteries of two 750-hp. Babcock & Wilcox boilers each. This sectionalizing of the layout reduces the matter of future expansion of the station to one involving simply the addition of another 24-ft. section on both the turbine and boiler rooms for the installation of another complete unit. The layout may perhaps be characterized as a one-floor-level station, as the boiler room, turbine room and switchboard room are all on the same elevation with only the high-tension switching and protective apparatus above it. The only electrical equipment below this is the 4000/66,000-volt water-cooled transformers and the station-power and lighting transformers.

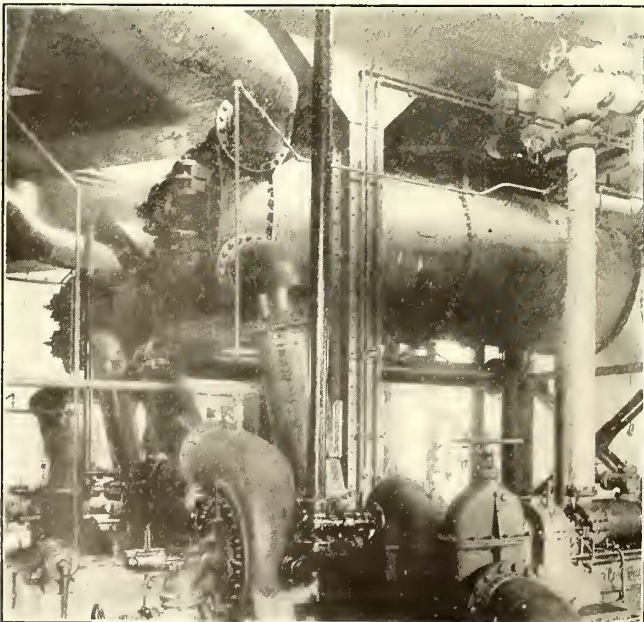
The switchboard with all control circuits leading from

it and the 4000-volt oil switches are on the main floor at the most convenient location for the observation and immediate accessibility of the engineer in charge. The transformers are installed immediately below this switchboard section of the station and the high-tension oil switches, lightning arresters, etc., immediately above.

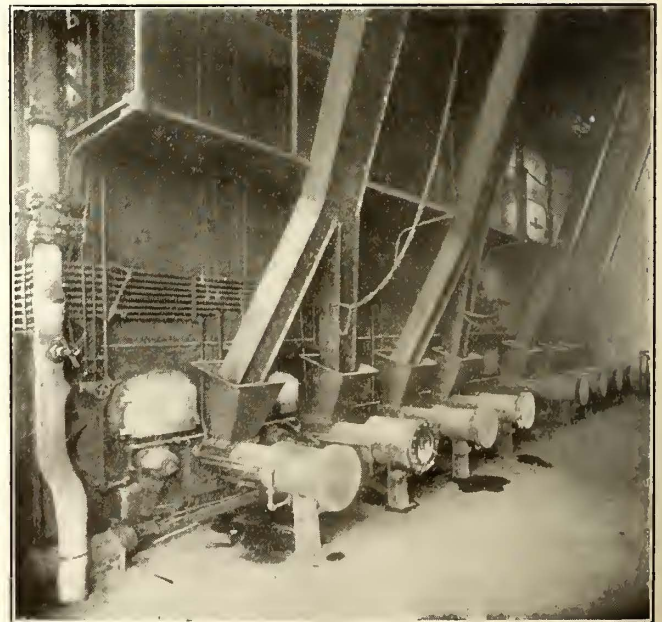
Supports for the various pieces of equipment consist of steel columns, thus giving the maximum of open space available underneath for the installation of auxiliary equipment. The basement under the boilers is utilized for the forced-draft fans and the ash hoppers, water heaters, etc., while that under the turbine room houses the condensers and also all other auxiliary equipment, the turbine-room floor being entirely free from miscellaneous equipment.

BOILER AND TURBINE ROOM EQUIPMENT

The boilers are installed on both sides of a central firing aisle, opposite units forming a battery of two for each turbine, each pair of boilers on the same side of the aisle being connected to the same stack. These stacks, constructed of reinforced concrete, are mounted on steel supports above the boilers. Although a heavier steel structure was required for this plan, and a saving in first cost and operating expense was shown over



FREMONT POWER STATION—BASEMENT BELOW TURBINE FLOOR



FREMONT POWER STATION—BOILER FRONTS AND STOKERS

the more customary scheme of building the stacks from the ground up and enlarging the boiler room to provide the necessary additional space, or placing the stacks behind the boiler room and installing the long breeching. The plan makes a very compact boiler plant and has necessitated a minimum property purchase for the ultimate plant. The stacks are 104 ft. high above the steel supports and have an internal diameter at the bottom of 10 ft. 4 in. which tapers to 8 ft. 6 in. at the top.

Each of the boilers is of 750-hp. rating and operates at 250-lb. pressure with 125-deg. superheat, having 7629 sq. ft. of heating surface. All are equipped with specially-designed stokers built by the Jones Underfeed Stoker Company with four retorts for each furnace, the latter being 16 ft. wide. With these four retorts per furnace, it is possible to run the boilers considerably above rated capacity.

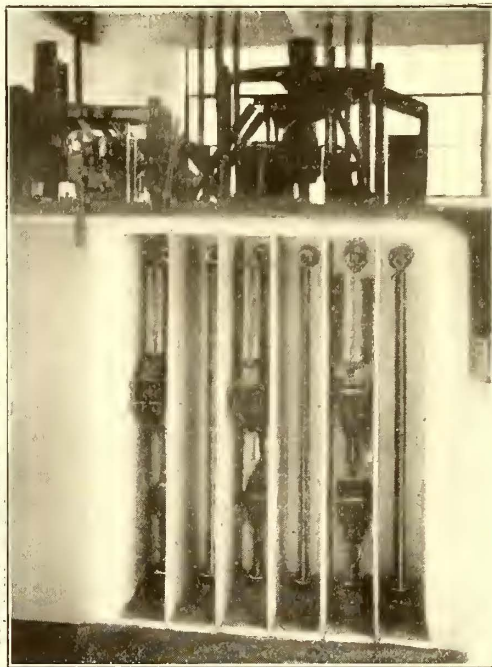
The coal-handling equipment comprises a monorail system extending out from the boiler-room firing aisle

the turbine room and are served by a 25-ton, three-motor traveling crane.

In the installation of auxiliary equipment a separate boiler-feed pump, Hoppes feed-water heater, etc., have been furnished for each of the two batteries of boilers, and a forced-draft fan for each boiler. A house service pump and condenser and condenser auxiliaries, etc., are installed for each turbine. The combined condensate, air and circulating pump units are turbine driven, as are also the boiler-feed pumps. The house pumps and soft raw water pumps, however, are motor driven.

A water softening and purifying plant is placed in the basement under the boiler room. Raw water is brought in through a Chain Belt Company's traveling intake screen in the river wall.

Both steam and water piping for each station unit are complete in themselves, and operation normally goes on without any intercommunication of systems, although a steam header connecting all boilers is provided for emergency operation. The steam supply lines for the turbine



FREMONT POWER STATION—OIL SWITCHES ON TURBINE FLOOR; VIEW OF OIL-SWITCH COMPARTMENT

on steel structures over a concrete storage pit. The ashes are dropped into cars which run on an industrial track in the basement and dump into the ash storage bin just outside the plant.

Simplicity is the most impressive feature of the turbine room, as it is free from all auxiliary equipment. The use of combination condensate, air and circulating pumps in one unit makes possible the complete installation of the turbine auxiliaries within the space that is available under each turbo-generator unit. In addition, separate exciter units on the turbine-room floor have been avoided by the independent operation of the direct-connected exciters. A winding stairway beside each unit places all auxiliaries almost within instant reach of the engineer. Further to safeguard operation, an Illinois Engineering Company's automatic stop valve is placed in the steam main just above the throttle, and this is so arranged that if the vacuum on the condenser is lost, for any reason, this valve cuts off the steam supply and automatically shuts down the turbine.

The main machines are 6250-kva., 3600-r.p.m., three-phase, 60-cycle, 4000-volt, grounded-neutral, Allis-Chalmers turbo-generators with individual exciters mounted on the generator shaft. They are set across

driving the condenser auxiliaries are tapped into the main supply to their respective turbines just above the throttle. There is also a steam connection between the feed water heaters and the turbines, so that in case the pressure in the heaters builds up, due to badly fluctuating load or any cause, a regulating valve opens and this pressure is taken back into the low-pressure stages of the turbine and utilized.

ELECTRICAL CONNECTIONS

The main bus in the station is divided by disconnecting switches into three sections whereby any unit may be operated independently of the others if desired. In addition to this main bus, there is an auxiliary bus and also an auxiliary feeder, the function of which is to make possible the interconnecting of the system in various ways. If it is necessary to work on the switches or instruments of any particular feeder in the 4000-volt local distribution system, this feeder can be energized from the auxiliary bus through the auxiliary feeder, which latter is equipped with an oil switch and disconnecting switches and complete instrument equipment with capacity large enough to take care of any two outgoing feeders. A small oil switch is pro-

vided in the neutral of each generator so that the neutral energy may be supplied from any one generator. An ammeter connected in the neutral bus serves to warn the operator that something is wrong if the current flowing is an amount approaching overload.

All buses and heavy power leads are copper tubing mounted on post-type busbar supports, and with busbar spacers placed about every 4 ft. to prevent displacement or distortion of buses due to the magnetic stresses under short-circuit. The sixteen oil switch compartments are constructed of 4 in. concrete with transite board partitions 1 in. thick. These oil switch cells serve the purpose also of providing a fireproof compartment for the potential and current transformers which are mounted in the same compartment with their respective oil-switch poles. This is probably the first time transformers have been so located, and there are several advantages claimed for the scheme. The whole unit, including oil switch, disconnecting switch and current and potential transformers, is thus placed altogether to make a handy and accessible arrangement. Less space is required and the installation cost is reduced. Type C-1 Westinghouse oil switches are used in this connection and they lend themselves well to the compact construction.

The high-tension switches and protective apparatus are located in the room above the switchboard and 4000-volt oil switches and bus structures which are on the turbine-room floor level. The 4000-volt, aluminum-cell, indoor-type lightning arresters are also located in this upper room, as are tanks for the 66,000-volt aluminum-cell arresters, the air gaps being on the roof but operated from inside.

The switchboard controlling these various feeders consists of twelve panels of black natural slate and one swinging bracket. Meters are of the 7-in. Westinghouse dead-beat type, and the watt-hour meters are mounted on the back of the board 5 ft. above the floor, so that a man does not have to stoop to read them. The board is also equipped with a curve-drawing voltmeter and a curve-drawing frequency meter. The Tirrill regulator is designed for individual exciter control, as the exciters are not operated in parallel at all. This was a matter of completely isolating each exciter from the others to avoid the possibility of shut-down when two units are being operated in parallel and one of them fails, thus throwing the whole load on the other. The arrangement necessitated the installation of a complete spare unit and the present peak load on the station can, therefore, be carried by two of the three 5000-kw. units.

Energy for the remote control switching system is supplied by fifty-five of Electric Storage Battery Company's E-9 cells. These are charged by a 2-kw. motor-generator set which is kept floating on the line with the rate of charging so adjusted as to be practically equal to the energy consumption of the indicating lamps on the switchboard.

The station was designed and the general contract for its construction was handled by Woodmansee & Davidson, consulting engineers, Chicago.

Robert G. Staplin, claim agent Shore Line Electric Railway, Norwich, Conn., has contributed to the fostering of pleasant relations with the public by sending out to the many friends of the railway, a handsome little New Year's card. It is on a fine quality of Bristol board, 2¾ in. x 5¼ in. in size, and is printed in two colors in raised letters. It is in excellent taste, containing simply the name and title of the sender and appropriate good wishes. The sentiment is this: "Good luck—good times—good health—good cheer. Good everything—for all the year."

Railway Publicity*

What a Railway Should Do to Foster Good Public Relations and How to Do It

BY WALTER S. THOMPSON

Press Bureau, Grand Trunk Railway System, Montreal

THE day of slamming and abusing the public has passed. It was doubtless good sport, but it did not pay. The railroad and the public should be in one great partnership for mutual interest. Much has undoubtedly been done to give proper information to the public, but much has been left undone. It is impossible to attend any meeting of the Railway Commission, when the public is represented, without realizing how deep-seated are the misconceptions regarding railway management; how strong, in many quarters, the prejudice against the roads.

There is only one way to overcome this prejudice and this misunderstanding. That is by persistent, intelligent, informative publicity, directed to the people as a whole.

To the publicity campaigns waged in the last few years is attributable, I think, the change in public sentiment toward the railways, a change so favorable that it indicates the beginning of co-operation instead of the continuance of antagonism. W. M. Acworth, the foremost expert in Great Britain on railway management and operation, recently collected reports from all over the American continent. Thirteen hundred and ten of these correspondents reported that antagonism toward the railroads is abating, and only 185 correspondents asserted that the former attitude of hostility remained.

BEGIN WITH THE EMPLOYEES

If we are to talk of educating the public we must surely begin with our own men. Efforts that have been made have for the most part been spasmodic or purely departmental in character. The employees have been left largely to learn facts of importance about railway service from whatever news items and comment the daily press has found space to print. A field rich in possibilities lies ready for us here.

What is the best method of reaching the employee? Many railroads have looked upon the publication of employees' magazines with some misgivings, and have not embarked upon their issuance because they believed that the commercial advertising that has been very generally carried between the covers of such magazines was "policy advertising," given by supply houses and other firms doing business with the roads. That there are objections to a railroad employees' magazine accepting this form of revenue is obvious. The railways, however, are now coming to the view that these publications, when properly conducted, are worth the price they cost and that support received from outside advertisers can be dispensed with.

Experience has shown that instead of leaving the issuance of such magazines to an editorial committee representing various grades in the service, with a "business manager" to make the magazine "pay," this work is best left to the publicity agent of the road, the whole expense being carried by the company. That is the right plan. Men in all departments should be encouraged to write articles for publication on subjects in which they possess special knowledge, and contributions should be solicited and paid for from writers outside the railway service. The main purpose of the magazine should be to raise the standard of knowledge and the standard of loyalty among the men. The material car-

*Abstract of paper read at meeting of Canadian Railway Club, Montreal, Oct. 10, 1916.

ried should be of the highest class. Such an organ gives the executive an opportunity of speaking to all grades and produces an *esprit de corps* that is invaluable.

There are several other channels for reaching the employees which can be used to advantage. I will mention only one more. That is a bulletin frame carried in each office, station building, round house and mechanic's shop. Attractive matter with "punch" and "point" could be supplied fresh each month, prepared in such a way that it would have a direct appeal, one subject of general interest being treated on each bulletin. These bulletins could be large enough so that those who run may read, and at the same time the cost would be inconsiderable.

OPPORTUNITIES FOR THE OFFICERS

I have been speaking of the railway employee. I will turn for a moment to the duties of the officers in this crusade. The modern railway official is the best equipped technically and among the best informed of all the men of our day. There is, however, a distinct and well marked tendency on the part of these able men to keep clear of public discussions and of public office. Every railway publicity man knows of the difficulties that arise in obtaining permission from railway officials to make known to the world praiseworthy achievements with which they have been associated. This reticence belongs to a time that is gone. This is an age of publicity. The stupendous labors that have gone into railroad upbuilding would fill hundreds of volumes, but for the most part they have passed unnoticed. The people want to know the men who are running the railways. Such statements that the "railways are owned by the banks," that they are "soulless corporations," have been accepted by a portion of the public and gained wide attention, because the public have known in only the most hazy way who the men are who are silently but doggedly staying by the task of providing transportation facilities of a high order while hampered often by heart-breaking conditions of lack of legitimate revenue and overabundance of "regulation." The public must know and believe in the men who are running the railroads before they believe and trust in the railways themselves.

Every officer has, according to his responsibilities, opportunities of supplying good publicity to his road. A large number make use of these opportunities; many, it would appear, do not realize fully what is lost by adopting an attitude of indifference toward publicity, favorable or unfavorable.

It is well to remember that it is not always the large things that count with the public. Some of the announcements that have been most widely quoted, that have been seized upon by the newspapers for editorial comment and have brought additional reputation to the roads, have not told in staggering figures of immense outlays of money for double-tracking or new facilities. If I may be pardoned for making a direct reference by way of illustration I would mention a bulletin issued by the Grand Trunk in connection with the service rule that the utmost courtesy must be shown to the public at all times and in all circumstances. That bulletin went out to each employee on the system above the signature of the president. It was headed "Politeness Pays." It was a human little document, but it left no doubt in the reader's mind that the policy which it enunciated was regarded as the keystone of the arch of service, and that failure to comply with its teachings would be looked upon with a serious eye. Here was something that concerned the relationship of every traveler toward the railroad, but it was the phrase

"Politeness Pays" and the human note in the appeal that led, I believe, to its being featured prominently in practically every paper on the continent and in scores of publications in Europe. Such announcements may be matters of routine, but they can be made publicity features of great value. All the announcements issued to employees should reach your publicity department at some stage, whether you desire the co-operation of the head of that department in drafting them or not. They may contain just that happy phrase or that new idea that the public will fasten on to and associate with your road.

WORK WHICH THE PUBLICITY DEPARTMENT CAN DO

I will now outline what are believed to be the legitimate activities of a railroad publicity department. This subject was very fully discussed at a conference of the publicity representatives with the railway Executives Advisory Committee at Washington this year. The outline which follows is not a description of any particular organization in any railroad, but is rather a summary of the general scheme of action as presented at that conference.* It may be of assistance to the members of the club in approaching the subject under review.

General Scope of the Publicity Department.—Should handle all matters involving the public relations of a railroad. Should be the medium of promoting good will and reflecting an intelligent understanding of railroad problems on the part of the community and people whom its facilities serve or concern. Should afford the means of conducting campaigns for maintaining a high standard of loyalty among employees. In direct advertising should prepare material used in campaigns in newspapers and periodicals, time-table folders, excursion and resort booklets, exhibitions, etc. The department should be established to serve every branch of the service without reserve, and the director of the work should be regarded as a staff member of the executive organization.

Service to the Press.—Should maintain friendly relationship with those who control the policy and men who edit and write the matter which goes into all classes of publications. Should maintain a service whereby publicity statements sent out reach all the papers simultaneously and go direct to the person on the editorial staff delegated to handle the various kinds of matters, thus keeping managing editor, news editor, telegraph editor, railroad and financial editor in direct touch with railroad. Should be at the service of the press at all times, where information is requested or might be given without demand. When it understands that a railroad aims to act honestly with the public, the press is invariably disposed to afford fair consideration. It should be possible for the press to communicate with the publicity department by wire day and night and receive prompt replies to inquiries.

Executive Statements.—Publicity Department should assist in the preparation of authoritative statements and interviews given out by executive officers or other members of railroad organization. It should be possible for the head of this department to prepare articles presenting the railroad's side of topics so that unwarranted criticism can be forestalled, the head of the department having access to general information concerning his company and enjoying full confidence of officials.

Public Addresses.—Records should be kept in the department of facts and figures concerning the railroad situation, as well as general and historical data relating to the company itself, so that upon requests for an offi-

*See addresses by J. Hampton Baumgartner and others.

cial to present a subject to a community in the form of a signed article or interview in a newspaper, or an address before a gathering of business men, the preparation of this material should be assisted in by the Publicity Department.

Clipping Service.—The Publicity Department should operate a press intelligence service of clippings for the information of the railroad officials and as a matter of record. These clippings should embrace all railroad matters, subjects relating to government regulation, financial articles, topics of general interest and municipal doings of important character. The department should enable the railroad to keep informed concerning the attitude of the communities toward the company and should present all information available with reference to traffic possibilities.

Community Development.—By working in co-operation with the industrial and colonization departments of a railroad, the Publicity Department can render important assistance in emphasizing the interests in common possessed by patrons of the railway in building up prosperous communities. Through boards of trade, commercial clubs and manufacturers' associations it can reach the business men on such subjects as railroad service and facilities, fair rates, etc.

Photography, Lectures, etc.—The Publicity Department has a new field of endeavor in the demands for information received from university faculties, schools, colleges and students in general. Photography has always played an important part in publicity, and the departments carry thousands of negatives of all classes for illustrating articles and making lantern slides. Moving picture reels have now been added to stock equipment and, if the circumstances are favorable, the railway can supply a complete travelogue before any representative body.

On Dec. 19 the Commonwealth Edison Company of Chicago delivered to its distribution system 5,176,527 kw.-hr. This is the first time in the history of the company that the output in any twenty-four-hour period has passed the 5,000,000 mark. The peak load on the company's stations occasioned by this enormous demand for electrical energy was 369,740 kw., which is also the greatest peak the company has ever experienced. It is an unusual occurrence for the annual peak and the maximum yearly output to fall on the same day, as they did this year. In 1915 the peak for the year reached 337,900 kw. on Nov. 29. The maximum twenty-four-hour output last year was 4,550,137 kw.-hr. on Dec. 29. The peaks are definitely attributable to the railway load.



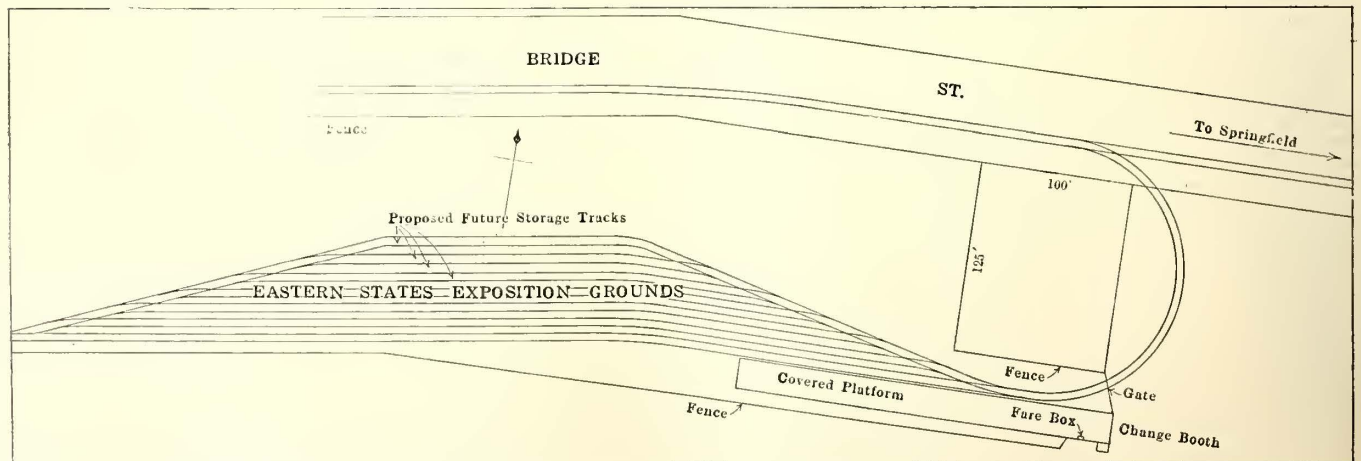
HANDLING FAIR TRAFFIC—LOADING PLATFORM AS SEEN FROM OUTSIDE AT SPRINGFIELD (MASS.) FAIR GROUNDS

Handling Traffic at the National Dairy Show

Methods Employed by the Springfield (Mass.) Street Railway to Provide Adequate Facilities for the 300,000 People Who Visited the Show

THREE hundred thousand people attended the National Dairy Show at West Springfield, Mass., which closed a short time ago after a run of about twelve days, and the street railway facilities provided were very important factors in the success of the exposition. The attendance was drawn from all parts of New England and even outside, about \$1,000,000 worth of cattle being one of the features of the display, besides a notable exhibit of machinery. Before the show opened, the Springfield Street Railway built a special prepayment station just outside the grounds, a map of which is reproduced on this page. This contained excellent storage track facilities as well as a loop for the expeditious handling of traffic at all hours. Eighty cars an hour were operated over the loop during periods of maximum travel, the limitation in car movement being imposed by a 2600-ft. single-track section on the North End Bridge over the Connecticut River, between Springfield and West Springfield. The movement of cars across the bridge was controlled by an installation of Chapman automatic block signals, cars usually being run over the single-track section in sets of five.

The accompanying illustrations show the prepayment station from within the exposition grounds and the loading platform from the outbound gate, at a time of light traffic. The cars were routed through the station from west to east, discharging upon a 200-ft. covered platform of crushed stone. Passengers walked through a gate at



HANDLING FAIR TRAFFIC—MAP SHOWING ARRANGEMENT OF PREPAYMENT STATION AND STORAGE TRACKS AT SPRINGFIELD (MASS.) FAIR GROUNDS



HANDLING FAIR TRAFFIC—CHANGE BOOTH, GATE AND FARE BOX AT SPRINGFIELD (MASS.) FAIR GROUNDS

the end of the platform to the main entrance to the grounds. Cars were loaded at the same point, the inward and outward traffic peaks being virtually non-interfering. Parallel tracks adjacent to the platform provided a storage capacity of thirty-two double-truck cars in addition to the main line track, which holds six cars inside the station and affords further opportunity for temporarily storing cars approaching the latter. The

platform width is 33 ft., the prepayment station being permanently installed for service in connection with future events at the grounds. The yard tracks are spaced to enable cars with double folding steps to be stored upon them without folding the steps, and two future storage tracks are planned.

Passengers outward bound from the grounds enter the station at an opening just at the left of the change booth shown in one of the illustrations. The wire fencing which surrounds the grounds forms a truncated-V terminating at an International motor-driven fare box and register. The passage on either side of the fare box is 28 in. wide, and an additional hand-operated register was installed under the roof within reach of the gateman to record passes or employees' tickets. In about 45 minutes in the afternoon homeward rush Oct. 12, 4000 persons passed the fare box. A sign about 6 ft. by 12 ft., illuminated by five 56-watt series incandescent lamps mounted in metal reflectors calls the attention of the public leaving the grounds to the trolley service. A telephone booth for company use is provided just inside the prepayment station. As the usual jitney charge to and from the exposition grounds was 25 cents each way, the service of the railway was greatly appreciated during the show, the round trip with transfer privileges in Springfield being but 10 cents.

MID-YEAR MEETING
BOSTON
FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING
BOSTON
FEBRUARY 16, 1917

List of New Manufacturer Members—Four Important Committee Meetings—Company Section Meetings of Past Few Days—Series of Biographical Sketches of Section Officers Continued

Manufacturer Members in the Association

Supplementing the lists of manufacturer members of the American Association printed in the issues of the *ELECTRIC RAILWAY JOURNAL* for June 3, July 29 and Aug. 26, Secretary Burritt has supplied the list given below, bringing the roll up to date.

American Cotter Pin Company, Pittsburgh, Pa.; American Electrical Works, Phillipsdale, R. I.; Atlas Preservative Company, New York, N. Y.

Barrett Company, New York, N. Y.; Beckwith-Chandler Company, Newark, N. J.; Blackburn Varnish Company, Cincinnati, Ohio.

Call Switch Company, New York, N. Y.; Cobb Shockless Railway Crossing Company, Los Angeles, Cal.; Columbia Refining Company, New York, N. Y.

F. W. Devoe & C. T. Reynolds Company, New York, N. Y. Electric Railway Equipment Company, Cincinnati, Ohio; The Eureka Company, North East, Pa.

Fadgl Flexible System Company, San Francisco, Cal.; Flood & Conklin Company, Newark, N. J.; F. M. Freeburg Company, Philadelphia, Pa.; Frictionless Rail Company, Boston, Mass.

W. R. Garton Company, Chicago, Ill.; Gould Coupler Company, New York, N. Y.; Gulick-Henderson Company, Pittsburgh, Pa.

Hildreth Varnish Company, New York, N. Y.; The Hoover Smith Company, Philadelphia, Pa.; Hubbard & Company, Pittsburgh, Pa.

Ingersoll-Rand Company, New York, N. Y. Johnson Automatic Register & Manufacturing Company, Johnstown, Pa.

Kay & Ess Company, Dayton, Ohio; Keystone Equipment Company, Philadelphia, Pa.

The Lincoln Electric Company, Cleveland, Ohio. MacGovern & Company, New York, N. Y.; McGuire-Cummings Manufacturing Company, Chicago, Ill.; MacRae's Blue Book Company, Chicago, Ill.; Monroe Calculating Machine Company, Orange, N. J.; T. J. Mullen Sons,

New York, N. Y.; Murphy Varnish Company, Newark, N. J. National India Rubber Company, Bristol, R. I.; National Lead Company, New York, N. Y.

Patton Paint Company, Milwaukee, Wis.; Philadelphia Holding Company, Philadelphia, Pa.; Pressed Steel Car Company, Pittsburgh, Pa.; Pyrene Manufacturing Company, New York, N. Y.

Rand McNally Company, Chicago, Ill. St. Louis Surfacers & Paint Company, St. Louis, Mo.; Shanklin Equipment Company, Springfield, Mass.; Sterling Varnish Company, Pittsburgh, Pa.

Templeton Kenly & Company, Ltd., Chicago, Ill.; Thayer & Company, New York, N. Y.; Transportation Utilities Company, Chicago, Ill.

U. S. Metal & Manufacturing Company, New York, N. Y. Van Dorn & Dutton Company, Cleveland, Ohio; Vulcan Brake Shoe & Equipment Company, Baltimore, Md.

Wallace Supplies Manufacturing Company, Chicago, Ill.; Weiss Manufacturing Company, Monroe, Mich.; Worthington Pump & Machine Company, New York, N. Y.; Wyoming Shovel Works, Wyoming, Pa.

Engineering Association Standards

As announced in the issue of the *ELECTRIC RAILWAY JOURNAL* for Dec. 16, page 1253, a meeting of the committee on standards was held in New York on Dec. 14 and 15. In addition to those mentioned earlier, the meeting was attended by L. P. Crecelius, Cleveland, Ohio, and Hugh Hazleton, New York City. The meeting was taken up with three main topics, namely, the revision of material in the *Engineering Manual*, the plan of publishing the *Manual*, particularly with reference to the incorporation of revisions, and the procedure to be followed in adopting association standards.

In considering the revision of the text of the *Manual* the committee took up, item by item, its present con-

tents. The chairmen of the respective committees concerned stated their views as to the disposition to be made of each section and secured the advice of the other members. The suggestions will be considered by the several technical committees and recommendations will be made to the standards committee at a later meeting. There was also some discussion as to the present form of the *Manual*, after which the following sub-committee was appointed to consider the matter and report at the next meeting: J. H. Hanna, Washington, D. C., chairman; L. P. Crecelius, Cleveland, Ohio, and Martin Schreiber, Newark, N. J.

In the matter of procedure in adopting standards a sub-committee prepared a set of recommendations addressed to the executive committee. These have for their purpose the institution of a plan to insure more consistent use of the standards among member companies.

Power Generation

A meeting of the Engineering Association committee on power generation was held in New York City on Dec. 7. Those in attendance were J. W. Welsh, Pittsburgh, Pa., chairman; A. B. Stitzer, New York City; F. S. Freeman, Boston, Mass.; E. H. Scofield, Minneapolis, Minn.; R. W. Eaton, Norwich, Conn.; C. W. DeForest, Covington, Ohio; W. C. Slade, Providence, R. I. After consideration of the assignments made by the executive committee the work for the year was divided among sub-committees with topics as follows: Specifications for fuel, Messrs. Freeman and Eaton; power station operation, Messrs. Scofield and DeForest; automatic substations, Messrs. Slade and E. F. Gould, Cleveland, Ohio; historical development of turbines, Messrs. Stitzer and G. H. Kelsay, Anderson, Ind.

Joint Committee on Block Signals

A meeting of this committee was held in Newark, N. J., on Dec. 15 with the following members of the committee in attendance: J. M. Waldron, New York City, chairman; J. W. Brown, Newark, N. J.; co-chairman; J. J. Doyle, Baltimore, Md.; R. C. Johnson, Brooklyn, N. Y., and J. B. Stewart, Jr., Youngstown, Ohio. The following visitors were also present by invitation: H. W. Griffin, New York City; R. V. Collins, West Newton, Mass., and H. H. Norris, New York City.

The several subjects to be considered by the committee were assigned to sub-committees as follows: Requisites for automatic block signal systems on high-speed interurban lines, John Leisenring, Peoria, Ill., chairman; G. K. Jeffries, Indianapolis, Ind., and Mr. Waldron. Use of continuous track circuits for the control of automatic signals for high-speed interurban service, Mr. Johnson, chairman; and Messrs. Brown and Griffin. Block signal rules, J. J. Brennan, Fort Wayne, Ind., chairman; and Messrs. Leisenring and Johnson. (This committee was appointed to study the subject with instructions to confer with the chairman of the rules committee of the Transportation & Traffic Association, and these two committees are to appoint a sub-committee of two to confer with the president of the Transportation & Traffic Association relative to the making of an appointment for a meeting with the rules committee of the American Railway Association, at which meeting an attempt will be made to harmonize all rules.) Further study of block signal operation on roads signaled from end to end to cover maintenance cost, efficiency of operation and effect on traffic, Mr. Leisenring, chairman; and Messrs. Jeffries, Brennan, Stewart, Griffin and S. M. Day, Rochester, N. Y. To advise the committee on way matters of approval or

rejection of all or any portion of conventional symbols for recording surveys, Mr. Leisenring, chairman, and Mr. Johnson. Mr. Norris was appointed to bring the bibliography on block signals up to date. A committee was also appointed to continue the study of requisites for the performance of trolley contactor signals and the proper aspects of trolley contactor signals, consisting of Mr. Stewart, chairman; and Messrs. Brown, Collins, O. E. Chapman, Boston, Mass., and C. P. Nachod, Louisville, Ky. It was considered advisable also to appoint a committee to develop needs of automatic signals and interlocking apparatus and the following were appointed: Mr. Waldron, chairman; and Messrs. Johnson, Leisenring, Griffin and Day. Mr. Doyle agreed to continue the digest of block signal laws and rules.

After the meeting the committee made an inspection of the blocking in use on the fast line between Newark and Trenton, the trip being made in a heavy snowstorm at which time the signals were observed under the most adverse conditions. It was decided that the next meeting of the committee will be held at the William Penn Hotel, Pittsburgh, Pa., on Friday, Feb. 2, 1917.

Schedules and Time-tables

The Transportation & Traffic Association committee on schedules and time-tables met in Boston on Dec. 15 and 16 to block out the year's work. The following were in attendance: Edward Dana, Boston, chairman; Howard F. Fritch, Boston; F. L. Hubbard, Toronto, Ontario; Alexander Jackson, Newark, N. J.; R. T. Sullivan, Youngstown, Ohio. The assignments made were as given below.

Mr. Jackson will study the subject of latest practices and recommendations in dispatching on urban lines. The chairman will prepare for discussion by the committee a statement of the factors essential in the making of all time-tables and in the establishment of a uniform basis for determining and stating schedule speed. Messrs. Fritch and Sullivan will lay out the work on the skip stop. The former will consider it in connection with schedule speed, and the latter will prepare a set of questions which will form the basis for short papers by all members of the committee to be incorporated into a joint paper later. The subject of street railway transportation in congested districts will be taken up later after conference between H. C. Donecker and the chairman.

Rolling Stock Department Discussed in Milwaukee

At the regular meeting of Company Section No. 1, held on Dec. 14, forty members were present. The program comprised a paper on "Current Events in the Rolling Stock Department" by D. C. Hinstorff, and one on "Civic Art and the Progress It Has Made in Milwaukee," by A. C. Clas, a prominent architect of the city. Mr. Clas described among other things the layout of the new proposed court house building and civic centers, illustrating his talk with appropriate pictures and diagrams.

Mr. Hinstorff touched on some of the "high spots" in the work of the rolling stock department, dwelling mostly on the construction of the new center-entrance cars. He also described the hot galvanizing plant which has recently been added to the shop equipment.

After the meeting a luncheon was served in the company dining room, accompanied by orchestral and vocal music. A Christmas tree furnished decoration appropriate to the season.

Electrical Pressure Discussed in Chicago

Reports of an interesting meeting held on Dec. 15 come from the Chicago Elevated Railroad section. P. B. Woodworth, professor of electrical engineering at the Lewis Institute, Chicago, lectured on "Electrical Pressure." The less serious part of the program comprised musical and humorous selections. The latter culminated in an imitation by one of the entertainers of Richard Mansfield in his famous walk to the lunch counter which was quickly copied by all present.

Newport News & Hampton Railway, Gas & Electric Company Section

The following notes regarding the men who are charged with the responsibility of conducting section affairs at Hampton, Va., form part of the series begun last week.

Edgar C. Kelly, who was re-elected president of Company Section No. 10 this fall, has been in railroad work for about twenty years. At present he is head electrician and pit foreman in the car shops of this company, having previously been master mechanic of the West Chester, Kennett & Wilmington Railway & Electric Company, and master mechanic of the Hampton



EDGAR C. KELLY
President Company Section
No. 10, Hampton, Va.

JOHN W. HOWARD
Secretary Company Section
No. 10, Hampton, Va.

Roads Traction Company. He is forty years of age, and hails from Huntingdon, Pa. After obtaining a public school education he took a course of study at the Coast Artillery School, Fortress Monroe, Va.

John W. Howard, secretary of this section, is at present taking the student course offered by this company. He completed the four-year course in civil engineering at Rensselaer Polytechnic Institute, Troy, N. Y., in 1916, immediately thereafter entering the service of his present employer.

Annual Smoker in Newark

Thursday evening, Dec. 21, was ladies' night at the Public Service Company Section. A real "movie" show, with vaudeville, was presented under the personal direction of the general manager of Loew's theaters. After the program there was informal dancing and a buffet luncheon was served.

In addition to the entertainment described, a short business session of the section was held. The feature of interest was the announcement of the result of the membership campaign started in October. President Warner stated that 107 new members were added during the campaign and that the award of \$20 in gold announced as the prize for the member enrolling the largest number went to J. R. Cameron, assistant instruc-

tor Hoboken School of Instruction, Mr. Cameron having secured forty-six applications. A. J. Bliss, supervisor, was a close second with forty recruits. The names of seventy-one applicants for membership were read. They were men in all departments and from several divisions of the property within reasonable reach of Newark. The largest number were from the transportation department and the carhouse shops. The attendance at the meeting was 200.

Operation on the Milwaukee

Results of Increased Speed and Train Loads Outlined
by G. H. Hill Before New England
Railroad Club

At the November meeting of the New England Railroad Club, George H. Hill, assistant chief engineer of the General Electric Company, read an illustrated paper on the electrified section of the Chicago, Milwaukee & St. Paul Railroad, in which comment was made on the results of operation on this notable installation. He stated that, in operation, the success of the regenerative method of braking had far exceeded all expectations. The braking effort is so completely under the control of the engineers that they much prefer it to the air, and find that regenerative braking means less danger of drawbar failures and much less care required to avoid dangerous surges in the trains. As to operating results of the electrification, the period of use has not been sufficient to present accurate comparative data but does give an indication of results.

The electric locomotives were designed to haul 2500 tons up a 2 per cent grade at 15 m.p.h. They have been used successfully to haul 3500 tons on the 2 per cent grade, and it has been found necessary to increase the length of the passing sidings in order to utilize the maximum hauling capacity of the locomotives. Before the electrification it was usual to have the freight cars congested at the entrance of the mountain division and it occasioned some surprise to find that the electric locomotives not only could easily keep this congestion from forming but delivered the tonnage to the neighboring divisions of the railway faster than it could be hauled away.

The time occupied on the mountain division has been much reduced. Both the passenger and the freight schedules have now been reduced by about 30 per cent, and the schedule is maintained with greater reliability. Freight trains that formerly required ten or twelve hours to make the run of 115 miles from Three Forks to Deer Lodge now require seven or eight hours. The mountain division is now counted upon to make up time lost by steam passenger trains on adjacent divisions.

Tests between Colorado Junction and Three Forks show that the total power taken to cross this division (including the 2 per cent grade) corresponds to 31.7 watt-hours per ton-mile neglecting the power returned by electric braking. The actual net power required, taking account of the regenerated power, is 23.7 watt-hours per ton-mile. From these figures it may be calculated that to move the train over the same distance on level track of the same curvature would be 20.4 watt-hours per ton-mile. It appears, then, that the energy actually required to move the trains over the mountains is only 16 per cent greater than for a level track, and that the energy required to move the train without any return from braking is 55 per cent more than that actually taken. In other words, electric propulsion by regenerative braking has eliminated 70 per cent of the mountain from the point of view of actual power required.

Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Aluminum Catenary Messenger with Steel Contact Wire on L. E. & N. Ry.—Tests on Electric Headlights for Interurban Service—Convenient Car Inspection System of Boston & Worcester Street Railway—Sleet Cutter for Use in Place of Trolley Wheel—Circuit Breakers for Tying Third-Rails Together

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Convenient Inspection Record System

BY A. BLANCHARD

Master Mechanic Boston & Worcester Street Railway

On the Boston & Worcester Street Railway, cars are inspected on the basis of each 1000-mile run. The company owns about 100 motor cars. The staff devoted to this branch of the service includes one foreman inspector, one car-body inspector, one motor inspector, one truck inspector and helper, one air-brake and trolley inspector, one contactor and miscellaneous electrical inspector, and one oil and journal inspector. The mileage of the cars is kept by the dispatcher, who turns in a daily report to the master mechanic, whose clerk adds this to the mileage already made by each car. Every morning the foreman inspector turns in his inspection slips for the previous day, and every car inspected is checked off on the mileage sheet. Then a slip is given the foreman inspector of all cars with a mileage of 700 miles or more, and should any of these cars be in the carhouse, he tries to inspect them during the day in addition to the ones he already has for regular inspection, so as to avoid shifting for inspection. Before leaving at night, the foreman inspector gives the night foreman a list of cars for inspection the following day, and he also telephones this list to the dispatcher, who can arrange for these cars to come in to Framingham at night, otherwise they might put up in one of five other carhouses. From six to nine cars are inspected daily, depending on the amount of repairs found necessary, as the inspectors also take care of

BOSTON & WORCESTER ST. RY. CO.
CAR INSPECTION REPORT.
CAR BODY
Car No. 153 Date 11/3 1916

Conductor bell and cord.....	X
Register and fittings.....	X
Hand straps and rods.....	X
Curtains and fixtures.....	X
Glass.....	X
Ventilators and fixtures.....	X
Signs.....	X
Seats and cushions.....	X
Floor.....	X
Doors and fixtures.....	X
Sand box.....	X
Jacks and handles.....	X
Space draw bars.....	X

BOSTON & WORCESTER ST. RY. CO.
CAR INSPECTION REPORT.
CONTACTORS
Car No. 153 Date 11-3 1916

Contactors cleaned.....	X
Contactors tips filed.....	X
" leads.....	X
" boxes.....	X
" Arc chutes.....	X
Reversers cleaned.....	X
" fingers.....	X
" leads.....	X
" cut out switches.....	X
" boxes.....	X
" tips.....	X
Circuit breakers cleaned.....	X

Remarks

This is to certify that I have this day inspected and left in good condition all items check marked, except as noted under remarks.

Henry Small
CAR BODY INSPECTOR

All defects found must be reported on the back of this report under DEFECTS FOUND.

This is to certify that I have this day inspected and left in good condition all items check marked, except as noted under remarks.

J. Goff
CONTACTOR INSPECTOR

All defects found must be reported on the back of this report under DEFECTS FOUND.

SAMPLE CAR INSPECTION FORM, B. & W. ST. RY.

3 3/8 in. x 9 1/4 in. in dimension. On the front, each blank carries a list of items to be checked by the inspector for that particular car, a space being provided on the back for listing any defects found and noting the action taken on each. One card is devoted to the car body, and covers thirty-one items; one assigned to motors covers fourteen items; one assigned to trucks covers twenty-three items; one for air brakes, twenty-two items; contactors, nineteen items; miscellaneous electrical, twenty-five items; trolleys, eleven items; oil and journals, eight items. These records show at a glance the condition of the car in detail at each inspection, and have been approved by the company's counsel for use in court as evidence.

From the card records of the individual cars, a monthly inspection summary sheet, Fig. 2, is made. This is about 27 in. long by 30 in. wide, and shows at a glance the dates when each car was inspected and the kind of inspection performed, the inspections being summarized

under eight letters corresponding to the titles of the detail inspection cards above described. The inspections are checked off by the chief clerk of the master mechanic from the detail card records, and any irregularity in the inspection can be detected at a moment's notice. Even-numbered cars are of the open type, odd-numbered cars being closed, and cars with a cipher before the number are used in freight and express service.

KEY
A CAR BODY
B MOTORS
C TRUCKS
D AIR BRAKE
E CONTACTORS
F MISC. ELECTRICAL
G TROLLEYS
H OIL & JOURNALS

RECORD OF CARS INSPECTED
MONTH OF
May 1916

CAR No.	A		B		C		D		E		F		G		H		CAR No.	A		B		C		D		E		F		G		H			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
21																	109																		
25																	111																		
41																	113																		

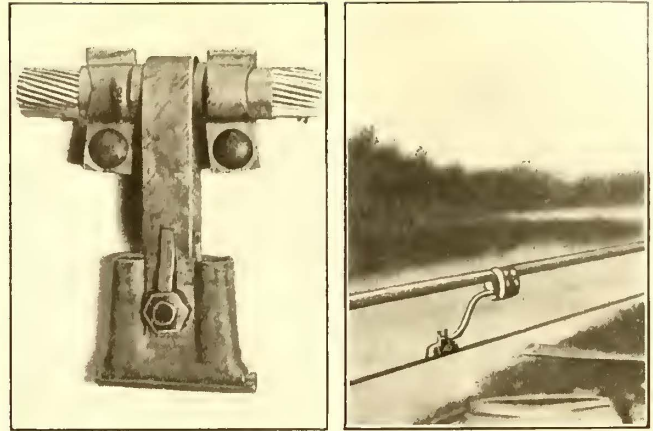
PART OF CAR INSPECTION MONTHLY SUMMARY SHEET

small repairs. On the main line between Boston, Framingham and Worcester, the cars average a daily run of about 250 miles, the schedule speed being the highest of any interurban road in Massachusetts. Cars traverse the company's own lines from Chestnut Hill to Lake Junction, 31 miles, in one hour and fifteen minutes. The system of inspection records used on the road is illustrated herewith. Fig. 1 shows two samples of a series of car inspection blanks, the originals being

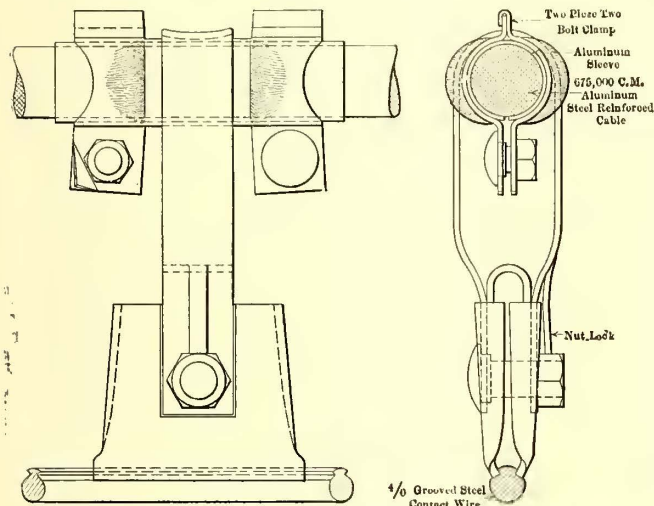
Aluminum Catenary Messenger with Steel Contact Wire Used on L. E. & N. Ry.

Specially Designed Fittings Provide Simple Overhead Construction—Methods of Splicing Are Described

The Lake Erie & Northern Railway is a single-track, standard-gage road, extending from Galt, Ont., through the cities of Paris, Brantford and Simcoe to Port Dover, on Lake Erie, a distance of about 50 miles. In this distance approximately 36 miles consists of tangent track. The curves are all comparatively easy with the exception of a few short lengths near the sidings and yards where the curvature becomes as great as 7 to 9 deg. There are a number of sidings as well as yard tracks at certain points along the road, particularly at Galt and Brantford. Both passenger and freight service is provided. In the former there are six quadruple-equip-



PRESSED STEEL CATENARY HANGER WITH ALUMINUM SLEEVE AND CLAMPS, AND FEEDER TAP, MESSENGER TO CONTACT WIRE



DETAILS OF PRESSED STEEL CATENARY HANGER

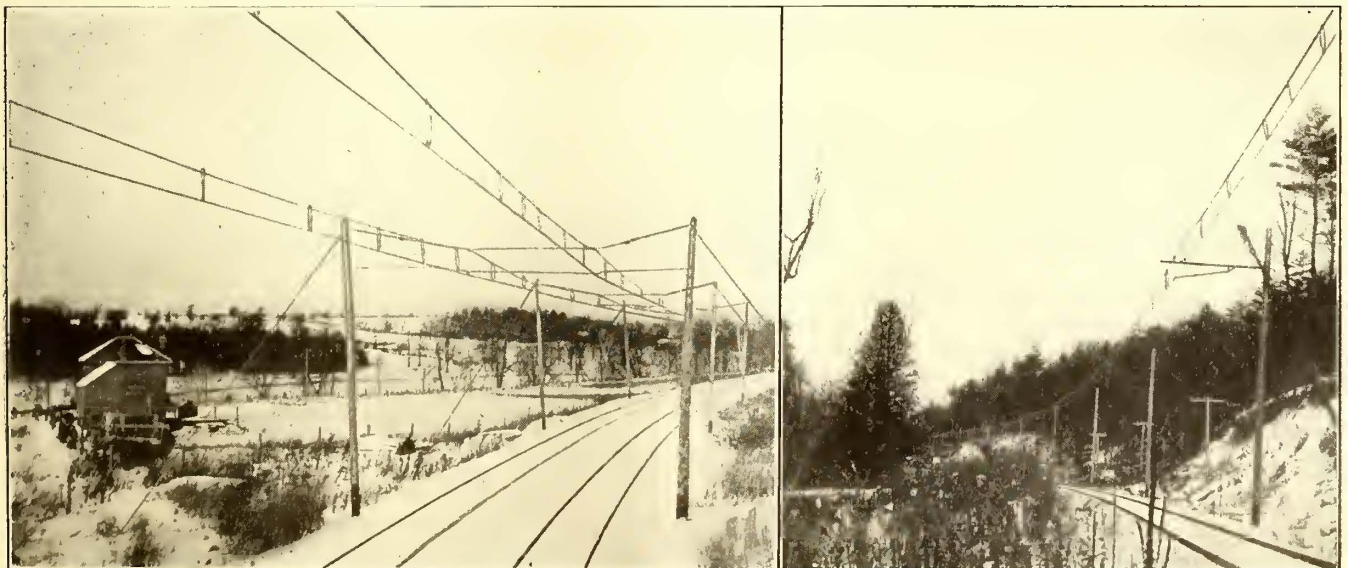
ment interurban-type cars, operating at a maximum speed of 45 m.p.h. The freight service is cared for by two 60-ton locomotives. The line voltage is 1500 d.c.

The general features of this road and details of the locomotive were covered in articles appearing in the issues of the ELECTRIC RAILWAY JOURNAL for May 27,

1916, page 986, and Oct. 7, 1916, page 730, respectively. The purpose of the present article is to describe the rather novel overhead construction. The general offices of this property are at Galt. Martin N. Todd is general manager and Matthew Kirkwood is electrical engineer. The overhead lines were designed and erected under the direction of Mr. Kirkwood.

In approaching the problem of electrification the officials of the railway made a careful investigation of the types of overhead construction and kinds of material available. They finally decided upon the use of wooden poles with T-iron bracket arms, carrying a single messenger conducting cable and supporting a single contact wire 22 ft. above the rails.

The traffic conditions contemplated required for conductivity the equivalent of two No. 0000 copper conductors throughout the length of the line. To obtain the simplest possible construction it was decided to use a messenger cable having the combined qualities of maximum strength and necessary conductivity. For this purpose an aluminum cable with a steel reinforcing core was adopted. This cable consists of an extra high strength double galvanized steel core of seven strands, each 0.1118 in. in diameter. Around this core are stranded, in three layers, fifty-four hard-drawn pure aluminum wires, each having a diameter of 0.1118 in. The aggregate cross-section of the aluminum part of the cable is 675,000 circ. mil, and as the conductivity of the



OVERHEAD CONSTRUCTION ON L. E. & N. RY.—SPAN-WIRE SUPPORT AT TURNOUTS AT LEFT; BRACKET SUPPORT AT RIGHT



JOINING STEEL CORE WITH SPLICING SLEEVE

aluminum is 61 per cent this cable corresponds to two No. 0000 hard-drawn copper conductors of 97 per cent conductivity. The weight per foot of the complete cable with the steel reinforcing core is 0.874 lb. The weight of the two No. 0000 copper conductors would be 1.316 lb.

The messenger cable is spliced by joining the steel core with a McIntyre sleeve, which consists of a steel tube 18 in. long and having a figure 8 cross-section. This tube is given four and one-half turns by means of a pair of twisting tongs. Before making up the McIntyre joint, one-half of an aluminum sleeve is placed over each end of the cable. After the McIntyre joint is complete the halves of the aluminum sleeve are brought together and screwed up tight like a pipe coupling. The ends of the aluminum sleeve are bored to fit the exterior of the cable closely. The ends of the sleeve are successively placed between the dies of a hydraulic press and the aluminum is cold forged around the cable. The metal flows into the interstices between the strands, making a practically perfect joint. The press is operated from a small hand pump, with which it is connected by means of a small flexible pipe. It exerts a pressure of 100 tons.

For the contact wire a No. 0000 grooved, double-galvanized steel wire was selected. The characteristics of this wire are 14 per cent conductivity; weight, 0.562 lb. per foot, and elastic limit, 36,000 lb. per square inch. The material was furnished in continuous lengths of approximately 1 mile, on reels of 48 in. in diameter and 22 in. wide.

The contact wire is suspended from the messenger cable by flexible hangers placed 15 ft. apart. These hangers are made from sheet-steel stampings thoroughly galvanized. The stem of the hanger is in the form of a loop which fits over a stamped sheet-steel galvanized clamp bolted around the messenger cable. This clamp is of the approximate shape of a spool, so that the hanger is free to slide up and down as the collector on



HYDRAULIC PRESS FOR JOINING ALUMINUM STRANDS IN SLEEVE

the car passes under it, but it is prevented from coming in contact with the aluminum cable. The shield is used around the cable so that the constant rubbing of the hanger may not in time wear away the strands of the messenger.

The poles are spaced 150 ft. apart on tangents and closer on curves. The messenger cable is installed with a sag of 2 ft. at 60 deg.

In order to carry current from the messenger cable to the contact wire, an aluminum parallel-groove clamp is bolted to the messenger cable in every span. The other side of the parallel groove clamp carries a No. 00 flexible copper jumper, which is attached by set screws to a feeder ear on the contact wire.

The messenger cable is furnished in continuous lengths of approximately 1 mile, and on reels approximately 5 ft. in diameter.

The track consists of standard 85-lb. rails, bonded with No. 0000 copper bonds electrically welded on each joint.

The advantages claimed for the Lake Erie & Northern overhead construction are: (1) Great strength in the messenger cable on account of the steel core, which has an elastic limit of 130,000 lb. per square inch. (2) Durability. On account of the lightness of aluminum the main conductor can be placed around the messenger cable where it is most conveniently located for feeding the contact conductor, but is not impaired by the wearing away of the latter. (3) Saving in insulators and labor of installing an independent feeder cable. (4) Use of a comparatively cheap but durable contact conductor, which is not relied upon for conductivity. (5) Low coefficient of expansion of the contact conductor, together with higher elastic limit, rendering steel better for this purpose than other materials.

Study and Comparative Tests of Electric Headlights

Analysis of Experiments with Headlights in Inter-urban Service, Showing Various Degrees of Efficiency Under Different Conditions

BY R. N. HEMMING

Superintendent of Motive Power, Union Traction Company of Indiana, Anderson, Ind.

The subject of headlights has been and is now one of great concern to all railway properties for the part it plays in safe operation between sunset and sunrise. Many railway properties, both steam and electric, are at present and have for many years past been experimenting on different types and locations of headlights. These include oil, acetylene gas and electric lamps, with the mounting in some cases on the dash and in others in the hood of the car.

Strange as it may seem, all of the headlights on the market seem to be very successful on some properties and utter failures on others, although the conditions in general are identically the same, except for the differences due to atmospheric conditions or geographic locations, where mist, fog or a hazy atmosphere may be common in one case and totally absent in another.

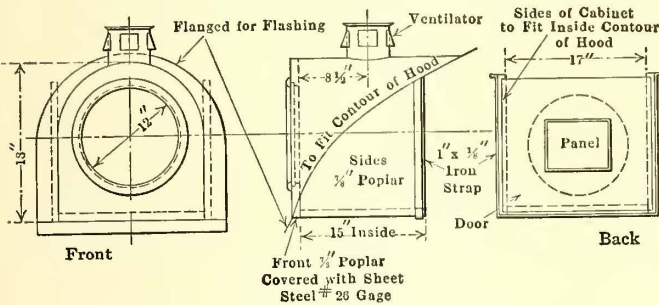
There are many types of headlights on the market and three which are in most common use: the inclosed carbon arc, the luminous arc and the incandescent lamp, all of which have some good features, but more objectionable ones. The inclosed carbon arc possesses some splendid features, especially from an illuminating standpoint, and it ranks among the best and is liable to come into use again. It has the common weakness of inner globe breakage and requires frequent trimming, resulting in a high maintenance cost. Its mechan-

ism is apparently not any more subject to failure than the luminous arc mechanism. The relative cost of repair parts for it may be a little in excess of those for the latter on account of its obsolescence.

The luminous arc headlight also has its defects, and its illuminating value varies, like all others. The luminous arc demands daily attention, particularly as to the cleaning of lenses and reflectors, which become coated with a heavy deposit from the electrodes. If not removed, this naturally affects the illuminating efficiency. The shifting of the arc around the electrodes very materially affects the illumination intensity. This is also characteristic of the inclosed carbon arc, but not to as great a degree, due to the difference in the diameter of the carbons compared to the electrodes. Each type, however, is subject to the forming of craters, thus causing the arc to flicker and often to be extinguished entirely.

While the use of the bull's-eye or semaphore lens has been a great improvement, it has not offset all of the evils. It would seem that here is a timely suggestion for the manufacturer to improve the electrodes.

The incandescent headlight has been looked upon with a great deal of favor, as it seemed for a time to overcome all of the objections found in the arc types. The incandescent headlight for interurban service, however,

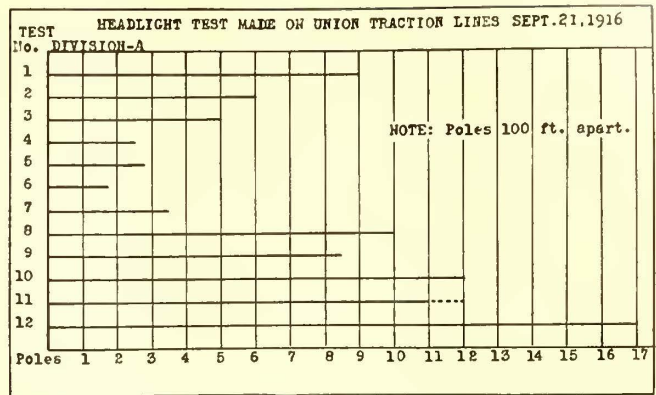


DETAILS OF U. T. CO. HEADLIGHT MOUNTING

is only efficient and reliable as long as the line voltage is up to the proper amount to give the lamp its required voltage. The fluctuation of potential is more noticeable on this type of lamp than either type of arcs. Many attempts have been made to design some reliable and practical voltage regulator to overcome this objection, but apparently only one or two have proved to be successful. In one of these, low-voltage lamps all wired in series are used.

This plan involves the use of other than the type of lamp now standard. As, I believe, it is customary to use 36-watt tungsten lamps of a voltage to make them available for use in residences and stores, there is a temptation to theft on the part of persons minded to steal. The low-voltage lamp used with voltage regulators has little commercial value, hence is not so liable to be stolen, one reason why this scheme demands careful attention. At the same time it is desirable to standardize interurban car lighting as far as possible as more and more in the future this business will depend upon long-haul traffic involving the operation of the cars over foreign lines.

The next experimental step with the incandescent lamp was to operate it independently of the trolley circuit by means of a storage battery, using either an independent battery or taking current from batteries operating the controller circuits. This has been done with more or less success. The keeping of these batteries charged up to full capacity without employing any special apparatus was important, and a plan was devised to utilize the air compressor load, sometimes adding the lighting circuit. If batteries are not required

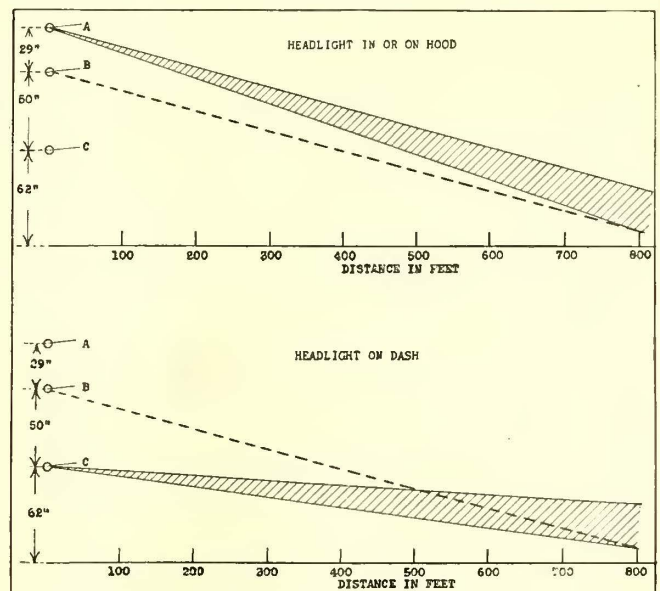


DATA FROM HEADLIGHT TEST, U. T. CO. OF IND.

for the control circuits and an independent battery is installed for the lighting alone, the illuminating results and efficiency are highly satisfactory, but the cost of installation is almost prohibitive.

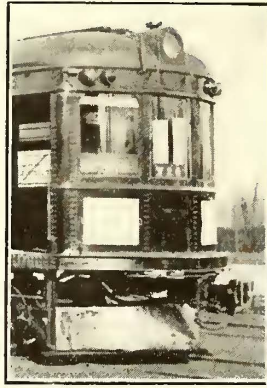
Two of our cars were equipped, one with six batteries charging and discharging in series, with a two-way switch in the circuit to transpose the compressor circuit, and the other car with two sets of batteries charging in series and discharging in parallel with an automatic relay to transform the connections from series to parallel and vice versa, and also a two-way switch in circuit to transpose compressor circuit. The former was not entirely satisfactory on account of the discharge capacity not being sufficient to operate continuously a 6-volt, 18-amp., 108-watt concentrated film lamp. The latter proved very satisfactory except that shopmen at the various division points and also on foreign lines had to be ever mindful to see that the batteries were fully charged and distilled water added when needed. It frequently occurred that the car would lay up at some division point or foreign shop all day and if the batteries did not receive attention, the headlight would be very dim or possibly not light at all. Therefore, it is doubtful if the storage battery is going to prove to be all that is desired.

Much interest has been displayed in the development and claims made for the headlights which cast a golden beam of light. Several different trade names have been assigned to this type by their respective manufacturers, but they do not differ much in appearance, especially as to the color of the reflector. The claims



LIGHT BEAMS FROM HOOD AND DASH-MOUNTED HEADLIGHTS

which were made for this type, compared to the white beam, were accepted by many as theoretical. However, time and practical tests have proved their claims. The golden beam by tests in mist, haze and fog has penetrated to a greater distance than the white beam and is worthy of careful consideration. The white beam seems to cause a mirror effect in rainstorms and mist and will scarcely penetrate a fog at all. The blinding effect of the white beam to the public and cattle is dangerous. The golden beam has been found to eliminate these objections. Any person can look squarely into the golden beam and then look away without being blinded or having the sight impaired. The maintenance cost of this type of headlight with concentrated filament Mazda lamp would be almost nil. The maintenance cost of the batteries could not be predetermined. Service and make of battery would have to be considered to determine this.



STANDARD HEADLIGHT MOUNTING, U. T. CO. OF IND.

Some tests were made on Sept. 21, 1916, to determine the comparative illuminating value of these several headlights. The results of these tests are shown on the accompanying illustration in graphic form. The man used as the object to be detected in judging the distance illuminated by the various headlights was dressed in dark cloth and his coat collar turned up so there was no means of seeing his white collar or the back of his neck. Thus he presented a completely dark object. The distance was judged by the motorman in the car, an important consideration as an observer standing outside the car would be able to see farther than one inside.

Division A

Test 1. Luminous arc headlight equipped with a semaphore lens; mounted in the hood of the car; a man could be seen on the track with the car standing, at 900 ft.

Test 2. Same headlight mounted on the dash; car standing; a man could be seen at 600 ft.

Test 3. Same type of headlight but with a clean plain glass substituted for the semaphore lens; mounted in hood; car standing; a man could be seen at 500 ft.



TRACK ILLUMINATED BY ARC HEADLIGHT

Test 4. Same headlight as No. 3, only hung on the dash; car standing; a man could be seen at 250 ft.

Test 5. Same type of headlight as in No. 4 after being burned twelve hours without either repairing, trimming or cleaning; mounted in hood; car standing; a man could be seen at 275 ft. This headlight was not cleaned for the test as we desired to observe the relative condition or the effect on the illuminating value, which might be impaired by the deposit from the electrodes, but it will be noticed that even though the headlight was in this condition the motorman could see 25 ft. farther with the headlight mounted in the hood than he could in Test 4 with a perfectly clean headlight mounted in the dash.

Test 6. Same headlight as used in Test 5, only mounted on the dash; car standing; a man could be seen at 175 ft. This gives a direct comparison of the same headlight under the same conditions, but in one instance mounted in the hood and in the other, mounted on the dash.

Test 7. Carbon arc headlight on the dash; car standing; a man could be seen at 350 ft. This headlight was too large to go into the hood of the car and therefore comparisons were not made from that position.

Test 8. Headlight of the golden beam characteristics, operated with storage batteries; mounted in the hood; car standing; a man could be seen at 1000 ft. Unfortunately the focusing screw was somewhat defective and the best results could not be obtained. See Test 12.

Test 9. Same conditions as above, only headlight hung on the dash; car standing; a man could be seen at 850 ft.

Test 10. One of the luminous arc headlights with semaphore lens was placed in the hood and a run was made from Hunt's Siding to Block's Siding, a distance of 6.48 miles. The car had attained maximum speed and at times the light would shine down the track so the motorman could see for a great distance. At one time a passenger signaled the car and the motorman was watching to make a test. It was found that it was 1200 ft. from the point at which the motorman first saw the passenger to the one where the passenger was standing. It was only at times, however, that this was possible, on account of the arc shifting from one side of the track to the other due to its traveling around the electrodes. Twelve hundred feet under running conditions is a decided exception rather than the rule, and in this instance it occurred at the moment when the arc happened to be in its most effective position.

Test 11. A headlight of the golden beam characteristic, the same as used in Test 8 and operated on storage battery, was placed in the hood on the return trip and a run was made from Block's Siding to the carhouse, a distance of 9.25 miles. The car had attained its maximum speed and it was found that the motorman could see on the average from 1100 ft. to 1200 ft. and the track was constantly and brightly illuminated as far as this light would penetrate. This light was very satisfactory and much better than any of the arc lights that were tested.

Test 12. The same outfit as in Tests 8 and 11, except that the focusing screw was repaired. With the car running, a man could be seen at 1600 ft.

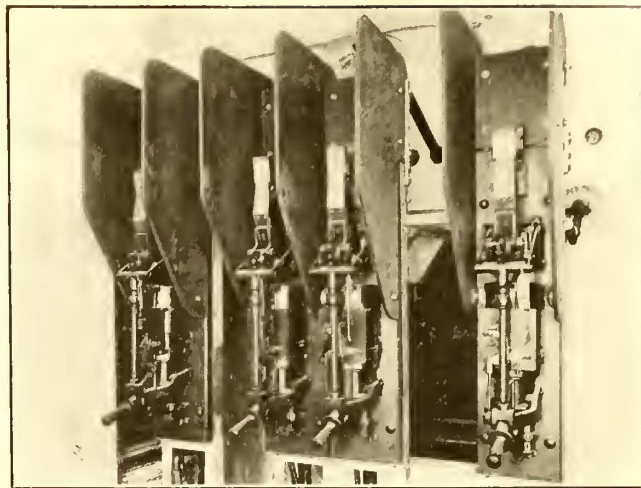
All of the Union Traction interurban cars have the headlights mounted in the hood. The exterior appearance will be observed in the accompanying photograph, which shows that this mounting really adds to the appearance rather than otherwise. The headlight resistance is placed in the motorman's cab. This is also an important factor in reducing the maintenance cost, as it puts the headlight up out of the way of minor accidents

and out of the elements. Details of the headlight hood box are shown in the accompanying drawing. We propose to install adjusting screws, one on each side of the headlight hood box and one on the bottom, so as to focus the headlight and keep it in a rigid position while the car is running, otherwise it keeps shifting about in the hood.

From many previous headlight tests (about two per year) it has also been demonstrated that the illuminating efficiency has been greatly increased by mounting the headlight in the hood. This was first based on theory and then proved in practice. Attention is directed to the accompanying print showing comparative visions which the motorman has in front of his car with the headlight mounted on the dash or in the hood. It will be noted that when the headlight is on the dash, the motorman must look through the rays of light to see the track or any object in front of his car, whereas when mounted in the hood his vision is beneath the ray and he has full vision of the track up to the point where his vision and ray of light and track meet. When a headlight is mounted on the dash, and especially with a white beam of light, it has been proved beyond a doubt that the motorman's vision is greatly impaired in observing any object along the track or right-of-way, and especially so in a mist or rain.

In conclusion, for illuminating efficiency, the golden beam with the headlight mounted in the hood and operated from a reliable storage battery, is the ultimate solution of the highest degree obtainable, but the unfortunate part is the initial cost of such installation.

The Selah Manufacturing Company, Newark, N. J., has developed a line of threadless pipe clamps for use in the support of busbar insulators, switchboard panels, etc. The clamps are made in two parts hinged together and compressed on the pipe by means of one set screw each. The design provides a powerful leverage with slight tension on the bolts. There is also sufficient elasticity to furnish continuity of pressure. One interesting application of the clamps is in attaching pipes to walls in connection with expansion bolts.

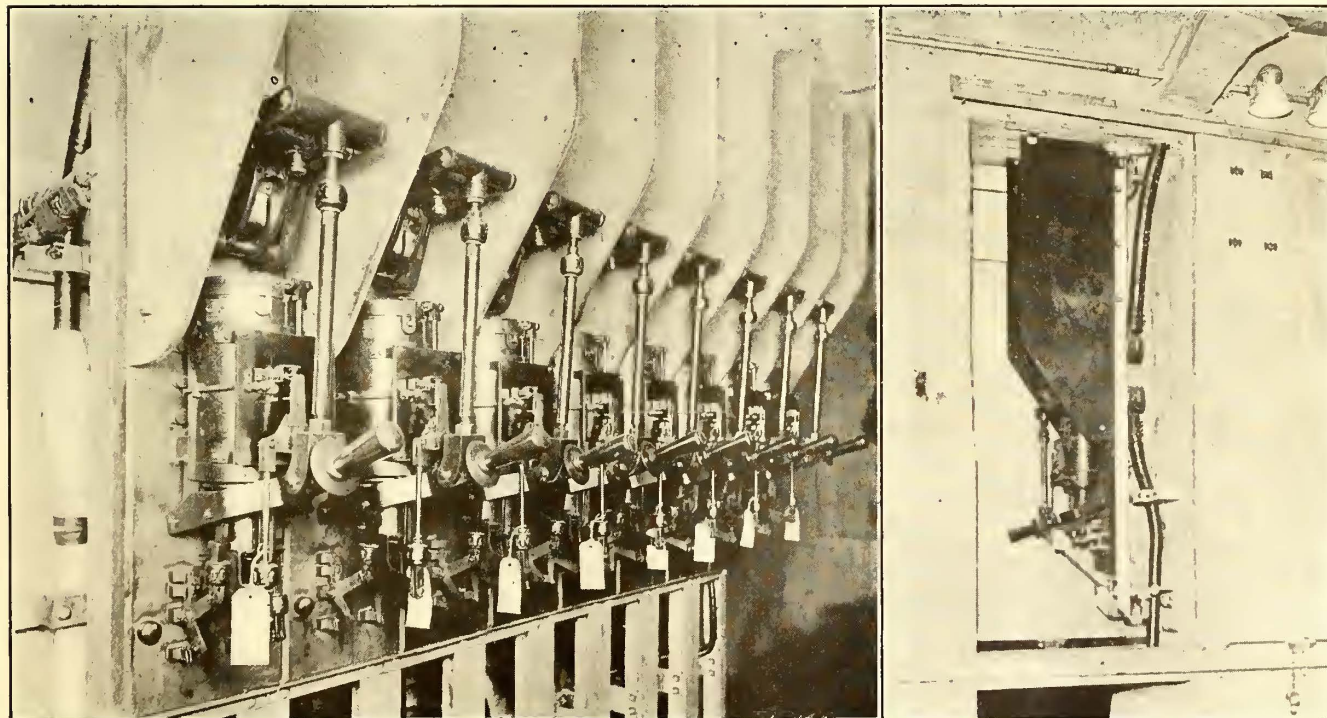


REMOTE-CONTROL CIRCUIT BREAKERS IN NEW SUBWAY SYSTEM, NEW YORK MUNICIPAL RAILWAY

Interesting Applications of Circuit Breakers for the New York Municipal Railway

In connection with its third-rail conductors the New York Municipal Railway Corporation has installed more than 100 3000-amp. continuous-load circuit breakers. These are of I-T-E remote-control type without over-load feature, but arranged to give indicating lights at the substation—red when the breaker closes, green when it opens.

They are placed in cabinets under the stairways of passenger stations or else in the upper part of niches in the retaining walls along the right-of-way. Those in the latter location take a minimum amount of copper, as they are located only a few feet from the third rail. These circuit breakers are so mounted on narrow slate panels that the entire breaker can readily be removed if necessary. Ebony transite shields are installed on each side of the breakers to confine and direct the arc. The compartments are closed by sliding doors



REMOTE-CONTROL CIRCUIT BREAKERS IN SPECIAL CHAMBER IN SUBWAY, NEW YORK MUNICIPAL RAILWAY—CIRCUIT BREAKER IN COMPARTMENT IN SUBWAY CURTAIN WALL

made up of a galvanized iron frame with 1/4-in. transite. In the subway the breakers are installed at the ends of substation feeders where the latter are attached to the third-rail so that the feeders can be disconnected for testing; or to prevent burning of the cables in case of failure of the cables which would be injured by being kept alive from the substation connected to the other end of the third-rail section.

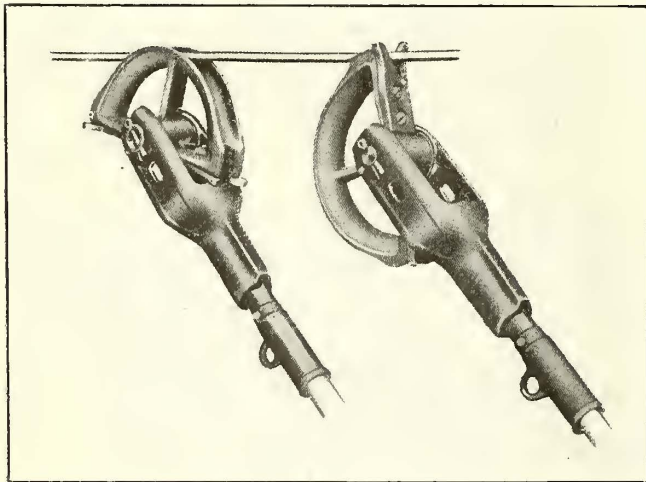
At other places, these breakers are used to tie together the third-rails of all four tracks in order to keep up the voltage at intermediate points; also as a means of supplying power to the third-rail if the feeders on any conductor rails are out of service for any reason. The importance of these ties can be better appreciated when it is stated that currents up to 10,000 amp. are transferred to one rail from the adjacent rails for momentary periods in the starting of trains.

These tie circuit breakers permit a much lower setting of circuit breakers in the substations, as the total load on any one rail is supplied from all the feeders available, thereby protecting all circuits against severe shorts.

Semi-Rotary Sleet Cutter

Difficulty has been experienced with some sleet cutters when it became necessary to back up cars for short distances, as the cutters frequently gripped the wire, forcing the "overhead" upward under great strain, or jumped off the trolley wire altogether. A new type of semi-rotary sleet cutter, which is being sold by the Bayonet Trolley Harp Company, is designed to overcome this fault.

The cutter consists of a malleable iron half-wheel, grooved like a trolley wheel and provided with remov-



SEMI-ROTARY SLEET CUTTER IN POSITIONS ASSUMED IN BACKWARD AND FORWARD MOTION

able blades made preferably of phosphor bronze or steel. These blades or shoes are securely attached by means of stove bolts to the plane side of the half wheel, and the contact surfaces, which are made of V-form, slide along the trolley wire and cut off the sleet. Each cutter has two blades, which are said to be practically self-sharpening. As the surface of the cutter below the cutting groove is perfectly plane, there is little likelihood of the ice accumulating and clogging up the cutter.

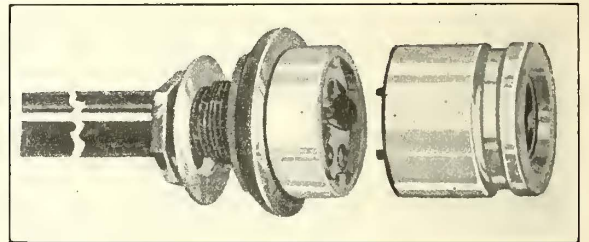
The cutter is designed to be placed on the trolley wheel axle in place of the trolley wheel, so that the latter is entirely removed from the danger of being burned up by the flashing.

In operation the cutter revolves until the segment

rests against the trolley harp, bringing the cutting edge into action. In case it is necessary to back up, the half-wheel revolves forward until the opposite side of the segment rests on the top of the trolley harp, allowing the wire to slide easily through the smooth groove of the round portion of the wheel. With the two cutting blades, if one burns out before a car has completed its trip, the other edge can be turned up by simply turning the wheel over in the harp, thus bringing the second cutter into action.

Combination Shade and Socket

A lighting unit for use in carhouses, shops, etc., consisting of a combination of a one-piece porcelain enameled steel reflector and a porcelain socket assembled by means of a special holder, is being marketed by the Central Electric Company, Chicago, Ill. The holder consists of a substantial malleable-iron reflector seat



COMBINATION SHADE AND SOCKET

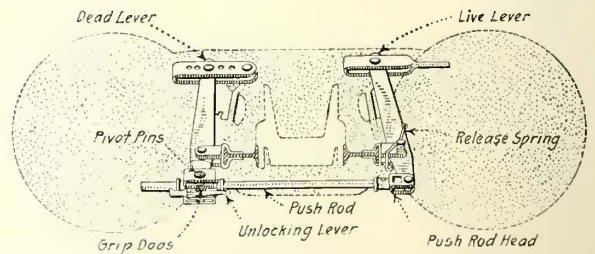
with a neck at the top as shown in the accompanying illustration.

The reflector is held solidly between a lead washer and a locknut above and a special cork washer on top of the reflector seat below. A split porcelain socket is employed, the upper half of which is fastened to the reflector seat. Two long contact screws support the lower half of the socket and make connections electrically between its two parts.

These fittings are made to accommodate all of the standard types of reflectors for lamps up to 1000 watts. With lamps of 300-watt capacity and larger a mogul-base socket is supplied.

Automatic Brake Slack Adjuster

Recent developments in brake slack adjusters have been made by the Gould Coupler Company, New York. One of the latest is an adjuster which takes the place of the turnbuckle or bottom rod connection found on



AUTOMATIC BRAKE SLACK ADJUSTER ADAPTED TO BRAKE BEAM TRUCKS

most trucks, or the tie rod connection on cylinder levers. Its application to the brake beam truck is shown in the accompanying illustration. It may be used with all types of trucks and brakes automatically to adjust the piston travel.

NEWS OF ELECTRIC RAILWAYS

Traffic and Transportation

Financial and Corporate

Personal Mention

Construction News

NEW TRANSIT OFFER IN PHILADELPHIA

P. R. T. Agrees to Equip and Operate the City-Built High-Speed Lines in Conjunction with Its Own Lines as One System

The Philadelphia (Pa.) Rapid Transit Company on Dec. 20 submitted to the city a proposal that a contract for the operation of the city's high-speed lines shall be undertaken by it under the following general terms, which, if acceptable to the city, can be incorporated in a contract drawn in definite terms so as to protect adequately the interests of both parties:

"The Taylor plan covers an elevated from Front and Arch Streets to Bridge Street, Frankford; an elevated from Thirtieth and Market to Darby; a subway in Broad Street with branches and with a delivery loop, and a subway elevated line from City Hall to Roxborough via the Parkway, Twenty-ninth Street and Henry Street. It provides that the Philadelphia Rapid Transit Company shall equip these lines, extensions thereof and other lines built by the city and operate them in conjunction with its own lines as one system, granting free transfers at intersecting points, so that the citizens would get the fullest possible benefit from this great expenditure by the city.

"Heretofore the condition of the rapid transit company was such that it was proposed that the receipts of the two lines should be kept separate, and the company protected by a so-called preferential payment to the extent that its earnings were diverted to city lines. The great improvement that has taken place in the financial condition of the company makes this plan no longer necessary, as this company is to-day making on its own system a greater amount than it is willing to accept as an assured fixed share of the profit from the joint operation of the two systems. Its surplus applicable to dividends for the current calendar year with the month of December estimated will be very close to \$2,400,000, or 8 per cent upon the full-paid capital of the company.

"The company, therefore, proposes that the two systems should be operated as one—financially as well as physically. All payments, charges and credits between the city and the company to be eliminated, and the gross receipts from such operation to be applied to the payment of:

- "1. The actual cost of operation of the combined system.
- "2. The fixed charges of the company.
- "3. A cumulative dividend of 5 per cent upon the actually paid-in capital stock of the company.
- "4. Ten per cent of the remaining net surplus from operation to be paid to the company and the remaining 90 per cent to be the annual current net revenue to the city from the operation of the city-built lines and paid into the city treasury as such, within the meaning of the recent amendment to the Constitution.

"In so far as may be necessary, the 1907 contract to be amended so as to cover this distribution of net surplus earnings and the company to waive all claims for back dividends due to it thereunder.

"The company has earned a substantial surplus, which at the close of its last fiscal year was in excess of \$2,700,000, the cash balance at the same date being approximately \$3,000,000, out of which it has since distributed a dividend of 2 per cent, or \$600,000.

"It has added substantially to that surplus during the last five months of operation. Until it assumes actual operation of the city's lines under the proposed contract it will limit its dividend distributions to 5 per cent per annum from July 1, 1916, and will carry over into the new arrangement as working capital all surplus which it may have acquired at that time.

"The contract shall reserve to the city the right at any

time to purchase the company's property or outstanding capital at a price equal to the par of such stock with dividends accumulated and unpaid during the term of this contract, and may use the sinking fund accumulations for that purpose. The city may also at any time during the term of the contract take back the municipal properties under a fair recapture clause.

FREE TRANSFERS

"Exchange tickets shall be abolished at the earliest practicable moment and free transfers given on surface and high-speed lines outside the delivery district as recommended in the report of the Director of City Transit for 1915. The company will forthwith remodel its Nineteenth Street station on the Market Street Elevated and will make it a stop for high-speed trains and establish a transfer at that point with the Nineteenth and Twentieth Street lines with a further transfer thereon in order to give to passengers between West Philadelphia and either North Philadelphia or South Philadelphia an opportunity to make the journey on the high-speed line and for a single fare, thus relieving a discrimination that would otherwise exist in favor of Frankford, and giving adequate high-speed service to the district tributary to the Nineteenth Street station.

"All payments into the city treasury under the 1907 contract and for tax dividends of subsidiary companies to stop at the time exchange tickets are abolished. The present sinking fund under the 1907 contract to remain in the hands of the commissioners and payments into the same to be resumed five years after the date of the extension of said contract as provided therein.

"The system shall be operated with a 5-cent fare, but provision shall be made for such readjustments of fare at any time during the term of the contract as may be necessary to protect and secure the return to the company as specified herein and necessary and advisable in the interest of the city for any unforeseen reason or contingency.

"The company will undertake to equip and operate the city lines when and as built after the city has obtained a certificate of public convenience. The form of security to be issued by the company to cover the company's contribution for construction and equipment of city's lines to be the best compatible with the interests of both parties.

CAPITAL REQUIREMENTS FOR COMPANY'S SYSTEM

"The company will undertake to obtain \$19,500,000 of new capital as and when required for the future requirements of its own system. If obtained by the payment of the unpaid portion of Union Traction stock the company will be permitted to amend its lease with that company so as to pay a rental equivalent to \$5 a share upon its full-paid capital. If obtained by an issue of Union Traction preferred stock or Philadelphia Rapid Transit preferred stock or on any other form of security there shall be allowed a return of 6 per cent cumulative thereon as one of the fixed charges of the company.

"It has been suggested that the city might from time to time offer to build feeder or surface lines which would be reasonably remunerative and rent them to the company on a 5 per cent basis. If this were done fifty-year bonds issued by the city to cover the cost would not count against the city's borrowing capacity and the rental paid the city would meet the interest and sinking fund requirements of such bonds. Thus the city would ultimately become the owner of such lines free of debt. This suggestion, which meets with our approval, should, we believe, receive your consideration.

"The contract shall be executed and take effect as soon as it secures the approval of City Councils, the Public Service Commission and the stockholders of the Philadelphia Rapid Transit Company. The fifty-year period of operation and the extension of the 1907 contract shall run from

the beginning of operation of the first of the city-built lines.

"The 1907 contract shall be so amended as to conform with the terms of the new contract.

5 PER CENT AND CONTINGENT INTEREST

"The plan as proposed has to recommend its definiteness, fairness and a promise of immediate advantage to the citizens in the elimination of exchange tickets. The city seizes the best possible operator for its system with a free interchange of passengers between privately owned lines and municipal high-speed lines—a result never before attained in any city. All complicated accounting is avoided, and while the stockholders of the company take a 5 per cent fixed return upon their actual cash capital, in addition there-to they retain a sufficient contingent interest in the success of the joint enterprise to insure a careful and competent management on their part."

MAYOR MAKES STATEMENT

The Mayor issued a statement as follows:

"The Mayor will have no statement to make regarding the attitude of the administration on the proposed transit lease in advance of his message to Councils on this subject. The matter is of such vast importance to the people of Philadelphia that the administration will investigate every phase of it before making any recommendations. The proposal submitted by the company has been referred to the transit department. The transit director has been instructed to make a report to the Mayor, who, in the meanwhile, will give careful consideration to every point involved in order that the people and their representatives in Councils may be fully informed as to the responsibility involved in the undertaking both by the city and the company."

The finance committee and the street railways committee of Councils, a joint body, now have before them the ordinance introduced several weeks ago by Mayor Smith which the company declined to agree to in its original form. The company's proposition, which is a counter to that offered by the city, will be referred by Councils to that committee.

INCREASE IN WAGES IN ATLANTA

The Georgia Railway & Power Company, Atlanta, Ga., on Dec. 22 announced a substantial increase in the wages of its men, effective on and after Jan. 1. According to officers of the company, the new wage scale means the distribution among the men of \$50,000 additional each year hereafter. In a statement which he made following the announcement, P. S. Arkwright, president of the company, said:

"This is not a bonus, but a permanent and continuing payment from the company to the men in recognition of their efficient and loyal services and in alleviation of their increased living expenses. It was decided upon several months ago, and very nearly was prevented by the losses we were made to suffer recently. We determined, however, that the men were entitled to the increased pay and it should not be withheld from them. It is made notwithstanding the company's own heavily increased expenses. The increase is in line with the company's policy of increasing wages. Before 1902 the rate of pay in Atlanta was from 12 cents to 15 cents an hour. With the merger in that year, a flat rate of 15 cents was made effective. In 1906 this was increased to a minimum of 16 cents and a maximum of 20 cents. In 1910 it was still further increased to a maximum of 23 cents an hour. In 1912 the wage scale was made from 17 cents to 25 cents an hour. We shall continue to increase wages from time to time as conditions justify."

The announcement of the increase was made by H. M. Atkinson, chairman of the company's board of directors; Mr. Arkwright, and W. H. Glenn, vice-president and operating manager, at the regular December meeting of the men. Mr. Atkinson had come from Philadelphia especially to be present and add his personal greetings.

The new wage scale will be as follows: For first year of service, 20 cents an hour; second year, 22 cents; third year, 24 cents; fourth year, 25 cents; fifth year, 26 cents; sixth year and thereafter, 27 cents an hour. Conductors and motormen on the Marietta and Stone Mountain lines

will receive 29 cents an hour. The wage scale which the new one supersedes is as follows: For first three months of service, 17 cents an hour; second three months, 18 cents; second six months, 19 cents; second year, 21 cents; third year, 23 cents; fourth year, 24 cents; fifth year and thereafter, 25 cents an hour. Stone Mountain and Marietta lines, 27 cents.

ADVERTISING FOR EMPLOYEES

Rochester Company Uses Posters — Labor Situation Not Acute in Many Localities

The question of labor supply in the electric railway industry seems to depend largely upon the location of the companies reporting. Those in the center of the great machine-shop sections naturally have suffered most, while those in the agricultural districts and where the textile and other industries are located and furnish the principal sources of employment have suffered least.

Any considerable shortage in labor is quick to manifest itself beyond the management directly concerned. After the management, the first persons who learn about it are quite naturally the other employees to whom such shortage manifests itself promptly in a number of ways. Following them, the general public learns of the shortage, which, if it becomes acute, is indicated directly in unmistakable ways. The fact that this is so true has led several companies frankly to admit that they were greatly hampered in putting service changes into effect because they were unable to secure the necessary help.

That the conditions which now confront some companies are not altogether of recent origin is shown in the case of the New York State Railways, Rochester Lines. Beginning in May, 1916, the company in Rochester experienced difficulty in securing men for positions as motormen and conductors. This was due to the fact that two large companies in the city began the manufacture of munitions and offered a large wage to men even though they had had no experience in machine work. The normal operating force on the Rochester city lines is approximately 1000 motormen and conductors. Between May 1 and Nov. 1, 435 men left the service, the majority of these resigning to accept other positions. Although the company advertised both in city and country papers for men and sent employment agents to various places, including points as far distant as Kentucky, the number of men in service fell to 915. During the latter part of October, realizing that inclement weather would increase the rush-hour demands for service, the company placed a large sign on the dash of each car in service announcing that men were wanted for motormen and conductors. The results were quite gratifying, as during the first week following sixty-six applications were received. On Dec. 1 the number of men in service had been increased to a total of 965, besides which there was a considerable number of men on the cars as students. In the early part of December fewer men were applying for positions, and as a consequence the advertising signs were again placed on the dash of cars. The number of applicants increased promptly.

As was stated before, the extent to which the electric railways have been inconvenienced has depended on their location considered industrially. Thus, the Boston (Mass.) Elevated Railway and the Bay State Street Railway, in the heart largely of the cotton goods and textile country, report an adequate supply of men for platform service at present, contrary to the shortage noted in some other sections of the country. In the case of the former, only a few new men have been employed recently. The return of various employees from military service on the Mexican border, increased use of trail cars, and generally attractive employment conditions on the property are factors in the company's adequate supply of men at the present time. Inquiry at the offices of the Stone & Webster Management Association developed no particular shortage of men on the Northwestern or Southwestern properties. Especially in the latter case, recent wage increases have tended to swell the ranks. On the Blue Hill Street Railway and the Brockton & Plymouth Street Railways, in Massachusetts, some difficulty is being experienced in securing men, but no special campaigns have been undertaken.

TAX ACTION SUPPORTED BY FULL ST. LOUIS BOARD

The board of directors of the United Railways, St. Louis, Mo., through its president, Richard McCulloch, has issued a statement in which it indorses the acts of Henry S. Priest, general counsel for the company, in the litigation in which the company resisted the payment of the mill tax. The statement by the board follows:

"The directors of the United Railways regret that the impression has been created that the litigation in the matter of the mill tax suits did not receive their full support. Such an impression is unfounded. At a meeting of the board of directors of the United Railways held June 20, 1916, at which were present Messrs. Adkins, Brown, Carleton, Francis, Jones, McCulloch, Priest and Shapleigh, the following resolution was unanimously passed:

"Resolved, That the president be authorized and instructed to notify Judge H. S. Priest, general counsel of this company, to continue to defend the mill tax cases brought by the city of St. Louis against this company and any of its constituent companies."

"The Eastern interests, represented by J. D. Mortimer, questioned the advisability of the last petition to the United States Supreme Court for a rehearing, and advised payment, without further litigation, of the judgments affirmed by the Missouri Supreme Court.

"At a meeting of the board of directors of the United Railways held on Dec. 19, 1916, at which were present Messrs. Brown, Carleton, Francis, Jones, McCulloch, Priest and Shapleigh, the following resolution was unanimously passed:

"Resolved, That every step taken in the courts in relation to the mill tax suit by the general counsel was authorized and was with the full approval of the board."

CHANGES IN BOSTON ELEVATED ORGANIZATION

The following appointments will go into effect on Jan. 1 on the Boston (Mass.) Elevated Railway:

J. Walter Allen, acting electrical engineer, appointed electrical engineer of the company.

Cyrus Corliss, assistant to the chief engineer of mechanical and electrical engineering, appointed construction engineer of the department of power.

Joseph A. Howard, chief clerk, department of power, appointed assistant to the superintendent of power.

Messrs. Allen, Corliss and Howard will report directly to Fred S. Freeman, superintendent of power. On Dec. 12, 1916, J. J. Donahue was appointed chief operating engineer.

The work of inspection and maintenance of elevated and subway structures, now performed under the jurisdiction of the vice-president, will be placed in direct charge of the department of maintenance of way on Jan. 1. A. T. Sprague, Jr., superintendent of steel erection and maintenance, will thereafter report direct to H. M. Steward, chief engineer of maintenance of way. The latter will assume the responsibility for the inspection and safe and suitable maintenance of elevated and subway structures and surface line bridges. Steel workers, painters, tools and materials from stock will be furnished by the chief engineer of maintenance of way to the vice-president upon his requisition when necessary for construction work under his charge.

THOMPSON COMMITTEE TO REPORT IN FEBRUARY

Senator Thompson, chairman of the Legislative investigating committee which inquired last winter into the work of the Public Service Commissions of New York, was interviewed on Dec. 27 with respect to the recommendations to be made by the committee to the incoming Legislature as based on the testimony taken by the committee. He promptly denied the report that the committee would ask for an extension of time in which to continue the taking of testimony. He said that the report will touch upon every matter taken up by the committee during the investigation and it will be presented to the Legislature along with the testimony. It may not be ready before February because of the time it has taken to make a digest of the testimony, so that the volumes would be serviceable for easy reference.

NORTHERN OHIO IMPROVEMENTS OUTLINED

The new Akron terminal station, more car-line extensions in Akron and Canton, more new cars in these cities and elsewhere, a large increase in power plants, and the new substation in East Akron, are some of the improvements in the program of the Northern Ohio Traction & Light Company for 1917.

As has been already announced, the Akron terminal station will be carried to completion as rapidly as possible. The Carmichael Construction Company is now tearing away the old brick buildings of the former Webster, Camp & Lane Company, which for many years have occupied the site. Continued low temperature may mean some delay, but the steel is ready for shipment. The main building will be 179 ft. x 84 ft. and four stories high. The train shed will be approximately 147 ft. x 179 ft., with the abundant trackage facilities arranged in the most modern manner. A restaurant and other accommodations will adjoin the large central waiting room. On the upper floors of the building will be the general offices of the company. Upon the completion of the station, interurban cars will make this the point of arrival and departure.

For the Akron City lines, thirty-one new cars of the largest and most modern type have been purchased. Ten trailers of the type used in Cleveland have also been purchased. For Canton twenty-five new pay-enter cars have been purchased. These are in addition to the cars which are now coming through for Canton and which, upon their arrival, will release five new pay-enters in use in that city, which will later be turned over to Akron. This equipment, which will place all Canton lines on the pay-enter plan, will be ready in the very near future.

The subject of car line extensions is receiving attention. This applies to both Akron and Canton. In the latter city the lines to be built were tentatively agreed upon when officials of the company met the City Council and other city executives in Canton on Dec. 13.

Sale of Bay State Parks Authorized.—The Public Service Commission of Massachusetts has authorized the Bay State Street Railway to sell Lakeside Park, Freetown; Dighton Park, Dighton; Westwood Park, Westwood; Glen Forest Park, Methuen; Mountain Rock Park, Tyngsboro, and Long Beach Resort, Gloucester, the board having found them unprofitable in the recently decided 6-cent fare case.

Cleveland Trail-Car Matter Settled.—On Dec. 26 the Council of Cleveland, Ohio, approved the plan of having fifty trail cars built in the new shops of the Cleveland Railway. J. J. Stanley, president, agreed to build as a test three all-steel cars, such as Street Railway Commissioner Sanders recommended. The rest of the fifty will be a combination of steel and wood, the type in use at the present time. This plan was approved by the Council and the matter is now settled.

Employees Receive Insurance Policies.—Some 200 employees of the Manhattan & Queens Traction Corporation, New York, N. Y., received life insurance policies worth \$500 apiece at Christmas. The insurance is issued by the Travelers Insurance Company, Hartford, Conn. The employer will pay the entire premium, the only condition being that those who benefit shall join the mutual benefit association. Practically all the employees have joined the association already and consequently the coverage will be practically complete. Each policy is on the one-year renewable term plan.

Quebec Employees Awarded Increase in Wages.—The report of the board of three arbitrators, appointed in connection with the settlement of the one-day strike of a number of employees of the Quebec (Que.) Railway in September last, was made public on Dec. 12. The arbitrators were unanimous in granting the men an increase in pay of 2½ cents an hour. Under the old scale the men were paid as follows: first year, 18½ cents; second year, 19½ cents; third year, 21 cents; seventh year, 22½ cents. The new scale follows: first year, 21 cents; second year, 22 cents; third year, 24 cents; seventh year, 26 cents. The new scale is to remain in force for a period of three years.

Iowa Road to Be Scrapped.—It has been decided to tear up the 36 miles of the Chicago, Anamosa & Northern Rail-

road, often called the "Can" road, and ship the whole thing to England, to be relaid over there. With the rails will be included six freight cars, two combination passenger cars, three locomotives and six steel bridges. The road runs from Anamosa, Iowa, in a northerly direction to Quasqueton. No trains have been operated over it since November, 1915. The property was sold under foreclosure in July, 1916. Plans were under consideration at one time for electrifying the road and making it part of the Waterloo, Cedar Falls & Northern Railway.

Status of St. Louis Franchise of I. T. S. Unchanged.—City Counselor Daues of St. Louis, Mo., on Dec. 20 announced he would not seek an injunction to restrain the Illinois Traction System from violating the franchise agreement to charge not more than 5 cents fare to an adult between points in St. Louis and the Tri-cities in Illinois, but would await the decision of the Board of Aldermen on a bill to repeal the company's franchise, introduced by Alderman Barney L. Schwartz. The Interstate Commerce Commission recently decided that the Illinois Traction System was entitled on its showing to charge a graduated fare, varying from 6 to 10 cents, according to the number and kind of tickets purchased, stating that a city could not indirectly control or regulate interstate commerce by a franchise condition.

Colorado Court Upholds Commission Control.—Exclusive and original jurisdiction in all cases involving rate making and service of public utilities rests solely with the Public Utilities Commission of Colorado under a decision of the State Supreme Court, which on Dec. 5 denied a rehearing in the case brought by the Denver & South Platte Railroad against the town of Englewood. The Supreme Court ruled the lower court had no jurisdiction where the question of a contract between a city and a public utility corporation was involved. The railway contracted to supply transfers to a Denver line. Later it repudiated this contract. When Englewood went into court to force the company to give transfers the utility commission intervened, claiming the courts had no jurisdiction.

U. S. Deputy Marshals on Springfield Cars.—In connection with the injunction proceedings to prevent the employees of the Springfield (Mo.) Traction Company from going on strike Judge Van Valkenburgh of the District Court of the United States for the Western District of Missouri at Kansas City, some time after granting his original writ, issued an order to the marshal's office to place United States deputy marshals on as many cars in Springfield as was necessary to insure constant operation in accordance with the terms of the injunction issued by him. These marshals were withdrawn a short time ago. On Dec. 20 the railway was operating cars on all lines and only one car less than the regular number, there being twenty-two cars in service then as compared with twenty-three run regularly. The circumstances attendant upon the strike were reviewed in the *ELECTRIC RAILWAY JOURNAL* for Nov. 4, page 988.

Move to Dismiss Indictment Against Public Service Commissioner.—A motion that the bribery indictment against ex-Public Service Commissioner Robert Colgate Wood be dismissed was made by District Attorney Swann of New York City on Dec. 26 before Judge Nott in General Sessions. After hearing the motion from the District Attorney, as well as an argument by John B. Stanchfield, counsel for Mr. Wood, the court took the matter under advisement. The indictment alleging the solicitation of a \$5,000 bribe was found on Jan. 25 last, on which day the ex-Public Service Commissioner pleaded not guilty and was released in \$7,500 bail. The alleged disclosures regarding Mr. Wood first became public in testimony taken by the Thompson committee. The district attorney is said to have concluded that in the absence of corroborative testimony it would be useless to put Mr. Wood on trial. Judge Nott on Dec. 27 denied District Attorney Swann's request that the bribery indictment against Mr. Wood should be dismissed. District Attorney Swann replied with a statement in which he called the case against the former commissioner insufficient, and declared that he would be unable to get a verdict because of lack of evidence. Judge Nott in his opinion said: "It may be laid down as a general principle that where an indictment for felony is returned against a public officer hold-

ing an important position public policy requires that the case be publicly tried unless it is perfectly apparent that under no possible circumstance can the prosecution succeed, especially where it is evident that the trial of the case cannot be a long one, unduly burdening the parties thereto or unduly obstructing public business."

PROGRAMS OF ASSOCIATION MEETINGS

Railway Business Association

F. A. Delano, member of the Federal Reserve Board, former president of the Chicago, Indianapolis & Louisville Railway, and Alfred P. Thom, general counsel of the Southern Railway, and also general counsel of the railway executives advisory committee, are announced as the speakers for the eighth annual dinner of the Railway Business Association, which will be held at the Waldorf-Astoria Hotel, New York, on Tuesday evening, Jan. 16, 1917, at 7 p. m. The business meeting of the association will convene at 11 a. m. at the Waldorf-Astoria.

American Institute of Electrical Engineers

The American Institute of Electrical Engineers will hold its next meeting in Pittsburgh on Jan. 12, 1917, with headquarters at the Port Pitt Hotel. Following the policy adopted a short time ago, the institute, instead of confining its session to one annual meeting during the year, has decided to hold several meetings at stated intervals in various parts of the country.

The Pittsburgh meeting will be devoted to a discussion of "Braking Electric Vehicles by Regeneration," using the energy generated on down grades to apply brakes to the vehicles. The paper on this subject will be presented by R. E. Hellmund of the Westinghouse Electric & Mfg. Company. The meeting will be presided over by Harold W. Buck New York City, president of the institute.

The morning will be devoted to a meeting of the board of directors of the institute, and the afternoon to an excursion to the various industrial plants in the Pittsburgh district. The session of the institute will be held in the English Room of the Fort Pitt Hotel in the evening. It will be preceded by an informal dinner.

National Civic Federation

The seventeenth annual meeting of the National Civic Federation will be held at the Hotel Astor in New York City, on Jan. 22 and 23, 1917.

In addition to the résumé of the year's work by President V. Everit Macy at the opening session, departmental reports will be made by L. A. Coolidge for the welfare department, August Belmont for the workmen's compensation department, Warren S. Stone for the social insurance department, John Hays Hammond for the industrial economics department, Miss Maude Wetmore for the woman's department, Alton B. Parker for the department on reform in legal procedure, Jeremiah W. Jenks for the department on regulation of industrial corporations, Louis B. Schram for the industrial accident prevention department, and A. J. Porter for the minimum wage commission.

The other sessions of the meeting will be devoted to the consideration of some of the larger economic and military problems confronting the American people during and at the close of the European war, such as:

"The Lesson from the Mobilization on the Mexican Border."

"The Indifference, if not Positive Opposition, of the Wage Earners and Farmers to all Preparedness Programs."

"Will There Be a Flood of Immigration or a Flood of Emigration?"

"Must this Country, to Secure Military Efficiency, Copy the Paternalistic Social Program of Germany?"

"Can the Great Forces of Production, of Labor, and of Finance be Cemented Into One Big Force to Grapple with the Oncoming Problems?"

The annual banquet of the federation will be held on the evening of Jan. 23. The luncheon of the woman's department will be held on Jan. 22.

Financial and Corporate

MUNICIPALITY DISREGARDS CONTRACT

Bondholders of Brazilian Utility Make Strong Protest Against Disgraceful Action

At a recent meeting in London of the debenture holders of the Bahia Tramway, Light & Power Company, Bahia, Brazil, a strong protest was made against what was designated as a "disgrace to any civilized community," i. e., the deliberate disregard of obligations by the municipality of Bahia, one of the most important cities of Brazil.

At the instigation of the municipality and under a contract approved by it, according to the report submitted by the trustees to the debenture holders, the property of the Bahia Tramway, Light & Power Company was transferred to the city on March 19, 1914, for a provisional 6 per cent sinking-fund bond of \$7,605,000, the city not being able to pay cash. From this point obstructive tactics were pursued by the city. The interest and sinking-fund payments due in July, 1914, and January, 1915, were not made, and the municipal council in addition tried to lower the amount of the provisional bond from \$7,605,000 to \$6,746,000.

On March 29, 1915, however, as a result of sequestering some of the municipal funds, the company secured from a new municipal leader an authorization for the delivery of definitive bonds in exchange for the full sum (\$7,605,000) of the provisional bond, and also a promise for a payment of \$200,000 in cash and \$210,000 in one-year promissory notes to cover the interest and sinking-fund charges up to January, 1915. These payments were made as promised. In the latter part of 1915 another new municipal head tried to secure a cancellation of the bonds in exchange for a renewed concession, but this was refused because there was no guarantee that a new concession would be any more respected by the municipality than the old one had been. Moreover, it was found on investigation that the property since the transfer to the city had fallen into such a state of neglect that \$700,000 would be required to insure its proper working.

The municipality then offered \$1,500,000 in cash for the bonds and in final settlement of everything, but this was refused. In July, 1916, the municipality issued a formal protest against carrying out the contract, stating that according to Brazilian law "contracts that cause enormous injury to one of the parties can be cancelled." This protest was not regarded seriously, but was thought to be an excuse to trap the company into long and expensive litigation. Later the \$210,000 of promissory notes were returned dishonored by Brazilian banks, while not a penny of the \$750,000 of fixed charges due since January, 1915, has been paid.

At present, therefore, matters have come to a deadlock, and the London debenture holders believe that the situation should be explained in Great Britain and the United States. In the view of the trustees the action of the municipality is particularly deserving of censure because it first fostered and protected illegal competition against the company and then of its own volition made an offer to purchase. Until the city ceases to disregard its admitted liability it is thought that no fresh loan should be negotiated by it anywhere. It is felt that the Brazilian government should look into the matter and prevent the city from repudiating its contract.

VALUATION OF CHICAGO-AURORA LINE

During the arbitration proceedings now in progress between the Aurora, Elgin & Chicago Railroad and its employees, Bion J. Arnold was called on to appraise the railway property of the company. Mr. Arnold made a rough study of the physical property, exclusive of the lighting properties, and, using the book values for copper and rail, arrived at a total valuation of \$11,382,982. General, legal and organization expenses were placed at 2 per cent and the bond discount at 10 per cent. On the basis of the total valuation, it was shown that the company was not receiving the reasonable return allowed by the courts.

ANNUAL REPORT

San Francisco-Oakland Terminal Railways

The comparative income statement of the San Francisco-Oakland Terminal Railways, Oakland, Cal., for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Railway operating revenue.....	\$4,417,847	100.0	\$4,353,891	100.0
Railway operating expenses....	3,063,084	69.3	2,932,652	67.4
Net revenue—railway operations..	\$1,354,763	30.7	\$1,421,239	32.6
Auxiliary operations—net.....
Net operating revenue.....	\$1,354,763	30.7	\$1,421,239	32.6
Taxes assignable to railway operation:				
Real or personal property...	\$5,786	0.1	\$7,235	0.2
Earnings	258,976	5.9	241,929	5.6
Miscellaneous	230	0.0	2,716	0.0
Total	\$264,992	6.0	\$251,882	5.8
Operating income	\$1,089,771	24.7	\$1,169,357	26.8
Non-operating income	60,413	1.3	62,664	1.4
Gross income	\$1,150,184	26.0	\$1,232,021	28.2
Deductions:				
Rentals	\$1,298	0.0	\$291	0.0
Interest on funded debt....	849,674	19.2	852,308	19.6
Interest on unfunded debt...	166,634	3.8	170,750	3.9
Miscellaneous	1,854	0.0	2,233	0.0
Total	\$1,019,461	23.0	\$1,025,583	23.5
Net income	\$130,722	3.0	\$206,438	4.7

The railway operating revenues for the last fiscal year showed an increase of \$63,956 or 1.5 per cent over those of the preceding year. The gain was not sufficient to bring the revenues back to the 1914 figure, but it was an appreciable advance in view of the still existing jitney competition. During the first half of 1915 the jitneys diverted from the company at least \$150,000 in revenue, and it is not unlikely that this figure was doubled during the last fiscal year.

The operating expenses rose to a greater extent than the revenues in 1916, the total increase being \$130,432 or 4.4 per cent. As a result the net revenue from railway operations fell off \$66,476 or 4.6 per cent. Taxes continued to rise, on account of the increased tax on earnings, and non-operating income fell off, but these were partly counterbalanced by a decrease in interest charges and miscellaneous deductions. The net income for the year at \$130,722 represented a decrease of \$75,716 from that of the preceding year. The surplus on June 30, 1916, was \$99,695 as compared to \$276,751 the year before.

UNJUSTIFIABLE MANAGEMENT PRACTICES

Massachusetts Commission Disapproves Overlapping Control in Construction and Managing Contracts Save Under Exceptional Circumstances

In an order recently made public, the Massachusetts Gas & Electric Light Commission sets forth its disapproval of certain classes of public utility construction and management contracts in which overlapping control is a feature of the administration. The order, which is addressed to all companies under the commission's direction, states that the board has for some time viewed with concern the control of the directorates of certain of the companies under its supervision by officials and employees of engineering, construction and management organizations and corporations with which the companies involved have from time to time contracted for extensions and improvements of and managerial services for their respective properties. In the opinion of the commission such practices are wrong in principle.

The order states that whatever justification may exist for these practices in public service companies whose credit is feeble or future hazardous and uncertain, "that justification ceases when their financial position is firmly established. The management of such companies should be in the hands of directors and officers responsible solely to their stockholders and the public whom they have undertaken to serve. For reasons that are obvious companies should not have any dealings in supplies or materials or make any contracts for construction or management with another

corporation, partnership or association when said company has upon its board of directors or as its president, manager, purchasing or selling officers, or as its agent in the particular transaction, a person who is at the same time a director, purchasing or selling officer, or agent of, or who has any substantial interest in, such other corporation, partnership or association, unless and except such purchases shall be made from, or such dealing shall be with, the bidder whose bid is the most favorable to such company, to be ascertained by honestly conducted competitive bidding. Notice is hereby given of the conclusions reached by the board to the end that no company under its supervision shall hereafter enter into contracts and relationships of the character above described save under exceptional circumstances and with the approval of the board, and that upon the expiration of existing contracts they shall not be renewed."

ALLOWABLE CAPITALIZATION FOR PURCHASER OF FORECLOSED RAILWAY

The Massachusetts Public Service Commission, in a recent finding approving the issue of \$120,000 of capital stock by the Norton, Taunton & Attleboro Street Railway, following a receiver's sale of the antecedent Norton & Taunton Street Railway, discussed the basis for determining the allowable capitalization in the case of the successor company. In the opinion of the commission, the words of the statute "fair cost of replacing" are equivalent to "cost of reproduction less accrued depreciation." It is the intent of the statute that a company organized to take over street railway property purchased at a receiver's sale shall start with a clean slate, not handicapped by the past, and shall be in at least as favorable a position as though the enterprise were entirely a new one. In order that this may be the case, the capitalization of such a company must be based upon the depreciated value of the property acquired. Street railway property purchased at a receiver's sale, being not as good as new, enjoys less time in which to accumulate funds for its ultimate replacement. For this reason allowance was made for depreciation in the case not only of the materials but also of the labor entering into construction, for both of these elements of cost must be repeated in connection with replacements.

In preparing their estimate of reproduction cost the engineers of the commission used the average unit prices prevailing during the last five years so that the valuation might not be affected by temporary or abnormal conditions. As the railway is small and its traffic very light, in estimating depreciation longer lives were assumed in the case of certain of the property units than would ordinarily be assumed. No allowance was made for depreciation in the case of a large portion of the overhead charges, on the ground that most of these charges would not arise in connection with replacements.

NEW STOCK ISSUE AUTHORIZED

Tidewater Southern Railway to Spend \$600,000 on Improvements to Its System in California

The California Railroad Commission has authorized the Tidewater Southern Railway, Stockton, to issue \$600,000 of its common stock of the par value of \$1 a share, to net the company not less than 80 per cent of par. The proceeds of the stock are to pay for improvements of the system, including \$109,700 for a proposed extension from Hatch to Irwin City, 8 miles; \$68,250 for an electric line from Modesto to Turlock, 16 miles; \$12,000 for additional overhead from Ortega to Stockton, 3 miles, \$88,000 for notes issued; \$15,000 for the Tuolumne steel bridge; \$15,000 for lining up the present track; \$40,000 for property in Modesto, \$10,000 for property in Turlock and other expenditures. The Turlock and Modesto property purchases are for terminals. The original application to the commission was for permission to issue 850,000 shares, but that part of the application concerning the right to issue 250,000 of these to Byron A. Bearce, president of the company, in return for properties sold by him, and for the surrender by him of a certificate for \$2,000,000 held for voting purposes only, is held in abeyance.

The Tidewater Southern Railway operates a standard

gauge railway from Stockton to Turlock, and to Hatch in the San Joaquin Valley, 50 miles. In addition 8 miles have been surveyed from Hatch to Irwin City. The plan of the company is to extend its construction into Merced County to reach a rich section which offers abundant traffic. In this connection it is necessary to acquire terminals and yards at Modesto and Turlock, to construct interlockers at crossings, and to build warehouse terminal facilities, as well as to electrify the line from Modesto to Turlock.

The company has 945,703 shares of stock of a par value of \$1 a share, of which 30,000 shares are preferred. The company has on hand \$50,000, and materials and supplies worth \$15,000. Its obligations consist of \$466,500 of 5 per cent bonds due in 1942, \$88,000 of notes payable and \$40,000 of accounts payable—a total of \$594,500. The commission has previously set a "present value" on the company's properties as of June 30, 1914, of \$713,493. President Bearce testified before the commission that capital additions had been made to the property which would bring the total value to \$1,128,910. Mr. Bearce estimates that the railway will earn \$150,000 in the next fiscal year, with a net profit of \$30,000 after the payment of fixed charges. He estimates that the gross receipts from the fiscal year 1917-1918 will be \$300,000, with a net profit of \$100,000. The company has made traffic connections with the Southern Pacific Company, the Atchison, Topeka & Santa Fé Railway and the Western Pacific Railway.

LEGAL STREET RAILWAY BONDS

The Massachusetts Public Service Commission in a report forwarded to the bank commissioner has listed all the Massachusetts street railways which it appears from the returns made by them have annually earned and properly paid, without impairment of assets or capital stock, an amount in dividends equal to at least 5 per cent upon their outstanding capital stock in each of the five preceding years. The bonds of the companies so certified are legal investments for savings banks. The names of the companies that qualify under the ruling follow:

Boston & Revere Electric Street Railway; East Middlesex Street Railway; East Taunton Street Railway; Fitchburg & Leominster Street Railway; Holyoke Street Railway; Springfield Street Railway; Union Street Railway; West End Street Railway and Worcester Consolidated Street Railway.

The commission also certified that the bonds of the Boston Elevated Railway and of the Milford & Uxbridge Railway are legal investments of savings banks by virtue of chapter 273 of the acts of 1915.

No company that was on the list last year has been dropped this year, while the East Taunton Street Railway has been added.

In its report the commission makes it clear that it has not determined whether or not the street railways listed have made adequate provisions for maintenance and depreciation.

Chicago City & Connecting Railways, Chicago, Ill.—A semi-annual dividend of \$2.25 has been declared on the 250,000 shares of stock of the Chicago City & Connecting Railways, payable on Jan. 1 to holders of record of Dec. 23. In July, 1916, \$1 per share was paid.

Chicago (Ill.) City Railway.—An extra dividend of 1¼ per cent has been declared on the \$18,000,000 of stock of the Chicago City Railway, along with the regular quarterly dividend of 2 per cent, both payable on Dec. 29 to holders of record of Dec. 26. In March, June and September last 2 per cent was paid.

Cities Service Company, New York, N. Y.—The Cities Service Company has declared an additional dividend of one-half of 1 per cent on the common and preferred stock along with the regular monthly one-half of 1 per cent, both payable on Feb. 1. The company has arranged that holders of fractional stock dividend warrants may allow them to remain with the company until such time as these fractions total a full share. Under this plan, holders of the fractional warrants will receive on their fractions the regular cash and stock dividends and on the delivery of full shares of stock they will also receive their cumulative cash dividends, any fractional dividend warrants being retained for further cumulation.

Detroit (Mich.) United Railway.—The shareholders of Detroit United Railway at the annual meeting to be held on Feb. 6 will be asked to approve an increase in the capital stock of the company from \$12,500,000, all outstanding, to \$25,000,000, the additional \$12,500,000 to be issued from time to time and in such amounts as required. A statement made by the directors says that it will be necessary to incur obligations and expend considerable amounts of money in the acquisition and construction of additional lines of electric railway, etc., as well as in betterments and improvements, the cost of which would be properly chargeable to capital account. The proposal to increase the authorized stock indicates that the company plans to finance its future capital requirements by the sale of capital stock.

Kansas City, Outer Belt & Electric Railway, Kansas City, Mo.—The Federal Court at Kansas City, Mo., has postponed indefinitely the sale of the property of the Kansas City, Outer Belt & Electric Railway pending measures for joint re-organization with the Kansas City, Mexico & Orient Railway.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Harper & Turner, Philadelphia, Pa., are offering at 102½ and the dividend, yielding about 6.83 per cent, \$3,467,000 of 7 per cent cumulative preferred stock of the Mahoning & Shenango Railway & Light Company. The stock is callable as a whole but not in part at 110 per cent and dividends. The authorized issue is \$10,000,000. The amount outstanding is \$3,500,000. The stock was originally sold for cash at par to the Republic Railway & Light Company, which controls the Mahoning & Shenango Railway & Light Company. Of the total issue, \$3,000,000 was deposited as collateral to secure an issue of the Republic Company three-year 5 per cent notes. All these notes were called for payment, the cash for this purpose being realized from the sale of this preferred stock. Holders of the notes had the right to convert their notes at par for preferred stock and upward of \$500,000 of notes were so converted. The additional \$500,000 of preferred stock was issued for improvements and other capital expenditures.

Manitowoc & Northern Traction Company, Manitowoc, Wis.—The property of the Manitowoc & Northern Traction Company has been sold to the Wisconsin Securities Company by Thomas Higgins, owner and president of the company. This company operates an electric railway between Manitowoc and Two Rivers, a distance of approximately 10 miles. New officers have been elected for the Manitowoc & Northern Traction Company as follows: Clement C. Smith, president; C. R. Phenicia, secretary; Howard Greene, treasurer; J. G. Miller, manager.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—The property of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company will be sold at auction under foreclosure on or before May 27, 1917, in accordance with an order issued by Federal Judge Booth.

National Properties Company, Philadelphia, Pa.—A semi-annual dividend of 3 per cent has been declared by the National Properties Company on the \$2,491,400 of common stock, payable on Dec. 30 to holders of record of Dec. 20. In July last 2 per cent was paid.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—Formal permission has been granted to the New Jersey & Pennsylvania Traction Company by the Board of Public Utility Commissioners to transfer upon its books 5000 shares of its capital stock to the Bucks County Interurban Railway of Pennsylvania. The Bucks County syndicate now holds all the traction company's capital stock. The traction corporation has also been allowed to open upon its books a "Property Abandoned" account because of the sale of its securities to the amount of \$439,445 to the syndicate. The latter, however, must surrender for cancellation 5000 of the outstanding shares, leaving 5000 outstanding. In October the company sought to transfer the 10,000 shares to the Pennsylvania Power & Light Company, but the utility board refused to authorize the action. The transfer of securities had left a deficit on the books and this will be taken care of under the new plan. The independent operation of the New Jersey & Pennsylvania Traction Company will not be altered or its financial status affected.

Ohio Valley Electric Railway, Huntington, W. Va.—Newburger, Henderson & Loeb and Bioren & Company, Philadelphia, Pa., and Scott & Company, Wilmington, Del., have placed privately an issue of \$1,675,000 of first mortgage 5 per cent thirty-year gold bonds of the Ohio Valley Electric Railway, guaranteed principal and interest by endorsement by the American Railways.

Oklahoma (Okla.) Railway.—It is the intention to take the North Canadian Valley Railway, Oklahoma City, over into the Oklahoma Railway organization on Jan. 1, as the last-named road owns the property.

Public Service Corporation of New Jersey, Newark, N. J.—A gross increase in total business of \$438,240, representing an increase of 13.1 per cent over November, 1915, is shown by the financial statement of the Public Service Corporation of New Jersey for November last. The balance available—after payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus was \$580,493, and the increase in surplus available for dividends over the corresponding month of 1915 was \$56,150. For the eleven months ended Nov. 30, 1916, the gross increase in total business amounted to \$4,534,683 or 13.4 per cent. The balance available for amortization, dividends and surplus totaled \$5,148,875, and the increase in surplus available for dividends was \$1,074,889.

Republic Railway & Light Company, New York, N. Y.—The Republic Railway & Light Company has declared the regular quarterly dividend of 1½ per cent on the preferred stock and an initial common dividend of 1 per cent, both payable on Jan. 15 to holders of record of Dec. 30.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has filed with the California Railroad Commission a petition for a continuance of authority to issue \$180,000 of equipment notes, to secure funds to pay in part for thirty-two new cars. The original authority for this was granted by the commission last May, but the time of issuing the notes was limited to Dec. 31, 1916. The railways says that it did not avail itself of this authority until Nov. 22, when it issued half of the amount authorized. It has not made any further issue because the builder of the cars ordered has not been able to make delivery of the twenty modern pay-as-you-enter cars until now and the early part of 1917. In order to save interest on these equipment notes, the company has been holding them back as the builders of the twelve additional cars for the Twelfth Street line will not make delivery until the second quarter of next year. For this reason the company wants the authority for note issues extended until June 30, 1917.

Sunbury & Susquehanna Railway, Sunbury, Pa.—The bondholders of the several units which make up the consolidated Sunbury & Susquehanna Railway have appealed to the Supreme Court of Pennsylvania against an order to sell at foreclosure the property of the company in its entirety. A hearing is set for Jan. 3, 1917. Judge Cummings in the County Court at Sunbury ordered the property sold some time ago, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 19.

DIVIDENDS DECLARED

Birmingham Railway, Light & Power Company, Birmingham, Ala., 3 per cent preferred.

Boston & Worcester Electric Companies, Boston, Mass., \$1, preferred.

Chicago City & Connecting Railways, Chicago, Ill., \$2.25, preferred.

Chicago (Ill.) City Railway, quarterly, 2 per cent; extra, 1¼ per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus (Ga.) Electric Company, 3 per cent, preferred.
 Halifax (N. S.) Electric Tramway, quarterly, 2 per cent.
 Honolulu Rapid Transit & Land Company, Honolulu,
 Hawaii, quarterly, 2 per cent.

International Traction Company, Buffalo, N. Y., quarterly, 1 per cent, 4 per cent cumulative preferred; quarterly, 1 1/4 per cent, 7 per cent cumulative first preferred; quarterly, 1 1/2 per cent, common.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 2 per cent, common.

London (Ont.) Street Railway, 3 per cent.
 Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, 2 1/2 per cent, preferred.
 Montreal (Que.) Tramways, quarterly, 2 1/2 per cent.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1 1/4 per cent, preferred.

National Properties Company, Philadelphia, Pa., 3 per cent, preferred; 3 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1 1/2 per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., quarterly, 87 1/2 cents, common.

Philadelphia & Western Railway, Upper Darby, Pa., quarterly, 1 1/4 per cent, preferred.

Porto Rico Railways, Ponce, P. R., quarterly, 1 3/4 per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 2 per cent.

Republic Railway & Light Company, Youngstown, Ohio, quarterly, 1 1/2 per cent, preferred; quarterly, 1 per cent, common.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1 1/4 per cent, first preferred; quarterly, 1 1/4 per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, 3 per cent, common.

United Gas & Electric Corporation, New York, N. Y., quarterly, 1 3/4 per cent, first preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1 per cent.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1 1/4 per cent, preferred; 1 per cent, on account of accumulated dividends; 1 per cent, common.

Traffic and Transportation

FREIGHT SERVICE DEVELOPED IN KANSAS CITY From Twelve to Twenty Cars a Day Handled on 12-Mile Suburban Line Between 9 A. M. and 4 P. M.

The Kansas City (Mo.) Railways is working out more smoothly now its plans for improving suburban freight and express service in and near Kansas City, Mo. Increased leeway for the operation of freight service was granted by the Public Service Commission, after the railroads had threatened that no more freight cars would be turned over to the Kansas City Railways for delivery, unless congestion was overcome. At the time the complaint arose, there were said to be eighty-four cars of freight standing on the city railway tracks and switches, on the Dodson line. The Public Service Commission granted permission to the street railway to operate the freight line between 9 A. M. and 4 P. M. every day on part of the line, and all day on the rest of the line. Previously, freight cars could be moved only at night.

The Kansas City Railways has no freight cars of its own, but switches and hauls railroad freight cars with an electric locomotive, on a 12-mile line between Dodson and the Westport station, the latter in the south residence district of Kansas City. This is the route of the old Westport & Belt Railway, which for years was a "dummy" line operated by steam. Of late years it has been part of the electric railway system, and passenger cars have been operated over it. The building of new lines has transferred much of the passenger business away from the Dodson-Westport line. An incident of the development is that a controversy with citizens of Waldo, a station on the Dodson line, was recently solved by agreement to run more cars on one of these newer lines, the Country Club, which with the recent commission order allowing switching in the daytime, provided a double advantage for the freight service on the Dodson-Westport line. This 12 miles runs through a district which has not been built up with residence property until the past few years. One district has been almost entirely built of materials handled by the street railway, the real estate concern taking often as many as sixteen cars of building materials a day. Lumber yards, a coal yard, and other similar concerns receive freight cars billed via the Kansas City Railways.

The most significant phase of the increasing freight business, however, is the service to grocers and merchants with stores along the line. Two of the largest retail grocers of Kansas City get their supplies largely from Chicago, and receive them in car shipments direct to these branches. Many other merchants and individuals are getting the benefit of the freight service by arranging to receive their smaller shipments in combined full carloads.

The company now handles from twelve to twenty cars a day from the Missouri Pacific and the Frisco Railroads. Frequently the cars total forty-two a day. The company has extensive switch tracks and is building 800 ft. of additional switch at an intermediate station, and 900 ft. more of receiving track at the Dodson terminal, where the freight office is located, and where the junction is made with the railroads.

RAILWAY COMMISSION ACT ON CROSSING PROTECTION

The National Association of Railway Commissioners, which met in Washington on Nov. 14-17, took action which is expected to result in providing greater safety for the public at grade crossings of railroads and public highways. Upon the recommendation of the committee on grade crossings and trespassing on railroads, whose report was abstracted in the ELECTRIC RAILWAY JOURNAL of Nov. 25, the convention adopted certain recommendations for the additional protection of grade crossings and recommended to the several state commissions the submission to their re-

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '16	\$22,841	*\$21,740	\$1,101
1 " " '15	23,678	*20,902	2,776

DALLAS (TEX.) ELECTRIC COMPANY

1m., Oct., '16	\$211,642	*\$116,383	\$95,259	\$40,683	\$54,576
1 " " '15	185,200	*104,825	80,375	33,923	46,453
12 " " '16	1,939,462	*1,195,561	743,901	440,201	323,042
12 " " '15	1,865,517	*1,112,210	753,307	401,412	351,895

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Nov., '16	\$458,668	\$284,356	\$174,312	\$56,656	\$117,655
1 " " '15	341,974	200,063	141,911	54,241	87,669
11 " " '16	4,689,676	2,865,806	1,823,870	558,626	1,265,244
11 " " '15	3,510,933	2,155,044	1,355,889	575,269	780,620

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Oct., '16	\$205,490	*\$102,633	\$102,857	\$29,442	\$73,415
1 " " '15	181,515	*95,642	85,873	27,714	58,159
12 " " '16	1,886,666	*1,146,542	740,124	345,315	394,809
12 " " '15	1,730,709	*1,038,187	692,522	330,119	362,403

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Oct., '16	\$715,833	*\$440,857	\$274,976	\$184,794	\$90,182
1 " " '15	641,412	*391,703	249,709	182,911	66,798
12 " " '16	7,930,385	*5,062,817	2,867,568	2,208,368	659,200
12 " " '15	7,620,427	*4,754,319	2,866,108	2,170,492	695,616

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Oct., '16	\$72,246	*\$49,068	\$23,178	\$23,830	†\$652
1 " " '15	67,962	*44,492	23,470	23,274	196
12 " " '16	806,554	*545,425	261,129	281,515	†20,384
12 " " '15	800,410	*519,859	280,551	278,552	1,999

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Nov., '16	\$848,497	\$521,767	\$326,730	\$137,676	\$189,054
1 " " '15	795,274	484,236	311,038	139,783	171,255
11 " " '16	9,250,401	5,727,440	3,562,961	1,572,554	1,990,407
11 " " '15	8,617,714	5,504,360	3,113,354	1,556,202	1,557,152

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

spective legislatures of a bill for such enactments as may be necessary to put the recommendations into effect.

The recommendations, which were reported in the issue of Aug. 12 in connection with their approval by the American Railway Association after negotiations with the grade crossing committee, provided for the establishment of a cautionary sign to be placed in the highway at a distance not less than 300 ft. on each side of the railroad tracks; that the railroad companies continue to maintain on their rights-of-way such cautionary signs as are now in use; that all lights displayed at night toward highways at grade crossings shall be red; that during the day all crossing flagmen use a uniform white disk 16 in. in diameter, with the word "Stop" painted in black letters on its center instead of the varied colored flags which are now in use; that all crossing gates shall be painted white with diagonal stripes of black; that the railroad companies be required wherever practicable to maintain their property at grade crossings free of obstructions to vision and that the highway approaches to such crossings be so graded that the free passage of vehicles shall not be impeded.

Should these recommendations be carried out by the several states, the cautionary and danger signals, both day and night, at grade crossings will be uniform in every state of the Union, so that the automobile driver from New York State would recognize such signals if driving in California, or any other state, just as readily as he would at home. In the opinion of the committee and the railroad and automobile men who co-operated in this work, this very uniformity would prevent a great many accidents which are now due to mistaking signals. Some of the railroads have already acted upon some of these recommendations without waiting for direction from the State Legislature or commission. The striped painting of crossing gates has been adopted by several roads and the use of the white "Stop" disk in place of flags has been already put into effect.

ED HOWE SPEAKS

The Sage of Kansas Has Something Homely to Say About Reformers

Ed Howe of Kansas has recently said some things about reformers and reforms, in part as follows:

"When country-town idlers gather in the shoemaker's shop and discuss the question of the day, they always give the people the best of it.

"Every convention does the same thing; so does every orator and writer.

"The trouble is, the people cannot be given the best of it; nature will permit only a square deal. If, by means of plenty of laws and plenty of agitation, we advance wages until employers can't pay them, and are forced to close up, we have not helped ourselves; in fact, we have been injured. If we pass laws demanding that merchants sell us supplies at less than cost, nature steps in and punishes our greed and unfairness.

"We can't enjoy rights, and refuse them to others; much less can we demand more than is fairly coming to us and refuse others their just rights.

"Much that we call reform is plain unfairness; it is the pig instead of the patriot speaking.

"We can't rob the corporations in the way we are attempting. They must have as fair a deal for their business as we have for ours, or they can't exist.

"This is the decision of the Supreme Court of Nature, and all human courts, passions, prejudices and mobs must bow to it.

"I wish we could pass innumerable laws benefiting us in innumerable ways; it is so easy to pass laws and adopt resolutions, but all effective laws must be based on common sense and fairness.

"We might easily pass a law ordering the bankers to loan us all the money we want without interest, with the privilege of renewing our notes at will. Such a law, if it could be enforced, would end all our financial ills; but the actual result would be to close the banks and destroy a useful financial system on which worthy and intelligent men have worked for centuries.

"And we are not only willing to rob when we meet in convention, but we lie like thieves. Suppose that a thousand of us are gathered together in an indignation meeting to discuss the railroad question. No representative of the

railroad is present; all of us are patrons of the railroad. In discussing our grievances, not one of us tells the truth about our wrongs; not one of us does the railroad justice.

"This is human nature; I am not finding fault with it, but I am saying we can't help ourselves in this way."

JITNEY FRANCHISE APPLICATIONS

The proposed franchise of Stephen Carver, president and general manager of the Portland & Oregon City Electric Railway, which has been approved by the City Council of Portland, Ore., calls for a \$10,000 bond and requires a transfer system over the lines. It also provides for the operation of buses seating nine or more, is for a three-year period, and the company is to pay \$1 quarterly for each seat. Service would be over three routes from the center of the city which are not now served by car lines, buses to operate every fifteen or twenty minutes during the busy hours of the day. The company is to be known as the Portland Trackless Car Company. The franchise was ordered published in conformity with the provisions of the charter. An application for a franchise for a line to Linnton made by W. M. Foster has been referred to the city attorney so that an ordinance can be drafted.

Jitney drivers declare that the franchise provisions calling for \$10,000 bond and a transfer system will prevent jitneys from operating on the franchise basis. Two of the lines accepted by the Portland Trackless Car Company were refused by the Union Motor Bus Company, an organization made up of more than 200 owners of jitney buses. A new zone system has been framed by the City Council to replace that of Commissioner Daly. It provides for taxicab service to various parts of the city on a basis of distance and grades traveled. Report by the Jitney Drivers' Union will be made at an early date as to whether or not the Council's franchise terms will be met. If the members do not accept the Council's terms it will be necessary for them to meet taxicab regulations or discontinue business.

B. R. T. Put In Wrong Light.—Col. Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, has written a long letter to Chairman Straus of the Public Service Commission for the First District of New York complaining that his company has been put in an unfair position in the eyes of the public in the matter of heat for Brooklyn cars by the orders of the commission, referred to at length in the *ELECTRIC RAILWAY JOURNAL* of Dec. 23, page 1317.

Service Order in Baltimore.—The Public Service Commission of Maryland has handed down orders providing for the inauguration of new car service for the northwest suburban section, and for the suspension until Jan. 1 inclusive of the rules limiting the number of passengers who may be carried on street cars, and prescribing headways, this latter action being due to the commission's belief that enforcement of the rules would be difficult during the holiday season and probably very inconvenient to the public. The order for the new service for the northwest section states that it shall be in effect not later than May 1, 1917.

The Kansas City (Mo.) Railways has placed seven men on the pension list. It is called an honor roll, rather than a pension list. A committee including officers and employees in various departments designate the men to be pensioned and prescribe the amount to be paid. The minimum is \$20 a month. There is no maximum. The basis of estimating the pension and the amount generally awarded is 1½ per cent of the average annual wages for the ten years multiplied by the number of years in service. Twenty years' service is the minimum for pensions. An employee may retire voluntarily at the age of sixty-five after twenty years' service.

New Traffic Rules in Denver.—The new traffic laws in Denver, Col., go into effect on Jan. 1, 1917. The near side stop for Denver tramway cars goes into effect at midnight on Dec. 31, 1916. For some time crews of men have been at work putting iron frames on the poles nearest the corners where the cars will stop. They will put in each frame a card specially printed for that corner. The sign will face the sidewalk, and as it extends only half way around a pole, the company is painting a white band around the other half of the pole so that people on the other side of the street will know that cars stop at the corner. A white sign and a white band around a pole indicate a near side

stop. A yellow sign and a yellow band indicate a far side stop. Cars will not stop at corners where there is no sign and band.

Annual Southwest Missouri Dinner.—The annual dinner of the employees of the Southwest Missouri Electric Railroad was held recently at Carthage, Mo. A. H. Rogers, president of the company, and others spoke. The guest of honor was J. E. Gibson, general manager of the Kansas City Railways. Mr. Gibson said in concluding his remarks: "It is up to us to keep the pendulum of popularity swinging toward the side of big business. Tell the people our troubles, show them the light, don't 'roll 'em bones' with loaded dice. Play it square. Give the public courteous and generous treatment, handle our jobs in a business-like manner. Don't be 'manana' men—which means to-morrow—do it to-day. Open the window for the fresh air crank, close it again for the dear old maid, gladden the hearts of all around, and it will return to us a hundredfold."

Louisville Line Handles Tobacco.—The Louisville & Interurban Railway has begun transportation to Louisville of some 3000 hogsheads of tobacco from Shelbyville, Ky., and points beyond on the route of the motor truck line making through rates with the railway company. R. H. Wyatt, general freight agent of the company, recently made a canvass of the growers on the route of the truck line and contracted to haul the tobacco. The service of this company is liked by the growers. They are able by using the electric line, to superintend the loading of their crop and then to set out themselves for Louisville. By the time they reach the tobacco "breaks" where their hogsheads are broken open and the tobacco sold, their tobacco is being delivered. They can see it sold and collect their money and return home on the same day. This is service such as no other agency offers. Fourteen to sixteen hogsheads make a carload and Mr. Wyatt is putting four additional freight cars on the line to handle this business.

Interurban Buses Under Railroad Commission's Jurisdiction.—The Railroad Commission of California has been directed by a peremptory writ recently issued by the Supreme Court of that State to assume jurisdiction over interurban motor bus passenger and motor truck freight corporations operating over certain routes on a regular schedule. The decision of the court was rendered in the combined cases of the Western Association of Short Line Railroads against the Wichita Transportation Company, operating freight motor trucks between San Diego and El Centro, and the United Railroads, San Francisco, against the Peninsular Motor Bus Company, operating passenger motor buses between San Francisco and San Mateo. In both cases the railways had met with the commission's refusal in their efforts to have the bus companies put under its jurisdiction. The companies then petitioned the Supreme Court for writs of mandate. The court's decision does not place jitneys operating within the corporate limits of a city under the commission's jurisdiction.

Seats for Conductors in Washington.—The Washington Railway & Electric Company, Washington, D. C., has issued an order effective on Jan. 1, 1917, giving to conductors on all lines operated by the company the privilege of sitting down while on duty under certain conditions, and while passing through zones specified. Motormen have had the privilege for some time. It is planned to provide special seats in the prepayment and center-entrance cars, but until such time as they have been installed conductors will be permitted to sit in the rear part of the car in the seat nearest to the well. On cars with longitudinal seats, conductors will be permitted to sit on the end of the left-hand side next to the rear door, on cars with cross seats, on the end of the left-hand seat next to the rear door, and on open cars, on the right-hand outside end of the last seat facing the direction in which the car is traveling. The rules provide, however, that conductors must stand when giving bell signals; that while sitting they must not read newspapers or books or engage in conversation with passengers, and that they must not occupy seats to the exclusion of passengers. The order is to be made part of the rule book, and specifically states that an abuse of the privilege means a rescinding of the order which was voluntary on the part of the company.

Personal Mention

James F. Shaw, president of the American Electric Railway Association from 1908 to 1910, has become associated with the New York banking firm of Knauth, Nachod & Kuhne.

J. K. Choate, vice-president of the J. G. White Management Corporation, New York, N. Y., has returned from a six weeks' trip to Nicaragua, where he spent considerable time inspecting the property of the Ferrocarril del Pacifico de Nicaragua, which is being operated by the J. G. White Management Corporation.

Walter Belding, electrical superintendent of the Rutland Railway, Light & Power Company, Rutland, Vt., has resigned to accept the position of manager of the municipal electric light plant in Burlington, Vt., succeeding L. R. Mc-Broom. Mr. Belding has been associated with the Rutland company for four years. He was graduated from the University of Vermont in 1911.

N. I. Garrison, who has been connected with the Fort Smith Light & Traction Company, Fort Smith, Ark., for the last fifteen years and is at present treasurer and assistant manager of the company, has been promoted to manager of one of the other plants of H. M. Byllesby & Company, Chicago, Ill., which owns the Fort Smith properties. Mr. Garrison went to Fort Smith as bookkeeper, and was successively promoted to the position of cashier and then to treasurer and assistant to the manager.

Sir Albert H. Stanley, president of the Board of Trade in the reconstructed Cabinet of Premier Lloyd George, was on Dec. 23 elected to the House of Commons for Ashton-under-Lyne without opposition. Sir Albert succeeds in the House of Commons Sir William M. Aitken, who has been raised to the peerage by King George. He resigned recently as managing director of the London Underground Electric Railways, London United Tramways, Ltd., Metropolitan District Railway and the London General Omnibus Company on his appointment to the Board of Trade.

J. M. Penick has been appointed engineer of maintenance of way of the Virginia Railway & Power Company in Richmond, Va., to succeed T. Norman Jones, Jr., who has been appointed assistant general manager of the company in charge of the properties in Norfolk. Mr. Penick is a native Virginian and has been in the service of the company for the last six years. Since 1911 he has been directly associated with Mr. Jones as assistant chief engineer of railways. He is also a member of the general safety committee recently organized for the purpose of reducing the number of avoidable accidents to the public and to the employees of the company.

Cyrus Corliss has been appointed construction engineer of the department of power, on the Boston (Mass.) Elevated Railway. Mr. Corliss is well known in New England electric railway circles. In 1900, after taking a special electrical course at the Massachusetts Institute of Technology, he entered the employ of the Boston company's electrical department, and after a varied experience in cable, motor and power-station work, became assistant to the electrical engineer. In 1905 Mr. Corliss was transferred to the Milk Street offices of the company as assistant to Paul Winsor, chief engineer of motive power and rolling stock, where he was actively associated with equipment development on the system, investigations, tests and advisory work in connection with purchases of engineering material. He is a member of the New England Street Railway Club and an associate member of the American Institute of Electrical Engineers.

J. Walter Allen has been appointed electrical engineer of the Boston (Mass.) Elevated Railway, to take effect on Jan. 1. Mr. Allen is a native of Newtonville, Mass., and was graduated from the electrical engineering course at the Massachusetts Institute of Technology, class of 1899. His entire professional career has been associated with the Bos-

ton company, and he has been actively engaged in every phase of its electrical work. He entered the employ of the road under the electrical administration of Roger W. Conant, and spent four years in the cable-testing branch of the service, in two of which Mr. Allen was in charge of this department. In 1906 he was appointed assistant to John W. Corning, then in charge of the electrical department, and since Nov. 1, 1915, has been acting electrical engineer with headquarters at the Albany Street shops of the company in Boston. Mr. Allen has borne a responsible share of the work in connection with the electrical equipment of the subways and other rapid transit lines of the company, as well as that associated with surface line operation, and has been closely identified with the installation of the alternating-current transmission system of the road, the provision of substations and direct-current distribution plant. He is a member of the American Electric Railway Association, New England Street Railway Club and an associate member of the American Institute of Electrical Engineers.

T. Norman Jones, Jr., who has been appointed assistant general manager of the Virginia Railway & Power Company, Richmond, Va., in charge of the properties in Norfolk, to succeed E. C. Hathaway, was born in Richmond in 1882. He was educated in the graded schools of Wilson, N. C., the Episcopal High School at Alexandria, Va., and the University of Virginia. He began his professional career with the engineering corps in charge of the construction of the Potomac yards, with which he served for two years. He then became associated with the McKay Engineering Company and the United Electric Light & Power Company, Baltimore, Md. In 1906 Mr. Jones entered the service of the Virginia Railway & Power Company as mechanical and electrical engineer. The following year he took charge of operation of the Richmond & Chesapeake Bay Railway. He returned to the Virginia Railway & Power Company in 1911 as successor to Calvin Whitely, chief engineer of railroads, and has continued in that position since. Mr. Jones is president of the Virginia Railway & Power Company's Young Men's Christian Association.



T. NORMAN JONES, JR.

OBITUARY

James Y. Carithers, president of the Athens Railway & Electric Company, Athens, Ga., died on Sunday, Dec. 17, at the age of sixty-two, from heart disease.

Clarke C. Fitts, counsel for the New England Power Company, died at Watertown, Mass., on Dec. 20. He was forty-six years of age and for many years had made his headquarters at Brattleboro, Vt., where he was actively identified with the development of the Connecticut River Transmission Company and allied systems. Mr. Fitts was the first attorney-general of Vermont. He addressed the New England Street Railway Club recently upon "The Future of White Coal," and at that time forecasted the electrification of important steam railroads in northern New England through the use of hydroelectric energy.

William W. Smalley, president of the First National Bank of Bound Brook, N. J., president of the Bound Brook Oil-less Bearing Company, president of the L. D. Cook Company and State Senator for Somerset County, died at his home in Bound Brook on Dec. 27. Mr. Smalley was born on Dec. 17, 1850, near Bound Brook, N. J., and was graduated from the New York University Grammar School. In 1880 he moved to Bound Brook and engaged in the lumber business. His activities in Somerset County brought him prominently before the public, and in 1906, against his wishes, he was elected to the Assembly by the Republican party and had the distinction of being re-elected for four consecutive terms. In 1911 he was elected to the Senate by a large majority and re-elected again in 1914.

Construction News

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

FRANCHISES

Lockport, Ill.—The Chicago & Joliet Electric Railway has received a franchise to construct an extension of the Hickory Street line into Lockport Township, the new extension to reach a point 400 ft. south of the tracks of the Elgin, Joliet & Eastern Railway.

St. Paul, Minn.—The City Council of St. Paul is considering an ordinance requiring the St. Paul Railroad to equip its railroad from Chestnut Street to the west city limits for electrical operation.

Ashville, N. Y.—The Panama Traction Company has received a franchise from the Council to construct a line between Ashville and Panama. [Nov. 25, '16.]

Hillsboro, Ohio—The Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company has received a franchise from the Board of County Commissioners to construct a line over roads in Highland County. R. R. Faulkner is interested. [April 29, '16.]

TRACK AND ROADWAY

Fresno (Cal.) Traction Company.—Permission has been secured by the Fresno Traction Company from the Railroad Commission of California to issue and sell \$49,597 bonds to be used to extend its lines in Fresno.

Murphysboro & Southern Illinois Railway, Murphysboro, Ill.—Work has been begun on the line of the Murphysboro & Southern Illinois Railway from Murphysboro to Carbondale, 8 miles. The company reports that the line will be extended during 1917, but plans have not yet been prepared. A 52-ft. steel bridge and several pile trestles from 50 ft. to 600 ft. long will be built. Rolling stock and other equipment will be purchased by R. D. Smith, chief engineer, Third National Bank Building, St. Louis, Mo. [Nov. 18, '16.]

Tipton-Frankfort Traction Company, Tipton, Ind.—It is reported that plans are being made by Eastern capitalists to revive the project to construct an interurban line between Tipton and Frankfort and a cross-town system within the city limits of Frankfort. [Oct. 9, '15.]

Paducah (Ky.) Traction Company.—This company reports that it will tear up 3500 ft. of 60-lb. single track and lay double track, using 80-lb. T-rail on a concrete base.

Shelbyville & Frankfort Realty Company, Shelbyville, Ky.—The estimated cost of construction of the proposed electric railway to connect Shelbyville and Frankfort, about 22 miles, is \$440,000, according to the figures of C. E. Coon, McConnellsville, Pa., who recently went over the route. Mr. Coon, in a communication to Eugene Cowles, secretary of the Shelbyville Business Men's Association, recommends that a corporation capitalized at \$300,000 be formed; that \$200,000 of 7 per cent preferred stock be issued, and that a first mortgage bond issue of \$240,000 be floated. This is an increase over the original estimate of Roland Cox, the engineer who made the first survey, but it is pointed out that material costs have been increasing steadily. [Dec. 9, '16.]

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.—A report from the Ironwood & Bessemer Railway & Light Company states that it has under construction an extension from Gile to Montreal, Wis., 1½ miles.

***Vicksburg, Miss.**—Indianapolis capitalists are contemplating the construction of an electric railway from Vicksburg to Jackson, about 40 miles. H. C. McCabe, secretary Vicksburg Young Men's Business Club, may be able to give information.

Lincoln (Neb.) Traction Company.—A report from the Lincoln Traction Company states that during 1917 the company will construct an extension between Lincoln and Omaha, 49 miles.

Orange County Traction Company, Newburgh, N. Y.—During 1917 the Orange County Traction Company will construct a ½-mile extension in Newburgh connecting with the Chadwick Bleachery, to be used as a freight line.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York will receive bids until Jan. 10 for the construction of the Livonia Avenue extension of the Eastern Parkway subway in Brooklyn. The contract is being advertised for construction of the line by two different methods. Under one form of contract bidders will be called upon to build the line furnishing all the steel, as well as doing all the necessary construction work. The commission is also asking for bids upon the steel needed—about 15,700 tons—and also for contract for the erection of the steel. The Livonia Avenue extension is a two-track elevated line from President Street and Ninety-eighth Street to Livonia Avenue and Ashford Street, about 2 miles. The commission early last summer received bids for the construction of the line, but these bids, which covered construction of the line and also a separate contract for the furnishing of steel, were rejected, the commission having the hope that by advertising at a later date lower prices for structural steel might be obtained. The final blast holing through the headings of the south tube of the Old Slip-Clark Street tunnel beneath the East River was fired on Dec. 19. The north headings were connected on Nov. 28. The Old Slip-Clark Street tunnel, which is being constructed by the Public Service Commission for the First District, is for operation by the Interborough as a part of the Park Place, Beekman and William Streets branch of the Seventh Avenue subway, and will connect the Seventh Avenue line with the first subway in Brooklyn.

Pictou County Electric Company, Ltd., Stellarton, N. S.—A report from the Pictou County Electric Company states that it expects to construct a 1-mile extension in Trenton during 1917.

Columbus, Delaware & Marion Railway Company, Cincinnati, Ohio.—Citizens along the Columbus, Delaware & Marion Railway north of Columbus have asked the County Commissioners to have the track removed to the center of the public road between the north corporation line of the city and Worthington. The company some time ago refused to make this change without a renewal of its franchise. The commissioners have asked the prosecuting attorney to prepare a tentative franchise, but refuse to say whether or not they will grant the company's demand.

Cleveland (Ohio) Railway.—At a recent conference between county and city officials J. J. Stanley, president of the Cleveland Railway, stated that the company will pay two-thirds of the expense of relocating the railway tracks in order that the approaches to the new bridge across the Cuyahoga River may be built. The city will pay the other third.

Tulsa (Okla.) Traction Company.—Work will be begun immediately between West Tulsa and Red Fork on the construction of this company's line from Tulsa to Sapulpa, 15 miles.

Baysville, Ont.—Plans for the construction of an electric railway from Baysville to Gravenhurst are being considered by the Hydro-Electric Power Commission of Ontario, Toronto, and the municipalities concerned. M. Bucke, engineer.

Bridgeburg, Ont.—Plans are being considered by the Provincial Government for the construction of a radial line between Welland and Bridgeburg and a by-law will be submitted to the municipalities concerned.

Toronto (Ont.) Civic Railway.—The City Council of Toronto has decided to apply to the Legislature for power to construct a double-track line on Yonge Street from the present southern terminus of the Metropolitan Railway to the northern city limits and for power to construct a civic car line, if necessary, on Yonge Street, without the consent of the ratepayers. The Council has decided to extend the Bloor Street line to Runnymede Road.

South Fork-Portage Railway, Johnstown, Pa.—A report from the South Fork-Portage Railway states that one-half of its proposed line between South Fork, Ehrenfeldt, Summerhill, Wilmore and Portage is completed and it is expected that operation of this portion of the line will be

begun about May 1. The remaining section of the road is under construction. O. P. Thomas, Johnstown, secretary. [Nov. 4, '16.]

Montgomery Transit Company, Philadelphia, Pa.—It is reported that the Montgomery Transit Company is in the market for 4½ miles of 60-lb. to 70-lb. rails, also 4½ miles of No. 0000 trolley wire and 4½ miles of No. 0000 feed wire.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that the Houston, Richmond & Western Traction Company has let a grading contract for 60 miles of interurban railway from Houston to Garwood to J. S. Moore & Sons, Lufkin. A contract has also been let to the Pittsburgh Bridge Company, Pittsburgh, Pa., for bridges over the Brazos and Colorado rivers. [Dec. 9, '16.]

Seattle & Rainier Valley Railway, Seattle, Wash.—This company reports that during 1917 it will construct 3 miles of new track.

Tacoma Railway & Power Company, Tacoma, Wash.—Preliminary work has been begun by the Tacoma Railway & Power Company toward the extension of its Tideflats line on Eleventh Street from the terminus of the line at the city limits to the bluff at the extreme easterly limits of the tideflats, about 2 miles. No construction will be begun until the county has completed the road, which will be started immediately. The new line will provide access to new ship-building yards and lumber mills on the tideflats.

Monongahela Valley Traction Company, Fairmont, W. Va.—A new line has been completed from the Baltimore & Ohio Railroad in Fairmont to Helens Run and the Monongahela Valley Traction Company will soon install street car service over the line.

SHOPS AND BUILDINGS

Indiana Railways & Light Company, Kokomo, Ind.—It is reported that the Indiana Railways & Light Company contemplates the construction of a new terminal station in Kokomo.

Plymouth & Sandwich Street Railway, Plymouth, Mass.—This company plans to construct a carhouse of eight or ten-car capacity at Sagamore in the spring of 1917.

POWER HOUSES AND SUBSTATIONS

Burlington Railway & Light Company, Burlington, Iowa.—This company has applied to the Railroad Commission of Iowa for permission to erect electric transmission lines in Louisa and Des Moines Counties.

Durham (N. C.) Traction Company.—Work has been begun on the extension of the power plant of the Durham Traction Company on Vivian Street which will involve an expenditure of about \$30,000. The work will include an addition to the power house 100 ft. x 35 ft. and the erection of a smokestack 175 ft. high. A new 500-hp. boiler will be installed and orders have been placed for a 2000-kw. steam turbine.

Memphis & Rugby Railroad, Memphis, Tenn.—This company, which is constructing a line between Memphis and Rugby, has awarded a contract for the construction of a power house to L. B. Moody, Memphis, at \$3,500. The work will also include the erection of 2 miles of transmission line to connect Memphis and Rugby. The total cost of the plant is estimated at \$10,000.

Wisconsin Public Service Company, Green Bay, Wis.—The Wisconsin Public Service Company is completing an extension of its transmission lines from Green Bay to Manitowoc, a distance of 38 miles, and has secured a contract for furnishing electric power to the city of Two Rivers, 7 miles north of Manitowoc. A franchise for selling power in that city has also been obtained. The company will reconstruct the pole line of the Manitowoc & Northern Traction Company so as to carry the transmission line, trolley and feeder wires between Manitowoc and Two Rivers. Hydroelectric power will be furnished by the Wisconsin Public Service Company for the operation of the Manitowoc & Northern Traction Company. A new standby steam station equipped with one 5000-kw. Allis-Chalmers turbine, Babcock & Wilcox boilers, etc., similar to the plant which the Wisconsin Railway Light & Power Company is now completing at Winona, Minn., will be constructed in the city of Manitowoc.

INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases

Business Changes

Trade Literature

STANDARDIZATION IN CAR DESIGN

Development Has Been Rapid Under Present Plan, but Time Has Arrived for Standardization Along Certain Lines—
Definite Recommendations Are Made in the Way of Types, Sizes and Material of Construction

By W. H. HEULINGS, JR.

Vice-President and General Manager of Sales, The J. G. Brill Company, Philadelphia.

Every opportunity for the discussion of standardization in car design should be welcomed by those who have the interests of the electric railway industry genuinely at heart, but strangely enough it is a subject which those of us who are familiar with the history of car design are inclined to treat with skepticism. It is quite natural to be skeptical of achieving much in the way of standardization, seeing that after a quarter of a century of development types of electric cars are as divergent to-day as ever, and hardly are there to be found two cities in the United States where the cars are alike. Such a state of affairs would appear illogical and wasteful, but the fact is that any industry which is being rapidly developed is liable to wide differences in equipment and probably will be accompanied by heavy expenditures for equipments which are outgrown within a short time because of improvements and economies arising in later developments. The competition between manufacturers also is a factor in creating divergence in plans and details of equipment. All this is necessary to rapid development; and if buyers of railway equipment had been slower to spend money on equipment which had higher earning or saving power and were loath to side-track or scrap their old equipment, the railway industry would not be at the high stage of efficiency that it is to-day. The man who would not buy an automobile because he expected changes, and kept waiting from season to season, still drives a horse. Railway men "are from Missouri," but to the man you can sell them this year's model.

In the days of horse-car building John Stephenson developed certain types of cars and practically refused to depart from his designs even in small details. That was in the latter years of the horse car, and was, doubtless, a wise policy to work to except for the fact that the days of that industry were numbered and a new form of traction came into the field, which made it very difficult for a company organized to build only certain types of equipment—it naturally lacked the elements for supplying a changing and progressive field. The electric car, unlike the horse car, has come to stay; and while it is possible to standardize designs as it was at the end of the horse-car period, and it may be that shortly such will be the case with a few types of one-man cars, the subject of standardization as it presents itself to the manufacturer to-day is in the structural plan and only in detail as far as necessary to the general plan. There has, of course, been a convergence of car-building practice along similar lines, an adaption of features of construction finally resulting in general adoption and incorporation into principles of the art. Much more could be achieved by co-ordination and to better advantage and saving of time. Standardization, at least on certain fundamental features of modern design, would be distinctly desirable alike to manufacturer and to buyer. There is not the slightest doubt but that such standardization would effect a very appreciable saving in the cost of equipment to the railways and a saving in maintenance charges; also, the time spent in deciding upon more or less minor features of equipment would be saved, as would a great deal of the time now lost in making repairs and replacements. To the manufacturer standardization would be highly beneficial along all lines, such as designing, ordering material, carry-

ing stocks of material, providing manufacturing equipment and facilities, inspection, overhead charges, shipping costs—in fact, the cost of everything would be lessened, and the cost of cars being reduced would mean a larger output.

Without going into the matter thoroughly, but simply with the desire to offer my suggestions as to the lines upon which standardization could proceed at present in a concrete form, I should say that the subject could be divided under three heads, viz., types, sizes and construction, as follows:

Types:

- Single-truck car.
- Center-entrance, double-truck city car.
- End-entrance, double-truck city car.
- Interurban car.

Sizes:

- Single-truck car, 20-ft. 8-in. body and 6-ft. 3-in. platforms.
- Center-entrance, double-truck city car, 47 ft. over bumpers.
- End-entrance, double-truck city car, 30-ft. 8-in. body and 6-ft. 3-in. platforms.
- Interurban car, 36-ft. body and 4-ft. 8½-in. platforms.
- Width of single- and double-truck city cars, 8 ft. 2 in. over side posts, and interurban cars, 8 ft. 6 in. over side posts.
- Centers of side posts of single- and double-truck city cars, 2 ft. 5 in.; interurban cars, 2 ft. 8 in.

Construction (for cars of all types):

- Steel framing and sheathing; wooden roofs.
- Side construction to consist of angle side sills, with the longer leg horizontally placed for lateral stiffness; bar belt rail; steel plates which serve as sheathing; T-posts (not continuous); angle top plate.
- Pressed "U" shape steel carlines with wood filler for attaching roof boards of plain arch roof.
- Transverse framing members to consist of pressed "Z" form end sill; pressed channel crossings; cast-steel bolsters. (No trussing required in interurban underframes up to any reasonable length.)

Platforms (both dropped and flush) to be supported on angle outside knees and channel center knees; bumper to be of channel construction and to project 6 in. beyond the sheathing.

Round-end vestibules, with all sashes to drop. Side windows to have top sash stationary and framed in a continuous piece applied to outside of posts; lower sashes to raise full height and constructed of brass stiles, with wood fillers and wood top and bottom rails.

City Single- and Double-Truck Cars:

- To be constructed without bulkheads; steel header formed of plate with flanged edge.
- End platform doors to be of the two-part double-folding type, mutually operating with a folding step.
- Single flooring laid longitudinally, with floor mat strips in aisle. Platform flooring laid transversely.

Interurban Cars:

- To have end bulkheads with single slide doors. Vestibules equipped with single swing doors hinged to body corner post. Triple steps with step traps.
- Double side floor and single center floor, all laid longitudinally, and the center floor to have mat strips.
- It would be desirable to standardize the dimensions of material both in length as well as in cross-section. Many other items are suitable for standardization, but those mentioned, it appears to me, are desirable to establish in regular practice.

W. S. HAMMOND DISCUSSES HEATING EQUIPMENT

Roads Installing Improved Equipment—More Steel Cars Being Run in Trains—Thermostatic Control Business Active

During the early part of 1916, according to W. S. Hammond, Jr., vice-president in charge of sales, Consolidated Car Heating Company, the business offered to makers of car-heating equipment was below normal. Later in the year activity increased, and now the market for heaters, thermostats, door engines, car-signal systems and similar equipment is fairly brisk for the winter season. A large part of this company's business is based on sales of materials for new cars, and as during 1916 cars were ordered in comparatively small lots the heater and other equipment orders have run smaller than in the past. The total for the year, however, is said to be satisfactory when it is remembered that the high prices of materials have held back orders for cars that ordinarily would have been built. Mr. Hammond expects the market to show a substantial improvement in 1917, so far as sales of cars and car equipment are concerned. High prices have deferred purchases for so long that natural conditions in the industry will soon necessitate more cars in many cities.

Speaking of the costs to the manufacturer of various materials, Mr. Hammond said that molded insulation, as used in some of his company's products, is now 500 per cent above normal. It may also be surprising to learn that in some types of 1200-volt car heaters more than \$8 worth of wire alone is used. Because of the rapidly fluctuating market and because some manufacturers have only made horizontal increases in their prices, it is not difficult to find some specialties that are now being sold at less than actual shop cost. Such parts as switches, sockets, plugs, push-buttons, connectors and others formed from molded insulation might be included in a class on which there is now practically no profit.

Referring particularly to the tendencies of the roads toward making car service improvements, Mr. Hammond pointed out that the demand for heaters shows the general adoption of car heaters of larger capacity than previously used. The use of thermostatic control for car heaters has greatly increased, more wiring is being placed in conduit, and more installations of electrically-controlled air-operated door engines are being made. Sales of single-stroke bells and of buzzers show a proportionate increase, which indicates a greater use of surface cars in train service. Inquiries for this equipment confirm the prospective increase in the number of roads which plan to operate street cars in trains.

Thermostatic control is now said to be looked upon as a money-saving part of car-heating equipment. Most big roads, according to Mr. Hammond, have installed or are considering the installation of thermostats to control the input of current to their electric heaters. This control will save, he says, at least 33 1/3 per cent of the current that otherwise would be used by the heaters if controlled only by hand switches. On some roads this saving has reached 60 per cent. The cost of thermostatic control installations at \$40 to \$50 per car will usually be saved in one year.

In the installation of door engines the tendency now is to use electric push-buttons, rather than mechanical valve control. The magnetically operated pin valve gives better results than the slide valve. It requires no lubrication and also shuts off the air at a point close to the door engine, thus eliminating piping and fittings and reducing air leakage.

CAR SHORTAGE STATISTICS IN THE UNITED STATES

Reports made to the American Railway Association by the railroads of the United States show that on Dec. 1, 1916, there was a net freight car shortage of 105,527 cars. The association has published a statement of car shortages and surpluses since Jan. 2, 1907, which shows that for the whole period of nearly eight years preceding the middle of August this year, there had been a continuous net surplusage of cars not in use on American railroads except for about one month in 1909, three months in 1912, one month in 1913 and the month of March in this year.

HAND-BRAKE BUSINESS SHOWS ACTIVITY

The Sales for 1916 Triple Those of Last Year—Large Orders for Replacement—Deliveries Prompt on Standard Design

The sales of improved hand brakes in 1916 will triple those of 1915, according to Frank D. Miller, president of the National Brake Company. Also, the inquiries received during November and December, 1916, he states, will no doubt produce orders for more hand brakes than ever before were sold in the same two months of a year. In judging the sales prospects for improved hand brakes it should be remembered that to the number of cars ordered during a year must be added the large number of cars which are reconstructed in company shops. In fact, the largest Peacock brake order taken last year was for improved brakes to replace 650 old brake equipments. This order was sold on estimates, which showed that the railway could well afford on the score of economy to scrap its old brakes and put on new Peacock brakes, due to the lower cost of maintenance and repairs. Mr. Miller also points out that in those years when the number of cars ordered is small there seems to be an extra amount of money available for car maintenance and renewal purposes, and in consequence the hand-brake business shows corresponding activity.

The orders for Peacock brakes placed during 1916 were largely received during the latter part of the year, and there is no evidence that the buying will slacken shortly. Mr. Miller says that his company is carrying over into the new year more unfilled orders than ever before. The question of deliveries has been an important one with this company, as it has been with all other manufacturers. A large reserve supply of malleable castings and other brake parts, however, has enabled orders so far to be filled promptly; that is to say, orders for standard brakes. On special types or designs not standardized prompt deliveries have not, of course, been possible. Stock parts are now on hand for manufacturing more than 500 improved Peacock brakes. This brake is largely made of forged and malleable parts, and its cost, naturally, has risen along with the cost of other iron products.

THE GIRDER RAIL MARKET

Dullness Prevails Because of High Prices and Slow Deliveries—Too Many "Live" Sections—Special Work Conditions Better

A review of the girder rail situation and talks with manufacturers of girder rails by a representative of this journal show that few of the electric railway companies are now buying girder rails. The reason is that it would be almost useless for them to order rails, because at this time deliveries cannot be made. The manufacturers say that there is no prospect at present for lower prices. Most of the big railway companies purchased their rail supply, so far as it could be determined, eight or nine months ago.

Prices for girder rails have remained stable for fifteen years until very recently. The old prices were \$39, Chicago, and \$38.40, New York, for girder rails in 60-ft. lengths. There has been during the year an increase of \$11 a ton, but even at these prices there is little prospect of much rail being available for 1917.

The purchases of girder rail in 1916 were relatively small as compared with earlier years but, owing to the rising market, were a slight bit larger than the purchases of 1915. One of the unfortunate situations in the girder rail business from a manufacturing standpoint is the large number of sections demanded. One maker alone has been called upon to make rolls for more than 125 different rail sections, of which more than 100 are used in the United States. These figures cover only the so-called "live" sections, those which have been in demand within the last two years. It seems hardly possible to the manufacturer that track and municipal requirements should call for this multiplicity of rail sections. The cost, of course, is charged into the selling price of the rail; and when it is known that the cost for a set of rolls for any one section is at least \$5,000, and that some of the sections amount to a relatively small tonnage, the loss due to non-standardization will be appreciated.

The American Electric Railway Association in 1913

adopted a standard section for 7-in. 122-lb. rail and also for 9-in. girder rail. The manufacturers state that the proportionate demand shows an increase in the use of these standard sections. This points toward a better manufacturing situation as more roads call for the association rail sections.

With regard to the manufacture of special track work, there is not the same congestion in the plants as is found in the girder rail plants. Deliveries, of course, are slow, due to the delayed deliveries in raw materials, and the price is about 33 per cent above normal. Manufacturers do not feel that this is a high price in comparison with the increases in charges for other forms of rolled steel. Practically all special track-work manufacturers are having difficulty in obtaining satisfactory deliveries on rail stock.

The manganese market has been relieved somewhat; and while the price in earlier months touched \$400 a ton, it has become more stable around \$160 a ton.

ELECTRICAL EXPORTS IN 1916

Based on the figures reported to the government for the first ten months of the current year, exports of electrical goods of American manufacture will reach in value in 1916 a new high record. It is estimated that the 1916 electrical exports will be well in excess of \$37,000,000. If the volume of exports for the three months last reported—August, September and October—has been maintained during November and December, then the above estimate will be too small by more than \$1,000,000.

October was another heavy export month, being larger than any previous month. The volume of electrical export business in that month was \$4,045,645, in comparison with \$2,179,453 in the preceding October. The exports of batteries, generators, insulated wire and cable, carbon filament lamps, motors and miscellaneous merchandise during October last were greater in value than ever before. Attention is called particularly to miscellaneous merchandise, of which almost \$2,000,000 was exported in October. In the ten months January-October the exports in this class have almost doubled in value.

Exports of electrical goods amounted to \$31,073,268 during the first ten months of 1916, in comparison with \$19,419,403 and \$16,697,829 during the corresponding periods of 1915 and 1914 respectively. The largest items in the list are: Batteries, \$1,504,788; generators, \$1,379,153; insulated wire and cable, \$3,587,342; metal filament incandescent lamps, \$1,165,509; motors, \$3,993,233; telephones, \$1,322,939, and miscellaneous merchandise, \$15,266,360.

During the past three years a steady growth has been noticeable in the exports of batteries, insulated wire and cable, metal filament incandescent lamps, meters, motors, telegraph instruments and miscellaneous equipment.

COPPER PRICES LOWER

From its high point of 36 cents a little over two weeks ago, prompt delivery electrolytic copper had dropped early this week to 31.50 cents, with no buyers. January copper was quoted at 30.75 cents. Copper for the first quarter of 1917 was quoted at 30.25 cents, second quarter at 29.25 cents, third quarter at 28.25 cents and last quarter at 27.25 cents.

In spite of the fact that large producers declared that they were sold out well into 1917, and that unsold production for the rest of 1917 was small, the market was unable to withstand the uncertainties that would be contingent upon peace. There was every evidence also that buyers had overstocked. It was really this latter class, and not the speculators, who forced the market down. The stocks held by speculators were really not very large, and therefore could have but little effect on the market, especially if the manufacturers wished to protect the prices of their own stock. Many manufacturers, however, did not care to do this, as they had protected adequately, by orders for future delivery, their copper stocks and were therefore willing to take a profit on present excess stocks. Frequent offerings of resale copper in lots of under 500 tons cut the quotations to near the 30-cent mark.

One thing is significant, and that is the drop in quotations

for delivery during the second half of 1917. When spot copper first began to fall in price long-delivery copper held very firm. It was then pointed out that manufacturing demand for long deliveries was sufficient to hold up the price. Now there is apparently some apprehension on the part of the producers that such might not be the case.

Copper wire base fell off to 37.50 cents for prompt delivery and 35.50 cents for February delivery.

ROLLING STOCK

Montreal Tramways, Montreal (Que.), Canada, are in the market for fifty cars.

Saskatoon Municipal Railway, Saskatchewan, Canada, is considering the purchase of three new single-track cars.

Peoples' Railway, Dayton, Ohio, noted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 23 as being in the market for ten motor cars, has placed this order with the St. Louis Car Company.

Ringling & Oil Fields Railway, Ardmore, Okla., has purchased an electric motor car which will be put in passenger service between the Ardmore and Healdton oil fields.

Springfield (Ill.) Consolidated Railway has placed an order with the St. Louis Car Company for seven 28-ft., single-end, pay-within cars, equipped with two 50-hp. Westinghouse motors. These cars will be ready for delivery about April 1, 1917.

National Importing & Warehousing Company, Via Erbe 2-9, Genoa, Italy, is asking for bids on equipment for an important Italian suburban railway extension. Two motor cars with four motors each, ten flat cars and six passenger trailers are required. The building of about thirty-eight miles of track is also involved. Details can be obtained by addressing the *ELECTRIC RAILWAY JOURNAL*, Industrial News Department.

Manitowoc & Northern Traction Company, Manitowoc, Wis., which has been purchased recently by the Wisconsin Securities Company, ordered two steel cars which were ready to be shipped from the St. Louis Car Company to the Evanston Railway Company, to be shipped to the Manitowoc Company. These will replace the two interurban cars now in regular service. The new Evanston cars are exactly the same as the seven cars recently put in service in LaCrosse except for such improvements as three years' use of the latter suggested.

United Railways & Electric Company, Baltimore, Md., noted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 9 as purchasing one hundred double-truck, semi-convertible, four-motor pay-within cars, announces that contracts have been awarded for the following equipment:

- Car bodies and trucks.....J. G. Brill Company
- MotorsGeneral Electric Company
- Air brakesWestinghouse Traction Brake Company
- SeatsJ. G. Brill Company
- SignsHunter Illuminating Car Sign Company
- RegistersInternational Register Company
- Fare boxesJohnson Fare Box Company
- Gears and pinionsTool Steel Gear & Pinion Company
- Electric heatersConsolidated Car Heating Company
- WheelguardsWendell & MacDuffie Company
- Car wheelsNational Car Wheel Company
- Ackley brakesNational Brake Company
- InspectionR. W. Hunt & Company

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the Boston Elevated Railway for 5000 trolley ears.

National Pneumatic Company, New York, N. Y., has received an order from the Detroit United Railways to equip the fifty trailer cars recently purchased by that company.

National Pneumatic Company, New York, N. Y., announces that it has taken over and absorbed the factory of the Burdett-Rowntree Manufacturing Company, Chicago, Ill., and hereafter will be in a position to give its customers even better service than before.

Jacques Vieyra, 24 Rue de Lubeck, Paris, France, announces that he will be pleased to receive catalogs and literature on electrical appliances and supplies (motors and generators excepted), labor supplies for industrial chemistry and metallurgical work.

Railway Improvement Company, New York, N. Y., has received an order for twenty-one Rico coasting recorders from the Havana Central Railroad, Havana, Cuba. These recorders are for use on both type K and multiple unit control cars which are operated on the Maria Nao division of this road.

Johnson Fare Box Company, Chicago, Ill., through its Eastern agents, the U. S. Metal & Manufacturing Company, has received an order for ten fare boxes from the Schenectady Railway and also one for the same amount from the Connecticut Company, New Haven, Conn.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., advises that during the New York Automobile Show, to be held Jan. 8 to Jan. 13 inclusive, it will have headquarters at the Woodstock Hotel, New York, and during the Chicago Automobile Show, to be held Jan. 30 to Feb. 3 inclusive, it will have headquarters at the La Salle Hotel, Chicago. The company at both conventions will be represented by George O. Smalley, first vice-president and general manager; Harry J. Lindsley, western sales manager; William F. Jennings, eastern sales manager, and J. Bertram Howell, sales department.

Lord Manufacturing Company, New York, N. Y., has received an order from the G. S. Ackley Company for twelve differential brakes to be used in Australia, and also an order for twenty screenless air cleaners from the Westinghouse Air Brake Company to be used on cars of the International Railway, Buffalo, N. Y. The company wishes to announce that the entire business, together with all of the railway devices now manufactured by it, will be taken over and handled after Jan. 1, 1917, by the Cooley Manufacturing Company, 98 Park Place, New York City. Under the new arrangement manufacturing facilities will be increased and the scope of the selling organization enlarged.

C. A. Wood-Preserver Company, St. Louis, Mo., has completed arrangements with the Kettle River Company of Minneapolis whereby the first-named company becomes general sales agent for the Kettle River company for the sale of C. A. Wood-Preserver and three other grades of preservative oils which it has been manufacturing. Through this consolidation of efforts it is anticipated that in the early part of next year arrangements may be made to supply direct to the purchaser electric railway ties treated with "C. A. Wood-Preserver." This will make it easily possible for the railways to use ties that have been "open-tank treated" with a high-grade oil. The plan is to supply the railways with these treated ties in small quantities and the roads will thus find it unnecessary to carry a large investment in ties and oil.

Beckman & Linden Engineering Corporation, 604 Balboa Building, San Francisco, Cal., was recently incorporated for the purpose of carrying on consulting and development work in civil, electrical, metallurgical and chemical engineering, the partners being J. W. Beckman and H. E. Linden. Their activities will embrace investigations of the natural resources adjacent to existing or prospective power developments, with a view to developing new industrial uses of power; investigation of hydroelectric developments, designing and construction of power developments and industries for power consumption, and the managing of such organizations. They will maintain a laboratory and are prepared to undertake any research work in chemistry, electro-chemistry and electro-metallurgy. They are also prepared to finance such prospective developments as appear promising.

Wagner Electric Manufacturing Company, St. Louis, Mo., announces as incident to its extensive expansion various changes in sales office personnel and locations and in departmental heads. These include the following: The Chicago office will remove to 918 South Michigan Avenue, where it will combine with the service station. The Boston office will remove to 88 Brookline Avenue, where it will combine with the service station. The San Francisco office will remove to 159 New Montgomery Street, where it will combine with the service station. P. B. Postelthwaite, formerly manager of the Cincinnati office, is now in charge of the service department with headquarters at the home office. J. W. Bryant, formerly in charge of the Buffalo and Syra-

cuse offices, is now Cincinnati manager. C. P. MacGonigal of the Philadelphia office will be in charge of the Syracuse and Buffalo offices. The St. Louis service station is now under the direction of C. M. McCord, who was with the home office.

ADVERTISING LITERATURE

Chicago Pneumatic Tube Company, Chicago, Ill., has issued bulletin 34-W on its Giant fuel-oil engines.

E. I. Du Pont de Nemours & Company, Wilmington, Del., announce that the publication of the Du Pont magazine will be discontinued after the current issue until the paper supply again becomes normal.

Sprague Electric Works of the General Electric Company, New York, N. Y., has issued a neat booklet on safety panels. On this type of panel the door covering the fuse compartment is locked and the compartment is accessible only to authorized persons having keys. A four-circuit safety panel with a steel cabinet is also illustrated.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued special publication No. 1577 on its No. 506, 25-hp. 600-volt railway motor. This motor is especially adapted for single-truck, one-man light-weight cars, and is similar to the type built several years ago for the low-floor center-entrance cars of the Pittsburgh Railways.

R. H. Beaumont Company, Philadelphia, Pa., is distributing catalog No. 32 on its skip hoist for ashes handling. This booklet describes and illustrates a number of installations, among which are those of the Reading Transit & Light Company, Reading, Pa., the Eastern Pennsylvania Railways, Pottsville, Pa., and Peoples Railway Company, Dayton, Ohio. One section is devoted to reasons for "Divorcing Your Ash-Handling System," and another points out the advantages of the skip hoist. A typical plant showing coal handling separated from ashes handling is given. Electric worm-gear type drums which operate the skip hoist are described and illustrated.

Arc Welding Machine Company, New York City, N. Y., has issued a well-illustrated forty-page booklet on Arc Welding. Sections of this booklet are devoted to heat production, arc regulation and welding practice. The first section is devoted to showing where and how the arc heat is produced, with practical examples of the total heat requirements for the several systems. The methods of welding, with illustrations of single and double-bevel welds and of welds without bevel are described. Graphs are used to show the percentage of welded surface for different number of strings and also for the effect of reinforcement. Under the next section the constant potential system and the constant-current system are explained in detail and illustrations, practical examples and graphs are given. The third section is devoted to the closed-circuit system which has a constant current generator. In the last section the relative floor areas for equal capacity of different systems of welding, comparisons of wiring systems and comparisons of arc-welding systems and costs are given.

NEW PUBLICATION

Handbook of Machine Shop Electricity. C. E. Clewell, McGraw-Hill Book Company. 461 pages, illustrated. Price \$3.

In the preparation of this handbook the viewpoint of the practical shop man has been kept in mind by the author. The subjects treated are chiefly those that apply to particular uses of electric power in shop operations. The arrangement of the material makes reference to any subject easy. There are ten main sections, arranged as follows: Abbreviations; terminology and units; circuits; costs; communication and distant control; generators and transformers; electrochemical, soldering and welding applications; heating and magnetic apparatus; lamps and shop lighting; measuring instruments; motors. Each of these sections has one or more divisions in which the several topics are arranged in alphabetical order. There are many illustrations which show the construction and operation of apparatus, as well as numerous simple diagrams which demonstrate clearly the principles which the practical man should know.