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BIG CARS ON LONG SCHEDULES

If the jitney flare-up is illuminating any problem it is that of big cars and long schedules. The public does not patronize the jitney as much for its comfort or its actual speed as for the fact that it is there when the passenger wants transportation and it takes him with few stops to his destination. This condition applies even where a seat is available for every car passenger. Without question the public of the towns where the jitney has done big business will not remain satisfied with fifteen and ten-minute headways in city service. Few companies could afford to run more cars of the same type as those they have in service now. Naught will remain then than recourse to shorter and lighter cars. At this writing at least two types of one-man cars have been designed, each weighing between 300 lb. and 350 lb. per seat, this achievement being accomplished in part with the aid of the small wheel and the small motor. With the improvements available in the way of braking, door-control and fare-recording apparatus, there seems to be no hindrance from a mechanical or electrical standpoint to the use of the one-man car. The saving in cost of operation per car-mile by such a car is not confined to the transportation expenses but is reflected as well in the accounts of power, maintenance of way and maintenance of equipment. It can thus supply the demand for frequent headway at a minimum operating cost.

THE SHORT LIGHT CAR

It is of interest, in illustrating the great attention being directed to this subject of shorter headway, that the topic should have been considered during the past ten days at railway conventions in such widely-separated cities as Pittsburgh, Pa., and Galveston, Tex. The principal obstacle to the greater use of the one-man car, brought up at the Pittsburgh convention, was that of grade crossings. How is the one-man car to be flagged across a steam railroad track? Testimony presented at the meeting, however, indicated that this was not an insuperable obstacle. Electric railway companies are so accustomed to requiring one employee on a car to act as a lookout at places of this kind while the other employee operates the car over the track, that it is difficult at first to realize that any other procedure can be proper. It must be remembered, however, that practically every other vehicle that uses the road has only one operator, and the experience on the West Penn Traction lines indicates that a crossing can be safely passed even without the second employee. So far as other accidents are concerned, the experience of the same company was that they had been reduced, owing probably to the fact

that there is no possibility of confusion in signals between the rear platform and the front platform. A one-man car, of course, is not synonymous with a short, light car, and there are many places where short, light cars could be used to advantage instead of long cars, yet where two employees per car would be desirable. The question is one primarily of headway, but it also involves schedule speed, because with a smaller number of passengers there will be fewer stops. Long cars will remain desirable for long runs and for the larger cities, but the smaller towns can well look into the merits of the short car.

WHO ARE JITNEY DRIVERS?

The first jitney drivers were men out of work who happened to own automobiles. To these have been added a number of men who, misled by the first glowing reports of jitney profits, forsook their jobs to invest (?) in this modern South Sea bubble. But detailed observations of jitney service by individual license numbers show that an astonishingly large part of the operators consist of still a third class, namely, those engaged in other work who "jitney" only during the rush hours. It is obvious that when 125 out of 400 jitneys in a city earn less than \$1 a day, the operators must have some other occupation during the normal hours. The fact is that quite a number of jitney operators are car owners who display a sign to pick up a few nickels while going to or returning from their work. Observation that the same-numbered car was run by different men morning and evening also developed some remarkable partnership agreements. In one case two stationary engineers clubbed together to enter the jitney game. These men are employed on successive eight-hour shifts. One quits in the early morning in time to make a few revenue trips during the morning rush; the other, in like manner, is free for work during the evening rush. Of such material is a large fraction of the jitney operators. The men who really try to make a living out of the business will be cured by the chastening influence of time, but the others who are in it only for some loose change must learn that from time immemorial strict regulation of common carriers has been practiced and found necessary in the interests of the public. From observations made in many cities where jitneys are in use we are satisfied that an ordinance which specified no more than operation over a fixed route for sixteen to twenty hours a day would kill off 25 per cent to 50 per cent of these traction mosquitoes, while a \$5,000 bonding requirement would place the jitney movement in the class of the dodo, the protohippus and "civilized warfare."

TRAMWAY LABOR IN LONDON

In our issue of May 1 we expressed a hope that the confidence in London in regard to the tramway employees being too patriotic to ask now for much higher wages would not be misplaced. It seems now that we were even more justified than we thought in thus placing a restriction on English trust. Practically all the motormen and conductors of the London County Council Tramways have gone out on strike because the Council refused a general 15 per cent increase in wages to offset the higher cost of living, and the latest cables state that the men have now pledged themselves not to return to work until a permanent increase in pay instead of merely a war bonus of this amount is granted. The situation is particularly exasperating because so many of the motor omnibuses in London have been commandeered for war service that the strike is certain to impose a severe stress upon the remaining transportation facilities. A vital criticism that has always been directed against municipal ownership of street railways in England has been based on the too powerful political and operating influence of the body of employees. In this time of national conflict it might reasonably be supposed that a spirit of patriotism would prevent a misuse of this power, but such has not proved to be the case. It may be that some advance should be granted the employees, in inverse ratio to the largeness or smallness of their present wages, but the insistence upon a 15 per cent permanent advance for all is as ill-timed as the amount is excessive. Never have the London tramway employees had a better opportunity to avoid coercive measures and to co-operate in a reasonable settlement fair to all parties concerned.

PROGRESS IN MOTOR VENTILATION

The interest aroused by R. E. Hellmund's article on motor ventilation, printed in the issue of this paper for May 1, indicates that the subject is more important than the lack of available reference literature would seem to indicate. In the issue of May 8 a valuable letter from E. D. Priest was printed showing that the number of ventilated motors in use is remarkable for the length of time that they have been available. Last week a series of diagrams depicting in graphical form the progress of motor ventilation was given, while this week there is a letter from a large user of ventilated motors. The readers of this paper have, therefore, in convenient form for reference and study the results of the accumulated experience of two large manufacturing companies and of a typical, progressive railway system. Taken together, these data permit the formation of a definite impression of the progress which has been made within a very few years. This progress is largely due to the struggle for light weight in car construction which has also been conspicuous during this period. It is remarkable for the fact that experimentation and successful commercial application have gone on simultaneously. A very interesting point made in Mr. Adams's communication is the necessity for careful cleaning of ventilated motors. Experience here bears out that obtained in the ventilation of stationary machines, where

it has resulted in the washing of the cooling air in some extreme cases to eliminate dust. The motor armature with its longitudinal ducts is a natural centrifugal dust-separator. Hence it is only reasonable to urge that these ducts be kept clear if the minimum resistance to the air flow is to be secured.

EDUCATION FOR ELECTRIC OPERATION

One of the factors in the electrification of steam railroads which attract little attention, but which are quite important from the operating standpoint, is the preparation of men for duty on the electric trains. The problem is simplified, in a way, by the fact that the electric runs are "bid in" on a seniority basis. This fact at the same time complicates the instruction problem because, until the runs are advertised, it is not known who the successful bidders will be. The way in which the Pennsylvania Railroad is now working on the problem of preparing men for the coming electrification of the Paoli division is told in this issue by the man in charge of this preparation—an assistant road foreman of engines. On this division multiple-unit trains will be run, and it is assumed that the runs will be largely bid in by the present local enginemen. Although it is true that older men having through runs will have first chance at the new work, it is not likely that they will avail themselves of it as their present runs are presumably more desirable. The railroad is, therefore, familiarizing the men who will probably secure the runs with the nature of the equipment for which they will soon be responsible. From the general reputation of the employees of this great railroad system for intelligent service and fine esprit de corps, it may be inferred that the new service will start off with snap and enthusiasm. In fact, the interest in the new phase of the local transportation situation is such that many men who are only remotely liable to have to do with the electrical equipment have joined the classes.

The instruction which is being given is of a practical nature and is designed not so much to fill the minds of the men with indigested theory as to impart a knowledge of the electrical equipment commensurate with that which an engineman should have of his engine and boiler. An engineman is not expected to be a machinist, but he must be able to co-operate with the roundhouse men in keeping his machine in order. So the electric motorman need not be an electrician but he must know something of his equipment to operate it properly. In a recent paper W. S. Murray laid a considerable share of the troubles with the New Haven electric locomotives to the difficulty which steam enginemen have in appreciating the difference between steam engines and electric motors. While it is true that the ammeter is a safe guide to the power draft by the latter and while circuit breakers can be set to check heedlessness, yet there is much to be gained by careful controller handling. There is no fundamental principle in the electric equipment essential to intelligent operation which is beyond the grasp of a man with an intellect capable of comprehending the fundamental principles of the air brake.

THE DETROIT STRIKE

The recent short-lived Detroit strike affords a good illustration of the arbitrary way in which a small body of irresponsible men, in utter disregard of their pledged word, can subject the citizens of a large city to inconvenience and pecuniary loss. The contract between the Detroit United Railway and its employees specifically provides that in all cases of differences of opinion, the question at issue shall be referred to arbitration, and it describes the methods by which the arbitration board shall be appointed at the instance of either side. Yet last week this contract, so far as its binding effect on the men was concerned, became "a mere scrap of paper." Without warning, and without taking the preliminary steps required by the contract to insure arbitration, the men stopped work early on Thursday morning of last week and remained out all day. The absolute lack of good foundation for their position is shown by the fact that they reversed it at 8 o'clock on the following morning, a complete change of attitude in thirty hours.

A great deal is being said at present in international affairs about the sacredness of treaty obligations and the disregard by some nations of the rights of neutrals. Civilization cannot exist if either in international affairs or in affairs within a nation solemn agreements are to be lightly repudiated at the whim of either side. Between individuals such action is subject to a penalty enforceable at law, and such seems to be the only remedy in industrial and international disputes, and some authority must be found to enforce the penalty.

In this particular case the point at issue between the Detroit United Railway and its employees emphasizes the unreasonable attitude taken by the union in this dispute. It related to the discharge of a motorman who, according to the records, in less than five years had been reprimanded sixty-four times and had been laid off thirteen times, the offences committed by him being, for the most part, reckless operation. There has been no movement connected with transportation in recent years which has received more popular approval than that of "safety first." Both railways and public have awakened to the importance of putting forth the utmost care in the protection of life and limb, and prizes are awarded by a national society annually to the railway company, both steam and electric, which makes the best record in this regard. This safety movement has been strongly indorsed by the public, but it cannot be successful unless a railway management is supported by both the public and its employees in insisting upon the exercise of care in the operation of its cars. Yet here is a case, where, according to the record, a trainman had been involved in eight collisions, had run into open points eight times, had four times failed to report an accident, had been reprimanded numerous times because he had run his car ahead of schedule, and finally had derailed his car by operating it at high speed over tracks which were being reconstructed. It is no wonder that one of the Detroit papers, in speaking of the strike, says:

"As an instrument of public education the strike of

the Detroit United Railway employees is almost worth its cost in dollars and cents. It has brought home to thousands of people who would discover it in no other way the exact meaning of a labor union clothed with unlimited power, responsible to no authority, unfaithful to its solemn word and covenant and indifferent to the welfare of the community that feeds it."

JITNEYS AND RAILWAY SERVICE

Phrased in various ways, a statement has been running through current newspaper editorials to the effect that jitneys have come into wide use only in those cities where the electric railway service has been inadequate. The "safe assumption" of such a cause for the existence of jitney competition is a very poor example of *a posteriori* reasoning. The successful inference of the correct cause for any given effect depends entirely upon the non-possibility of finding another cause that would be more likely to account for the effect. In other words, anyone who presents inadequate electric railway facilities as the real cause for jitney operation is convicted of careless and unreasoning thought when better causes are shown.

That such other causes are in existence, we insist. In Los Angeles, the birthplace of the jitney, for example, the railway service is admittedly of a very high grade. Here the jitney craze arose only through a combination of an extraordinarily large per-head ownership of low-priced automobiles, an excellent system of roads and most element and constant climatic conditions. The rapid growth of jitney operation in Los Angeles and its spread to other cities then came as a result of the effervescence with which Americans hail all new ideas, the novelty of this means of transportation and its speed, the appeal of the affluence-denoting automobile to the vanity of the average citizen, and the ignorance of the individual operators of such equipment as to the unavoidable costs and the inevitable deficits.

These were the true causes of the origin and the expansion of the jitney movement—causes which by their very lack of stability were certain in time to prove ephemeral in their effect, as is evidenced by the now increasing stories of set-backs and collapses of the movement in many sections. In some cases, however, these real causes have had their effect heightened and rendered unnaturally continuous by auxiliary causes directly connected with the public relations problem of the electric carriers. That is to say, the railways of some cities, on account of the unsettled condition of certain questions affecting both the public and the companies, have been unable to make the public see the folly of supporting a temporary competitor. Thus, in Kansas City and Des Moines, the issue has been the provisions of a new franchise, while in other cases the question has been the fare or the rate of return on the investment. But urban transportation is essentially a monopoly, and the public is bound to become the principal sufferer in the establishment of any uneconomical plan of conducting it. Certainly it seems a poor way to secure further concessions from a railway company to lessen its ability to supply those which hitherto it has agreed to give.

Training Steam Railroad Men for Electric Operation

Great Interest Is Being Manifested in the Preparation for Electric Operation by the Men Connected with Local Operation at the Pennsylvania Railroad's Philadelphia Terminal—The Training Methods in Use Are Described in Detail

BY CLARENCE ROBERTS, ASSISTANT ROAD FOREMAN OF ENGINES, PHILADELPHIA TERMINAL DIVISION, PENNSYLVANIA RAILROAD

One of the essential steps in the process of electrifying steam railways is the training of men for electric operation. During the transition the men most affected are those connected with train operation, and ordinarily such men not only have no knowledge of the elementary principles of electricity and magnetism or the operation of electrical apparatus, but they are not even familiar with relative terms or phrases.

The features of instruction on equipment and electric train service have been given thorough treatment in connection with the Pennsylvania Railroad Company's Philadelphia-Paoli electrification, which is a single-phase, high-tension system, with overhead catenary construction, for multiple-unit train operation.

It is expected electric train service will be begun about June 1, 1915, when multiple-unit equipment will replace the present steam equipment in local passenger service between Broad Street Station and Paoli, a distance of about 20 miles. Through passenger, freight and yard service in electrified territory will continue to be handled with steam locomotives. Approximately twenty crews are employed in the previously-mentioned local passenger service, comprising an engineman, fireman, conductor, baggagemaster and one or two brakemen. Nearly all of these men, except the firemen, who will not be required for multiple-unit service, apparently desire to qualify for electric train service.

Facilities have been provided for all employees interested to become familiar with the electric equipment and its operation. Two multiple-unit cars have been stationed at convenient places, one at Broad Street Station, the other at the West Philadelphia shops, with instructors in attendance during schedule hours, for instruction purposes. The car at the shops is blocked up off its trucks, covers are removed from the motors

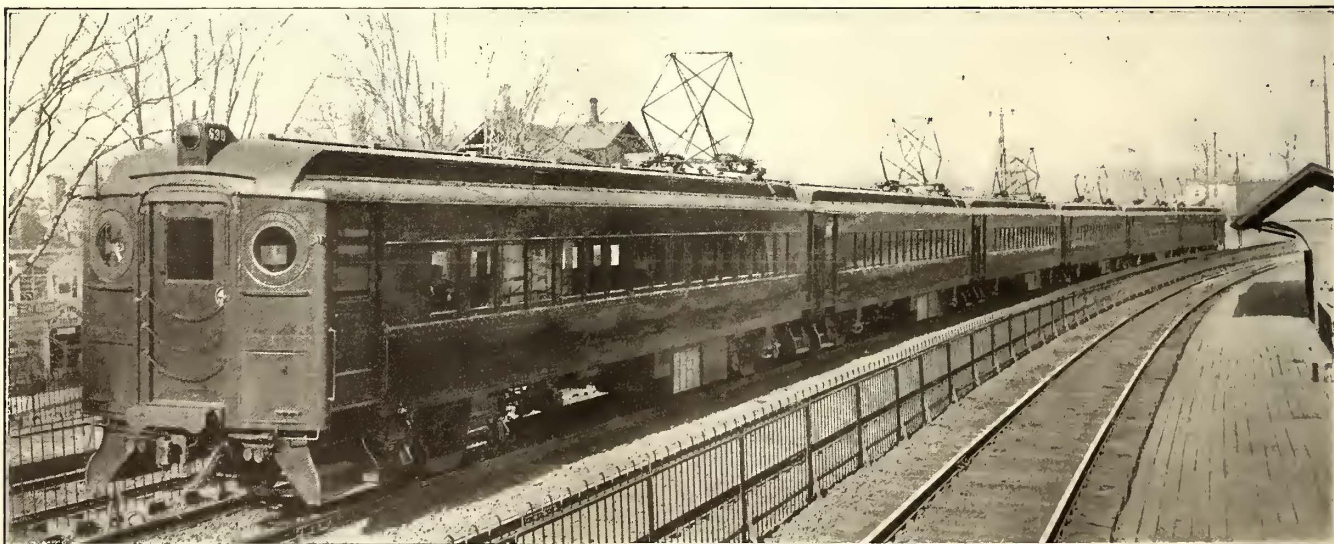
and other apparatus so that all working parts are exposed, and all appliances and devices on both cars bear designating tags. Instruction trains are now being run on a short section of main track between Overbrook and Bryn Mawr, electrified in advance, in order to give enginemen posting for motormen necessary practical experience in handling the new equipment and also to break in the latter.

The Pennsylvania Railroad Department Y. M. C. A., Philadelphia, the membership of which is composed of employees of the company and its affiliations, has co-operated with the company in this work of instruction. In fact, it anticipated the present situation by establishing in 1911 a course of study known as the "Practical Railway Electricity" class which has continued since.

At first the nature of instruction was general, the idea being to familiarize the men with the various electrical terms, phrases, etc., and to outline in a practical way the principal features of power generation, transmission and utilization, and systems of unit-switch control. A car instruction plant was erected, equipped with standard multiple-unit apparatus, and operated for demonstration purposes.

But this season the "Practical Railway Electricity" course of the association has treated specifically the multiple-unit equipment and electric train service of the Philadelphia-Paoli electrification. A series of twenty lectures has been arranged, covering a period of the same number of weeks. Sessions are held one evening per week for men employed in daytime, and the same lecture is repeated the following morning for the night men.

A set of syllabi was prepared, containing a description of the electric equipment and line, and relative operating features, with necessary diagrams and charts.



TRAINING STEAM RAILROAD MEN—COMPLETE M. U. TRAIN AT NARBETH STATION, MAIN LINE, PENNSYLVANIA RAILROAD

SYLLABUS FOR CLASS IN RAILWAY
ELECTRICITY, P. R. R. Y. M. C. A.

Philadelphia, 1915.

PART I

MULTIPLE UNIT SYSTEM—ELECTRICAL
MP
EQUIPMENT—P. R. R.—E CARS—
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DIVISION OF CURRENTS

MULTIPLE UNIT SYSTEM

The Multiple Unit System of electric railway operation enables a train of any number of cars, one or more, to be operated as a unit, and by one operator.

In the application of this system to the Philadelphia-Paoli electrification, each car will be equipped with motors and the requisite apparatus for feeding them power current, which will be collected by a pantograph trolley from an overhead catenary suspended contact wire. The apparatus that feeds the power current to the motors consists of a number of electric switches, operated by compressed air, actuated by electric current flowing in a circuit independent of the power circuit and known as the control circuit. The control circuit cables, with taps taken off to the various pieces of control apparatus run the entire length of the cars, having couplings on their ends which enable their being connected between cars by suitable cables termed train line jumpers. Two master controllers are provided, one at each end of the car in the vestibule, by means of which the motorman operates the car or train.

Acceleration of the car or train is automatic; that is, the motorman may place the controller handle on the "full-on" point when starting, and

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SYLLABUS FOR CLASS IN RAILWAY
ELECTRICITY, P. R. R. Y. M. C. A.

Philadelphia, 1915.

PART 9

CONTROL CIRCUITS AND APPARATUS [Continued]

SWITCH BOARD.

Each car is equipped with a switch board containing the following:

1. LINE RELAY.
2. COMPRESSOR-BLOWER MOTOR SWITCH.
3. MOTOR GENERATOR SWITCH.
4. GOVERNOR SWITCH.
5. BATTERY (CONTROL) SWITCH.
6. CONTROL CUT-OUT SWITCH.
7. HEATER SWITCHES.
8. FUSES.

1. LINE RELAY—The function of the line relay is to automatically open the motor-generator circuit and certain control circuits in the event of power failure or interruption. If some provision of this kind were not made, the storage battery could discharge itself through the motor-generator, or blow its fuse when power fails, and when resumed might do so with switches of switch group closed.

The Line Relay consists of a single coil solenoid, or magnet, with an armature having vertical movement, on which are mounted two contact discs. The coil is energized by current from the No. 8 tap of the transformer (8 to M—122 volts), and as there are no intervening switches or fuses, it is always energized when there is power current on the car and de-energized when it fails or is interrupted.

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SYLLABUS FOR CLASS IN RAILWAY
ELECTRICITY, P. R. R. Y. M. C. A.

Philadelphia, 1915.

AIR BRAKE

Parts 2, 4, 8, 12, 14 and 18.

The Electro-Pneumatic Brake Equipment on each car consists of the following:

One Air Compressor, which supplies the compressed air.

Two Main Reservoirs, which store the compressed air.

Radiating Pipe, which is inserted between the compressor and the first main reservoir and between the two main reservoirs so that the air, after being compressed, may be cooled, in order that all moisture will be deposited in the main reservoir and not be carried over into the brake system.

One Safety Valve, which prevents excessive pressure accumulating in the main reservoirs in case of a governor failure.

One Compressor Governor, which causes the air compressor to start and stop automatically so as to maintain the air pressure in the main reservoirs within predetermined limits.

One Clutch Magnet, which, actuated by the compressor governor, starts and stops the compressor.

One Brake Pipe, which transports the compressed air from the brake valve to the universal valve on each car.

One Main Reservoir Pipe, which conveys the air from the main reservoirs of the different cars to the operating brake valve.

Two Motorman's Brake Valves, with Feed and Reduction Limiting Valves attached, by means of

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TRAINING STEAM RAILROAD MEN—SAMPLE PAGES FROM INSTRUCTION SYLLABI

The following is a list of the subjects covered in the syllabi and the lectures:

1. General description of the multiple-unit system; electric equipment of P. R. R. M. P-54-E (multiple-unit) cars; definition of car circuits.

2. Air brake; description of the A. M. U. E. (Westinghouse automatic motor-driven electric) brake equipment.

3. High-tension power circuit; catenary suspension of trolley wire; a.c. voltage of trolley wire; pantograph trolley; oil circuit breaker (line switch); transformer (car); low-tension, or secondary power circuits; secondary voltages.

4. Air-brake, U. E. (universal electric) valve.

5. Motor circuits; sequence of unit switches, scheme of current flow in motor circuits.

6. Air brake, ME-23 brake valve and brake circuits.

7. Control circuits and apparatus; switchboard; master controller and switch group.

8. Air brake; compressor; governor; signal whistle.

9. Control circuits and apparatus (continued); reverser; line relay; train cables and jumpers.

10. Air brake; by-pass and limiting valve.

11. Control circuits and apparatus (continued); current-limit relay.

12. Air brake; U. E. valve (continued).

13. Low-tension circuits; compressor-blower motor; motor-generator; heaters; lights; storage battery.



TRAINING STEAM RAILROAD MEN—MEN EXPERIENCED IN STEAM RAILROAD WORK IN TRAINING FOR ELECTRICAL OPERATION

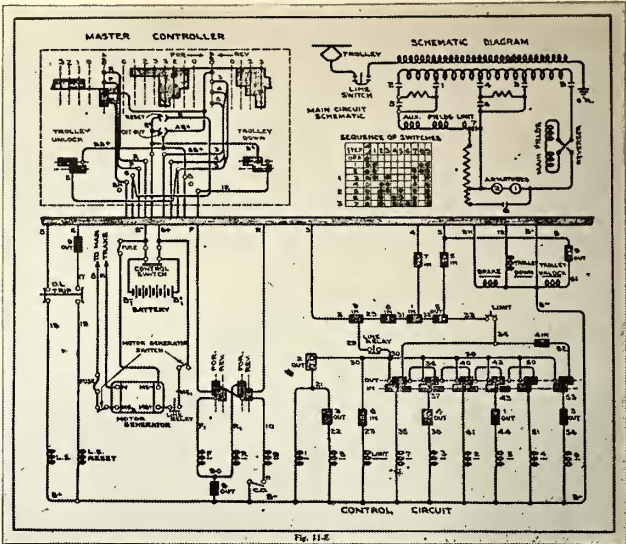
14. Air brake; U. E. valve (continued).
15. Preparation of train for start; operation of train.
16. Air brake; ME-23 brake valve and brake circuits (continued).
17. Disorders of electric equipment; rules for personal protection.
18. Air brake; compressor; governor; signal whistle (continued).
19. Review of the multiple-unit system.
20. Review of the air-brake system.

Enrollment in the "Practical Railway Electricity" class is open to both members of the association and non-member employees of the company. A nominal fee is charged, to cover the cost of preparing the course. This term there has been an enrollment of 280 men divided as follows:

| | | | |
|--|----|----------------------------|----|
| Enginemen | 76 | Yardmasters and assistants | 5 |
| Firemen | 35 | Master mechanics | 2 |
| Conductors | 9 | Foremen | 19 |
| Trainmen | 38 | Machinists | 17 |
| Road foremen of engines and assistants | 4 | Inspectors | 25 |
| Instructors of firemen | 7 | Electricians | 5 |
| Trainmasters and assistants | 3 | Clerks | 6 |
| Train dispatchers | 4 | Laborers | 1 |
| Station masters | 1 | Car cleaners | 1 |
| | | Miscellaneous | 22 |

Attendance at the association course of instruction is voluntary, though the course is approved by the company, but men desiring to qualify for electric train service are required to attend the instruction cars and finally to pass an examination on the equipment and its operation.

Employees qualifying for electric train service, or whose duties are in any way connected with the operation and maintenance of the electric equipment are furnished a copy of a book, "Electric Train Service Instructions," which describes and gives rules for operating the electric equipment, the A. M. U. E. brake, and the train signal applied to the multiple-unit cars. Motormen are required to familiarize themselves with the name, location and purpose of all apparatus, and the



TRAINING STEAM RAILROAD MEN—SAMPLE DIAGRAM FROM INSTRUCTION SYLLABI

principles of operation, and the mode of procedure in case of failure. Trainmen are also required to familiarize themselves with the name, location and purpose of all apparatus on the car.

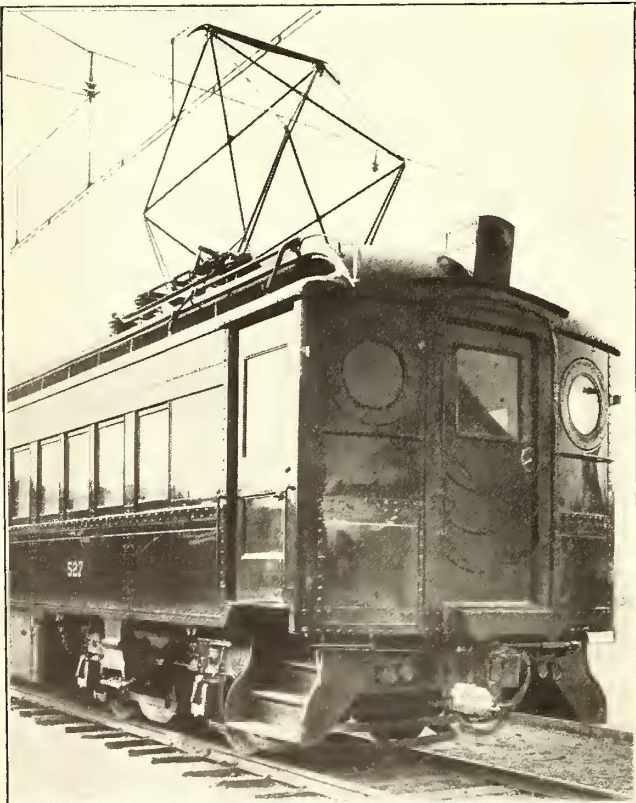
Every employee working in the electric territory or incidentally coming in contact with it has been provided with a copy of a pamphlet, "Special Instructions," specifying the electrified tracks, calling attention to the danger of coming in contact with high-tension circuits, to the action to be taken in the event of disorder to them, to "first aid hints," and to the methods of resuscitation from electric shock.

The men to be employed in electric train service; trackmen, signal repairmen, electric repairmen, telephone repairmen, yardmasters and others, whose duties require them to work in electrified territory, conductors and enginemen of steam trains running over electrified tracks, and trainmen and firemen in passenger shifting service, all have been required to take instructions on methods of resuscitation from electric shock. In the instructions on resuscitation personal demonstrations are made, that is, each person instructed is used as a subject and he in turn performs the method on another.

In view of the thorough manner in which employees are being instructed in the equipment and its operation, train service requirements and safety features in connection with the entire Philadelphia-Paoli electrification, it seems reasonable to expect electric train service to be introduced in safety to the public and employees, with a minimum amount of delay and on a fairly efficient basis.

Damaged Automobiles Repaired by Street Railway

The Union Electric Company, Dubuque, Ia., finds it more economical to repair automobiles damaged in collisions with cars than to have the work done by some outside concern. Many settlements have been made with automobile owners by offering to put the automobile in good repair. It is estimated that about 50 per cent of the cost of having this work done outside is saved, and the practice has tended to gain the goodwill of those whose cars have been struck. This company operates nine automobiles which its shop force keeps in repair. The management concluded that if it is cheaper to keep the company's cars repaired in this manner, damaged privately owned automobiles can also be repaired by the regular shop force.



TRAINING STEAM RAILROAD MEN—END VIEW OF M. U. CAR ON PENNSYLVANIA RAILROAD, SHOWING PANTAGRAPH DETAIL

Meter Results on Chicago & Milwaukee Line

Economies Effected by Ampere-Hour Meters on This High-Speed Interurban Railway Produce a Net Return at the Rate of \$12,000 Per Annum, the Necessary Investment Amounting Only to One-Fifth of This Amount

Probably one of the first complete installations of car meters on an electric system in this country was that made on the cars of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. During the last few years the possibilities and limitations of the car meter have attracted the serious attention of electric railways, probably to a greater extent than ever before. Greatly increased operating expenses on this road made economies in all departments necessary, and the management naturally was interested in any device that could actually effect economies in power consumption or in equipment maintenance. The car meter, which was not a new device, having been in successful use in Europe for a number of years, appeared to afford this means. The meter selected was of mercury-flotation type which overcame the difficulties pertaining to the earlier types, due largely to the meter mechanism which was not constructed ruggedly enough to withstand severe service. During the test period of three months none of these meters failed either mechanically or electrically.

Since reliable results with meters must be based on the average of the innumerable varying conditions of electric-railway traffic, it follows that comprehensive tests are necessary for satisfactory comparisons. The excessive costs of tests, including the expense of extra test cars with special instruments and the cost of maintaining these devices, has deterred many managers from seriously investigating meters. On the other hand, tests of short duration with a few meters accomplish nothing and often create an unfavorable opinion of these devices. While it is true that comprehensive tests are necessary and that all or a large percentage of the cars of any system must be equipped with meters, thoroughly satisfactory results were obtained by this company for an expenditure slightly in excess of the relatively small initial investment in the meters.

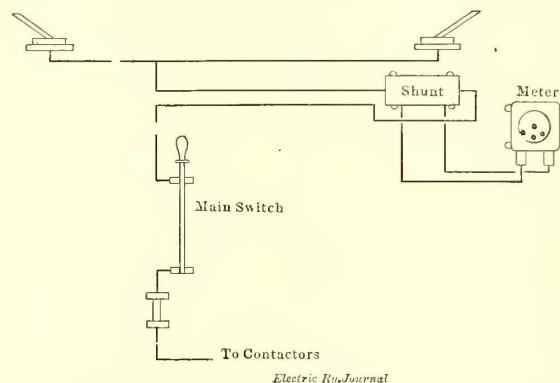
The Chicago & Milwaukee Electric Railroad has both city and interurban traffic, operating a high-speed hourly limited service between Evanston, Ill., and Milwaukee, Wis., a distance of 73 miles; a fifteen and thirty-minute service between Evanston and Waukegan, Ill., a distance of 25 miles, and city service in Waukegan and Milwaukee. Initially, all of the motor cars, a total of sixty-six, were equipped with Economy ampere-hour meters furnished by the Sangamo Electric Company of Springfield, Ill. The data which follow were not obtained from an elaborate, expensive test, but represent the savings resulting from the use of these meters, together with a simple and inexpensive system of record keeping. There were no special test cars used for instructing the motormen in car operation, and no expensive tests of acceleration were made. In fact, the instructions were given for the most part verbally and were accompanied by constant disciplining of careless and indifferent motormen. Therefore, the savings described should be considered as an average, rather than as the maximum possible economy which may be effected under similar conditions on other roads.

The installation was completed Jan. 3, 1915, at a cost of \$4.06 per car, exclusive of the cost of the meters. This may appear high but was due to the fact that all cars were double-ended, and the interurban cars, hav-

ing Type M control, necessitated considerable extra wiring and labor. The diagram on this page, which shows the meter wiring diagram for the interurban cars, gives some idea of the ease of installation, while the half-tone view on page 976 shows a representative installation of a meter and illustrates its accessible position, so that it is easy for a motorman to take readings. During the installation period the dials were masked with paper on the inside of the cover, so that the motormen could not see the readings and practise economy before the test started. Since the value of one revolution of the large dial may be varied by changing the meter register gear ratio, a value greater than the maximum consumption between any two consecutive readings was selected. The car-house men check up the totals on the four small totalizing circles every night.

INSTRUCTION IN CAR OPERATION

Commencing Jan. 7, 1915, notices were posted that the meters were to be read at designated places, when the motorman went on and off duty, etc., and that these readings should be recorded on the daily record slips,



CHICAGO & MILWAUKEE METERS—DIAGRAM SHOWING METHOD OF CONNECTING METERS

of which a reproduction is published. Verbal instructions were also given the men that energy could be saved by practising moderately rapid acceleration, by coasting whenever possible, and by anticipating stops. The management had taught the men proper air-brake operation, so it was unnecessary to dwell again upon that subject. With these three simple rules instilled in their minds, the motormen set to work to reduce the average energy consumption. The management, believing that experience was the best teacher, permitted the men to satisfy themselves as to the correctness of the rules, and immediately they began experimenting.

The interest taken in the meters and the pride the men took in their records were remarkable. Of course, there is always a small percentage of the men that take no interest in improvements, and this percentage was not lacking among the Chicago & Milwaukee trainmen. Certain men, upon finding that the meters ran slower on series points than on the others, tried to run on series as much as possible, but after reading the meter at the end of the run found they were in error. Others, believing that more rapid acceleration meant lower energy consumption, tried accelerating their cars too

[illegible]

CHICAGO & MILWAUKEE METERS—METER RECORD FILLED
OUT DAILY BY MOTORMAN

quickly, but soon found that by so doing they would use more ampere-hours per mile. It was not long, however, before the men had satisfied themselves regarding these various questions, after which they began to school themselves in other methods of economy. Owing to the fact that the first week was largely experimental and also because it took time to teach the men to hand in their records properly, records previous to Jan. 15 were not computed.

SYSTEM OF RECORD KEEPING

To compare the men fairly on the basis of their average consumption rates in the different services and with the different types of cars, all cars were separated into classes. Service conditions were also divided into several classes, and the results of each man in each service-car class were checked for ampere-hours and mileage on the daily meter record slips. Data on the service and car classes are shown in Table I. At the end of the reckoning period the total ampere-hours and mileage for each man for each service-car class were computed from the daily tickets. The totals were posted in the proper columns on the semi-monthly record sheets, reproduced, in part, on this page. This method of keeping records avoided transferring all except the totals to the record sheet and gave a summary of the results of all the men on two easily readable sheets.

After all the tickets had been totalled and posted on the record sheet, the total ampere-hours and miles for each service-car class were obtained. The service-car class average in ampere-hours per car-mile was obtained by dividing the former by the latter. The car-mile basis was used because it saved labor, and besides the results on a ton-mile basis would be no more accurate or valuable. The ampere-hours that each man should have used, had he performed at average efficiency, is shown in column "K" of the semi-monthly report. These figures were obtained by multiplying

TABLE 1—CHICAGO & MILWAUKEE ELECTRIC RAILROAD—CARS AND SERVICE

| SERVICE | | | | | | |
|----------------|----------------------|-------------------|--|-------------------------------|--------------------------|---------------|
| Car-Class Data | | | | Motors, Number and Type | Total Horse- power | Gear Ratio |
| Car Class | Car Number | Weight, Pounds | | | | |
| Express | 6 and 18 | 60,000 | | 4-73 | 300 | 2.41 |
| 20 | 23 to 28 inclusive | 67,160 | | 4-74 | 260 | 2.42 |
| 30 | 29 to 38 inclusive | 50,000 | | 4-70 | 160 | 2.74 |
| 130 | 117 to 403 inclusive | 76,000 | | 4-73 | 300 | 2.41 |
| 500 | 500 to 509 inclusive | 52,000 | | 4-216 | 200 | 4.06 |

| Service-Class Data | | | | | |
|--------------------|---|-----------------------|-------------------------|-----------------------------|-------------------|
| Symbol | Route | Miles Per Trip One | Frequency of Service | Average | Average |
| | | | | Number Stops Per Mile | Schedule Speed |
| A | Evanston-N. C. Jct. & Waukegan Local. | 24.39 | 15 and 30 min. | 2.5 | 18 |
| A-2M | Evanston-N. C. Jct. & Waukegan Local, two motor car multiple-unit | 24.39 | rush hours | 4.0 | 18 |
| B | N. C. Jct.-Milwaukee Local | 51.49 | 2 hours | .5 | 24 |
| B-2M | N. C. Jct.-Milwaukee Local, two motor car multiple-unit | 51.49 | rush hours | 4.0 | 24 |
| C | Evanston-Milwaukee Limited | 72.74 | hourly | .3 | 31 |
| C-2M | Evanston-Milwaukee Limited, two motor car multiple-unit | 72.74 | rush hours | .3 | 31 |
| D | Libertyville | 8.00 | hourly | .5 | 24 |
| E | Electric Park | 1.25 | 15 and 20 min. | 3.5 | 11 |
| F | North Avenue | 4.00 | 15 and 30 min. | 3.0 | 11 |
| G | Milwaukee City | 3.35 | 15 and 20 min. | 7.0 | 7 |

the service-car class average ampere-hours per car-mile by each man's mileage in that class, and so on for each class. The ratio of the man's "K" to his total ampere-hours in any one class represents his percentage of efficiency, or index number, in that class. It also follows that the ratio of his total "K's" to his total ampere-hours in all of the classes would be his system percentage of efficiency, or index number. While this record may appear to be complicated, it required the service of only one clerk who worked eight hours per day to handle all of the daily tickets and the semi-monthly record sheets.

FAIRNESS OF SYSTEM OF RATING

Originally, there arose considerable doubt as to whether the motormen could be rated fairly on the basis of average consumption per car-mile, without taking into consideration the number of stops and slowdowns. It was found, however, that by extending the test over a sufficiently long period and by classifying the different conditions as before described, all men had about an equal amount of heavy and light traffic. They also made practically the same number of the different kinds of stops, so that the variable representing the number of stops was eliminated. Of course, men running only under peak-service conditions should not be compared with men running through light-traffic hours, but such exceptions can easily be allowed for, and as a general proposition these extra men make an inappreciable amount of mileage.

Table II shows the index numbers of motormen for five consecutive periods and clearly illustrates how stable are the men's numbers. It also shows how gradually certain men increase their efficiency figures

| Motorman | CLASS A-2M | | | CLASS C-2M | | | CLASS A-130 | | | CLASS B-130 | | | CLASS C-EXP. | | | CLASS C-130 | | |
|--------------------------------|------------|----------|-------|------------|----------|--------|-------------|-----------|---------|-------------|-----------|--------|--------------|----------|--------|-------------|-----------|---------|
| | A. H. | Miles | K | A. H. | Miles | K | A. H. | Miles | K | A. H. | Miles | K | A. H. | Miles | K | A. H. | Miles | K |
| Bagley..... | ..... | ..... | ..... | 435 | 111.76 | 556 | 725 | 104.85 | 826 | 8,998 | 1,437.73 | 8,995 | ..... | ..... | ..... | 1,287 | 273.08 | 1,399 |
| Baker..... | ..... | ..... | ..... | ..... | ..... | ..... | 8,750 | 1,068.27 | 8,418 | ..... | ..... | ..... | ..... | ..... | ..... | 3,560 | 677.89 | 3,470 |
| Bancroft..... | 25 | 2.37 | 24 | 193 | 27.02 | 135 | 7,375 | 917.77 | 7,240 | 1,212 | 195.10 | 1,217 | 665 | 138.78 | 741 | 160 | 27.02 | 139 |
| Batcher..... | 420 | 37.90 | 379 | 144 | 27.02 | 135 | 6,225 | 766.27 | 6,038 | 1,018 | 164.10 | 1,025 | 355 | 71.74 | 380 | 403 | 72.74 | 373 |
| Woyce..... | 6,725 | 605.66 | 6,056 | ..... | ..... | ..... | 10,908 | 1,285.24 | 10,130 | 9,787 | 1,546.10 | 9,640 | ..... | ..... | ..... | 295 | 66.44 | 343 |
| Zell..... | ..... | ..... | ..... | ..... | ..... | ..... | 3,245 | 431.83 | 3,408 | 2,105 | 347.33 | 2,160 | ..... | ..... | ..... | 279 | 40.53 | 208 |
| TOTALS..... | 20,292 | 2,032.70 | 2,032 | 27,084 | 5,436.76 | 27,132 | 240,562 | 30,550.96 | 240,807 | 97,686 | 15,665.94 | 97,714 | 10,155 | 1,904.05 | 10,148 | 138,267 | 26,997.77 | 138,052 |
| Av. amp.-hr. per car-mile..... | 10.00 | | | 4.98 | | | 7.88 | | | 6.24 | | | 5.33 | | | 5.11 | | |

CHICAGO & MILWAUKEE METERS—PART REPRODUCTION OF SEMI-MONTHLY RECORD OF AMPERE-HOURS AND MILEAGE

TABLE II—CHICAGO & MILWAUKEE ELECTRIC RAILROAD SYSTEM
INDEX NUMBERS OF MOTORMEN FOR FIVE CONSECUTIVE PERIODS

| Motorman | Jan. 16 to 31 | Feb. 1 to 15 | Feb. 16 to 28 | Mar. 1 to 15 | Mar. 16 to 31 |
|--|------------------|-----------------|------------------|-----------------|------------------|
| Bagley | 1.014 | 1.039 | 1.048 | 1.027 | 1.002 |
| Baker | .975 | .996 | .949 | .950 | .957 |
| Bancroft | .988 | 1.007 | 1.040 | .976 | .988 |
| Batcher | .969 | .951 | .959 | .955 | 1.016 |
| Blank | .918 | .963 | .928 | .965 | .965 |
| Brown | .974 | .979 | .962 | .939 | .959 |
| Burke | 1.005 | 1.059 | 1.014 | 1.035 | 1.040 |
| Byrne | 1.080 | 1.107 | 1.096 | 1.079 | 1.076 |
| Collins | .959 | .986 | 1.007 | .961 | 1.037 |
| Cox | .982 | .986 | .979 | 1.025 | 1.044 |
| Curley, M. | 1.010 | .942 | .997 | .993 | .976 |
| Curley, T. | 1.008 | 1.041 | 1.103 | 1.011 | .987 |
| De Long | 1.051 | .920 | 1.055 | .934 | .922 |
| Ensign | .972 | .937 | .983 | .901 | 1.102 |
| Geisler | | | 1.103 | 1.097 | 1.102 |
| Gilkison | 1.014 | 1.036 | 1.045 | 1.024 | 1.019 |
| Grabbe | 1.014 | .997 | 1.005 | .980 | 1.008 |
| Ives | .987 | .969 | .975 | 1.022 | .970 |
| Knapp | 1.110 | 1.126 | 1.102 | 1.094 | 1.091 |
| Kranz | 1.000 | .920 | .996 | .931 | .906 |
| Kushawa | .996 | .936 | .981 | .987 | 1.001 |
| Lenfosty | 1.004 | .988 | 1.003 | .998 | .986 |
| Litchfield | 1.071 | 1.073 | 1.081 | 1.121 | 1.054 |
| Ludwig | 1.044 | 1.057 | 1.016 | 1.027 | 1.050 |
| Mansfield | 1.953 | .966 | .996 | 1.032 | 1.053 |
| Marcy | 1.037 | 1.065 | 1.054 | 1.032 | 1.055 |
| Marks | .943 | .914 | .631 | .815 | .884 |
| May | .948 | .949 | .919 | .953 | .933 |
| McDonald | .959 | .961 | .935 | .916 | 1.031 |
| Mead | 1.095 | 1.069 | 1.094 | 1.107 | 1.001 |
| Melville | .964 | 1.029 | .989 | 1.001 | 1.004 |
| Merriman | 1.066 | 1.029 | 1.076 | 1.062 | 1.008 |
| Miller | 1.031 | .965 | .991 | | 1.015 |
| Miner | | 1.012 | 1.037 | 1.024 | .980 |
| Moran | 1.004 | 1.059 | 1.020 | .999 | 1.044 |
| Murphy | 1.021 | 1.076 | 1.046 | .994 | .970 |
| Olinger | .904 | .942 | .957 | .957 | .960 |
| Oppe | .996 | .949 | .992 | .942 | 1.012 |
| Peters | 1.063 | 1.041 | 1.019 | 1.016 | 1.010 |
| Radke | 1.037 | | .955 | .991 | 1.063 |
| Rettig | 1.050 | 1.036 | 1.032 | 1.014 | 1.022 |
| Roehlen, Joe | 1.036 | 1.064 | .976 | 1.008 | .918 |
| Roehlen, John | .927 | .978 | | .925 | .949 |
| Ringberg | .919 | | .916 | .939 | 1.058 |
| Snyder | 1.030 | 1.068 | 1.058 | 1.056 | 1.018 |
| Sprague | .909 | .966 | .919 | 1.051 | .964 |
| Steffen | | .969 | .974 | .918 | 1.076 |
| Stephens | 1.088 | 1.048 | 1.092 | 1.053 | 1.015 |
| Strong | 1.017 | 1.005 | .991 | .970 | .967 |
| Syson | .996 | .991 | .978 | 1.002 | .999 |
| Wagner | 1.009 | 1.000 | .977 | 1.030 | .918 |
| Webster | 1.027 | 1.045 | .924 | .958 | .985 |
| Wicklander | .954 | 1.028 | | | 1.021 |
| Williams | 1.003 | .983 | .993 | .994 | 1.018 |
| White | 1.035 | 1.030 | 1.034 | .998 | .926 |
| Whiting | .956 | .977 | 1.029 | .938 | 1.055 |
| Wright | 1.014 | .990 | 1.019 | .994 | .950 |
| Woyce | .964 | .940 | .930 | .937 | 1.020 |
| Zell | 1.036 | 1.018 | .951 | 1.034 | |
| Average d.c. kilowatt-hour station output per car-mile | 4.45 | 4.61 | 4.14 | 4.16 | 4.11 |

by practising economical operation. A man with an index number of unity has done his work at average efficiency. A man with an index number above unity has performed better than the average, and a man with an index number which is below unity is careless and wasteful.

It would seem that eventually, as the men become more and more efficient in car operation, the range of the men's index numbers would be reduced and the numbers would tend to approach unity. So far, experience on the Chicago & Milwaukee Electric indicates no such tendency, and the range of numbers is practically the same at the last period as it was at the first. Assuming that the good men have approximated the best possible efficiency, it is also apparent that the inefficient men may raise their index numbers more rapidly than the men above unity. At first thought, it might also appear that the high men would be discouraged at seeing their index numbers decrease despite their efforts to raise them. It is to be remembered, however, that the high men will continue to top the list even though their actual index numbers show a decrease over the previous period, and very probably the constantly decreasing gap between them and their fellows would tend to spur them to greater economy.

It is believed that this system is superior to the "bogey" system of comparison, in that it rates the men on a basis of the average results of all the men. In this way it is unfair to no one, and it is simple and easy to explain to the men how their averages are made. It may also be possible that the "bogey" system will at-

TABLE III—CHICAGO & MILWAUKEE ELECTRIC RAILROAD—ESTIMATED POWER SAVINGS FOR 1915

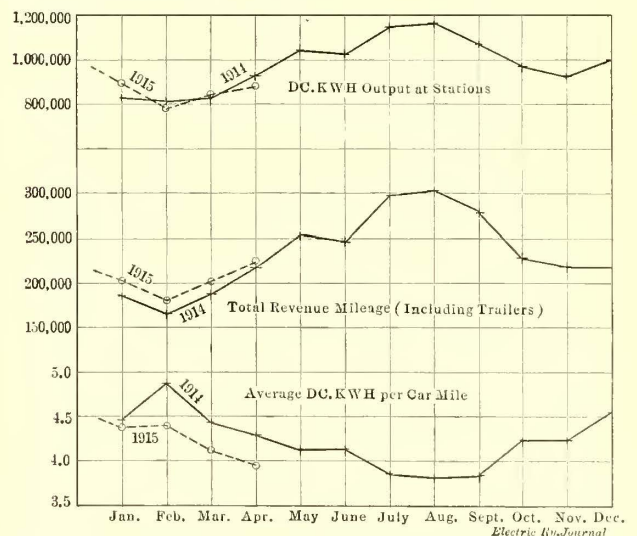
| | |
|--|-------------|
| Investment: | |
| Cost of 65 amp-hr. meters | \$2,015.00 |
| Cost of installation, labor and material | 267.96 |
| Total investment | \$2,282.96 |
| Yearly Charges: | |
| Depreciation at 15 per cent. | \$342.44 |
| Interest on investment at 6 per cent. | 136.98 |
| Maintenance and testing | 150.00 |
| Clerical labor | 1,200.00 |
| Stationery | 40.00 |
| Total yearly charges | \$1,869.42 |
| Estimated 8 per cent saving on 1915 power bill | \$14,056.40 |
| Deduction for yearly charges | 1,869.42 |
| Actual net saving for 1915 | \$12,186.98 |

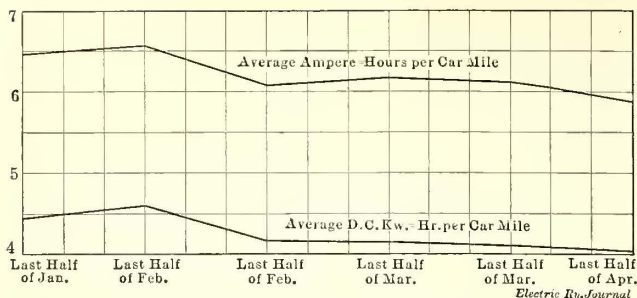
tain greater economy for the management by driving the men to reach a mark often obtained under most favorable conditions. On the other hand, the ultimate success of any merit system depends largely upon the degree of enthusiasm with which the men accept it and continue interest in it, and the company believes that continued economy and the employees' good-will are far more to be desired than economy that must be obtained by continuous driving.

POWER SAVINGS EFFECTED

It is to be noted that the diagram showing mileage and consumption curves for the years 1914 and 1915 compares results under exactly the same conditions. The marked decrease in kilowatt-hours per car-mile through the summer months of 1914 was due to the increased use of trailers. All conditions are practically the same for the months of January, February and March of the years 1914 and 1915, except that the traffic of 1915 increased approximately 10 per cent over that of the year 1914, and the mileage increased accordingly.

The value through November and December, 1914, tends toward a greater rate of increment than for the previous year end. It is reasonable to assume that the average kilowatt-hours per car-mile for the month of January, 1915, would have been much higher than that of January, 1914, had not the meters been used. February, 1914, was a month of bad weather, and February, 1915, was not without its storms. The first week of this month required an average of 4.8 kw-hr. for every car-mile operated. The decrease in kilowatt-hours per car-mile for the months of February, March and April, 1915, over the corresponding months of 1914, averages 8 per cent. On the whole, therefore, the saving is quite satisfactory, considering, as before

CHICAGO & MILWAUKEE METERS—DIAGRAM OF MONTHLY
FIGURES ON MILEAGE AND POWER



CHICAGO & MILWAUKEE METERS—POWER CONSUMPTION
PER CAR-MILE IN AMPERE-HOURS AND
KILOWATT-HOURS

stated, the difficulty of obtaining reliable comparative records.

POSSIBLE ECONOMIES IN DIFFERENT CLASSES

The decreases in ampere-hours and kilowatt-hours per car-mile for the system are also shown in graph form. The power savings in the different classes, however, varied quite widely. For instance, the A-2M class required considerably more power per mile than the A-130 class. This was because the multiple-unit service was operated only during the peak-traffic period. Likewise, the savings in the multiple-unit classes were not as consistent as those for the other classes, due to

weather and other greatly varying demands on this service.

Class A-130, representing about 30 per cent of the total mileage for the system, showed a decrease of 6 per cent at the end of the three-month period, while Class C-130, representing almost as much mileage, showed a mean decrease of about 14 per cent. Milwaukee city cars in Class G-500 showed the greatest consistent decrease of all the classes, with a 20 per cent saving. However, none of these decreases should be compared with the results from the last half of January, without taking into consideration that a very appreciable saving was realized immediately after the men were ordered to read the meters. The average motorman has considerable latent efficiency in him that is bound to show as soon as there is a check on his efforts.

The possibilities of saving by switching different types of cars in different services have also been brought out. For instance, in the first half of April a Class 30 car was used in the Libertyville service, with the result that a saving of about 30 per cent was made over the average for the D-20 class. Also, though operating conditions do not permit of doing so extensively, Class 20 cars are used whenever possible in the A service, with a saving of about 14 per cent per car-mile.

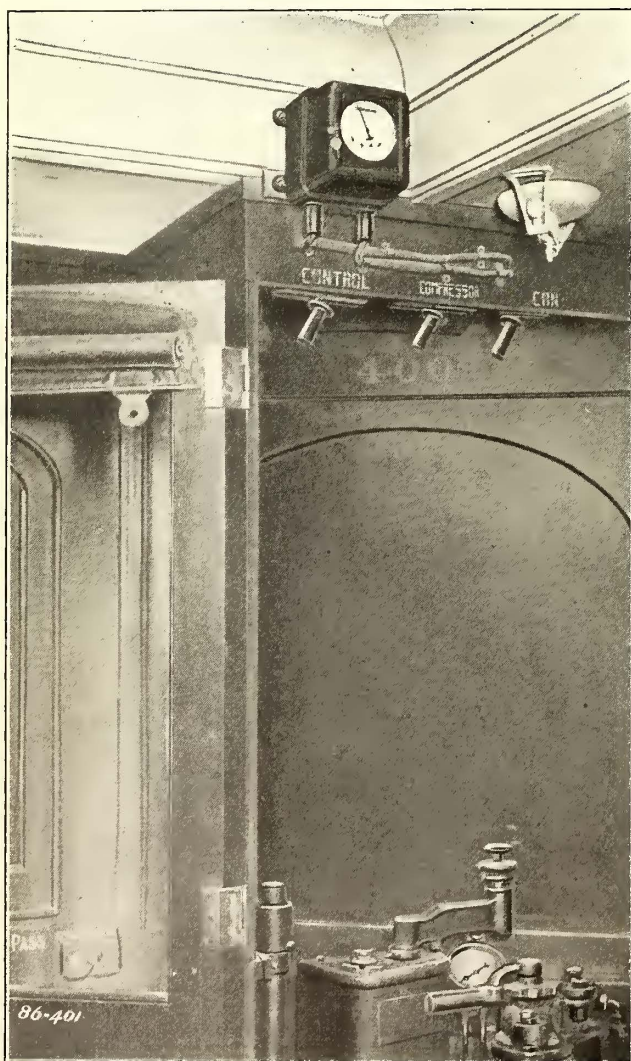
SAVINGS IN EQUIPMENT

Unless the motor sizes are far too small for the service, or the gear ratio is radically wrong, there should be less heating of equipment due to reasonably rapid acceleration and to increased coasting time. This would reduce the time the current was on and would increase the period of radiation, which in turn should result in decreased maintenance charges on equipment. Also, because less energy is wasted in braking, there should show a considerable decrease in brakeshoe wear. The savings during the three months in these two items were very noticeable, but as maintenance charges naturally decrease through the spring months, it was not thought advisable even to approximate the economy. There is every reason to expect, however, that maintenance charges for the present year will show a substantial decrease over those of 1914, and this can largely be attributed to the use of meters.

EFFECT ON VOLTAGE REGULATION

One other interesting fact was brought out, and that was that the voltage at the car was far better as a result of using power only when necessary. Obviously, this is equivalent to increased trolley-wire cross-section, especially where full voltage is necessary to make the scheduled time. In 1914 the limited trains could not maintain schedule time just south of Milwaukee, due both to an exceedingly severe schedule and to the fact that they had a number of meeting points where the power distribution also was not very good. This year, with the same schedule and all other conditions the same, there has been a marked absence of delays. This is attributed principally to the fact that while the motormen are still unable to coast to any great extent, the heavy drafts of current are less continuous which results in more voltage at the car.

The transportation of potatoes is the latest innovation of the Grosse Berliner Strassenbahn on account of the war. A potato train consists of a motor car and two open trailers, the benches of the latter being loaded with sacks of potatoes. The potatoes are taken from municipal farms to the public markets, at several of which special sidings are provided. All of these potatoes are sold directly by the city.



CHICAGO & MILWAUKEE METERS—VIEW OF METER
MOUNTED OVER MOTORMAN'S CAB

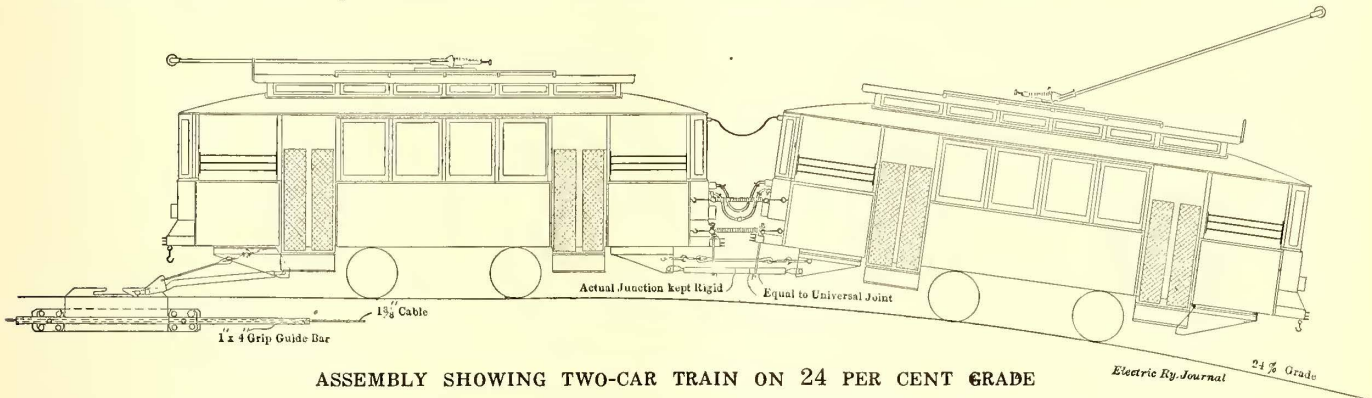
Two-Car Trains on 25 Per Cent Grade

Many Difficulties Overcome to Handle Exposition Traffic Over the Steepest Grades

In handling exposition traffic over its Fillmore Street line, the United Railroads of San Francisco have to operate over the steepest grades on the entire system. For two blocks on the hill the grades are 24 per cent and 25.4 per cent, respectively. This part of the line has long been operated by means of a heavy cable attached to two cars, one ascending and the other descending, while both use power. Until recently the

building the cars and rearranging motor control and brakes for two-car train operation.

The standard cars of the system operate over the Fillmore Street line up to a point seven blocks from the terminus at the exposition entrance and at the top of the grade. These seven blocks have heretofore been served by small single-truck open cars that could be safely operated by cable on the steep grade. The difficulty with these cars has been that during rush hours the large number of passengers that crowded aboard not only prevented the collection of fares but materially reduced the safety factor under which the cable line operated. A count made during several rush-hour pe-



ASSEMBLY SHOWING TWO-CAR TRAIN ON 24 PER CENT GRADE

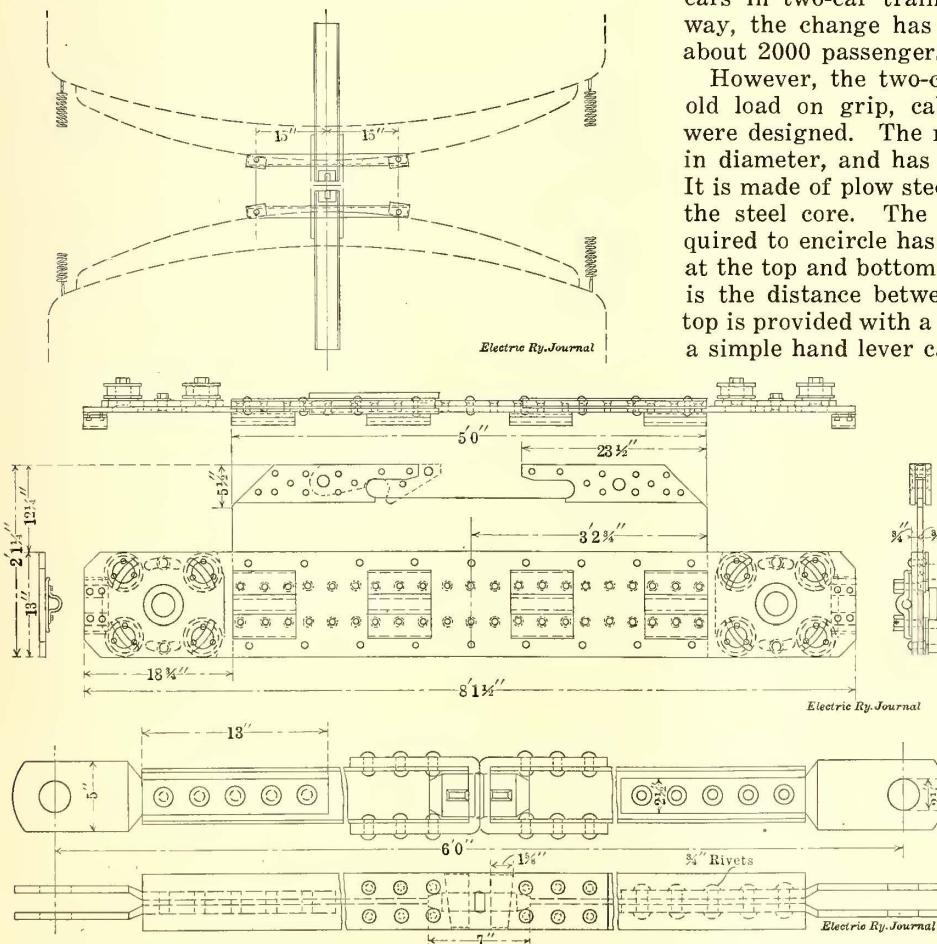
capacity of this line has been about 6000 passengers per hour, but changes have just been effected whereby the maximum capacity becomes 8000 passengers per hour, and the factor of safety in the weakest part of the system is not less than eight. To accomplish this has necessitated a larger cable, new design of grip, re-

riods showed that as many as 150 passengers sometimes rode up the 25.4 per cent grade on a car with a seating capacity of twenty-eight.

It was therefore decided to remodel the car bodies to the pay-as-you-enter type, and as this would reduce the capacity of the line it was planned to operate the cars in two-car trains. Thus, on a two-minute headway, the change has increased the actual capacity by about 2000 passengers per hour.

However, the two-car train imposes about twice the old load on grip, cable and couplings, and new ones were designed. The new cable, 1750 ft. long, is $1\frac{3}{8}$ in. in diameter, and has a breaking strength of 86.4 tons. It is made of plow steel and has seven strands, including the steel core. The smallest sheave this cable is required to encircle has a 5-ft. radius. The main sheaves at the top and bottom are 11 ft. 6 in. in diameter, which is the distance between track centers, and that at the top is provided with a friction brake band through which a simple hand lever can bring the cars to a full stop on the steepest grade if occasion should arise.

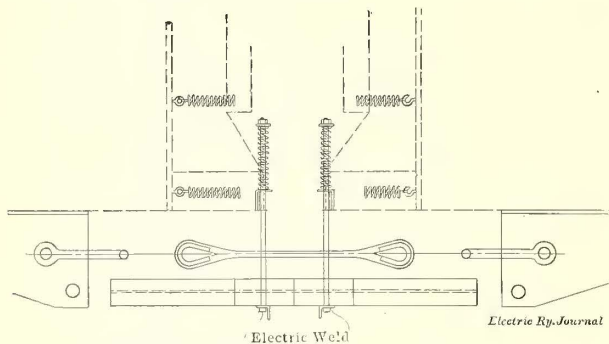
The greatest difficulty in designing the new grip was to provide adequate strength in a device that would operate in the small underground duct that had been built for lighter equipment. The old grip was about 3 ft. long, while the new grip is over 8 ft. long and has a total bearing on the cable of 32 in. The grip consists of an 8-ft. steel plate $1\frac{3}{4}$ in. x 13 in. in section and provided with swivel trucks at each end to prevent its binding in the conduit. The narrow quarters in which this device works will be understood when it is said that there is less than $\frac{1}{2}$ -in. clearance between its projections and the walls of the conduit.



PLAN OF DRAWBAR SUPPORTS; ELEVATION, PLAN AND SECTION OF GRIP; DETAIL OF DRAWBAR

It is interesting to note that some time ago the old grip was remodeled by substituting two wheels at each end for the four previously used. This reduced the binding to such an extent that the wear on bushings was reduced to one-sixteenth the previous amount and the oil consumption per week fell from 5 gal. to 1 pint. The grip is permanently fastened to the cable and is connected by a link bar to the car.

The vertical curves on the hill required so much clearance in the coupling that a new type was designed, arranged to allow play in a wide angle in both vertical



SIDE ELEVATION OF DRAWBAR SUPPORT

and horizontal planes. This was effected by the use of clevis and hinge joints at the rear end of the drawbars, each of which is 3 ft. long, while the joint between the two drawbars of different cars is made firm and rigid by two tapering keys. Thus, although there is freedom and motion in the coupling, the two drawbars themselves are connected by a rigid joint. To simplify and safeguard the act of coupling the cars, the outer end of each drawbar is supported by a long bolt threaded through coil springs in such a way as to allow wide latitude for vertical and horizontal play, the drawbar at the same time being returned to normal position when released.

The electrical control of the cars for this service has been modified so that one of the Type K controllers on each car can be used, by the aid of jumpers, for either two or four-motor control. In rebuilding the cars they have been fitted with a complete air-brake equipment of standard design with regulation hose connections between cars. The weight of the rebuilt cars, which have the same GE-1000 motors as before, is 22,000 lb. each, empty. The seating capacity of each car is now twenty-six.

When the last cars on the line are ready to go to the carhouses for the night, a flat car loaded with sand is used as a balance for bringing them up, and the flat car is left at the bottom of the hill to counterbalance the first train down in the morning.

The redesign of the Fillmore Street hill equipment was made by W. B. Farlow, chief draftsman, under the supervision of B. P. Legare, chief engineer of maintenance of way and construction.

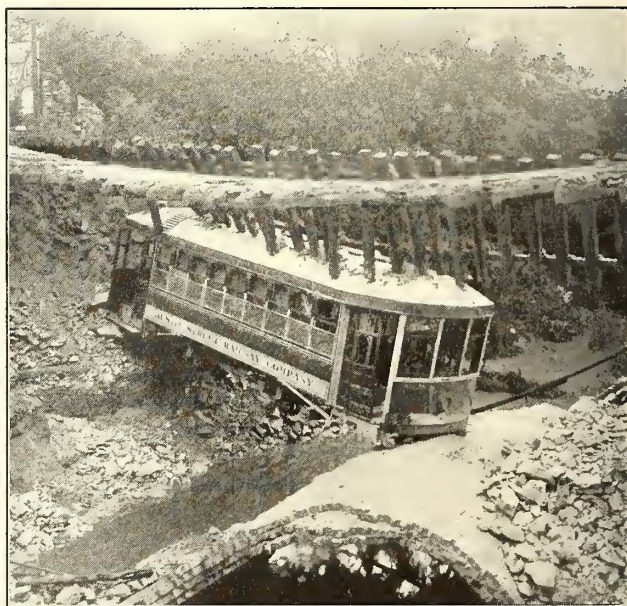
At a meeting of business men and owners of property on High Street, Columbus, Ohio, with Mayor Karb, the question of eliminating trolley poles on High Street, between Livingston Avenue and the Union Station, was discussed. W. C. Campbell, assistant general superintendent of the Columbus Railway, Power & Light Company, said the company is willing to undertake the expense of anchoring the supporting lines of the trolley wire to the structures abutting on the street by the use of rosettes, similar to the plan followed in many European cities, if the consents of all the owners of the buildings can be obtained.

An Unusual Accident

Floods caused by an excessive rainfall on the night of April 22 swept through Austin, Tex., and neighboring cities, drowning a score of people, wrecking houses and washing out bridges. A total of 10 in. of rain fell during the storm, 8 in. being precipitated in seven hours. Several creeks running through the city overflowed their banks, causing property damage that is estimated at \$500,000. One of these creeks, which crosses the boulevard leading to the newly-completed Austin dam on the Colorado River, is normally dry and no water flows in it except after a rain. This passed under the boulevard in a heavy brick-arch culvert over which the earth roadway was carried. The culvert was washed out completely in a very few minutes and one of the cars of the Austin Street Railway which was passing at the time dropped into the washout, as indicated in the accompanying illustration.

Notwithstanding the extraordinary strains to which the car was subjected by its long drop, and its final position across the creek, the damage was almost negligible, the platform knees only being bent slightly upward. The car, it may be said, is of semi-steel construction with side girders extending up to the belt rail. The weight of the car less electrical equipment was reported as 11,000 lb. when the car was designed. It was built by The J. G. Brill Company, and is mounted on one of that company's 11-ft. radiax trucks, the body being 23 ft. between corner posts and 34 ft. over all. In connection with this it is interesting to note from the illustration that the car hardly swerved from a straight course notwithstanding the fact that the rails evidently tipped over as the car left them.

Unfortunately, on the second day after the washout



ONE RESULT OF A RECENT FLOOD IN TEXAS

and before the car could be removed from its perilous position, another extraordinarily heavy rainstorm occurred and the flood that resulted carried the car downstream into the remaining portion of the culvert, finally forcing it clear through under the arch. As the headroom was insufficient for the car to pass intact through this space, the car roof was smashed down against the seats inside of the car and a great deal of other damage was done. If this last piece of ill-luck had not happened, however, the car could have been put back into service as soon as the broken glass had been replaced and the motors dried out.

Pennsylvania Association Spring Meeting

Conclusion of Report of Pittsburgh Meeting Held May 11 and 12, with Abstracts of President Tingley's Remarks, of the Papers on Workmen's Compensation and One-Man Cars, and of the Question Box Are Printed This Week

In the issue of the *ELECTRIC RAILWAY JOURNAL* for May 15 the minutes of the spring meeting of the Pennsylvania Street Railway Association, held in Pittsburgh on May 11 and 12, were given. Included was an abstract of a paper on "Organized Safety" by Lew R. Palmer. Abstracts of the other papers and of the question box discussion follow.

PRESIDENT TINGLEY'S REMARKS

In opening the meeting C. L. S. Tingley, vice-president American Railways, president of the association, congratulated the association upon the past year's work, reviewing particularly that of the last six months. The committee on schedules of rates and tariffs had done valuable work and he was disappointed in not being able to report the adoption of their suggestions by the Public Service Commission. The same was true of the report of the committee on overhead crossings, which was being printed. In the latter connection Mr. Tingley pointed out the difficulty of harmonizing the specifications of the manufacturers of wire and reducing these to a standard. He had hoped that the Legislature would adjourn before the meeting, in which case he could have given a report on the legislative acts relative to street railway work. He was able to assure the members that very little adverse legislation was likely to become law, although one piece of legislation had been passed which the association had opposed vigorously. This gives to a lawyer a lien, for his fee, upon any settlements made in negligence cases. Mr. Tingley thought that this would lead to a harvest of blind cases. The association had once defeated this measure but it was revised and finally passed.

The workman's compensation act was still pending, and might be voted upon. Mr. Tingley stated that he had made a careful study of this matter for six or seven years and was in a position to state that the proposed legislation was not of a drastic nature. He hoped, however, that some of the recommendations which the association had made would be incorporated in the act. A number of bills had been introduced to amend the public service laws, some good and some bad. None had passed and it seemed doubtful if any would.

In the speaker's opinion the most vital thing affecting the industry at present is the jitney bus, although he believed it to be transitory. A number of bills to regulate it have been proposed, the best being the Jones bill, which was unfortunately defeated in the Legislature, largely due to failure to arouse local interest. Mr. Tingley did not believe that any independent motor-driven vehicle has yet been designed which can successfully compete with the electric railway, in the development of which the best engineering minds of the world have been engaged for years. With a small investment the jitney operator has been able to skim the cream from the electric railway traffic during the rush hours and then, when the business threatened to cease being profitable, he has been able to find some gullible person to whom he could sell his outfit, thus causing a loss to the railways and to the people. This matter will doubtless come up again for action by the Legislature and will receive more careful attention and consideration from the lawmakers and the people of the State.

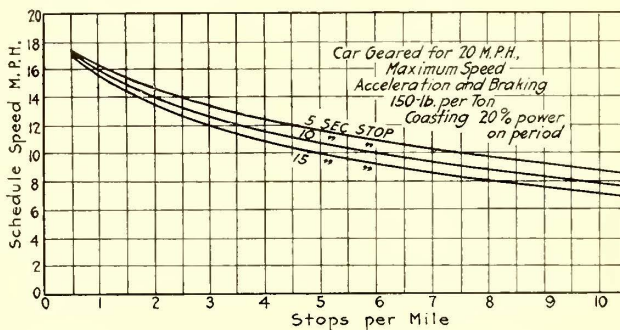
ECONOMIES IN OPERATING SMALL CARS

BY J. F. LAYNG, GENERAL ELECTRIC COMPANY

An excellent perspective of what is involved by the introduction of small cars may be obtained from the following table, taken from the census bureau figures and showing for all the electric railways in the United States the various primary expense accounts in percentages of operating revenues:

| | |
|--------------------------------|-----------------|
| General expense | 9.53 per cent. |
| Power | 9.00 per cent. |
| Maintenance of way | 8.17 per cent. |
| Maintenance of equipment | 7.06 per cent. |
| Transportation | 24.42 per cent. |
| Total | 58.18 per cent. |

Of these expenses the largest is the cost of conducting transportation, which is more than 24 per cent of the gross receipts. Practically all of this represents expenditures for platform wages. With the present plan or system of fare collections for the larger cities, and where travel is heavy, there does not seem to be any way of materially reducing this item, because all



ECONOMY IN SMALL CARS—EFFECT OF STOPS ON SCHEDULE SPEED

of the progressive railway companies have already increased schedule speeds to the maximum with this end in view. However, the time spent in stops is important, and one of the accompanying curves shows the effect of decreasing the length of stop with different numbers of stops per mile, the car being geared to a free-running speed of 20 m.p.h. This curve shows the highest possible schedule speed that may be obtained on level track under favorable conditions, although when making calculations and considering practical schedules, it is best to increase the running time by 10 per cent to allow for the slower schedule speed which will be caused by curves, grades and obstructions by vehicles which are encountered in actual service.

The next highest item in the expense of operation is power, which constitutes 9 per cent of the total. For the purpose of the present discussion, it will be assumed that all possible savings are being made by the proper application of power and brakes, limiting the consideration to the question of car weights. Some railway officials say that this is a negligible figure and do not consider that a few hundred pounds more or less on the car affects the cost of operation. Others figure weight at 30 cents per pound. However, the generally-

accepted figure of 5 cents per pound per year has a good bit of justification.

When power alone is considered savings can be made almost in proportion to reduction in weights of cars. This is indicated in a second diagram which shows the relative power consumed by a heavy and a light car. With regard to weight, the first successful storage-battery cars were a great object lesson because of their reduction in weight of car body, and trucks and improvements in electrical design. One of the next steps in weight reduction was the realization that two-motor equipments would give satisfactory service where grades did not exceed 5 per cent and where trailer operation was not required. Following this a great advance was made by P. N. Jones and his assistants when they put 24-in.-wheel equipments in service on the Pittsburgh Railways. With these cars and others of this character which have since been built, the weight per seated passenger was decreased to approximately 600 lb., although the preceding types of cars using four-motor equipments had a weight equal to 900 lb. or 1000 lb. per seated passenger. With the small diameter of wheel, smaller truck strains are obtained which, coupled with the less weight of wheel, gives trucks that are, roughly speaking, 33 per cent lighter than the trucks formerly

will require motors smaller than those now considered standard for railway service, but if there is a real demand for this class of car the manufacturers of apparatus can be depended upon to supply equipments which will meet the requirements in every respect.

Again referring to the census figures on the expenses of operation, the next item to be considered is 8.17 per cent for maintenance of way and structures. With very light cars this figure will become less, but the amount of the reduction is difficult of determination. The last figure is 7.06 per cent for maintenance of equipment. With small, light-weight cars this also would be reduced from 10 per cent to 20 per cent.

Summed up it may be said that from a purely engineering standpoint there is not the slightest doubt but that the light-weight car should be used for practically all service. With the small one-man car as compared to the larger cars used at present, practically the same service can be given with a large reduction in expense; that is, when a frequency of service is given that would be required in any case.

WORKMAN'S COMPENSATION IN PENNSYLVANIA

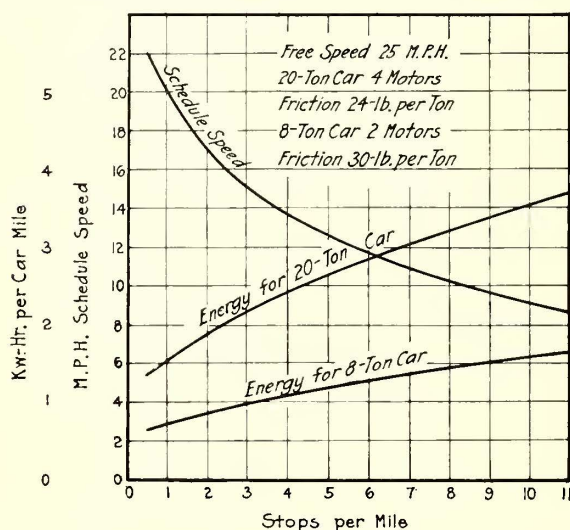
BY D. A. REED, CHAIRMAN INDUSTRIAL ACCIDENT COMMISSION

As would be inferred from the topic of his address, Mr. Reed discussed the subject in view of the pending legislation in Pennsylvania. He stated that the subject is being very generally discussed throughout the State and that most people think that the advocates of compensation favor some sort of a labor agitation scheme which is to benefit only the employees. There is a general impression that any man who has been hurt, whether through his own fault or through no fault, gets the equivalent of a large verdict and, further, that those back of the movement want to put in schemes of reform that would be hopelessly impractical.

Mr. Reed stated that under present conditions an injured employee must look forward to a delay of from two to five years in the adjudication of his case and to a court trial. He must engage a lawyer who, if successful, will take approximately one-half of the amount recovered. In deserving cases this is a poor system of procedure, while in undeserving cases the good liar with an unscrupulous lawyer can usually get the same judgment as one honestly deserving. The employer, too, has to keep up a claim department the cost of which is almost as large in caring for fake cases as deserving ones. During a trial a number of men are taken away from their work and time is thus wasted. The purpose of the workman's compensation laws is to prevent all of this waste. After all, most accidents are equally the fault of employer and employees, and even where neither is to blame the loss can be shared equally.

Mr. Reed then discussed the schemes adopted in twenty-nine other states and in foreign countries, stating that every country in Europe, with the exception of Spain and the Balkan States, has compensation laws. All of Pennsylvania's neighbors excepting Delaware have such laws, which are working satisfactorily in most of them. The West Virginia law is defective in that it provides for the management of the whole matter by the State. The result is the introduction of politics into the scheme with resulting inefficiency. The same fault can be found with the New York State law, which provides that every case shall be taken up with the State commission. The result is that at present the work is very greatly congested.

In the Pennsylvania legislation the settlement of compensation cases will be left entirely to the employer



ECONOMY OF SMALL CARS—RELATIVE POWER CONSUMPTION OF HEAVY AND LIGHT UNITS

used for this same class of service. Since the Pittsburgh Railways put cars with 24-in. wheels in service, a number of other companies have also purchased the same class of equipment, and all indications are now that an entirely new field of development has been started by the small-diameter wheel. With single-truck cars it is possible to have a much longer wheelbase with no greater binding on curves than is found with relatively short wheelbases and large-diameter wheel.

Recently the jitney competition has caused operators again to review general car design to determine if it is feasible to develop a light-weight one-man car. J. M. Bosenbury, Illinois Traction System, has designed a single-end car as well as a double-end one-man car, each of which seats thirty passengers. The single-end car, completely equipped, will weigh 10,000 lb. and the double-end car 15,000 lb. These weights are equal to 333 lb. and 500 lb. respectively per seated passenger. C. O. Birney of the Stone & Webster Engineering Corporation also has designed a single-end, one-man car which will weigh 9000 lb. completely equipped and will seat twenty-nine passengers, equivalent to 310 lb. per seated passenger. Of course, these types of cars

and the employee. They are to make direct settlements, and they do not have to pass the payment through any State office, which would only cause delay.

In conclusion Mr. Reed stated that compensation acts sometimes result in giving compensation to the man who does not deserve it. On the other hand, the employer is protected by making a moderate payment in cases where under the present arrangement he might have to pay a very large award. He believed that experience in the other twenty-nine states warrants confidence in the success of compensation laws. If this act is successful in Pennsylvania it will be interesting to see if it is not possible to apply the same method to all transportation accidents. It would be a tremendous relief to the courts and to the railways if a system could be worked out so that the expense now involved in claim departments could be applied to recompense the victims of accidents and relieve the railways of trouble and worry.

QUESTION BOX

Six topics were covered in the question-box discussion conducted by W. A. Heindle, superintendent Southern Pennsylvania Traction Company, Wilmington, Del. These related to lightning protection for signal and car equipment; car cleaning practice; renewal of car axles, and, of course, the jitney bus.

On lightning protection, Q. A. Brackett, engineer Westinghouse Electric & Manufacturing Company, advocated separate grounds for lightning arresters. Grounding on rail is permissible only when trouble from electrolysis is not anticipated. The pipe ground is adequate and an additional lead wire to the rail is not objectionable. A simple arrester is desirable for cars, one not disturbed by vibration.

Four types of arrester are available, multipath, magnetic blowout, electrolytic, and condenser. The first, of which the carborundum block arrester is typical, is simple and, in ordinary lightning disturbance, gives a high degree of protection at low cost. An objection to the circuit-breaker type of arrester is the difficulty of keeping it in good operating condition. The moving parts suffer from car vibration, developing friction in the tripping mechanism. The electrolytic arrester finds its field of application where strong protection is needed. It is troublesome to maintain and must be well inclosed. If power is off the line for a time the film dissolves and a short-circuit may develop when it comes on again. On high-voltage d.c. lines condenser-type arresters carry off the "static." These operate on the principle that a condenser is practically a short-circuit for high-frequency disturbances, but d.c. power cannot follow. The Piedmont Traction Company has used them successfully. For 600 volts the multipath arrester is recommended, and for higher voltages and better protection the condenser type. Electrolytic arresters are furnished for d.c. as well as a.c. circuits, and are recommended for high voltages.

Continuing the discussion, J. W. Welsh, electrical engineer Pittsburgh Railways, said that the first consideration is the setting of the arrester as near the operating voltage as possible. By tests he had found that carborundum arresters break down at a great variety of voltages while the electrolytic arresters can be set close to a given voltage.

C. B. Fairchild, Jr., executive assistant Philadelphia Rapid Transit Company, called attention to an arrester in which a fuse held the device in the closed position, a charge of pyrene being sprayed on the arc to extinguish it when the arrester operates.

In further support of the electrolytic arrester W. E.

Boileau, general manager Scranton Railway, said that in the severe storms over Missionary Ridge in Tennessee trouble was experienced on the lines of the electric railways of Chattanooga until this type was installed. Transformers had previously been burned out and No. 0000 wires burned off. The ground for the electrolytic arrester was made on a 2-in. pipe sunk 6 ft. in the ground and bedded in coke. Every car in Scranton, except two which have condenser-type arresters, are equipped with electrolytic arresters. Mr. Boileau believed that where arresters are on the cars the "static" is being drained off continually and the least trouble occurs on the lines where there are most cars. On the Missionary Ridge lines the blocks are three-quarters of a mile apart and two arresters are put in on each. One is midway between signals and the other between the trolley and the signal. All are equipped with choke coils before the lines enter the signals. On lines for which the new condenser-type arresters were planned there are some of the old arresters placed every half mile. It is planned to put one condenser-type arrester at the end of the 3-mile line and the other two at equal intervals. Another will be put in the car yard to drain the lines and to protect a large meter there which was "blown up" when protected by the old-type arresters.

F. R. Phillips, superintendent of equipment Pittsburgh Railways, considered that the location of the arrester, connections to it and care taken in its selection were more important than the type. As a result of tests his company now requires that arresters be furnished to discharge between 1000 and 2000 volts. At the beginning of the winter season, when lightning troubles were not liable to occur, the cars were stripped of arresters and the latter were carefully tested, with good results. Mr. Phillips also discussed the subjects of grounding and electrolysis, expressing the opinion that the presence of the earth ground to the rail will in no way influence electrolytic corrosion.

H. R. Stadelman, Nachod Signal Company, Philadelphia, Pa., stated that from the standpoint of the contact-signal manufacturer any arrester with a good ground is satisfactory. The ground should be made not only upon the rail but at an independent point. Experience has shown that the rail does not furnish a proper ground for the signal system. He described a method of installing the arresters which would furnish a direct path to ground. He advocated the use of the horn gap in connection with the line, as the "static" would take the gap rather than reverse its direction to follow the line.

On the subject of cleaning cars, E. L. Green, master mechanic York Railways, said that his cars are sprinkled with disinfecting liquid, before sweeping, daily. Windows are cleaned daily, and twice a week the cars are cleaned outside. C. B. Fairchild, Jr., reported that the Philadelphia Rapid Transit Company had cars cleaned inside with excellent results by women. The women clean the windows, but otherwise have no heavy work outside.

In discussing axle renewal, F. R. Phillips stated that if the load on an axle does not too closely approach the elastic limit the life is indefinite, aside from journal wear. While axles must be examined for flaws this feature has been over-emphasized. His company cleans axles with gasoline, dips them in French chalk, suspends them from two loops and strikes them with a sledge. Fractures are visible through discoloration of the chalk. An attempt to renew axles on a mileage basis often results in throwing away an axle better than the one which replaces it. W. B. Rockwell, manager Eastern Pennsylvania Railways, agreed with this, stating that his company has eighteen-year-old axles which are

better than some used only six months. Taking up general principles another speaker mentioned the stresses to which axles are subjected. Alternating stresses, even within the elastic limit, will eventually lead to "detailed cracks." These may start after the axle has been in use for some time. In heat-treated parts, hair-line cracks are often developed by the heat treatment. These may be too small for detection by the microscope. By supporting the axle on its journals and dropping a weight of perhaps 1000 lb. on the center from a height of a foot or two defects can be made visible. Mr. Rockwell stated that it is difficult to classify the many causes of axle failure. Usually the axle breaks against the gear, and in one case an axle broke at the center of a solid gear.

The last topic of discussion was the jitney bus. W. A. Heindle said that in Chester, where there are seventy-six or more jitneys, the experience is serious. In one case a truck used during most of the day for ice delivery takes thirty to forty men to and from work. Jitney riding is a popular diversion. The traffic is controlled by saloonkeepers, aldermen and others with political influence. President Tingley gave data as to the effect of the jitney upon railway revenues in a number of Western cities. He demonstrated the congestion which would result if the people depended entirely upon the jitney, reminding the audience of the slogan, "Who pays the bills the jitney kills?"

Another speaker considered "jitneyitis" a disease not yet correctly diagnosed. An important question for the railways is this: "Is the jitney bus a true step in the solution of the transportation problem?" If it is, the railways must take a different attitude from that of the past. The immediate problem is one of regulation in two parts: liability and taxation.

Indemnity to cover jitney liability involves an attorney's task to determine the form of bond, and it is a serious question as to how the insurance companies are to take care of it. The electric railways are paying about 10 per cent of their gross income for the privilege of doing business, about \$20 per seat. At the same rate a five-passenger car should pay \$100 per annum.

Mr. Rockwell said that he does not fear the jitney as public sentiment is turning against them and it is almost a disgrace to be seen in one. The experience of the Fifth Avenue bus line in New York City shows that bus service at a 5-cent fare is impracticable. The jitney need not be feared unless it steals its right-of-way. The jitney is a common carrier and must be compelled to obey the laws relating to such.

R. P. Stevens, president Mahoning & Shenango Railway & Light Company, stated that the jitney is a menace to the street railway. The direct or indirect interest of alderman in the bus business, in his territory, made it difficult to get suitable legislation. Vigorous advertising resulted in the passing of a satisfactory ordinance. He thought it might be well for the railways to go into the jitney business. His company met the situation by doubling up service during rush hours and decreasing it at other times, with the result that aldermen were impressed with the fact that the jitney does curtail electric railway receipts.

The first of a series of educational addresses which are to be delivered to employees of the Louisville Railway Company was made before an audience of 500 employees in the chapel of the company at the central offices by H. C. DeCamp, representative of the Westinghouse Electric Company. Mr. DeCamp spoke on modern electrical apparatus and on advanced methods for insurance of safety, speaking to two different groups of operatives. The night men heard the lecture in the morning and the day men attended in the evening.

Heavy Electric Traction Discussion

At Chicago Meeting New Features of St. Paul Electric Locomotives Were Described

Three interesting addresses on the mechanical and electrical characteristics of the modern electric locomotive were presented at a meeting of the Chicago section of the American Society of Mechanical Engineers on May 14. A. F. Batchelder, chief engineer locomotive department, General Electric Company, presented a number of views; Dr. W. F. M. Goss, past-president of the society and chief engineer of the committee investigating smoke abatement and electrification of Chicago railway terminals, contributed a paper which dwelt on the significance of mechanical engineering in the designs of electric locomotives, and A. H. Armstrong, General Electric Company, discussed the electrical engineering problems of locomotive designs and the reason for the present methods of rating them.

Mr. Armstrong said that at first continuous rating of motors on street and interurban cars was unimportant because of light loads and frequent stops. On the other hand steam road electrification and heavy freight haulage on some of the electric lines had made the continuous rating of motors of vital importance. He then referred to the recent order from the Chicago, Milwaukee & St. Paul Railroad and said that the locomotives for this line would have an output of 3200 hp and a tractive effort of 72,000 lb. at 15 $\frac{3}{4}$ m.p.h. This surpassed the best modern steam locomotive. Mr. Armstrong also stated that the "bogie" guiding trucks were introduced because the Chicago, Milwaukee & St. Paul locomotives were designed for both passenger and freight service. All parts of the passenger and freight locomotives are identical except the gear ratio. This should result in reducing the cost of locomotive maintenance to a minimum. These locomotives are also arranged so that they may be split at the articulated joint, and it is possible, Mr. Armstrong remarked, that the halves will be used in switching service.

Mr. Armstrong then took up the advantages of electric braking by stating that his company anticipated that a very considerable proportion of all of the energy taken from the line on the up-grade would be returned to it on the down-grade. The benefit of electric braking, however, was not obtained so much in the power returned to the line as in more efficient braking. Electric braking eliminated the danger incidental to automatic air braking because car wheels were not heated and brakeshoes were not broken. Regarding the efficiency of modern electric locomotives, Mr. Armstrong stated that the New York Central locomotives were from 93 per cent to 94 per cent efficient. This was high because there were no losses in transmission through gears. The Chicago, Milwaukee & St. Paul could not use the gearless type of locomotives, however, because of the heavy grades. This would reduce their efficiency to approximately 84 per cent.

Regarding progress on this electrification, Mr. Armstrong said that the overhead on the first engine division of 113 miles between Three Forks and Deerlodge was complete and that on the second engine division was well under way. He also stated that twin-conductor trolley wires suspended from alternate hangers would be used on this electrification to eliminate the detrimental effect of sparking at the hangers. In this connection a new type of current collector is being designed for these locomotives and will include a rocker arm with two contact pans. The combination of this current collector and the twin conductors will, it is believed, eliminate all difficulties experienced in collecting current.

Oklahoma Association Meeting

At the Fourth Annual Convention of the Gas, Electric & Street Railway Association of Oklahoma, Held in Oklahoma City on May 12-13, Discussion Centered on Oil and Gas as Fuels, Public Relations and Appraisals

Nearly 150 delegates attended the fourth annual convention of the Gas, Electric & Street Railway Association of Oklahoma, held at the Lee-Huckins Hotel, Oklahoma City, on May 12 and 13. Mayor Edward Overholser welcomed the delegates at the opening session, and was followed by President George W. Knox, general manager of the Oklahoma Railway Company, who presented his official address.

In this, Mr. Knox analyzed the living expenses of the average family and showed that the lowest average expenditures are made for the items of light, heat and car fare. Still, it is upon the industries which furnish these that almost the whole cost of regulation is placed. Furthermore, while the prices of other things have risen, the cost of light, heat and car fare have all decreased.

Most of the troubles of the utility corporations, declared Mr. Knox, could have been averted by a unified, honestly-conducted campaign of public education by the companies, throwing open all records and giving unrestrictedly all information asked by the public. In twenty-five years' experience in handling public properties he had yet to find a single instance where the utility companies had not received fair consideration by the public and its servants after the true situation had been explained and understood.

If, with the existing rates and amount of business, a company finds that it is not coming out on the right side of the ledger and making fair returns, he advocated a frank explanation to the public. Although it may be a little difficult to demonstrate that the company should have an increase in rates, it will be granted eventually. The public is amenable in such matters.

A public utility should not make the mistake of fighting regulation. All efforts should be directed toward the correction of those measures of regulation which make it impossible to conduct the business successfully. Every management should be fully prepared to show those servants of the people who have the carrying out of the regulatory measures enacted exactly where it stands and why, and there need be no fear that the company will not finally win their confidence and fair consideration.

NATURAL GAS AND OIL AS FUEL IN BOILER PLANTS

Following the president's address, a number of papers were presented on power-plant operation, two of these being abstracted elsewhere. The discussion centered around the correct way of burning gas to obtain the best results. Several members reported having had serious trouble with tubes burning out when gas-fired boilers were run at overload. L. G. Purtee, chief operating engineer Oklahoma Railway Company, stated that he had had the same difficulty until he did away entirely with baffle walls or checker walls, for he had always found hot spots above such structures when the boilers were operated at overloads. Other members spoke of having tile projections extending toward the front and on top of baffle walls and checker walls to prevent this hot-spot projection on the tubes. The determination of the correct amount of air was another topic of discussion. It was stated that some manufacturers of gas burners recommend open spaces around the burners, but the inadvisability of having air-feed spaces

over which the engineer has no control was urged against this.

J. J. Johnson, assistant general manager of the Oklahoma Railway Company, followed with a paper on "The Jitney Situation." This paper also is abstracted elsewhere in this issue.

UTILITY APPRAISALS AND PHYSICAL EQUIPMENT

The closing paper of the convention was on "Utility Appraisals Under Order No. 774 of the Corporation Commission of Oklahoma," presented by George B. Saunders, Oklahoma City. This is abstracted in another column. Harold Bozell, consulting engineer, led the discussion and brought up the point that the commission does not call for a full appraisal bringing the plant to "present value," as claimed by Mr. Saunders, but that the meaning of the commission is that the report should be only the "original cost," which includes the real overhead charges such as engineering, franchise cost, organization, legal, accidents or liability insurance, taxes, interest and miscellaneous general expenses. The commission has not asked for the intangibles, and there is no place for them in the accounts provided for the commission. The commission, however, does not expect to omit these items in a valuation for rate purposes, but they are matters of doubt, whereas the original cost is theoretically a matter of record. It is for a complete list and cost sheet of all property now in use for the public service that the commission asks. In event of a rate case involving any property, there would have to be settled the questions of depreciation, working capital, bond discount, going-concern value, etc. Mr. Mussen, engineer for the commission, stated that it was perfectly proper for an owner to make claim, in an attached exhibit, for the inclusion of such intangibles as he considered belonged to the property, in the event of a rate-case coming up later, adding that the percentages might be added which it was thought should be added in such a case. The position of the commission is that it feels that the history of the plant has considerable weight in its present value for rate purposes, and that this is the reason the commission is calling for this original-cost report and asking for the actual figures expended wherever they can be produced.

ELECTION OF OFFICERS

The following officers were elected: President, W. J. Dibbens, Guthrie; first vice-president, Hugh J. Cooper, Weatherford; second vice-president, C. H. Kretz, Okmulgee; secretary-treasurer, H. V. Bozell, Norman, Okla.

On Thursday evening the convention banquet, with about one hundred in attendance, was held at the hotel. H. J. Cooper, commissioner of public utilities at Weatherford, acted as toastmaster. Included in this lively program were talks by P. M. Gallaway, Tulsa; M. J. Wolfe, St. Louis; A. T. Schnaible, Lafayette, Ind.; V. L. Crawford, Pittsburgh, Pa.; C. S. Thompson, Oshkosh, Wis.; O. A. Parrish, Weleetka, Okla.; W. J. Murphy, Chicago; N. R. Gascho, Alva; W. R. Thomas, St. Joseph, Mo.; F. W. Insull, Oklahoma City; C. W. Ketterman, Dayton, Ohio; M. F. Sterret, Dallas, Tex., and Corporation Commissioner Humphrey, Oklahoma City, who

spoke on the friendly relations between commission and utilities.

On Friday afternoon the delegates were the guests of the Oklahoma Railway Company on a tour around the city with visits to points of interest. In the evening the Jovian Order held a supper and rejuvenation, which was largely attended.

FUEL VALUES OF COAL, OIL AND GAS

BY E. H. HUNTER, ENGINEER OF POWER STATIONS OKLAHOMA GAS & ELECTRIC COMPANY.

Fuel oil is that part of crude oil or petroleum which remains after it has gone through the refinery and the gasoline, naphtha, etc., have been removed.

It makes a most excellent fuel for the production of electric energy, but there are some disadvantages in its use. There is considerable noise in the furnace which might be unpleasant, and also a certain amount of vibration of the boiler doors and setting in general which in time open cracks and permit air to be drawn into the furnace, thereby decreasing the efficiency of the boiler. However, this vibration can be overcome to a large extent by the proper manipulation of the draft.

Natural gas is very closely related to petroleum, and is found in all oil fields to a greater or lesser extent. This fuel is the ideal one for the production of electric power because it is easy to handle and requires no storage bins or tanks. It is clean and is very economical, because of the small amount of labor required for its use and because of the chemical properties, 1 cu. ft. of gas requiring only about 10½ cu. ft. of air for its combustion. There are several good makes of gas burners on the market, and the secret of most of them is proper manipulation to get the right mixture of gas and air. Natural gas requires a furnace of somewhat different design than is used in burning oil, checkered walls being sometimes used, although this is not essential. Considerable vibration exists with burning gas, as in the case of oil, but this may be controlled to a large extent.

Comparing the three fuels, coal, oil and gas, as to their relative value the following approximate figures may be given: 1 lb. of coal will evaporate 9 lb. of water; 1 lb. of oil will evaporate 15 lb. of water, and 1 lb. of natural gas will evaporate 20 lb. of water. In general, 4800 cu. ft. of gas will equal 1 barrel of oil and 4¼ barrels of oil will equal 1 ton of good coal.

FUEL VALUES OF COAL, OIL AND GAS

BY L. G. PURTEE, ENGINEER OF POWER STATIONS OKLAHOMA RAILWAY COMPANY

With hand-fired coal-burning boilers the combined furnace and boiler efficiency will run above 60 per cent only in the best-handled boiler rooms. With mechanical stokers, however, the efficiency will run from 70 per cent upwards, the CO₂ determination approaching 18 per cent.

When gas is used the best efficiencies are obtained when the CO₂ ranges from 8 per cent to 10 per cent. Oil gives about the same results, the reason for the reduced CO₂ being the greater proportion of hydrogen in the fuel which results in the generation of superheated steam and its condensation in the gas-sampling machine. Oil and gas should give the same boiler and furnace efficiency as coal that is fired with mechanical stokers, and this increased furnace efficiency accounts for the reduction of fuel cost that occurs when a change is made in a hand-fired coal-burning plant to the use of gas or oil. The economy is not effected because oil or gas is the cheaper fuel.

In Oklahoma the coal averages at least 13,500 B.t.u. and costs about \$2.50 per ton. Each ton of 2000 lb. will contain 27,000,000 B.t.u. At 10 cents per 1000 cu. ft., \$2.50 will provide 25,000 cu. ft. of gas, which, according to the claims of the dealers, contains 900 B.t.u. per cubic foot. Therefore \$2.50 expended in gas will provide 22,500,000 B.t.u., or 16 2/3 per cent, less heat than can be obtained from a ton of coal. It will be seen, therefore, that if good stokers are installed the results with coal should be over 16 per cent better than can be obtained with 10-cent gas.

The same \$2.50 will buy about 4½ barrels of oil at the present price of 55 cents per barrel. One barrel of oil contains about 285 lb., which at 19,000 B.t.u. per pound equals 5,415,000 B.t.u. per barrel, or 24,367,500 B.t.u. in 4½ barrels. Compared with 10-cent gas, oil at 55 cents is over 7 per cent cheaper when considered strictly on a B.t.u. basis, but oil requires approximately 5 per cent of the steam generated to operate the oil burners, so that the saving of 55-cent oil over 10-cent gas is so small as to hardly be appreciable in the final results.

With small, hand-fired, power plants, however, such as most members of the Gas, Electric & Street Railway Association of Oklahoma have to operate, a substantial saving can generally be effected by substituting gas or oil for fuel instead of coal. The saving is not due to the fact that either gas or oil is cheaper than coal but to an increased furnace efficiency.

UTILITY APPRAISALS

BY GEORGE B. SAUNDERS, OKLAHOMA CITY, OKLA.

Attention is directed to Order No. 774, covering gas and electric companies. Appraisals under this order are made by essentially the "reproduction cost new—less depreciation" method of valuation. The subject of overhead costs is a feature of the order. The greatest stumbling block is encountered by utility heads when this subject is considered. Well-known engineers admit that items under this head are nearly always in dispute. This would indicate the necessity of utility managers in Oklahoma co-operating to adopt a uniform report on these points. It has been suggested by many eminent engineers that, wherever convenient, the overhead charges should be assigned to the units and included in the unit costs, while such overheads as (1) legal, (2) administration and supervision, (3) engineering, (4) insurance during reproduction, (5) taxes during reproduction, (6) interest during reproduction, (7) contingencies, and (8) omissions and oversights, should be treated as gross sums. These percentages in the structural cost are "definite and essential factors in the assembling of the physical property." Under the classification of "organization," the order is not so specific as in the case of other commission rulings.

It is interesting to refer to a paragraph by L. R. Nash regarding the aggregate of all the overhead costs as compared with the structural cost. He says:

"The successive addition of percentages applying to the physical property gives a cost of reproduction from 129 per cent to 158 per cent of the structural cost. The further addition of percentages connected with the organization of the company gives totals of from 131 per cent to 163 per cent of the structural cost. The final addition of percentages to cover development costs gives an undepreciated fair value from 141 per cent to 188 per cent of the structural costs. It thus appears that it is by no means inconceivable that such fair value in certain cases may be double the structural cost if the development costs are fully considered."

Reproduction cost new, as required by the order,

should be interpreted as including the actual physical property value, going-concern value, good-will value, franchise value and earning value, although such is not specified in the order. The appraisal of a public utility property under the order, including as it does physical and intangible values, is a troublesome and long-drawn-out ordeal. It is feared that intangible values are not given full consideration by all utility men in appraisals.

The subject of depreciation is becoming more and more important as rate cases develop. Special stress upon the necessity of distinguishing between depreciation and the depreciation reserve is urged. Most authorities agree that rates of return shall be based upon the present or depreciated value of the property, but if depreciation has not been earned or unless unearned depreciation and other losses have been properly included in development costs, the present value is inadequate. The Board of Supervising Engineers of the Chicago traction system states that the depreciated value of well-maintained utilities is estimated at from 75 per cent to 85 per cent of the cost of reproduction.

As to the subject of "franchise value," there is little to be said so far as Oklahoma utilities are concerned. The commission simply rules that "this account shall include only actual money paid to municipalities or to persons from whom franchises are acquired." Most franchises in Oklahoma are obtained by a vote of the people, and the corporation agrees to pay a certain per cent of its gross income annually to the city. Most states hold against including a franchise value in an appraisal, claiming that it is fictitious and improper. All court decisions say that there can be no "good-will" value where a utility has a monopoly.

After the total physical and intangible values of a property and the rate of return are ascertained, the net income is looked at to see whether it exceeds the sum obtained by multiplying the value of the property by the assumed rate of return. Most protests relative to rates are based upon the theory that a decrease in price or a lowering of rates means an increase of profits because of increased sales. An increase of sales, however, requires an increase in plant to produce the same and distribute them—that is, in the case of increased sales, there is more property upon which to pay a return, requiring a higher amount of net revenue to pay it than was the case before the increase. Thus profits from increased sales would have to be applied first to pay a return upon the increased assets and not to pay a return upon existing assets or to make good a loss of revenue on present sales resulting from a reduction in the product's price.

THE JITNEY SITUATION

BY J. J. JOHNSON, ASSISTANT GENERAL MANAGER OKLAHOMA RAILWAY COMPANY

The jitney craze in a modified form struck Oklahoma City the latter part of last January, and for a time two cars were operated. Later on a few more were added until about a dozen cars were in operation at one time. Without waiting for the matter to go any further, the people of Oklahoma City made a personal matter of it, and after a mass meeting, comprising representatives of retail and wholesale interests, insurance men, real estate dealers, bankers and others, the City Commissioners were induced to pass a drastic ordinance effectually regulating the jitneys. The arguments were that the railway company helped to build the city and that the citizens wished the company to continue to expand, which they believed would be impossible if they had to tolerate competition with the jitney bus.

The friendly public policy of this company and the

courteous treatment accorded its patrons undoubtedly were the important factors in overcoming the jitney nuisance. Of course, it would be difficult to determine the exact degree in which dissatisfaction with a street car company's methods might inure to the benefit of the jitneys, but this is certainly a factor in many places. In the cities where the jitneys appear to be doing the most thriving business the attitude of the people toward the street car companies is generally antagonistic because proper consideration for the people generally has not been shown.

The policy of railway companies of taking the public into their confidence, listening to complaints and suggestions and allowing the people really to feel that their interest is desired and appreciated, has been productive of so much good it is surprising to note that some roads apparently have not adopted this policy, but on the other hand have done things to aggravate the situation. Indeed, the best way to fight the jitney, if after all it is deemed necessary to hasten its disappearance faster than it is accomplishing its own demise, is to give the very best service possible, provide clean, comfortable cars, carefully maintain schedules and have trainmen and other employees that are courteous and accommodating under all circumstances.

American Railway Association Meeting

The spring session of the American Railway Association was held at the Biltmore Hotel, New York City, on Wednesday, May 19. There were present 250 members, represented by 180 delegates. The executive committee reported that the membership now comprises 206 members, operating 278,200 miles, an increase of two members and 190 miles. The associate membership now comprises 206 members, operating 12,500 miles, an increase of five members and 229 miles.

There was little of electric railway interest at the meeting because the committee on electrical working presented only a progress report. It said that several matters were still under consideration by it with the engineering associations, and that until they were settled there was nothing further to report.

A. W. Thompson, third vice-president Baltimore & Ohio Railroad, was elected second vice-president of the association. This was the only executive office whose term expired with this meeting. Chicago was selected as the place for the next regular session, which will be held on Nov. 17, 1915.

New Railway in Argentina

The firm of Anastasio Lopez & Company, of San Luis, Argentina, has secured a concession from the government of the province of Mendoza to construct and operate a 71-mile main line from General Alvear to San Rafael, province of Mendoza. The concession includes branch lines to Las Malvinas and Cuadro Nacional, about 30 miles of track in all, and such other branches up to a distance of 6 miles from the main line as may be necessary to connect the system with centers of production needing an outlet. Those additional branch lines are estimated at another 30 miles for the present. The region traversed is said to be well irrigated and under intensive cultivation. The system adopted for the new line is that of the so-called economical secondary railway with a 75-cm. (2.46 ft.) gage. Steam traction will be used at first, but it is planned to electrify the line at a later date. Work will be begun in about six months with the material of an 18-mile line belonging to the company. It is expected that the purchase of further material and equipment will begin in about eight months.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Conclusion of Power Distribution Committee Meeting Report—Brief Reports of Section Meetings and Other Committee Meetings to Be Amplified Next Week

COMMITTEE ON POWER DISTRIBUTION

Following is the conclusion of the minutes of the meeting of the Engineering Association committee on power distribution, held in New York on April 29 and 30. See page 938 of the issue for May 15.

A tentative set of specifications for overhead material was considered. After consideration the specifications were returned to the sub-committee for revision and later determination as to whether these specifications will be recommended as standard, recommended practice, or miscellaneous practice.

On April 30 G. N. Brown, representing the block signal committee, met with the power distribution committee to assist in the consideration of the block signal clearance diagram. Certain detail changes in the overhead line construction specifications were approved.

The A. I. E. E. standardization rules, as they relate to the work of this committee, were considered and no criticisms were made except that the desirability of pointing out a definite dividing line between the transmission systems, the substation, and the distribution system was suggested. This is important in connection with the classification of accounts.

The committee then considered the revision of existing standards, and detailed revisions, too numerous for abstract here, were approved. The following subjects were then suggested for reference to succeeding committee: Further consideration of concrete poles, including deflection formulas and tables for tapered sections; further specifications for overhead line material, including especially a standard thread for pins and insulators and a specification for structural steel cross-arms and fittings; consideration of the use of aluminum cable, with specifications; collection of data preparatory to possible later standard specifications for high-voltage direct-current and catenary trolley construction. It was also decided to recommend to the association that the specifications for the joint use of poles as printed on pages 82 to 91 inclusive of the 1914 proceedings of the American Association be printed under the head of miscellaneous methods and practices in the Engineering Manual, preceded by a precise statement of the action of the American Association in connection therewith.

EQUIPMENT COMMITTEE

An important meeting of the equipment committee was held in New York on May 17. There were present, W. G. Gove, Brooklyn, N. Y., chairman; F. R. Phillips, Pittsburgh, Pa.; L. M. Clark, Indianapolis, Ind.; W. E. Johnson, Brooklyn, N. Y.; W. W. Brown, Brooklyn, N. Y.; F. W. Garrett, Boston, Mass.; R. H. Dalglish, Washington, D. C. R. C. Bird of the National Fire Protection Association also attended the meeting during the presentation of the reports of the sub-committee on wires and cables. The minutes of the meeting will be given in next week's issue of the ELECTRIC RAILWAY JOURNAL.

MILWAUKEE SECTION

At the meeting of the Milwaukee Electric Railway & Light Company section, to be held on May 25, the topic for discussion will be "The Purchase, Storage and Distribution of Material and Supplies."

COMMITTEE ON POWER GENERATION

The Engineering Association committee on power generation meeting was held at the Fort Pitt Hotel in Pittsburgh, Pa., on May 18. Those in attendance were J. W. Welsh, Pittsburgh, Pa., chairman; G. H. Kelsay, Anderson, Ind.; W. H. Roberts, Akron, Ohio; E. H. Scofield, Minneapolis, Minn.; E. D. Smith, St. Louis, Mo., and A. B. Stitzer, New York, N. Y. On account of lack of space the minutes of the meeting will be put over to next week's issue.

MANUFACTURERS' ASSOCIATION

Secretary H. G. McConnaughy will leave again for the Pacific Coast on Monday, May 24, to complete the arrangements for the convention, particularly with regard to hotels and other accommodations en route. Special attention will be given to arrangements at the two parks which are to be visited. His trip will require about a month. Announcements will soon be made as to the features of the visits to typical railway properties in the cities included in the tours. Mr. McConnaughy goes on one of the special N. E. L. A. trains and will have the opportunity to benefit by the experience of the transportation committee of that association.

PUBLIC SERVICE SECTION

The regular meeting of this section was held on May 20, the subject being the power generating equipment of the Public Service Electric Company from which the power supply for the railway is secured. The speaker was Dudley Farrand, vice-president of the Public Service Corporation and general manager of the Electric Company. He gave a comprehensive, illustrated lecture and showed by comparative data how the demands for electric railway power had increased since 1903 when the corporation was formed. The generating capacity in 1903 was roughly 40,000 kw while it is now more than 170,000 kw. The lighting and industrial power load has grown faster than the railway until last year the two were equal. The latest power plant, now under construction, will ultimately produce 150,000 kw.

Joint Committee on Line Construction

A meeting of the national joint committee on overhead and underground line construction was held in New York on May 12, with a large attendance of members and several visitors. Important sub-committee meetings were held on the preceding day. These sub-committees are compiling information received as a result of circular inquiries addressed to various operating companies and consulting engineers with a view to revising the specification in due course. The committee is experiencing some difficulty in obtaining definite and specific criticisms of particular paragraphs in the old specification, the kind of information which will prove most instructive to it. The committee meeting was taken up with general discussion of the work of the sub-committees. At the next meeting, to be held on July 14, it is hoped that all replies to the inquiries will have been tabulated and analyzed and the committee will continue the adoption of additional paragraphs in the proposed specification.

COMMUNICATIONS

Investment Per Passenger

STONE & WEBSTER

BOSTON, MASS., May 17, 1915.

To the Editors:

I have read with much interest the article prepared by D. J. McGrath for the *ELECTRIC RAILWAY JOURNAL* of May 8.

It seems to me that Mr. McGrath's article is a valuable one and that there is distinct merit in his suggestion of comparing the investment in street railway properties on the basis of the number of revenue passengers carried. We have in the past, as suggested in his article, compared investment on the basis of per mile of track and per dollar of gross annual revenue. Each basis has some advantages, but neither has been particularly satisfactory. The investment per mile of track varies very largely, depending on local conditions in different cities. Paving requirements, subways, the volume of travel, and, consequently, the weight of rail, track foundations, and amount of rolling stock required, all vary much between large cities and small and also in different sections of the country between cities of approximately the same size. Comparisons of investment per dollar of gross earnings have been somewhat more satisfactory, but such comparisons are affected by varying rates of fare as well as by other local conditions. Adopting the number of revenue passengers as a standard removes some of these difficulties and offers a new basis of study, which will, I think, be very useful in throwing light on the street railway problem.

In making such studies it must, of course, be borne in mind, as Mr. McGrath has pointed out in his article, that we cannot expect to find any uniform investment per total revenue passenger, and we may find, as is indicated in the figures which he submits, material variations due to differences in local conditions. One would naturally expect a greater investment per revenue passenger in large cities than in the small, and this seems to be borne out by the figures which he presents. This increase in investment per passenger in the large cities, combined with a greater operating cost per passenger, because of the longer average haul, is largely responsible for the rather serious situation which street railways are now facing in most of these cities.

The public in such cities must, of course, have ample transportation facilities, and this transportation service must be furnished as far out from the center of the city as is called for by the building up of the outlying districts, but such service cannot be permanently maintained with adequate compensation to the street railway.

The problem before the large street railway companies at this time is to present their case properly to the public. It must be made clear that there is a limit beyond which a street railway cannot profitably carry its passengers for a 5-cent fare, and unless some plan is developed to enable the company to obtain adequate pay for the service which it renders, investors will refuse to furnish new capital necessary to keep pace with the growing demands of the community for service. Just how the street railway fare may best be readjusted to meet this condition is a problem which deserves careful thought and discussion, so that the relative merits and disadvantages of each plant may be fully brought out.

The plan suggested by Mr. McGrath of comparing investment on the basis of the total revenue passengers should give information which will be helpful in considering the broader problem.

HENRY G. BRADLEE.

Future Central Station Development

PENNSYLVANIA STATE COLLEGE

STATE COLLEGE, PA., May 13, 1915.

To the Editors:

The completion of the Seventy-fourth Street power plant of the Interborough Rapid Transit Company of New York City marks another milestone passed in the development of steam turbine engineering. The plant is unique particularly in its having some of the largest steam turbine generators ever built and in its having the most modern types of auxiliary equipment. Tests will doubtless show that this plant produces a unit of electrical energy with a smaller amount of coal than any other. In fact, we may say the equipment represents the last word in the design of coal-steam-electrical power plants. Then, naturally, the question is asked: What are we to expect of the future in the way of further development? Obviously the next step will be to use steam turbine generators of 50,000-kw capacity. In fact, designers are already working on the details of designs of this size. I should not be surprised if in less than two years contracts were let for 50,000-kw units.

The really important development of the future will be the combination of mercury and steam turbines,* by the method of vaporizing mercury at about 10-lb. to 25-lb. gage pressure in boilers of about the same size as those now used for steam. The mercury vaporized in these boilers would be expanded in the nozzles of a turbine and then passed on to a suitable mercury condenser of the surface type, in which the cooling or circulating water would be vaporized into steam at a temperature of about 400 deg. Fahr., corresponding to the boiling point of the mercury at a vacuum of about 28½ in. when referred to a 30-in. barometer. The steam thus formed would then be passed on and expanded in a turbine of one of the usual commercial types, also discharging into a condenser where a 28½-in. vacuum is maintained. By the installation of this equipment the fuel consumption of the power plant should be at least 30 per cent less than in the best steam turbine practice as illustrated in the Seventy-fourth Street station.

In this plant there seems to be a very marked substitution of steam pumps driven by steam turbines for those previously operated by electric motors. The high-speed centrifugal boiler feed pumps have certainly many advantages, and their operation with high-speed steam turbines is the obvious method. The kind of drive for auxiliaries is always a live topic for discussion. In many plants there seems to be a tendency toward more electric drives. In most American plants we have had too many steam-driven auxiliaries for the best economic results. There is usually more exhaust steam at atmospheric pressure from these auxiliaries than can be used in a feed-water heater and much heat is wasted in the steam escaping from the exhaust heads. The ideal arrangement as regards best economy is to have steam and electrically-driven auxiliaries selected in such a combination that the number of each is so adjusted as to give very little excess of exhaust steam above what the feed-water heaters can use. In regard to the application of this principle, the Seventy-fourth Street plant is, however, an exception on account of having a compound type of steam turbine with the receiver between the high and low pressure sections. By this arrangement any excess of steam from the auxiliary can be discharged through the "thermal" valve† into a low-pressure section where the heat energy it contains is utilized very efficiently.

J. A. MOYER.

*Proceedings American Institute of Electrical Engineers, Vol. 32, page 2133, *ELECTRIC RAILWAY JOURNAL*, Vol. 43, page 575.
†*ELECTRIC RAILWAY JOURNAL*, April 17, 1915, pages 747-748.

Use of the Gas Flame in Removing Pinions

THIRD AVENUE RAILWAY COMPANY
MECHANICAL DEPARTMENT

NEW YORK, May 19, 1915.

To the Editors:

Since my article appeared on page 675 of the *ELECTRIC RAILWAY JOURNAL* for April 3, recommending the use of a gas flame in removing pinions, as well as hot water in installing them, I have read two comments in the columns of the *JOURNAL* opposing the use of the gas flame, one in the issue for April 24, page 800, from A. A. Ross of the General Electric Company and one in the issue for May 15, page 942, by R. H. Dalglish, of the Capital Traction Company, Washington, D. C. In view of the adverse criticism by these writers I feel that I should add a postscript to my article by way of rebuttal.

There is not a great deal more to say that I did not cover in my two articles, but since the one on the gas flame in particular was published I had the pleasure of a visit from an eminent gear and pinion specialist who had also objected to the use of gas in the removal of pinions, and he and I went more deeply into the subject.

I showed him that, with the equipment illustrated in the *JOURNAL*, a pinion could be removed with the heat on the pinion for less than one minute, the pinion loosening with one smart but not hard blow from a medium-sized hammer. As stated in the article in question, the pinion was not hot enough to melt the gear grease, and the hand could be touched to the pinion without discomfort.

His comments at that time were to the effect that this method of removing pinions was excellent, handled in the manner in which we did it, his only fear being that all shops might not do as well. He also remarked to a companion that, if he were in charge of a shop, he would certainly adopt that method. Now, if the method is satisfactory when handled intelligently is there anyone who will admit that he cannot handle it as well as we do, or that his men do not possess the necessary intelligence?

Going into the question from the particular point of view of the destruction of the heat treatment, I wish to say a few words which may put things in a different light. There is but a small percentage of pinions removed which go back into service with up-to-date motors. On an old type of motor one is apt to find any conditions, and on those motors there never was difficulty experienced in removing pinions. But on the types of motors on which heat-treated pinions are used, the motor bearings and other wearable parts will outwear any pinion. Therefore, when the pinion comes off it is scrap, or in most cases should be. At any rate, how much of the heat treatment do you imagine remains at this time?

On those few pinions which do go back into service, if a temperature which will not burn the fingers or which will not melt the gear grease will destroy that property which gives the manufacturers a right to charge a high price for the pinion, heat treatment is too delicate a proposition for a railway motor.

I stated in one article that the removal of a pinion by a puller which would really pull, would be superior to any other means. I have not yet seen one which would any more than begin to meet requirements, even after reading Mr. Dalglish's article.

However, the main point is not, after all, to save the pinion. Getting it off without damage to the other parts is more important. The percentage of good pinions which must be removed is small and the cost of pinions is low in comparison to the cost of straightening or renewing armature shafts, building up and cutting new threads, replacing bearings and frame heads destroyed

by attempts to remove the pinion by means which save the pinion at the cost of something else.

Two facts, however, remain: 1, Saving the pinion is not the primary point; and, 2, the gas flame handled by men of at least ordinary intelligence will not destroy the heat treatment.

R. H. PARSONS, Electrical Foreman.

The Passing of a Great Engineer— Dr. F. S. Pearson

PEARSON ENGINEERING CORPORATION, LTD.

NEW YORK, May 17, 1915.

To the Editors:

With the sinking of the *Lusitania* there was lost a man whose name has been known among engineers and financiers the world over for twenty-five years as a matchless technical and financial director of great engineering enterprises. That man was F. S. Pearson, D.Sc., slain in the prime of life by the cruel act of a German submarine. His loss is all the more strangely fateful for the Germans, for many firms in that country have had huge orders from his enterprises and more would naturally follow.

Dr. Pearson was a man who shunned publicity, although many times it was forced upon him by well-meaning friends and one or two ill-advised alliances. Consequently he was not so well known as some less successful men, nor were his great benefactions to the people of several foreign countries or his personal characteristics so much talked about as some of his spectacular projects. It is safe to say that his enterprises, principally public utilities, such as electric light and power, gas, telephone and railway, benefit immeasurably a combined total of 5,000,000 people, equal to the population of New York, composed mostly of Spaniards, Portuguese and Mexicans, and have brought them the comforts of modern life which they had not before.

Where lesser men failed to do more than scratch at the surface, he stepped in, saw the possibilities, predicted the success of acquirement, consolidation, development and operation under American management and by American ways, won the confidence of the bankers of several countries, raised the funds, and notwithstanding the handicap of a foreign language and great distance from the source of supplies and engineering direction, found the experts to do the things properly and, at the cost of many millions of dollars, succeeded in establishing business enterprises thoroughly sound at the core and, except under war or revolutionary conditions, paying propositions. Such are the Sao Paulo Tramway Light & Power Company, the Rio de Janeiro Tramway Light & Power Company, the Sao Paulo Electric Company, all now merged with various gas and telephone companies into one great company—the Brazilian Traction, Light & Power Company, the companies in and around Mexico City, and those in and around Barcelona, Spain; the great electric companies in Niagara Falls and Toronto, Ont.; the Winnipeg, Man., companies; and the railroad, milling and mining companies in north-western Mexico.

Dr. Pearson was an American but largely resided abroad of late owing to the necessity of being near the financial centers of London, Paris and Brussels. He was a self-made man but had such a thorough grounding in chemistry and electricity and such courage, inventive genius and foresight that he, early in his career, inspired confidence in great financiers and owners of street railway properties in the belief that electric railways could be made to pay when the art was in its infancy. He was ahead of the manufacturers in all his demands, and many of the great engine, generator and

motor companies owe their early development and expansion to him. In the electrification of the Boston, Brooklyn and New York street railways he was the great dynamic force that overcame obstacles, built great power plants and electric systems of transit and set the pace and standards for the world.

Dr. Pearson was so full of energy, so rapid in his thoughts and calculations, so masterful in combination and in the development of the natural resources of the earth that he early sought the field of foreign countries where there was given to him a freer hand to do anything he pleased, which was always for the immediate and lasting benefit of the people and ultimately for the stockholders. He inspired confidence in foreigners of many nations, got wonderful concessions, and cheapened the cost of fuel, light and power greatly wherever he went. The coming of his companies into great foreign cities brightened the dark spots, induced cleanliness and sanitation, and resulted in better water supply and sewerage systems. To him nothing was formidable. The highest water falls in the most inaccessible regions were his by the magic of his organization, push and "get there" qualities. Mountains were eaten away, tunnels bored, precipices scaled with ease wherever he chose to go. Canadian capital was the first to invest in his enterprises, but later, English, French and Belgian men furnished much of the money, and Dr. Pearson himself became a millionaire and large owner in all the companies. At the time of his death he was president or chairman of the board of directors as well as consulting engineer of a dozen large companies and many small ones.

Dr. Pearson became a thorough master of every subject he attacked, whether engineering, financing, music, art or farming. In farms he possessed one of 12,000 acres in the adjoining States of Massachusetts and New York, and had much blooded stock and flocks and herds of every description.

In music and art he was thoroughly informed, having some of the greatest treasures in his several homes in this country and abroad. He was to have built in his London house the finest and largest organ in Europe, combining every combination and variation of musical sound and imitation of all the great musical instruments, ancient and modern.

Dr. Pearson was only fifty-four years old, yet he had compressed a whole lifetime of achievement into the last twenty-five years. Evidently his work was done and was to be passed on to others. The strain of the revolutions in Mexico and the great war in Europe were, in their effect on Dr. Pearson's companies, cutting off as they did all sources of funds for new development, very great. His resourcefulness may best be illustrated by the fact that he overcame the difficulties of exchange with Brazil and meeting of liabilities for purchases and payments of dividends by buying shiploads of coffee in Brazilian money and selling them to New York or Europe for dollars and sterling, and used the same ships to transport back to Brazil coal, machinery and merchandise for the various companies in which he was interested which needed them.

Dr. Pearson gathered around him a great number of strong, competent, dependable men, engineers, managers, superintendents and experts in various lines, who are using foreign tongues in operating his properties and doing it successfully under great difficulties, and they and their families will miss his guiding and helping hand.

He was a continuous reader in all lines of thought and practice. His travels by sea and land day and night were so extensive that few could keep his pace, yet he was constantly in touch by telegraph with the staffs of all his offices and companies and settled great

financial and technical questions with the data which he always kept at his fingers' ends.

Dr. Pearson was a member of all the great technical societies here and abroad, but seldom was heard in any of them. Some of these are: American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Electrical Engineers, American Society of Naval Engineers, Institution of Electrical Engineers of England, American Institute of Mining Engineers, American Electro-Chemical Society, New York Railroad Club and American Forestry Association.

His alma mater, Tufts College, is greatly indebted to him, as are many societies and individuals, and his place can never be filled. His enterprises will live, however, and will benefit unnumbered generations to come and will extend along the lines already shown to be so correct in principle and practice. It is to be regretted that many great communities which sought his advice will never see the fruition of plans which he had for their development. Many of them were postponed by the great war, which has now taken the great engineer.

HOWARD P. QUICK,

Designing and Mechanical Engineer.

The Vienna-Pressburg Electrification

THE CONNECTICUT COMPANY

NEW HAVEN, CONN., May 7, 1915.

To the Editors:

I have been interested in the details of the overhead construction of the Vienna-Pressburg electrification described in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 1. This appears to be very similar to the Fischer-Jellinek construction used at Budapest and on at least one other Austrian road.

In studying this construction I find it difficult to believe that there will not be serious wear at the loose connections between contact wires and hangers, although as a matter of fact there is a somewhat similar sliding connection between the slip and the copper feeder in the New Haven duplex-wire scheme, which has given no trouble at all.

The use of compensating weights seems to be quite common on the Continental lines, but the success of our American catenaries, none of which so far as I know employs this expedient, raises in my mind a question as to the real good to be obtained by the foreign complication. After all if the contact wire is reasonably uniform in the character of the resistance which it offers to the collector, and if the contact wire does not make any marked changes in direction, it does not matter very much whether it is maintained in an absolutely straight line or hangs in a series of festoons. Of course, there must not be a bend at the hangers so abrupt as to cause hammer action.

CHARLES RUFUS HARTE,

Construction Engineer.

THE ARCHBOLD-BRADY COMPANY

SYRACUSE, N. Y., May 5, 1915.

To the Editors:

I have noted with interest the description of the Vienna-Pressburg electrification in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 1, which shows a number of contrasts with American practice. The slip hangers on the catenary used on the Northfield cut-off of the Northern Ohio Traction & Light Company system have given the best results of any kind of catenary support with which I am familiar.

There appears to be no advantage in the triangular hangers used on the Austrian railway, as straight hangers such as are used in this country are simpler and just as flexible. The pole construction appears to

be very light for the length of span and, while the article does not give the sizes of the members in the poles, the number of wires carried would seem to make the use of a bridge rather than a pole desirable.

It is interesting to note that the strain from snow and ice is so much more than that calculated that the weights on the tension take-ups have been anchored, so that there is apparently no longer any adjustment in them. While some take-up scheme would seem to me a good thing theoretically, good operation on the lines with which this company has had to do has indicated that there is no necessity for it.

W. K. ARCHBOLD, President.

Mating Gears and Pinions

THE DENVER TRAMWAY COMPANY

DENVER, COL., May 11, 1915.

To the Editors:

I notice with interest the letter of Mr. Cooper in your issue of May 8 and his suggestion that your readers might like to hear further from me in regard to the other factors which might have caused, or partly caused, the difference in wear in the gears mentioned in my previous article.

The gears and pinions, whose wear was illustrated on page 803 of your issue of April 24, were on a one-way car, and our experience has been that on a one-way car all parts of the No. 1 motor, including gears, pinions, armature and axle bearings, show less wear than those of other motors on the same car. The reason for this is that the No. 1 motor is less exposed to the dust and dirt gathered from the street.

The excess wear on the gear train of the No. 1 motor, shown in the illustration, was not due to improper meshing, resulting from excessive bearing wear, as the top of the gear tooth was wearing clean on the bottom of the pinion tooth and the axle and armature bearings were not worn excessively. In fact, they showed less wear, if anything, on No. 1 motor than on the others of the same car. The gears and pinions on both Nos. 1 and 2 motors were meshed properly.

We are not surprised at the lack of wear on the gear and pinion of the No. 2 motor as they were of case-hardened, or high-grade, material running together, and on the same type and class of service we expect an ultimate life of at least five times that shown in the illustration in the issue of April 24.

The abnormal wear on No. 1 motor in our opinion was simply to have been expected as a result of dissimilar grades of material working together.

The car in this case made 30,582 miles in city service, about seven months' work, and we believe, and it is quite reasonable to suppose, that practically the same attention as regards gear lubrication was given to each motor during this long period. It is hardly possible that there could have been any great difference in the work done by the No. 1 motor for that length of time without its attracting attention. It has been our experience that increased wear results where gears and pinions of different materials are worked together as in this case; hence the extraordinary wear in No. 1 motor is to be expected. It is possible, though not decidedly apparent, that the face of the teeth of the soft pinion shows a slight roughness such as might be expected if grit had mixed with gear lubricant.

I would like to add that this case was not an experiment on our part; it was simply a mistake in matching up the gears, as explained in the original article. We did some experimenting with the same results some two or three years ago.

W. H. MCALONEY,
Superintendent of Rolling Stock.

Motor Ventilation

CHICAGO SURFACE LINES

CHICAGO, ILL., May 6, 1915.

To the Editors:

The article by Rudolph E. Hellmund describing some of the advantages and limitations of railway motor ventilation, which appeared in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 1, was very instructive, and it might be interesting further to record some of the results obtained from the use of ventilated motors in Chicago during the past three years.

The point mentioned in Mr. Hellmund's article regarding the elimination of the wearing edge, where the laminations are separated to form the air spaces in the armature core of an inclosed type of motor, is well taken. We not only find this condition to hold but we also find the continuous core to be an additional improvement in that the under sides of the armature coils are not exposed to dirt and moisture as in the inclosed motor with armature spaces. Where the coils are so exposed it is difficult to properly clean and repaint the bottom of the coil where it crosses the ventilating space.

The question of dust deposit is of considerable importance and, although we are not having any appreciable difficulty due to dust being deposited on the live parts of the motor, we find it necessary to blow out the armature air passages frequently. The dust which accumulates in the armature duct is deposited on the side of the duct farthest from the center where it is thrown by the revolving armature, and where it not only cuts down the area of the air passages but also acts as an insulator between the cooling air and the armature coils, thus cutting down the efficiency of the ventilation. For this reason a lack of attention in regularly blowing out the motor would soon result in greatly reducing the advantages of ventilation.

We have had some difficulty due to the ventilating fan becoming loose, and any design should take this factor into very careful account. As a general observation it is probable that the commutators in our ventilated motors are wearing slightly faster than in the inclosed type, although this point is not sufficiently marked to warrant attaching any considerable importance to it.

In so far as the effect of weather conditions is concerned, we have found no more difference in the operation of the ventilated motor for varying weather conditions than with the inclosed type. On a large property such as we have in Chicago it would not be possible to change from the ventilated to the inclosed type of motor to meet changes in weather conditions.

Although we have a class of service which necessitates frequent stops, our schedule speed is comparatively high and our average voltage is close to 550, so that in spite of the frequent stops we get the advantage of high schedule speed and voltage in making the armature fan more effective than where the average voltage and schedule speed are lower. Our specifications on recent equipments also call for a comparatively low temperature rise, namely, 65 deg. Cent., which makes the use of ventilated motors a necessity. It is probable that by keeping our maximum temperature down we are offsetting any slight increase in maintenance due to the open nature of the motor.

H. H. ADAMS,
Superintendent of Shops and Equipment.

The Bay State Street Railway's passenger department and free trolley information bureau has been removed from 309 Washington Street, Boston, to 15 Milk Street, on the ground floor. The new location is just off Washington Street, opposite the Old South Church, and on the site of the birthplace of Benjamin Franklin.

Equipment and Its Maintenance

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

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

The Effects of Remote Feeder Taps on Schedule Speed

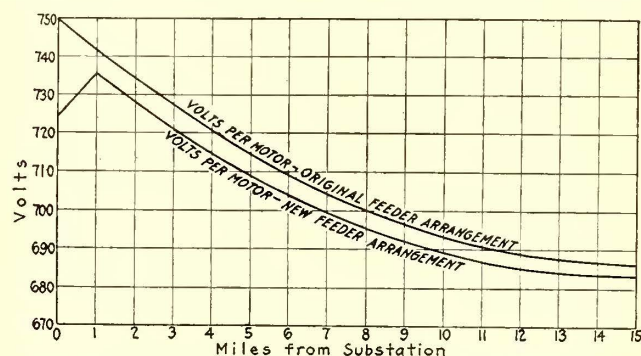
BY NICHOLAS STAHL, RAILWAY AND LIGHTING DEPARTMENT
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Recent editorials and communications in the *ELECTRIC RAILWAY JOURNAL** emphasize the importance, in the successful operation of substation machinery, of locating feeder taps sufficiently far away to minimize both the liability and severity of flash-overs on the occurrence of short-circuits on the trolley system. The editorial particularly commends the strong stand taken in this direction before the recent convention of the Illinois Electric Railways Association by C. H. Smith, who has thus done the railways suggestively a good turn, of which many more will doubtless soon take advantage, especially when the question of relative costs involved is considered.

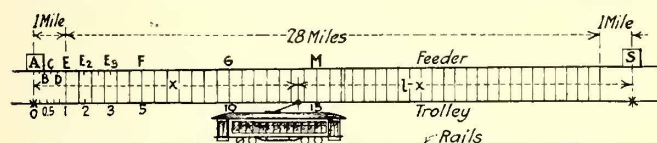
The principal argument against the suggested practice, advanced by those roads which have not yet adopted it, is the cost of the additional copper required to produce the same average trolley voltage—and hence to maintain schedule speeds—or, if this extra copper

and because the same argument can readily be extended to more complex schedules, no assumptions on which, moreover, would meet all actual operating conditions. For the same reasons the car is assumed to be making a steady run, without stops, because stops, from the present viewpoint, only mean that the current consumption is undergoing cyclic variation, which is commonly evaluated to the root-mean-square for the entire run, and any results with (substantially) steady current can be interpreted to include the variable current case.

Fig. 1 shows diagrammatically the conditions for Case I. From the symmetry of the figure it will only be necessary to consider the problem while the car is passing from the section break at A to the section midpoint M. The condition when feeders are tapped to trolley at A will be called the "original" position or



FEEDER TAPS—FIG. 2—EFFECT ON VOLTAGE OF TAPPING
NEAR-BY FEEDERS 1 MILE FROM SUBSTATIONS



FEEDER TAPS—FIG. 1—DIAGRAM OF FEEDER TAPS
BETWEEN SUBSTATIONS

is not provided they direct attention to the reduction in speed and the extra line losses.

To obtain a general perspective view of the economic value of such an argument in comparison with the cost of protecting "service apparatus and men against the damaging effects of flashing and buck-overs"—the exact cost of which each general manager can doubtless appraise for his own road out of painful experience—let us examine figures for a concrete case.

Assume a 1500-volt, d.c. road, with substations 30 miles apart, 80-lb. rails bonded, No. 0000 trolley, and one No. 0000 feeder throughout, but tapped first onto the trolley a mile from each substation, in front of which is a section break. A single 40-ton car, with average load and equipped with four 110-hp standard motors, is to operate between substations.

Two aspects of the problem will be investigated: *Case I*—Under the above feeder arrangement, (a) the average or integrated voltage drop, as compared with that occurring when the feeder is tapped directly at the substations, (b) the decreased schedule speed resulting therefrom, and (c) the relative line losses. *Case II*—The size and arrangement of additional feeder necessary to keep the integrated trolley voltage, schedules and line losses the same as with original feeder tapped directly to trolley.

A single car is assumed to simplify the calculations,

arrangement, and when feeders are tapped at E the "new" arrangement.

To simplify the calculations the current taken by the car throughout the run between substations will be assumed constant, which, while only approximately true, will not at all vitiate the conclusions, since we are interested here not so much in knowing the exact current, or the balancing speed, at any point of the run, as in evaluating the difference between the speeds at a given point under two different feeder arrangements.

Tables I and II on page 992 give the basis on which calculations were made for the voltage curves shown in the two graphs, Fig. 2. I is the total current taken by the car, say 100 amp, I_1 is the current coming from substation A, and I_2 that from substation S. The distance of the car from substation A is designated by x .

The graph brings out very clearly the very slight additional voltage drop occasioned by the "new" feeder arrangements. The integrated value of the voltage per motor in the original arrangement is 707.3, while in the new arrangement it is 702, or a decrease of only 5.3 volts, or 0.75 of 1 per cent on the average.

To investigate the error involved in assuming the current taken by the car and the balancing speed to be constant, we note that at 750 volts per motor the balancing speed is 54 m.p.h. and the balancing amperes 48, while at 600 volts per motor the balancing speed is 46 m.p.h. and the balancing amperes 44. If we prorate these values for the integrated voltages given

*See issues of March 27, page 627; April 3, page 659, and April 24, page 799.

TABLE I—ORIGINAL ARRANGEMENT: FEEDERS TAPPED TO TROLLEY AT SUBSTATIONS

| Position | x | $l-x$ | I | I_2 | Line drop to car, including feeder, trolley and rails | Volts at car | Volts at motor |
|----------|-----|-------|------|-------|---|--------------|----------------|
| A | 0 | 30 | 100 | 0 | 0 | 1500 | 750 |
| B | .25 | 29.75 | 99.1 | .9 | 4.2 | 1495.8 | 747.9 |
| C | .50 | 29.50 | 98.3 | 1.8 | 8.4 | 1491.6 | 745.8 |
| D | .75 | 29.25 | 97.3 | 2.7 | 12.4 | 1487.6 | 743.9 |
| E | 1 | 29 | 96.7 | 3.3 | 16.4 | 1483.6 | 741.8 |
| F | 1.5 | 28.5 | 95.3 | 4.2 | 20.4 | 1479.2 | 739.6 |
| G | 2 | 28 | 93.3 | 5.1 | 24.4 | 1474.8 | 737.4 |
| M | 15 | 15 | 50 | 50 | 127.5 | 1372.5 | 686.2 |

TABLE II—NEW ARRANGEMENT: FEEDERS TAPPED TO TROLLEY 1 MILE FROM SUBSTATION

| Position | x | $l-x$ | I | I_2 | Line drop to car, including feeder, trolley and rails | Volts at car | Volts at motor |
|----------------|-----|-------|-------|-------|---|--------------|----------------|
| A | 0 | 30 | *96.7 | 3.3 | 51.1 | 1448.9 | 724.5 |
| B | .25 | 29.75 | *96.7 | 3.3 | 45.6 | 1454.6 | 727.2 |
| C | .50 | 29.50 | *96.7 | 3.3 | 40.1 | 1459.9 | 729.9 |
| D | .75 | 29.25 | *96.7 | 3.3 | 34.5 | 1465.5 | 732.8 |
| E | 1 | 29 | 96.7 | 3.3 | 29 | 1471 | 735.5 |
| E ₂ | 2 | 28 | 93.3 | 6.7 | 44 | 1456 | 728 |
| E ₃ | 3 | 27 | 90 | 10 | 57.6 | 1442.4 | 721.2 |
| F | 5 | 25 | 83.3 | 16.7 | 81.6 | 1418.4 | 709.2 |
| G | 10 | 20 | 66.7 | 33.3 | 122 | 1378 | 689 |
| M | 15 | 15 | 50 | 50 | 134 | 1366 | 683 |

*Represents current flowing in the feeder; to the drop from this source must be added that of the total current flowing in trolley from E toward A.

above, we find at 707.3 volts a balancing speed of 51.71 m.p.h. and a balancing current of 46.85 amp, while at 702 volts the respective values are 51.43 m.p.h. and 46.72 amp. The error is but 0.29 per cent.

For ordinary trolley and feeder arrangements a convenient approximate rule is that for a given percentage drop (x) in voltage, the balancing speed will drop $0.75x$ per cent, and the balancing amperes $0.4x$ per cent.

As to the reduction in schedule speed, practical operators know that a difference of more than the 5.3 volts here indicated is frequently found on substation bus-bars, due to careless setting of the shunt field rheostats (even with rotary converters). To put the matter in concrete terms, let us assume that the car in question is on an express run with a schedule speed of 30 m.p.h., or that the run of 30 miles between substations, with the original arrangement, requires just one hour. With a schedule speed decrease of 0.54 per cent under the new arrangement the car arrives at the end of its run just 18 seconds late.

Electric traction will be in a much higher state of perfection than at present when operating officials need to worry over such delays, especially when so much can be accomplished to save time by proper attention to accelerating, coasting, braking and the "snappiness" of stops, namely, unnecessary waiting at stations.

The relative cost of line losses is actually, for the case cited, in favor of the new arrangement, since the car runs steadily and draws less current, the penalty being the negligible loss in speed. With many stops and a close schedule, lower voltage would require that power be kept on somewhat longer to maintain the schedule exactly, and the determination of the relative total kilowatt-hours involved would require special study for each case, but surely the above simple problem shows how near the vanishing point would come the difference between the respective line losses, whether in a given case they were greater or less for the new arrangement than for the original one.

Case II. On the assumption that the new arrangement would show a very detrimental effect on voltage, schedule speed and line loss, it was proposed to inquire what would be the additional cost of copper to restore the original voltage and speed, but in view of the results shown, is it not sufficient to point out that since the detriment is actually shown to be negligible it is idle to talk of spending any money on it at all?

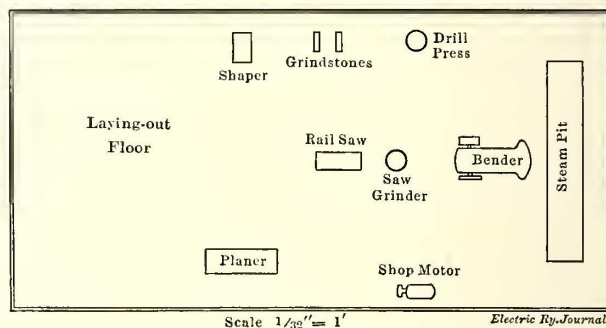
A wealth of testimony is certainly in favor of the

new arrangement as protecting substation apparatus from dangers that are very real. The fact is that even one "buck-over" may shut down a station for hours, tie up or at least cripple a considerable section of the road, with consequent loss of prestige in the public eye, quite apart from the wasted time expense of idle train crews. The actual cost of repairs may be and often is a very large part of the total substation charge. To eliminate such sources of waste of time, money and effort, with no appreciable concomitant disadvantages and practically without expense, is certainly well worth the thoughtful attention of every electric railway operating official.

The Special Work Shop for Electric Railways

BY S. GAUSMANN, BROOKLYN, N. Y.

While some electric railways have shops capable of turning out almost any piece of special work required, most of the jobs are usually confined to the making of repair parts, bending of rail, etc. Even for such purposes almost any investment will prove a paying one. However, unless equipped at large expense a railway track shop cannot be expected to turn out all classes of special work. Its greatest value lies in preventing delays in installation, particularly in doing emergency work, while avoiding the necessity of carrying in stock a large quantity of repair parts. With a home shop force almost any emergency job can be handled in three



PLAN OF SHOP FOR TRACK SPECIAL WORK, EXCLUSIVE OF SWITCHES

or four days. In fact, not more than five or six hours may be required to get out a small piece urgently wanted. Orders thus may be filled in less time than it takes to make out a formal requisition on the purchasing agent and to have him transmit the order to the manufacturer, to say nothing of the time consumed in making and delivering the goods.

It might seem that much of the track work could be made by the car maintenance department, but in practice it is found better to employ workmen who will not be distracted by jobs outside of their regular routine. Moreover, it cannot be reasonably expected that one department will give preference to jobs from another before it has its own work well ahead. Therefore, on all but the smaller properties, it is best to have a track shop under the head of the way department.

To build and equip a shop, 50 ft. x 100 ft., with rail bender, planer, drill press, shaper, rail saw and grinder, with minor miscellaneous tools, electric belt drive, steam pit for rail heating in winter, etc., should not cost more than \$7,500. If the railway has an unoccupied building the cost could be reduced to \$2,000. This cost could be lowered still more by the purchase of second-hand machinery, which, with the possible exception of power rail bender, saw and grinder, can be secured at very reasonable figures from dealers in such machines. The

accompanying sketch shows the layout of the machines proposed.

A shop of this size can be operated with a force of one foreman and fifteen men at the following rates per diem:

| | |
|------------------------------------|--------|
| One foreman | \$3.50 |
| Five machine operators, each | 2.50 |
| Eight helpers, each | 2.00 |
| Two helpers, each | 1.75 |

At these rates the cost would be \$35.50 a day, and by excluding all Sundays and ten holidays, a total of \$10,756.50 for a year of 303 working days.

This force will turn out much work and at a lower net cost than outside buying even if the workmen have to be gradually trained to this class of service. As the result of specializing, they are soon continually on the lookout for ways to turn out a cheaper and better product, particularly if the foreman in charge is of progressive character.

A comparison of the costs of various kinds of work turned out by men of this class over a period of three years is interesting. In this comparison fluctuations in the prices of material are not taken into consideration, it being assumed that the prices do not change. Where the cost is the same a like amount of material has been used, but where it is not the difference is due to using the material to better advantage or changing the construction slightly without sacrifice of strength.

| Bending 9-In. Rail, per Foot | | | |
|---|----------|----------|----------|
| | Guard | Tram | |
| First year | \$0.1282 | \$0.1106 | |
| Second year | .1051 | .0962 | |
| Third year | .0732 | .0654 | |
| Bending 7-In. Rail, per Foot | | | |
| | Guard | Tram | |
| First year | \$0.1004 | \$0.0902 | |
| Second year | .092 | .084 | |
| Third year | .0712 | .0621 | |
| 9-In. Frogs | | | |
| | Labor | Material | Total |
| First year | \$18.90 | \$39.07 | \$57.97 |
| Second year | 17.95 | 39.07 | 57.02 |
| Third year | 17.57 | 36.45 | 54.02 |
| 9-In. Mates | | | |
| | Labor | Material | Total |
| First year | \$22.64 | \$36.52 | \$59.16 |
| Second year | 20.32 | 36.52 | 56.84 |
| Third year | 16.03 | 32.98 | 49.01 |
| 9-In. Double-Track Crossings | | | |
| | Labor | Material | Total |
| First year | \$185.12 | \$294.35 | \$479.47 |
| Second year | 172.35 | 294.35 | 466.70 |
| Third year | 165.05 | 294.35 | 459.40 |
| 9-In. Crossover: Exclusive of Switch Castings | | | |
| | Labor | Material | Total |
| First year | \$79.96 | \$428.20 | \$508.16 |
| Second year | 78.25 | 428.20 | 506.45 |
| Third year | 74.75 | 431.30 | 506.05 |

While the labor cost does not decrease to any great extent the successive jobs receive more attention so that the third year's product is fully 30 per cent better than that of the first year. In addition to making up the foregoing material, fully 35 per cent of the labor charge would be expended in the manufacture of compromise plates, special work centers and other things which are occasionally required, and often wanted in a hurry.

While some railway shops may turn out cheaper work the figures given are less than the lowest prices of manufacturers. In some cases the length of service may be in favor of the manufacturer, but not enough to warrant the additional cost.

It would not be well for a shop of this size to attempt to make switches, as it has no facilities for doing so. Such an attempt would result only in a crude and unsatisfactory product.

Finally, in the equipment of a shop of this kind the transport of the material from tool to tool or to laying-out floor should receive proper attention. To oblige the

men to handle heavy pieces with no other facilities than rail tongs or bars will prove very costly. This way of handling work takes up too much time in addition to making the men unfit for a while to proceed with the machine work from which they have been taken. As the pieces turned out are not very heavy they can be handled by means of light inexpensive cranes between the different machines and the laying-out floor. The cost of channel-bar crane tracks carried from a properly reinforced roof has been included in the figure already presented. Such a transport system would pay for itself in six months, as one man could do the work usually performed by four in any other way.

While the shop described might be too large for some roads, it must not be thought that one of just this size is absolutely necessary. No matter if the shop has but little more than a power bender, the equipment if once installed will soon be increased and found indispensable.

A Safe and an Unsafe Way of Cutting Concrete

BY G. H. M'KELWAY, LINE ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

The safety-first movement has become such an important one that nearly every issue of any technical magazine will be found with at least one article describing some form of device designed to decrease the liability to accident or to minimize the damage when one does happen. In view of the care exercised by many companies and the ingenious devices employed by them it is surprising to note the indifference toward accidents dis-



SAFETY-FIRST IN CUTTING CONCRETE PAVING FOUNDATION

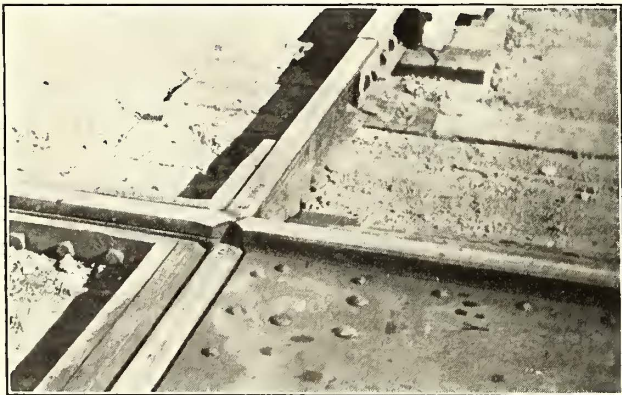
played by others, and sometimes even different departments of the same company show different degrees of interest in the subject.

Nearly every railway using city streets has to do more or less cutting of the concrete foundation of the street pavement, yet very many companies use the old form of chisel, shown herewith, held in the hand of one man while another strikes it with a sledge hammer. Occasionally the aim of the striker will not be as true as it should be and the hammer will glance off of the head of the chisel, perhaps doing no damage, or perhaps crushing a finger or one of the bones of the hand of the man holding the chisel. While such accidents very seldom happen, yet they do occur from time to time and there is no excuse for them. The handle shown in the second illustration is very cheaply and easily made, and once in use will prevent all danger of accident.

A Shockless Railroad Crossing

There have been in operation on the Pacific Electric Railway for a period sufficiently long to demonstrate their entire practicability, two Cobb railroad crossings of the shockless or noiseless type. One crossing has been in continuous service for more than six months and the other for more than six weeks. The officials of the railway have been much pleased with the result. At the particular intersection where they are located an interlocking tower is in use, controlling the switches, derailleurs and semaphores, and these two crossings are likewise controlled from the same interlocking tower. The crossings have been subjected to a daily electric traffic of more than 15,000 tons, consisting of 360 high-speed heavy cars made up in 240 trains, and steam railroad traffic, made up of heavily-loaded freight cars for the most part and a few passenger trains, amounting to 5000 tons more.

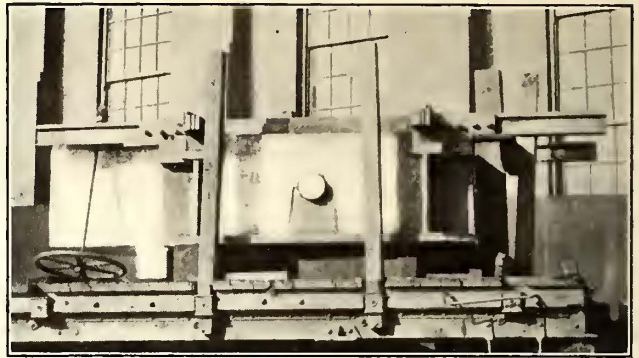
The general principle underlying this device is that



SHOCKLESS RAILROAD CROSSING—FIG. 1—CLOSE VIEW OF SHOCKLESS JOINT AFTER FIVE MONTHS' SERVICE WITH DAILY LOAD OF MORE THAN 20,000 TONS

the rails which are not in use are depressed by a suitable mechanism, leaving the through rails at grade so as to give a continuous bearing surface. The ends of the movable rails are framed at an angle with each other so as to form an interlocking joint. The general appearance of this shockless crossing is shown in Figs. 1, 2 and 3.

Before taking up the details of the operating mechanism it may be well to point out some of the reasons for the development of this shockless crossing. For

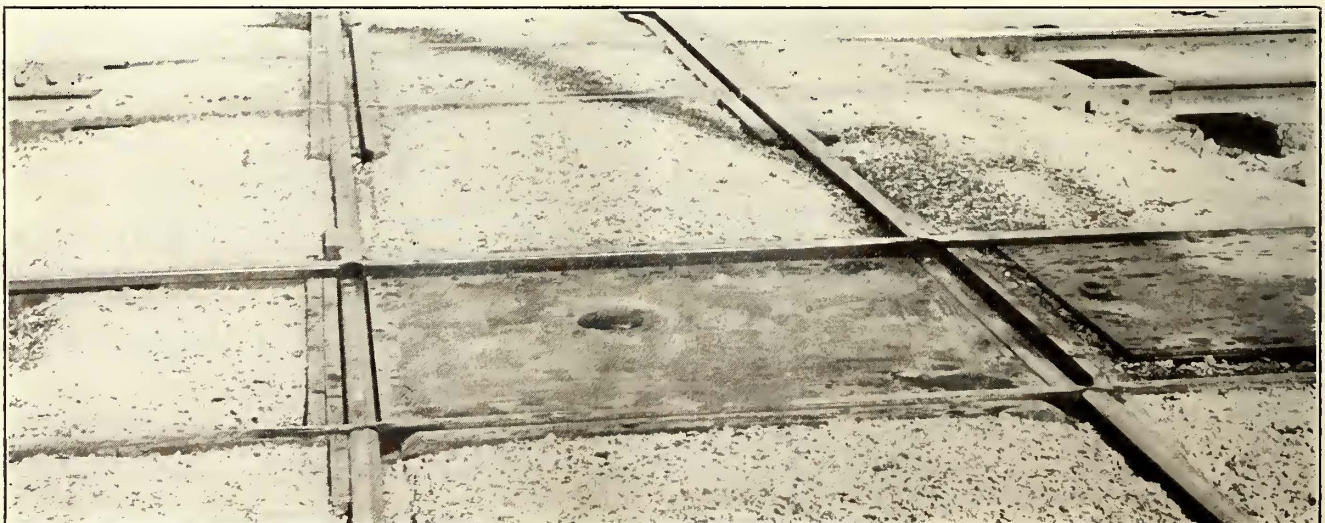


SHOCKLESS RAILROAD CROSSING—FIG. 3—COMPLETE CROSSING READY TO DROP INTO PLACE

many years there has been a strong demand for such a crossing, one of the important sources being the general public in cities which objects to the noise incident to crossings as built at the present time. Another source has been railway officials who, while not particularly interested in the noise produced by the intersections, considered as noise, are vitally interested in the cost of upkeep of crossings, special work and the adjacent roadbeds, and in the high depreciation of wheels, axles, brakes, wiring and the general fittings of rolling stock due to frequent shocks and consequent crystallization of metal. In this period of high-speed service, as interlocking systems come into more and more general use, the demand for a practical and safe shockless crossing has increased until now such a crossing seems to be a necessity.

Coming now to the operating mechanism by which the rails are raised and lowered through a distance of about $1\frac{3}{4}$ in., attention may be directed to Fig. 4. This shows a side elevation of one rail section together with the operating devices, vertical and horizontal cross-sections of the same, and details of the operating wedge.

The rail section is bolted on a hardwood stringer, preferably creosoted, the ends of the rails being chamfered as shown. On the under side of the stringer, at each end, is a casting with an under, sloping, finished surface. The weight of the structure so far described rests upon two cast-iron wedges, one at each end, which in turn rest upon wrought-iron guide plates rigidly supported from the cast-iron box which incloses the operating mechanism. The wedges are held in proper alignment by means of wrought-iron plates, one on each



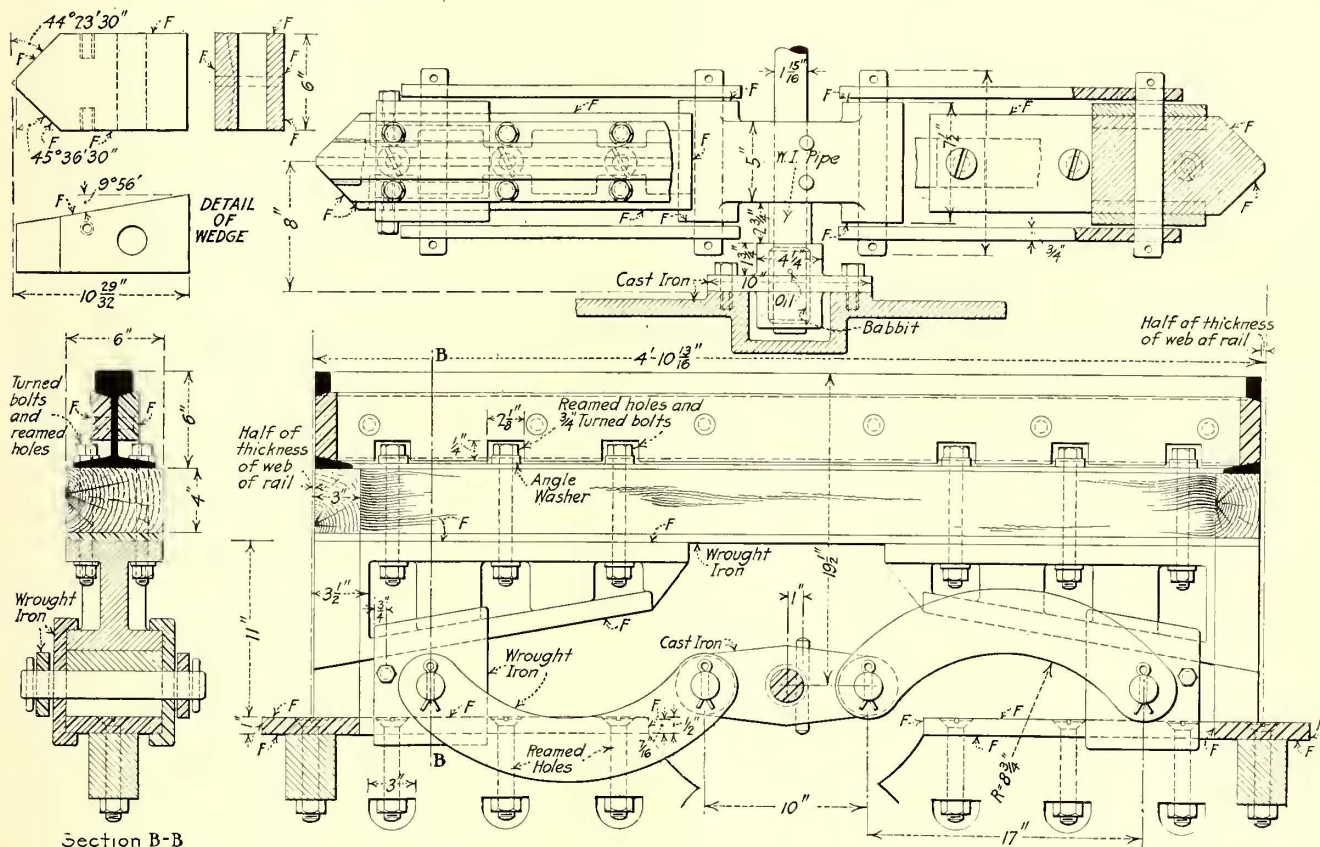
SHOCKLESS RAILROAD CROSSING—FIG. 2—SHOCKLESS AND ORDINARY CROSSINGS OF DOUBLE ELECTRIC AND SINGLE STEAM TRACK

side. Projections from these at the top and bottom serve to draw the movable section downward when the wedges are drawn inward.

As will be evident from the above, the movable member is raised and lowered by the motion of the wedges which results from the rotation of a shaft carrying a rocker arm, each end of which is connected to a wedge by means of a pair of links. A half revolution of the shaft in one direction serves to lower the rail section, the reverse operation serving to raise it. Suitable guides, not shown in the illustration, serve to constrain the motion to a vertical direction. When in the extreme outward position the wedges extend to the outer extremities of the rail, and support it rigidly just as the piers of a bridge support the bridge. The wedges under the several rails of a crossing are so connected that when one pair of rails is raised to an operating position

three and one-half seconds and a test made on an intersection which had been in use long enough for the bearings to become gummed up with dust from a near-by road showed that 6 amp at 110 volts provided ample power.

With these fundamental principles in mind some further structural and operating features of the crossing may prove of interest. When it is to be used in city streets, the covers can be made suitable for filling with the same paving material as that used in the remainder of the street surface. Under such conditions it would present no more metallic surface to view than would an ordinary intersection. The fact that there is no mechanism outside the intersection itself makes it very suitable for use in paved streets. The rails used in the intersection may be of any cross-section, and therefore of the same cross-section as those used in the adjacent



SHOCKLESS RAILROAD CROSSING—FIG. 4—SECTIONS OF ONE ELEMENT OF INTERSECTION

the other pair is drawn downward to its lowermost position.

By means of this ingenious arrangement of wedges it has been possible to produce a construction in which there are no moving parts, except the wedges, which are subjected to any load or strain due to traffic. The wedges are of such form and proportion as to give long and safe service. Obviously, when the weight of any rolling load comes upon the rails and wedges all parts are locked in a fixed position.

These crossings can be operated by means of an electric motor, by a compressed-air mechanism, by hydraulic mechanism, by hand, by chain or rod, or by switch throw, the only requirement being that the main driving shaft shall make a half revolution in one direction to bring one pair of rails into effective position and then a half revolution in the opposite direction to bring the other pair of rails into the effective position. In the photographs, the small box shown between the rails is water-tight and contains an electric motor for operating the crossings. This operation requires about

tracks. These rails do not wear any faster than those along the main lines of the track because they are subjected only to rolling wear, the intersections providing a smooth rolling surface from the main road on one side to the main road on the other side. Furthermore, there are no places where foreign material can become compressed between any two surfaces, and when the intersections are constructed in accordance with the general design shown there is no way for foreign substances to get at any of the working parts.

During the six months in which the first intersection has been in operation it has neither caused a moment's delay in train service nor cost a cent for repairs or maintenance. It has received only the same general supervision and lubrication given to the mechanism for operating the split switches and the semaphores. Moreover, the experience of the past six months has not developed the necessity for changing a single feature of the design.

It is claimed that the cost of installing these intersections is no greater than that of installing an ordinary

intersection, and when once installed properly all of its main foundation portions need never be disturbed. The rails or any of the other wearing parts can be replaced in a few hours without disturbing the paving. The cost of manufacturing the intersection is only slightly greater than that of the ordinary one, the additional expense for most installations being that represented by the cost of installing the operating mechanism.

By way of summary and on the basis of the experience mentioned the inventors of this intersection feel that they have a device which actually prevents shock and noise with consequent saving in wear-and-tear on equipment and objections from the public. The construction is simple so that the intersection can be made in any shop without special equipment. It can be operated by any plan which works in with the other equipment of a railroad. Many other advantages bound to result from the elimination of shock will occur to the reader from the description given. The patents on these crossings are controlled by the Cobb Shockless Railroad Crossing Company of Los Angeles, Cal.

A Reclosing Circuit Breaker

A novelty in d.c. circuit breakers has recently been placed upon the market. This might be termed an automatic circuit controller, as it opens the circuit in case of trouble and automatically closes it when the trouble is removed, thus reducing to a minimum the loss of time and danger in case of line trouble. The new circuit breaker interrupts the current instantly in case of a short-circuit or a predetermined overload. It remains open for a few seconds regardless of the cause for opening, and at the end of the short time-interval it closes, provided the short-circuit or overload has been

a small substation so that the substation operator can attend to other duties. While it is probable that there are instances where a breaker of this type would not be desirable for street railway service, there seems to be a considerable field for it, especially in small substations. The breakers for railway work can be set so that they will either automatically reclose at the expiration of a certain time limit regardless of the condition of the line, or so that they will not reclose so long as a short-circuit exists on the system. Also they may be made to reclose at any desired line voltage when they are feeding into a distributing network.

The accompanying illustration shows diagrammatically how the automatic reclosing feature is effected. From this it will be seen that the main contact brush is moved to the closed position and held closed by the operating coil. In case of an overload the armature of a series coil is raised and this opens a contact which breaks the circuit of the operating magnet, the latter being held open by a latch until the trip coil operates. After opening the main contact a small index current is permitted to flow around the breakers with high resistance. So long as the resistance of the load circuit is low the index current will be shunted around the trip coil, but if it is increased, enough current will be forced through the low-resistance trip coil to operate the latch and allow the contact arm to close the circuit of the operating coil, thus closing the breaker.

The device is manufactured by the Automatic Reclosing Circuit Breaker Company, Columbus, Ohio. It is regularly made in capacities ranging from a minimum of 100 amp to a maximum of 1200 amp, larger sizes being manufactured especially if required.

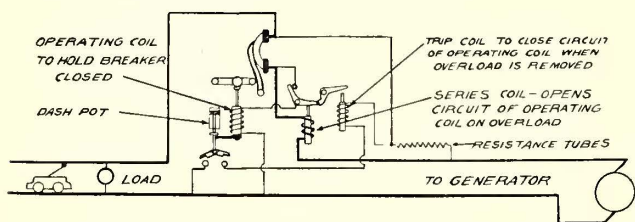
Roller-Bearing Trolley Wheels

After a period of development lasting for several years the American Roller Bearing Company is now offering roller bearings for trolley-wheel service. The bearings consist of four principal parts: the inner sleeve, or casing; the load-carrying rollers; the spacing rollers; and the outer casing, or container. This forms a complete unit, all cones and rigid or stationary separators being omitted. Exhaustive tests showed that the latter parts were unreliable and also were the source of much expense, as they required frequent adjustments and replacements.

The load rollers of the bearing operate within a track that is ground on the inner sleeve and they are separated at all times by the spacing rollers. These always maintain a position parallel to the load rollers and turn in an opposite direction. They effectively prevent the load rollers from touching each other and eliminate any sliding contact so that friction is practically avoided and the heat and wear are negligible. All of the load is taken by the load rollers, the spacing rollers being used only as separators.

One of the most desirable and commendable features of roller bearings for trolley-wheel service is the fact that they require no lubrication, the elimination of friction making the use of oil or grease unnecessary. This feature reduces maintenance expense and dispenses with considerable labor at the carhouse.

Roller bearings have been tried on wheels of all sizes from 4 in. to 10 in. in diameter and they are being used for both local and high-speed interurban service. Records of many thousands of miles of operation in actual service indicate that the life of the wheel (as distinct from the removable roller bearing) is increased from two to three times, due to the fact that the wheel is maintained in a constantly vertical position. It has been impossible, however, to determine the ultimate life of the bearings themselves, as the original ones are still



DIAGRAMMATIC CIRCUITS FOR RECLOSING CIRCUIT BREAKER

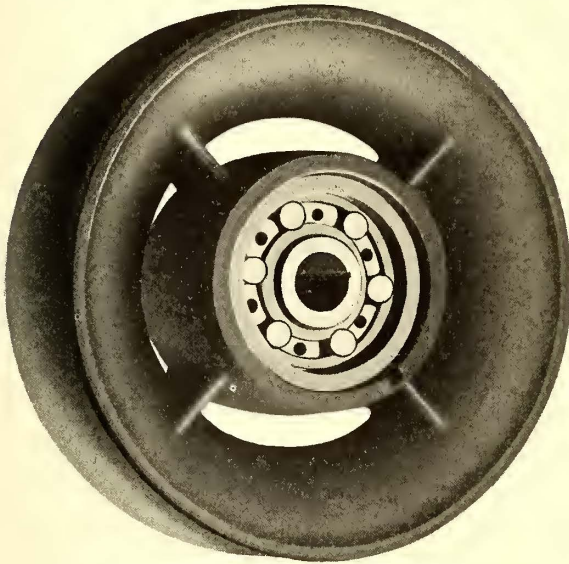
removed. In case of a persistent short-circuit the breaker remains steadily open until the short-circuit is removed and then it closes automatically.

The obvious advantages are the saving in time and the elimination of the danger involved by the fact that an operator of a manually-controlled circuit breaker has to guess when the trouble is removed or else must wait until he receives instructions. However, aside from these, the special claims made for the device are that it enables substations to be operated without an attendant; that it protects the generator from the strains produced by closing the circuit on a dead short; that it affords protection for branch circuits so that trouble is localized to the branch on which the trouble occurs without interrupting service on remaining lines; that it protects motors from being started under full voltage with all resistance out of the armature circuits; that it reduces the fire hazard; that it gives operators or repair men absolute control of the power from any point along the line, thus saving a great deal of time and providing a remarkable degree of safety in case of accident.

Special apparatus has been developed for use in railway substations. There is one installation at the present time on the lines of the Indiana Railways Company at Indiana, Pa. This company is using the breaker on

in continuous operation. Every bearing in service has outworn several wheels without showing any signs of undue wear.

As shown in the accompanying illustration, the wheel is bored out to admit the bearing, which is then pressed into place. The outer and inner sleeves of the bearing are insulated from the wheel by means of insulating tubes. Both ends of the bearing are insulated by means of insulating washers, thus protecting the bearing at all points. When the wheel becomes worn, the bearing, together with the insulating parts, is removed and



ROLLER-BEARING TROLLEY WHEEL

pressed into a new wheel, the operation being completed in a few minutes.

The American Roller Bearing Company, Pittsburgh, Pa., the manufacturer of these bearings, has been specializing in the production of anti-friction, non-lubricant roller bearings for all kinds of heavy machinery and equipment for several years. Bearings for trolley-wheel service were developed a few years ago, during which time they have been under continuous test and observation, and the company is now prepared to manufacture them in large quantities and after designs adapted to all types and makes of trolley wheels.

New Combination Welding Outfit

A novelty in oxy-acetylene welding and cutting outfits has recently been brought out, the change-over from the welding equipment to the cutting equipment being easily effected by the addition of a simple attachment which diverts a certain part of the oxygen supply at the hose connection and introduces it as excess oxygen behind the oxy-acetylene flame. This arrangement is illustrated in the accompanying halftones, which show the welding torch and the various tips used for welding

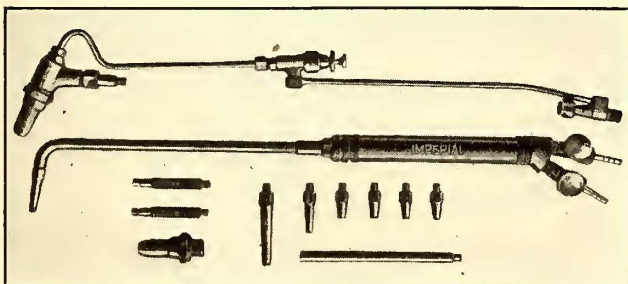


FIG 1—WELDING TORCH WITH CUTTING ATTACHMENT REMOVED

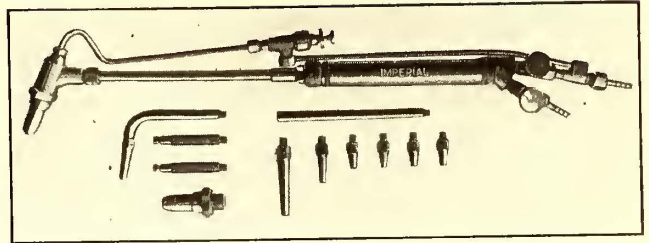


FIG. 2—CUTTING ATTACHMENT IN PLACE ON TORCH

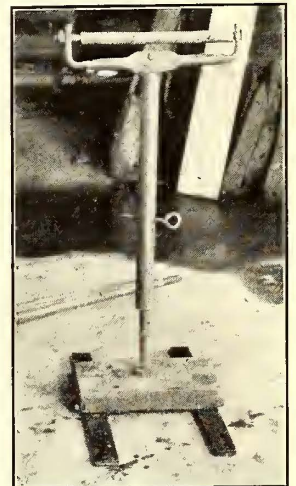
work of all kinds and with the cutting attachment removed, and also with the welding head removed and replaced by the cutting head.

By means of specially designed regulators correct mixing of the gases is assured, and the accurate control of the supply effects a very great saving in gas consumption. At the same time there is provided a long, white, incandescent welding flame that is entirely free from carbons and oxides. It welds anything in any metal. The cutting attachment has a multi-jet tip and is able to cut iron and steel up to 4 in. in thickness, a recent accomplishment being a cut 19 ft. 6 in. long through $\frac{3}{8}$ -in. boiler plate in twenty minutes. The outfit is manufactured by the Imperial Brass Manufacturing Company, Chicago, for general use not only in railway repair shops but also for yard and track work, and is furnished complete with torches, portable tanks, regulators, hose, goggles, welding rods, flux, etc. A two-wheeled truck for the tanks is furnished if desired by the user.

Adjustable Stand for the Forge Shop

In the repair shop of the Blue Hill Street Railway, Canton, Mass., a convenient, home-made, adjustable stand for blacksmith service is utilized. As shown in the halftone, the stand consists of the usual pipe carried on a horizontal rod at the top of a yoke to act as a roller,

the latter being supported on a $1\frac{1}{2}$ -in. sleeve that is slipped over a spindle which in turn is supported on a wide base. The pipe at the top rolls easily on its bearing and is $\frac{3}{4}$ in. in diameter and 15 in. long. The yoke and sleeve are riveted together, the sleeve being drilled at eight points to permit vertical adjustment by a $\frac{3}{8}$ -in. horizontal pin which passes through one of the holes in the sleeve and through a corresponding hole about midway between the top and the bottom of the spindle. The range of height above the floor at the pipe roll is from 27 in. to 44 in. The sleeve is 22 in. long and the spindle is of 1-in. stock, being clamped by nuts on either side to a $13\frac{1}{2}$ -in. x 8-in. oak block about 2 in. thick. The latter is screwed at four points to two 2-in. x 2-in. x $\frac{3}{8}$ -in. iron straps, which give a bearing on the floor. The stand is used frequently to hold the outer end of bars that are being heated in the forge or formed on the anvil instead of the customary non-adjustable stands, and the range in height available is found to be a great convenience. The stand was built complete from scrap stock and at a nominal cost.



HOME-MADE STAND FOR FORGE SHOP

News of Electric Railways

THE DETROIT STRIKE

Precipitate Action of Detroit Employees Followed Quickly by Vote to Arbitrate

Notwithstanding a written agreement between the Detroit (Mich.) United Railway and the motormen and conductors in its employ, as organized in Division No. 26 of the Amalgamated Association of Street & Electric Railway Employees, to arbitrate all differences between them, the trainmen went on strike on May 13, at 6 a. m. and remained out until the following forenoon, May 14, when they voted to accept arbitration and return to work immediately. The specific cause of the strike was the discharge by the company of Motorman Peter Whaling, a member of the executive committee of the union, for careless operation. The employees on the interurban and city lines in other communities than Detroit served by the Detroit United Railway went out at the same time, and no interurban cars were operated on the Flint, Pontiac and Orchard Lake interurban lines, and the city service in Flint and Pontiac was cut off by the strike. The Rapid Railway, which runs to Port Huron, and the Detroit, Jackson & Chicago Railway, which operates to Jackson, were not affected by the strike as the men on these lines maintain organizations distinct from the Detroit division of the union. The Detroit, Monroe & Toledo Short Line Railway, operating to Toledo, also was not affected as no union organization is maintained on that line.

Following the decision of the men, by a vote of 1160 to 81, to strike, Mayor Marx with the assistance of the three members of the municipal street railway commission and members of his cabinet started separate conferences with the union heads and with F. W. Brooks, general manager of the company, in an endeavor to establish a basis of settlement. The conferences lasted all Thursday afternoon, and finally late Thursday night an agreement was made, subject to the vote of the strikers, that the Whaling case would go to arbitration within forty-eight hours. The men assembled at 8 o'clock on the morning of May 14 and voted unanimously to accept the arbitration offer and then returned to work immediately. The agreement also included a stipulation on the part of the company that it would take up with the proper officers of the union any differences or grievances, whether covered by the existing agreement or not, concerning the relations between the company and its employees and endeavor to adjust the same without delay, with a provision for further arbitration in the event that a settlement was not reached in conferences between the company and the officers of the union. James Couzens, chairman of the street railway commission, was named as third arbitrator in the agreement and the company selected S. T. Crapo, a prominent business man, as its party to the arbitration. The union named J. V. Cunningham, State labor commissioner.

Immediately following the calling of the strike, the company issued statements covering the record of the discharged motorman, the agreement between the company and the union and its side of the controversy. The record showed that in less than five years' service Whaling had been reprimanded sixty-four times and had been laid off thirteen times. He was in eight collisions. Once he was laid off for leaving his car to engage in a fight with a man on the street. Eight times he ran into open points, seven times he missed his run, four times he failed to make a report of accidents and twice he copied the schedule wrong. There were in the record numerous instances where he had been reprimanded for running his car ahead of schedule. The whole record, from the company's view, was cumulative testimony to the effect that Whaling operated at too great speed. His discharge followed the derailment of a car which he operated at high speed over tracks which were being reconstructed.

In its official statement to the public the company, in charging the union with violation of its agreement to arbitrate all differences, cited the exact terms of the agreement, which provides in such cases as the Whaling matter that

the union may appeal to the president of the company as a board of review; then, if dissatisfied appeal to a conference of the president of the company and the president of the international union, and finally if necessary call for a board of arbitration. None of these methods was tried, notwithstanding information conveyed to the union that the company would take up the matter in the regular way. The company pointed out that this plan had been in effective use for more than fifteen years and had never before been questioned or in any way deviated from in any disciplinary matter, although hundreds of cases had been handled satisfactorily to both sides within that time.

The reply of the local union to the charge of breaking the agreement was to the effect that the company had not always lived up to the terms of its agreement with the men, although specific cases of violation were missing from the union's statement. William D. Mahon, international president of the union, whose home is in Detroit, was called to the union meeting about 2:30 o'clock on the morning of May 13 and, according to the newspapers, pleaded against the strike but without success. Later Mr. Mahon announced that the international union would support the local, one newspaper stating that "the men swept Mr. Mahon into the position of supporting them."

The company was taken by surprise, and the whole city was astounded by the action of the men. Notice of a strike vote to be taken by the men had been given in the newspapers, but it was generally believed that the men would vote to follow the regular course and arbitrate the question in dispute.

Arrangements had been made by the company for the operation of some of its cars on Woodward Avenue by men other than the strikers when the agreement to arbitrate was accepted. It was planned to start some cars on the afternoon of May 14, but when the union men decided to return to work the company telegraphed the street car operators it had engaged not to come to Detroit.

Following the strike it was stated in Detroit newspapers that several hundred of the union men who operate outside of Detroit were not notified of the meeting and were given no voice in the matter. Newspapers in Flint and Pontiac reported dissatisfaction by some of these men because recognition had not been shown them. These statements have not been denied by the union.

One of the interesting phases of the strike is the fact that at the meeting at which the strike vote was taken the plan of arbitration, as provided in the agreement, had few supporters while only a few hours later the men voted unanimously to arbitrate.

The strike proved a harvest for the jitneys, the prices of transportation running from 10 cents to whatever the drivers could get. In very few instances did the drivers stick to a 5-cent fare. Practically every motor car in the city was in service during the short period of the strike, but within an hour after electric railway service was resumed nearly all the automobiles engaged in transportation disappeared. There are only three regular jitney buses in the city.

STRIKE IN LONDON

Practically the entire London County Council Tramway was tied up by a strike of the employees, who quit work on May 16 when the County Council of London, England, refused their demand of a 15 per cent increase in wages in the form of a war bonus because of the increased cost of living. Only forty cars out of the 1500 usually operated on the system were run on the first day of the strike, most of these on the suburban line which runs to Woolwich Arsenal, on the north side of the Thames opposite Woolwich. In the districts to the north of the Thames, comprising old London, Westminster and the outlying sections, the omnibus still reigns supreme save for the competition of the underground railway system. None the less, omnibus service has already been much restricted and hampered by the commandeering of buses for war service, and the tram strike has in consequence affected the city's transportation service much more seriously than in normal times.

THE SYRACUSE ARBITRATION

Negotiations Reviewed in the Three-Cornered Empire United Controversy

Under the terms of the settlement by which the trainmen in the employ of the Empire United Railways, Syracuse, N. Y., returned to work, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 17, page 767, the company started to negotiate a contract with the Amalgamated Association. It was then served with written notice by the Brotherhood of Locomotive Engineers and the Order of Railway Conductors that no contract could be entered into with the Amalgamated which would not violate the Brotherhood contract. For a time this notice held up the negotiations, but after a week or so the negotiations were resumed. The demands of the men, however, precluded their being accepted by the company, and as the terms under which the men returned to work contained an arbitration clause, it was agreed that the representatives of the company and of the union meet and present their arbitrators.

In the meantime a new situation developed over about 8 miles of line between Auburn and Port Byron, at which point connection is made with the main line of the Empire United Railways between Rochester and Syracuse. The line between Auburn and Port Byron was formerly an independent corporation, known as the Auburn & Northern Railroad, but when the Empire United Railways was organized the Auburn & Northern Railroad was absorbed and became part of the Rochester division of the Empire United. The Brotherhood had contracts on the Empire United, but had not exercised them on the Auburn & Northern division. Subsequent to the date of the Brotherhood contract, an Amalgamated union was organized on the Auburn & Syracuse and as the men operating the former Auburn & Northern branch lived in Auburn they joined the Amalgamated union. As a result a controversy developed between the two organizations, both of which claimed jurisdiction over the Auburn-Port Byron branch. The fact that only four men were involved in this controversy, however, did not mitigate the fierceness with which this question of jurisdiction was contested.

The Brotherhood agreed in the fall to waive its rights to this piece of track until May 1, 1915. The settlement of the strike controversy left everything in statu quo, pending the adjustment of the differences. The company felt that it could not force the withdrawal of the Amalgamated men from the line and turn it over to the Brotherhood without violating the truce which was established pending the arbitration. On the night of April 30 the Brotherhood men operating on the Rochester Division voted not to take out the cars on the morning of May 1. They made good their threat and the first cars were not taken out. The company was therefore left with the alternative of a strike on the Rochester division, if it did not comply with the demands of the men on that division, or a strike of the Amalgamated on the Auburn & Syracuse division, if it did. The company finally decided to allow the Brotherhood men to operate the cars into Auburn. There was considerable disturbance at Auburn, but after a protest by the company calm was restored, the company making arrangements to have the through cars between Auburn and Rochester operated by Brotherhood men and the local or so-called stub cars, running only between Auburn and Port Byron, operated by the Amalgamated men.

As both sides agreed to arbitrate the entire issue there will be a three-cornered arbitration, involving the Amalgamated, the Brotherhood and the company. The company is particularly interested in this matter because under the present arrangement of dual operation it has to pay two sets of men for the work which one set would ordinarily do.

The company appointed R. A. Dyer, Jr., formerly general manager of the United Railways, as its arbitrator, and the Amalgamated appointed William B. Fitzgerald, member of the executive board, as its arbitrator. These two arbitrators on May 13 rendered their decision. It gives a contract to the Amalgamated on the Syracuse-Oswego division of the Empire United Railways and on the Syracuse & South Bay Electric Railroad. This contract is practically a duplicate of the Brotherhood contract and gives the men the same wages and working conditions which have pre-

vailed heretofore as covered by the contract with the Brotherhood. On May 14 the Auburn & Northern matter was still to be arbitrated. It was expected that in this arbitration James M. Lynch, State labor commissioner, would take an active part.

In Rochester, where the Empire United Railways have entrance contracts with the New York State Railways, the Buffalo, Lockport & Rochester Railway and the Empire United Railways have been operating their cars with Brotherhood crews and they have established joint terminals for both freight and passengers. The men employed on the local lines in Rochester recently demanded that the New York State Railways compel the two foreign roads to disembark their crews at the city limits and that the cars of the interurban lines while operating within the city be manned by Amalgamated men furnished by the New York State Railways. This action has still further complicated matters.

FIVE NEW PENNSYLVANIA COMMISSIONERS

Governor Martin G. Brumbaugh of Pennsylvania sent to the Senate on May 19 his nominations for members of the Public Service Commission. He retained only two of the old members, Samuel W. Pennypacker and M. J. Brecht. The new members of the commission are John S. Rilling, Erie, nine-year term; William A. Magee, Pittsburgh, eight years; John Monaghan, Philadelphia, six years; Edgar R. Kiess, Williamsport, five years, and William D. B. Rainey, Montrose, four years. Chairman Pennypacker is named for the ten-year term and Mr. Brecht for seven years. The recalling by Governor Brumbaugh of the nominations to the commission made by his predecessor was noted in the *ELECTRIC RAILWAY JOURNAL* of April 24, page 810.

CLEVELAND CARHOUSE CONTRACT CONTROVERSY

Following the presentation of charges to the City Council of Cleveland, Ohio, by Roderick D. Grant on May 10 to the effect that he had been offered \$12,000 by one of the prospective bidders a year ago to withdraw his bid for the construction of the Harvard Avenue carhouse, Attorney Harry Crawford stated that, since such charges had been made, the Cleveland Railway courts the widest and fullest investigation. Peter Witt, street railway commissioner, asserted that his office had been open to all since he had occupied it, and that the Council would be expected to investigate the charges.

On May 17 the Council adopted a resolution to make such an investigation and the committee to whom the duty will fall will have power to administer oaths, subpoena witnesses and compel them to attend the hearings. The company and Mr. Witt insisted upon such power being granted to the committee.

Councilman Koch has introduced an ordinance to increase the allowance of the company for operating purposes $\frac{1}{2}$ cent per car-mile to provide for the increase of 2 cents per hour in the wages of motormen and conductors. A resolution has also been introduced in the Council to create a line between the Public Square, Cleveland, and the new passenger steamer docks at the foot of East Ninth Street. The distance is only a few squares and for this reason the fare is fixed in the resolution at 1 cent. In making a recommendation for 1-cent fare, Mr. Witt said that the greater part of the business of the line would require the use of transfers and this would be the same as where a penny each is paid for the transfers, but it will save the passengers and the conductors the trouble of bothering with the slips.

On May 17 Judge Vickery's decision that the city had authority to grant the Cleveland Railway a franchise for an extension of the Euclid Avenue line between East Twenty-second and East Fortieth Streets without consents of property owners was sustained by the Court of Appeals. The case will be carried to the Supreme Court at once. This is the suit in which Frank Billings and twenty-three other residents of that section of Euclid Avenue, known as "Millionaires' Row," sought an injunction to prevent the construction of tracks and operation of cars on the street. The company has never occupied the section of Euclid Avenue in question.

DECISION IN INDIANAPOLIS EXTENSION CASE

In the Marion County Circuit Court on April 28, Judge Ewbank declared void the order of the Public Service Commission of Indiana directing the Union Traction Company to permit the Indianapolis Traction & Terminal Company to use the Union Traction Company's tracks in College Avenue between Fair Grounds Avenue and Forty-sixth Street, and ordering the Traction & Terminal Company to construct near Forty-sixth Street tracks for turning its cars at that point and extend its city service in College Avenue between Fair Grounds Avenue and Forty-sixth Street. Some time ago a petition was presented to the Public Service Commission, asking that the city company be directed to extend its service as far as Forty-sixth Street over the interurban tracks of the Union Traction Company of Indiana. The commission, upon hearing, ordered this extension, and part of the order provided that the Indianapolis Traction & Terminal Company should pay the Union Traction Company the sum of 1½ cents for each passenger carried in College Avenue between Fair Grounds Avenue and Forty-sixth Street, unless the companies should agree on a different compensation. Commenting on this point, Judge Ewbank said that there was nothing to show that the rate fixed by the commission was just and equitable between the companies. Complete control over the operation of street cars and the laying of tracks lies with the city of Indianapolis, Judge Ewbank said, and the Public Service Commission exceeded its authority in issuing the order for the extension of the city service in College Avenue, the Common Council of Indianapolis having taken no action in the matter as provided by law. The decision is of interest as similar orders by the Public Service Commission are under consideration in other cities in Indiana.

NEW OFFICERS OF A. I. E. E.

At the annual meeting of the American Institute of Electrical Engineers, held at New York, May 18, preceding the award of the Edison Medal to Dr. Alexander Graham Bell, the report of the tellers' committee announced the election of officers as follows:

President, J. J. Carty, chief engineer American Telephone & Telegraph Company, New York; vice-presidents, William McClellan, consulting engineer, New York; Comfort A. Adams, Harvard University, Cambridge, Mass., and J. F. Stevens, consulting engineer, Philadelphia; treasurer, G. A. Hamilton; managers, C. E. Skinner, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; John Taylor, General Electric Company, Schenectady, N. Y.; F. B. Jewett, Western Electric Company, New York, and Harold Pender, University of Pennsylvania, Philadelphia.

The report of the board of directors, presented at the meeting, showed that the Institute on April 30 had 8054 members, of whom 448 were fellows, 1079 were members and 6522 were associates. The Institute now has thirty-one sections and fifty-two branches.

WAGE CONFERENCES AT SPRINGFIELD

Conferences have been held between officials of the Springfield (Mass.) Street Railway and representatives of the employees' union relative to the establishment of a new scale of wages. The men recently asked the company for increases varying from a minimum of \$1.40 to a maximum of \$2.10 a week, desiring that the present daily minimum of \$2.30 be raised to \$2.50 and the maximum from \$2.85 to \$3.15 a day. The request of the men applies to both the Springfield and Worcester systems, which are connecting properties operated by the New England Investment & Security Company. At Springfield payment by the day is in force, and in conference with the union the company offered to establish payment on an hourly basis, suggesting a maximum rate of 28.5 cents after three years' employment, with a graduated scale having a minimum of 23 cents. The proposed scale of hourly payment is now in force on the lines of the Worcester Consolidated Street Railway. After the conferences last week it was stated that the men would not agree to the Springfield company's offer, but that arbitration would be resorted to in the event of failure to

come to terms. The rates finally established are to take effect as of June 1, 1915, according to the present understanding between the parties.

A long conference between the companies and the men was held at Worcester on May 17, but no agreement was reached. Both sides are at present deadlocked over the wages question. The men insist on a flat day rate with a 20-cent increase over the Worcester minimum and an increase of 30 cents over the Springfield maximum. By such a change the Worcester men would gain an hour's pay over the present rate plus the increase requested by the men in both cities. The Springfield employees receive as much pay in nine hours as the Worcester employees do in ten in view of the fact that the latter are paid by the day. Officials of the Springfield company stated that it is out of the question to consider an increase in wages at this time. In Springfield the company has been obliged to undertake extensive repairs and jitney competition is severe, now cutting the earnings by more than \$200 a day, with prospective further cuts in the coming summer. A further conference was scheduled for May 20.

Action on New York Service Board Charges.—It was stated at the executive chamber in Albany on May 19 that action was expected before May 24 on the charges preferred against the members of the Public Service Commission for the First District.

Municipal Ownership in Pekin.—The Pekin (Ill.) Street Railway was formally transferred to the city on May 4 and is now being operated in the interest of the municipality. The property consists of more than a mile of track, a storage-battery car and a charging station. The line is to be rebuilt, re-equipped and extended by the city.

New Tennessee Line Opened.—The Nashville (Tenn.) Traction Company has opened for regular service a 3-mile section of its road extending from Fifth Avenue and Church Street, Nashville, to Mulberry Street, to Second Avenue, to Lafayette Street, to the Murfreesboro pike, north of the tracks of the Tennessee Central Railroad.

Cincinnati Will Accept Company's Offer.—The Cincinnati, Newport & Covington Railway has proposed to pay into the treasury of Cincinnati, Ohio, \$65,000 in settlement of the city's claim of \$105,000, now pending. This is the amount agreed upon in the franchise that was defeated in a referendum vote some time ago. The city will ask that judgment be rendered for the amount offered and this will close the matter.

Important Ohio Supreme Court Decision.—In the case of Police Chief William H. Jackson against Saul Berger, who as agent of the Roth Shoe Company, Cincinnati, was prosecuted for discharging Edward Schroeder because he was a member of the shoe workers' union, the Ohio Supreme Court rendered a decision on May 4 sustaining the right of an employer to discharge employees for this cause. This decision is in line with the decision of the United States Supreme Court in the Coppage case which was rendered on Jan. 25, 1915.

Emergency Lighting System Disapproved.—The Public Service Commission for the First District of New York has disapproved plans for emergency car lighting submitted by the Long Island Railroad in conformity with the commission's order for auxiliary lighting apparatus in cars used in the tunnel on the Atlantic Avenue Division. The commission's objection was that the lights would not be automatically turned on in case the power current was shut off, and its order contemplated an emergency system which would automatically supply light when the power current failed.

Fenders for New York Buses.—The Public Service Commission for the First District of New York has approved the design of a fender with which the Fifth Avenue Coach Company proposes to equip its motor omnibuses. The fenders are to be attached to the sides of the vehicles in front of the rear wheels, so as to prevent pedestrians from falling under those wheels. The motormen of such vehicles can guard against accidents in front, but it has happened that without his knowledge persons have run into the sides of

the buses and been injured by the rear wheels. The proposed fender is designed to prevent such accidents.

Chicago Seeks Merger Enabling Act.—The local transportation committee of the Chicago City Council has approved a bill to obtain authority from the State to merge the surface and elevated railways. Although this plan was approved by the elevated railroads of Chicago and the Chicago Surface Lines two years ago, this is the first definite action taken by the city to bring the merger about. The enabling act is necessary because the five elevated railroads were organized under the steam railroad act, the Chicago Railways under the horse and dummy act, and the Chicago City Railway under a special charter which was granted by the State.

The Bauer Bill.—Governor Willis and leaders in the House and the Senate of Ohio have assured the Cincinnati people that the Bauer rapid transit bill, making a municipal loop possible, will not be killed because some of the members of the Legislature from Cincinnati and Hamilton County failed to support administration measures. Governor Willis has also assured the Cincinnati officials that nothing will be done to embarrass the city in the renewal of the canal water leases, as was feared a week or two ago. All leases will contain a clause voiding them automatically when the city is ready to take over the property and comply with the conditions defined in the statute enacted especially for the city.

Power Brake Order Extended.—The Coney Island & Brooklyn Railroad has been granted an extension of time by the Public Service Commission for the First District of New York to Oct. 15, 1916, in which to equip certain of its cars with power brakes as ordered by the commission. The extension was granted in accordance with the report of Clifton W. Wilder, electrical engineer of the commission, with the understanding that during the summer of 1915 there will be only 153 double-truck cars and during the summer of 1916 only sixty-seven double-truck cars of the company operating without geared hand brakes. The company has already equipped its heavy cars with air brakes, as required by the commission's order.

Power Contract Declared Unreasonable.—The Railroad Commission of California has rendered a decision in which it declared the existing rate between the United Light & Power Company and the San Francisco-Oakland Terminal Railways for electric power to be unjust and unreasonable. The commission finds that when the rate was established in 1911 the same interests dominated both the United Light & Power Company and the San Francisco-Oakland Terminal Railways, known as the Key Route System. The commission finds that through the medium of the unjust rate the railroad has been improperly deprived of \$183,000. In conclusion the commission says: "The parties responsible for this contract have not yet undone the wrong which the making of the contract involved. It should be stated that the contract in question was made under a former management and not by the present operating head of the San Francisco-Oakland Terminal Railways."

The Queens County Mandamus Proceeding.—The Public Service Commission for the First District of New York has notified the New York & Queens County Railway that it will consent to an adjournment of the mandamus proceeding against the company until the proceeding in regard to the declaration of abandonment of certain of the company's lines in Queens is finally disposed of, on the condition that the company will expedite the latter proceeding and will promptly obey the writ of mandamus if it is issued. The mandamus proceeding was brought to compel the company to construct and operate its street railroad in Flushing Avenue between Jackson and Ehret Avenues. The company recently filed a declaration of abandonment of portions of its franchise routes, including the stretch in Flushing Avenue mentioned. The commission refused to approve the declaration, and the company asked for a suspension of the mandamus proceeding until the abandonment question is finally decided.

Report on Municipal Ownership in Montreal.—That it would cost Montreal \$49,000,000 to build itself a municipal tramway system, exclusive of the cost of acquiring all or part of the present system of the Montreal Tramways,

is the principal feature of a report submitted to the Board of Control by Comptroller Thomas Cote. If the existing lines were taken over an outlay of \$30,000,000 would still be necessary. The report, which was prepared by G. R. MacLeod, one of the city engineers, says: "It is extremely difficult to determine just what mileage of tracks would be necessary, because many of the new lines would have to compete with existing lines of the Montreal Tramways, and would, therefore, operate at a disadvantage. Routes, aggregating about 100 miles of track (single) or 50 miles of double track, supplemented by 10 miles of subways for the more central parts of the city would probably be required. The total cost of this system is estimated at approximately \$49,000,000.

Annual Meeting of the Society for Electrical Development.—The annual meeting of the Society for Electrical Development, Inc., was held in New York on Tuesday, May 11. Henry L. Doherty, president of the society, presided. The following men were unanimously re-elected directors of the society for the ensuing four years: For director to represent the central station interests, J. F. Gilchrist; for director to represent manufacturing interests, W. A. Layman; for director to represent contracting interests, J. R. Strong; for director to represent jobbing interests, F. S. Price; for director-at-large, Charles W. Price. J. M. Wakeman, general manager, read his report of the year's work. H. W. Alexander, director of publicity, supplemented Mr. Wakeman's report with a few brief statements of the work of the publicity department. Mr. Wakeman said that the suggestion had been approved by the board of directors that the society should maintain a representative on the Pacific Coast, that the board of directors had approved of the plans for "Electrical Prosperity Week," and that in no case had any section of the society expended in its work the full amount appropriated in the last year's budget.

PROGRAMS OF ASSOCIATION MEETINGS

New York Electric Railway Association

At a meeting of the executive committee of the New York Electric Railway Association held at the Transportation Club in New York City on May 17 it was decided to hold the thirty-third annual meeting of the association at the Hotel Oriental, Manhattan Beach, N. Y., on Tuesday and Wednesday, June 29 and 30. The following members of the executive committee were in attendance. James F. Hamilton, Schenectady; John J. Dempsey, Brooklyn; James P. Barnes, Rochester; S. Walter Mower, Cooperstown; Wilbur C. Fisk, New York; W. O. Wood, Long Island City; and C. C. Dietz, Brooklyn.

Pan-American Financial Conference

At least fifty-seven delegates, representing eighteen of the twenty Latin American Republics—Haiti and Mexico alone having no delegations—will meet in the hall of the Americas of the Pan-American Building, Washington, on May 24. The opening address of welcome at the Pan-American Financial Conference will be made by the President of the United States. This conference has been born of immediate and pressing practical questions which have emphasized the neglect of the financial and trade relations between the United States and Latin America, despite the uninterrupted growth of friendly diplomatic and social intercourse of the nations of America. Practical results will be the aim of the meeting. Secretary McAdoo and Prof. L. S. Rowe of the University of Pennsylvania, who has been appointed secretary-general of the conference, have devised methods to permit of intimate and definite discussion of the problems of Latin-American countries. The secretary's plans for the program contemplate devoting the greater part of the week to separate conferences between the delegates of each of the eighteen Central and South American nations and representatives of the United States. He will appoint eighteen committees, composed of delegates of the United States, to confer with the respective visiting delegations. There also will be some general meetings to discuss questions of common interest to all the American republics.

Financial and Corporate

ANNUAL REPORTS

New Orleans Railway & Light Company

The comparative statement of income, profit and loss of the New Orleans Railway & Light Company, New Orleans, La., for the years ended Dec. 31, 1913 and 1914, follows:

| | 1914 | 1913 |
|---|-------------|-------------|
| Operating revenue: | | |
| Railway department | \$4,398,507 | \$4,401,152 |
| Electric department | 1,427,294 | 1,335,186 |
| Gas department | 1,186,322 | 1,158,094 |
| Total | \$7,012,124 | \$6,894,432 |
| *Operating expenses: | | |
| Railway department | \$2,341,420 | \$2,439,154 |
| Electric department | 561,227 | 555,308 |
| Gas department | 526,224 | 425,107 |
| Total | \$3,428,871 | \$3,419,569 |
| *Net operating revenue | \$3,583,253 | \$3,474,863 |
| Net revenue—outside operations | 8,012 | 11,791 |
| *Total net revenue | \$3,591,265 | \$3,486,654 |
| Revenue deductions: | | |
| Taxes | \$761,223 | \$724,535 |
| Uncollectible consumers' accounts | 9,000 | 6,661 |
| Total | \$770,223 | \$731,196 |
| *Net operating income | \$2,821,042 | \$2,755,458 |
| Miscellaneous income | 45,551 | 34,763 |
| *Gross income | \$2,866,593 | \$2,790,221 |
| Income deductions | 1,753,848 | 1,731,879 |
| Net income before deducting charges for renewals and replacements | \$1,112,745 | \$1,058,342 |
| Charges for renewals and replacements | 189,618 | 180,813 |
| Net corporate income | \$923,127 | \$877,529 |
| Less dividends on stocks of subsidiary companies held by others | 4,013 | 4,770 |
| Balance of net income carried to surplus | \$919,114 | \$872,759 |

*Not including charges for renewals and replacements.

During the year the operating revenues increased \$117,692 or 1.71 per cent, the railway department showing a loss of \$2,645 and the electric and gas departments gains of \$92,109 and \$28,227 respectively. The total operating expenses increased only \$9,302, the large decrease of \$97,734 in the railway department being this much overbalanced by the increase of \$5,919 in the electric department and \$101,117 in the gas department. The net operating revenue of all departments increased \$108,389 or 3.12 per cent, while the net income increased \$46,355 or 5.31 per cent.

The report states that the increase in the net income is very gratifying, particularly when it is considered that the operating expenses in the gas department were largely increased by the higher price of gas oil, and that the gas rates were reduced on April 1 and the electric rates on Dec. 1. On April 26 the fare on the West End and Spanish Fort line was reduced from 15 cents round trip to 5 cents each way. This materially benefited the revenue on this line and effected a marked reduction in the cost of operating Spanish Fort Resort.

The actual charges for maintenance during the year amounted to \$750,768. In addition to this amount, there was expended \$221,628 for renewals and replacements, making a total charge of \$972,396. There was reserved from income for renewals and replacements \$189,618, making the net charge to the reserve \$32,009.

The capital expenditures for construction, improvements and betterments during 1914 were as follows: Railway roadway and line, \$210,641; electric line system and accessories, \$94,347; gas distribution system and accessories, \$145,145; plant equipment, \$18,708; rolling stock and miscellaneous equipment, \$15,283; buildings and structures, \$191,791, and engineering and miscellaneous, \$64,271, a total of \$740,188.

The following table shows comparative traffic and operating statistics for 1905 and 1914:

| | 1914 | 1905 |
|---|------------|------------|
| Track mileage—all track reduced to single | 205.92 | 190.92 |
| Motor passenger cars | 534 | 466 |
| Other passenger cars | 46 | 36 |
| Work cars, wreckers, sprinklers, etc. | 62 | 50 |
| Revenue passengers carried | 87,249,918 | 65,021,214 |
| Transfer passengers carried | 22,979,988 | 6,641,193 |
| Percentage of passengers using transfers | 26.3 | 10.2 |
| Average fare per passenger—cents | 3.96 | 4.57 |
| Car mileage | 19,625,411 | 16,753,874 |

Northern Ohio Traction & Light Company

The statement of income, profit and loss of the Northern Ohio Traction & Light Company, Akron, Ohio, for the year ended Dec. 31, 1914, follows:

| | |
|---|-------------|
| Gross earnings: | |
| Passengers | \$2,817,271 |
| Light and power | 643,977 |
| Car mileage | 7,627 |
| Freight, etc. | 88,259 |
| Parks | 49,795 |
| Interest and discount | 16,377 |
| Miscellaneous | 12,779 |
| Total | \$3,636,085 |
| Operating expenses: | |
| Maintenance of way and structure | \$358,974 |
| Maintenance of equipment | 299,389 |
| Operation of power plants | 402,171 |
| Conducting transportation | 652,893 |
| General | 524,002 |
| Total | \$2,237,429 |
| Net earnings | \$1,398,656 |
| Interest on funded debt and notes payable | 606,898 |
| Net income | \$791,758 |
| Profit and loss credits: | |
| Profit and loss surplus, Dec. 31, 1913 | \$1,041,324 |
| Miscellaneous profit and loss credits—net | 1,325 |
| Total | \$1,042,649 |
| Profit and loss gross surplus | \$1,834,407 |
| Profit and loss charges: | |
| Refinancing costs, including discount on bonds and capital stock sold at less than par | \$29,597 |
| Expenses account of injuries and damages and taxes in excess of amounts charged to operating expenses | 118,768 |
| Reservation for depreciation of cars and equipment | 37,500 |
| Reservation for doubtful accounts receivable | 7,500 |
| Dividends on preferred stock | 182,364 |
| Dividends on common stock | 450,000 |
| Total | \$825,729 |
| Profit and loss surplus, Dec. 31, 1914 | \$1,008,678 |

The gross revenue for 1914 was \$3,636,085 as compared to \$3,284,533 in 1913, an increase of \$351,552 or 9.7 per cent. During the year the operating expenses and taxes increased \$217,775 or 10.7 per cent, while the net earnings increased \$133,777 or 10.5 per cent. The gross earnings per mile were \$12,637 in 1914 and \$12,291 in 1913, and the net earnings per mile were \$4,444 in 1914 and \$4,457 in 1913. The operating ratio in 1914 was 61.53 as compared to 61.49 in 1913.

The average mileage in operation during 1914 was 236,777. During the year the mileage of the system was increased 3.55 miles. The total expenditures for additions and improvements during 1914 amounted to \$740,896. Five inter-urban coaches and sixteen city cars of the pay-as-you-enter type were added, and sixty-two city cars of the Akron line were rebuilt for pay-as-you-enter service. A material increase in production of power was effected in the company's various plants, the output being 74,739,133 kw-hr. in 1914 and 57,903,294 kw-hr. in 1913.

On Dec. 31, 1913, there were pending in the courts 135 claim cases against the company, but at the end of 1914 the number had been reduced by forty-seven cases. In pensions and relief money \$7,184 was distributed during the year. Twenty retired employees are now receiving pensions. During the year the company's number of stockholders increased from 1509 to 1813.

Westinghouse Electric & Manufacturing Company

The gross sales of the Westinghouse Electric & Manufacturing Company in the year ended March 31, 1915, amounted to \$33,671,485, as compared to \$43,733,646 the year before. From this total \$2,009,744 was saved as net income available for dividends, as compared to \$4,058,809 in 1914. Stockholders received \$1,707,259 in dividends, and as the profit and loss account was charged with \$444,498 for depreciation and adjustments and \$126,257 for miscellaneous reserves, the net revenue was not sufficient by \$268,000 to offset the debits against it. The total surplus at the end of the year was \$7,473,411, as compared to \$7,659,130 for the preceding period.

The sales billed show a large reduction for the year caused chiefly by the unfavorable business conditions during the period, but partly by the month's strike last summer in East Pittsburgh. All of the extraordinary expenses caused by

the strike, as well as the factory and general expenses during the strike, were charged against the income for the year.

The value of unfilled orders on March 31, 1915, was \$8,951,410, as compared to \$7,951,385 at the close of the previous year. The average number of employees during the year was 15,145, as compared to an average of 18,635 during the previous year.

The report shows that the book value of the company's investments in foreign countries on March 31, was \$10,433,765; in traction and power companies, \$1,241,483; in miscellaneous companies, \$1,010,037, and in miscellaneous investments, \$316,710, a total of \$13,001,995.

UNITED RAILROADS DECISION

California Railroad Commission by Own Accounting Finds Deficit of \$4,000,000 Instead of Surplus—Dividends Frowned On Until Solano Note Is Adjusted

In a bulky decision handed down on May 18 the California Railroad Commission, in commenting upon the \$1,096,000 withdrawn by note from the treasury of the United Railroads of San Francisco by Patrick Calhoun for use in the Solano project, said that in the absence of restitution or the presentation of a plan that would bring about the restoration of the funds, it would not look with favor upon disbursements in the form of dividends to stockholders. This decision was on the investigation begun by the commission last August. Previous reference to the Calhoun note was made in the *ELECTRIC RAILWAY JOURNAL* of June 6, 1914. The commission now states that it has traced \$888,412 of the amount withdrawn, but \$207,588 remains unaccounted for.

The commission declares that instead of a surplus of \$1,018,632, as shown by the books of the company as of June 30, 1914, there was in reality a deficit of approximately \$4,000,000 on that date. The difference arises from a lack of agreement as to the proper method of accounting, the company asserting that sinking fund assets are proper offsets to the liabilities which they secure. The commission intends to submit to the company a list of the items constituting the deficit and invite the company to give testimony showing that the deficit was on June 30, 1914, or is now less than the amount determined by the commission.

In its decision the commission reviews the financial history of the company since the fire and expresses the opinion that President Lilienthal is eager to rehabilitate its finances. The total indebtedness of the company is placed by the commission at \$41,700,000, but judging by similar systems, the commission states that the value of the physical property of the company will not reach this figure.

The company is ordered to set aside \$550,000 annually for three years for betterments and improvements. An amount of \$250,000 may be spent annually for building up the property, and \$300,000 annually for acquiring additional facilities, making extensions and meeting franchise obligations. The latter expenditure is under the supervision of the commission.

TAXATION VALUES IN UTAH

The Utah State Board of Equalization has announced for the purposes of taxation the valuation of public service corporations of the State. The total valuation of \$55,443,448 is an increase over last year of \$1,394,235. The value of railroads is \$31,785,760; of interurban railways \$5,698,823, and of light and power companies \$2,757,736. The properties controlled by the Electric Bond & Share Company have the highest values, the Utah Power & Light Company being assessed at \$2,586,297 and the Utah Light & Traction Company at \$4,095,218.

Albuquerque (N. Mex.) Traction Company.—On May 8 George Roslington was appointed receiver for the Albuquerque Traction Company upon the petition of the First Savings Bank & Trust Company, trustee. The bank asserted that the conditions of the deed of trust had been violated, no interest having been paid for more than two years on the \$116,000 of outstanding bonds, and taxes having been allowed to become delinquent.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has sold to N. W. Harris & Company, Perry, Coffin & Burr and Merrill, Oldham & Company, Boston; Harris, Forbes & Company, New York, and Harris Trust & Savings Bank, Chicago, \$190,000 of Boston & Northern Street Railway and \$160,000 of Old Colony Street Railway 4 per cent first mortgage gold bonds, due on July 1, 1954. These are being offered at 83 and interest, to yield about 5 per cent. They are underlying issues of the Massachusetts Electric Companies, being parts of outstanding issues of \$7,635,000 and \$6,352,000 respectively.

Carolina Power & Light Company, Raleigh, N. C.—The comparative operating figures of the Carolina Power & Light Company, the Yadkin River Power Company and the Asheville Power & Light Company, the last two of which are controlled by the first, are as follows for the fiscal year ended Dec. 31: Gross earnings—1914, \$1,284,985; 1913, \$1,121,849; operating expenses and taxes—1914, \$673,589; 1913, \$573,579; net earnings—1914, \$611,396; 1913, \$548,270; balance after fixed charges and dividends—1914, \$132,464; 1913, \$96,707. The Carolina Power & Light Company, which operates a street railway service in Raleigh, carried 2,298,854 passengers in 1914 as compared to 2,294,201 passengers in 1913, while the street railway track in operation increased from 13.5 miles in 1913 to 13.7 miles in 1914. The Asheville Power & Light Company, which operates a street railway in Asheville and suburbs, carried 5,457,180 passengers in 1914 as compared to 4,973,949 passengers in 1913. The miles of track in operation for this company remained at 19.2 for the two years.

Charleston (W. Va.) Interurban Railroad.—The Charleston Interurban Railroad has sold to Baltimore bankers \$750,000 of three-year 6 per cent secured notes. The proceeds will be used to extend the lines of the company from St. Albans to Montgomery, a distance of 24 miles.

Charlotte (N. C.) Electric Railway.—The capital stock of the Charlotte Electric Railway has been reduced from \$1,250,000 to \$1,000, an amendment to the company's charter having been allowed by the Secretary of State. Since the Southern Public Utilities Company took over the operation of the local street railway, no further need was felt for the local corporation. It was not dissolved entirely, however, because of several bond issues not yet matured.

Chicago (Ill.) Elevated Railways.—The National City Bank, New York, is offering two-year 5 per cent secured gold coupon notes of the Chicago Elevated Railways at the market price, to yield about 7 per cent. These notes are redeemable as a whole on any interest date at 100 and interest at thirty days' notice, and are secured by a specific pledge of all the outstanding stocks, \$36,292,500 par value, of the Northwestern Elevated Railroad, the Metropolitan West Side Elevated Railway and the South Side Elevated Railroad. The cash investment junior to these notes amounts to \$23,000,000.

Chicago (Ill.) Surface Lines.—The City Council local transportation committee has approved an amendment to the traction merger ordinance covering the formation of the Chicago Surface Lines. According to General Counsel Gurley, the adoption of this provision would put it beyond the power of a single stockholder, or two or three stockholders, to hold up any merger of the Chicago rapid transit lines. The proposition gives to a minority stockholder the alternative of agreeing to the merger or getting out with a fair cash price for his holdings. This provision is in effect in some other states.

Des Moines (Ia.) City Railway.—A committee composed of A. J. Frame, president Waukesha (Wis.) National Bank; W. N. Pelouze, president Pelouze Manufacturing Company, Chicago, and Chester Corey, of the Harris Trust & Savings Bank, Chicago, has been formed for the protection of the bondholders' interests in the Des Moines City Railway. This move follows the recent interest and sinking fund default on the company's 5 per cent refunding mortgage gold bonds, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 17. The committee asks that the \$2,408,000 of bonds outstanding, which are due on April 1, 1921, be deposited not later than June 18 with the Illinois Trust & Savings Bank, Chicago.

Detroit, Almont & Northern Railroad, Detroit, Mich.—The Detroit, Almont & Northern Railroad has applied to the Michigan Railroad Commission for permission to issue \$400,000 of bonds to pay the Detroit United Railway for \$200,000 already advanced to build the line from Romeo to Almont and \$200,000 to be advanced by the latter company to build the line from Almont to Imlay City. The petitioning company is under the control of the Detroit United Railway.

Federal Light & Traction Company, New York, N. Y.—The directors of the Federal Light & Traction Company have deferred the quarterly dividend of 1½ per cent on the preferred stock. The last payment was made on Sept. 1, 1914. While the company is said to be in a stronger financial position at present than ever before, having \$200,000 of cash on hand, with no floating debt except a small secured loan for payment of which provision has been made and with all financial requirements for the current year provided for, the board felt that it would not be prudent to disturb this strong financial position by taking any part of these funds for making any payment of dividends at this time.

Fort Wayne & Springfield Railway, Decatur, Ind.—The Fort Wayne & Springfield Railway property was bid in at receiver's sale on May 4 by John Koenig of St. Marys, Ohio, and Charles Dirksen, Decatur, for \$85,000. John H. Romer, Fort Wayne, was the only other bidder. The sale is subject to confirmation by the Adams Circuit Court. The buyers are among the original promoters of the road. The line is 22 miles long.

Interborough-Metropolitan Company, New York, N. Y.—C. H. Venner & Company has issued a circular against the plan to reorganize the Interborough-Metropolitan Company. The circular, sent to preferred stockholders, contained requests for proxies to be used at the special meeting called for June 1. It is charged that the directors are trying to reorganize the company for the benefit of the common stockholders. A director of the company is reported to have said that the directors hold ten times as much of the preferred stock as of the common. The acceptance of the plan seems assured, and the number of assents received from holders of preferred stock actually outnumbers the assents from the common by 5 per cent.

Interstate Railways, Camden, N. J.—The income from dividends, interest, loans, etc., of the Interstate Railways for the fiscal year ended Jan. 31, 1915, amounted to \$569,924, from which there was deducted interest charges of \$431,064 and expenses (including taxes) of \$5,427. The resulting surplus was \$133,432, which permitted a payment of \$60,000 in preferred dividends and left a net surplus of \$73,432 for the year. The total amount of money expended on the several properties controlled by the company, from the date of the respective leases to Sept. 30, 1914, totaled \$4,295,459. It is estimated that the various operating companies around Wilkes-Barre, Reading, Wilmington and Trenton, which the Interstate Railways controls by lease through the United Power & Transportation Company, will receive an annual income amounting to \$953,541 in 1915 and \$1,075,000 in 1926 and thereafter.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—The Maine Public Utilities Commission has authorized the Lewiston, Augusta & Waterville Street Railway to issue \$750,000 of notes in \$1,000 denomination, dated July 1, 1915, and payable on June 1, 1918, with interest at 5 per cent. The company was also authorized to execute an indemnity with the Fidelity Trust Company, trustee, for the notes.

Los Angeles (Cal.) Railway Corporation.—The California Railroad Commission has issued an order authorizing the Los Angeles Railway Corporation to issue \$250,000 of first and refunding mortgage 5 per cent gold bonds. As noted in connection with the application for this issue in the *ELECTRIC RAILWAY JOURNAL* of April 10, the bonds are to be used in refunding a similar amount of first mortgage 6 per cent bonds of the Los Angeles Traction Company that fell due on May 1.

Northern Electric Railway, Chico, Cal.—It is reported that the bankers' plan for refinancing the Northern Electric Railway was well received at a recent meeting of creditors

in San Francisco. The committee headed by A. Bonnheim reported that 214 of the 400 creditors had subscribed to the plan. A meeting of the underlying bondholders is to be held in order to secure their opinion in the matter. With the support of these, Mr. Bonnheim declares that the plan will be a success and the company saved from a foreclosure sale.

Northern Massachusetts Street Railway, Athol, Mass.—The Massachusetts House has passed to be engrossed a bill authorizing the Northern Massachusetts Street Railway to consolidate with, or purchase the franchises and property of, the Connecticut Valley Street Railway. The application to the Legislature was noted in the *ELECTRIC RAILWAY JOURNAL* of April 10.

Pacific Gas & Electric Company, San Francisco, Cal.—The California Railroad Commission has authorized the Pacific Gas & Electric Company to issue \$1,960,000 of common stock to holders of its common stock as a dividend, equivalent to 6 per cent of their present holdings. It is expected that the board of directors will soon meet and issue this stock as two dividends of 3 per cent each, one payable now and the other later in the current year.

Portland Railway, Light & Power Company, Portland, Ore.—The government has taken title to the canal and locks of the Portland Railway, Light & Power Company around the Willamette Falls at Oregon City, for a consideration of \$375,000. The Fidelity Trust Company, Philadelphia, trustee under the Portland Railway, Light & Power Company first and refunding mortgage, and the Bankers Trust Company, New York, trustee under the Portland General Electric Company first mortgage, formally consented to the release of the property from the lien of mortgages. This transfer opens the upper Willamette River to free transportation.

San Francisco (Cal.) Municipal Railways.—It is reported that the operation of the municipal railway system of San Francisco during 1914 resulted in a profit of \$216,541 after all expenses of operation had been provided for, due allowances being made for depreciation and interest on outstanding bonds. The total receipts were \$1,159,438, while the total money paid out was \$828,656. The net operating revenue was \$330,781, to which was added \$6,125 received in interest on bonds purchased out of the earnings, making the total income \$336,906.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The California Railroad Commission has authorized the San Joaquin Light & Power Corporation to issue \$1,582,000 of series C 6 per cent first and refunding forty-year bonds. The company is also authorized to issue interest coupons calling for 1 per cent additional interest to any holders of the \$2,924,000 of series B 5 per cent bonds now outstanding who will pay a premium of \$100 on each \$1,000 bond held. Of the new series C bonds \$1,532,000 are to take the place of a similar amount of series B bonds held in the treasury of the company or pledged as collateral. The order provides that the first \$300,000 of the series C bonds shall be sold at a price to yield not less than 94 and interest, and the remainder not less than 95 and accrued interest. The proceeds of the series C bonds and the premiums which may be paid on the series B bonds will be used in retiring \$954,000 of two-year notes maturing on Aug. 1, and in paying outstanding notes representing amounts borrowed for capital expenditures aggregating \$838,300. The bonds authorized by the commission have been purchased by N. W. Halsey & Company, New York, who are offering them at par and interest. The commission has requested the company to submit within ninety days a plan for future supplemental financing to secure any necessary funds for extensions and betterments otherwise than by the sale of bonds.

Scranton & Binghamton Railway, Scranton, Pa.—T. J. Foster, president; W. L. Connell, vice-president and treasurer, and Jacob Griffith, of Pittston, director, have disposed of their interests in the properties of the Scranton & Binghamton Railway to Mortimer B. Fuller, president International Salt Company; E. J. Lynett, owner of the Scranton Times, and M. W. O'Boyle, coal operator and manufacturer, Pittston. In a short time there will be a reorganization of the board of directors. R. W. Day will continue to manage the properties of the company.

Union Traction Company of Indiana, Anderson, Ind.—The Public Service Commission of Indiana has entered an order permitting the Union Traction Company of Indiana to issue \$50,557 of notes to cover the purchase of new motors and other equipment for use on the company's property.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 75 cents, common.

Chicago (Ill.) Railways, 4 per cent, participation certificates, series 1; 2 per cent, participation certificates, series 2.

Manhattan Bridge Three-Cent Line, New York, N. Y., 1½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

| Period | Operating Revenues | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|----------------|--------------------|--------------------|------------------|---------------|------------|
| 1m., Apr., '15 | \$414,818 | ..... | ..... | ..... | ..... |
| 1 " " '14 | 445,493 | ..... | ..... | ..... | ..... |
| 4 " " '15 | 1,681,622 | ..... | ..... | ..... | ..... |
| 4 " " '14 | 1,708,099 | ..... | ..... | ..... | ..... |

BATON ROUGE (LA.) ELECTRIC COMPANY

| | | | | | |
|----------------|----------|----------|---------|---------|---------|
| 1m., Mar., '15 | \$14,854 | *\$9,029 | \$5,825 | \$2,088 | \$3,737 |
| 1 " " '14 | 14,227 | *9,938 | 4,289 | 2,088 | 2,201 |
| 12 " " '15 | 180,223 | *112,593 | 67,630 | 25,033 | 42,597 |
| 12 " " '14 | 168,550 | *108,663 | 59,887 | 25,232 | 34,655 |

CITIES SERVICE COMPANY, NEW YORK, N. Y.

| | | | | | |
|----------------|-----------|----------|-----------|----------|-----------|
| 1m., Mar., '15 | \$347,372 | \$12,315 | \$335,057 | \$40,833 | \$294,224 |
| 1 " " '14 | 348,447 | 11,309 | 337,138 | 29,167 | 307,971 |
| 12 " " '15 | 3,941,425 | 131,272 | 3,810,152 | 455,000 | 3,355,153 |
| 12 " " '14 | 2,869,854 | 92,120 | 2,777,734 | 210,562 | 2,567,172 |

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

| | | | | | |
|----------------|-----------|------------|-----------|----------|----------|
| 1m., Mar., '15 | \$188,728 | *\$110,258 | \$78,470 | \$62,964 | \$15,506 |
| 1 " " '14 | 182,628 | *119,754 | 62,874 | 63,543 | †669 |
| 12 " " '15 | 2,543,661 | *1,441,273 | 1,102,388 | 756,302 | 346,086 |
| 12 " " '14 | 2,388,970 | *1,367,661 | 1,021,309 | 734,602 | 286,707 |

GRAND RAPIDS (MICH.) RAILWAY

| | | | | | |
|----------------|-----------|-----------|----------|----------|----------|
| 1m., Mar., '15 | \$93,284 | *\$69,168 | \$24,116 | \$13,706 | \$10,410 |
| 1 " " '14 | 103,555 | *66,575 | 36,980 | 13,629 | 23,351 |
| 12 " " '15 | 1,276,581 | *835,091 | 441,490 | 161,998 | 279,492 |
| 12 " " '14 | 1,299,756 | *819,257 | 480,499 | 162,918 | 317,581 |

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

| | | | | | |
|----------------|-----------|------------|-----------|-----------|----------|
| 1m., Mar., '15 | \$478,806 | *\$199,064 | \$279,742 | \$211,369 | \$68,373 |
| 1 " " '14 | 488,361 | *198,348 | 290,013 | 207,130 | 82,883 |
| 3 " " '15 | 1,396,419 | *586,472 | 809,948 | 633,103 | 176,845 |
| 3 " " '14 | 1,426,692 | *590,906 | 835,786 | 623,192 | 212,594 |

LEWISTON, AUGUSTA & WATERTOWN RAILWAY, LEWISTON, MAINE

| | | | | | |
|----------------|----------|-----------|----------|----------|---------|
| 1m., Mar., '15 | \$53,132 | *\$35,603 | \$17,529 | \$15,663 | \$1,866 |
| 1 " " '14 | 48,720 | *39,858 | 8,862 | 15,503 | †6,641 |
| 12 " " '15 | 691,967 | *461,458 | 230,509 | 187,048 | 43,461 |
| 12 " " '14 | 674,232 | *446,630 | 227,602 | 182,207 | 45,395 |

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

| | | | | | |
|----------------|-----------|------------|----------|----------|----------|
| 1m., Mar., '15 | \$175,946 | *\$108,397 | \$67,549 | \$41,964 | \$25,585 |
| 1 " " '14 | 182,565 | *121,025 | 61,540 | 41,337 | 20,203 |
| 12 " " '15 | 2,226,710 | *1,307,423 | 919,287 | 490,464 | 428,823 |
| 12 " " '14 | 2,218,531 | *1,392,028 | 826,503 | 476,534 | 349,969 |

NEW YORK (N. Y.) RAILWAYS

| | | | | | |
|----------------|-------------|-----------|-----------|-----------|-----------|
| 1m., Mar., '15 | \$1,111,940 | \$725,774 | \$386,166 | \$374,842 | †\$63,338 |
| 1 " " '14 | 1,043,284 | 717,176 | 326,108 | 365,592 | †16,979 |
| 9 " " '15 | 9,999,586 | 6,394,715 | 3,604,870 | 3,371,100 | †610,345 |
| 9 " " '14 | 10,336,128 | 6,553,235 | 3,782,894 | 3,336,717 | †735,721 |

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

| | | | | | |
|----------------|-----------|------------|-----------|----------|----------|
| 1m., Mar., '15 | \$280,780 | *\$178,949 | \$101,831 | \$51,901 | \$49,930 |
| 1 " " '14 | 274,198 | *168,811 | 105,388 | 50,331 | 55,056 |
| 3 " " '15 | 822,069 | *525,913 | 296,156 | 153,014 | 143,142 |
| 3 " " '14 | 793,165 | *494,979 | 298,185 | 149,361 | 148,361 |

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

| | | | | | |
|----------------|-------------|-------------|-----------|-----------|----------|
| 1m., Apr., '15 | \$1,971,560 | \$1,140,510 | \$831,090 | \$816,022 | \$15,068 |
| 1 " " '14 | 2,042,320 | 1,206,899 | 835,421 | 808,317 | †27,103 |
| 10 " " '15 | 19,776,807 | 11,486,176 | 8,290,631 | 8,101,462 | 189,169 |
| 10 " " '14 | 20,016,913 | 11,829,473 | 8,187,441 | 8,012,337 | 175,104 |

PORTLAND (MAINE) RAILROAD

| | | | | | |
|----------------|-----------|-----------|----------|----------|---------|
| 1m., Mar., '15 | \$76,179 | *\$48,678 | \$27,501 | \$27,375 | \$2,126 |
| 1 " " '14 | 74,798 | *51,131 | 23,667 | 22,038 | †1,629 |
| 12 " " '15 | 1,050,983 | *642,717 | 408,266 | 255,139 | 153,127 |
| 12 " " '14 | 1,037,467 | *666,515 | 370,952 | 218,046 | 152,906 |

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

| | | | | | |
|----------------|-----------|------------|-----------|-----------|-----------|
| 1m., Feb., '15 | \$437,854 | *\$247,296 | \$190,558 | \$182,551 | \$8,007 |
| 1 " " '14 | 538,236 | *259,989 | 278,247 | 174,880 | 103,367 |
| 12 " " '15 | 6,079,892 | *3,235,308 | 2,844,584 | 2,189,429 | 655,155 |
| 12 " " '14 | 6,760,919 | *3,318,019 | 3,442,900 | 2,051,234 | 1,391,666 |

SAVANNAH (GA.) ELECTRIC COMPANY

| | | | | | |
|----------------|----------|-----------|----------|----------|----------|
| 1m., Mar., '15 | \$64,394 | *\$42,239 | \$22,155 | \$23,409 | †\$1,254 |
| 1 " " '14 | 68,923 | *45,163 | 23,760 | 23,015 | †745 |
| 12 " " '15 | 834,580 | *545,756 | 288,823 | 276,465 | 12,358 |
| 12 " " '14 | 838,619 | *555,646 | 282,973 | 273,199 | 9,773 |

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

Traffic and Transportation

THE JITNEY BUS

Jitney Conditions in St. Louis—The Fort Worth Ordinance Sustained—Jitney Ordinances in Augusta, Birmingham and Providence

While no regulatory ordinance has been adopted in St. Louis to govern the operation of the jitneys, the number of automobiles in operation in that city on May 14 was estimated at about 150, compared with a maximum of 250 in operation at one time. Street Commissioner Talbot drew up a proposed ordinance some time ago, but this died with the last Municipal Assembly. The first measure was really nothing more than a safety-first proposal. It did not require any indemnity bonds, fixed routes or schedules, and no taxes other than the regular State and city license were to be imposed under the terms of the measure. Mr. Talbot is now at work on another ordinance.

A pressing question in St. Louis is the increasing number of automobile accidents. According to the police records there were 677 automobile accidents from Feb. 1 to May 1, 1915, the period that jitneys have been operating, as compared with 393 during the same months of 1914. This is an increase of 284 accidents, or 72.26 per cent. Companies have been formed in St. Louis to write indemnity bonds, but the jitney drivers do not care to take out policies. The policy offered is a mutual one and the jitney driver is responsible for the first \$200 damages.

Crimes having their origin in jitney operation are multiplying in St. Louis and one, the assault on a Belleville stenographer, has resulted in a call upon the part of the daily papers for a regulatory ordinance. Following the revelations in this case the St. Louis *Republic* received a letter from another girl who had almost the same experience as the young woman from Belleville. The editor, in an effort to find out if the practice had become common of subjecting to insult young women who used the jitneys, asked other girls to write about their experiences. In consequence the St. Louis papers are now printing two columns of letters daily from feminine readers who have suppressed their modesty in order that the facts may become public.

The failure of the attempt made in St. Louis to increase the fare on the jitneys from 5 cents to 10 cents is considered very significant. An organization of independent jitney drivers on the south side, under the name of the Lafayette Motor Service Company, was formed last month to raise the fare from 5 cents to 10 cents. W. A. Sears, managing director of the Motors Service Company, the original jitney organization, was present and urged the drivers to join his association and stick to the 5-cent fare. He said that the increase to a dime would kill the business. When the owners voted unanimously to raise the fare to 10 cents, Mr. Sears said that he would send cars over to the south side route and charge only a nickel, even if to do so he had to divert autos from the regular routes which he operated. How successful he was in this venture is indicated by the fact that less than a week later announcement was made that his organization, too, would adopt the 10-cent fare. This was attempted, but the number of passengers fell off so perceptibly that the 5-cent fare was restored.

The city ordinance of Fort Worth, Tex., regulating the operation of jitneys has been held to be constitutional by the Court of Criminal Appeals in the case of I. W. Sullivan, the court denying a writ of habeas corpus and remanding the applicant. According to the record, Sullivan was convicted in the Corporation Court of Fort Worth on a complaint charging that he violated Ordinance No. 488 of that city, regulating motor buses, in that he failed to pay the license fee of \$10 required for operating a jitney before doing so; that he so operated it without first procuring an indemnity contract from some solvent insurance company; that he was fined \$10 in the Corporation Court; that he appealed therefrom in the County Court, where he was again fined \$10, from which no appeal lies. He was held in custody by the sheriff under a proper commitment under the conviction. Sullivan attacked the ordinance as unconstitutional in that it imposed restrictions on jitneys to which other vehicles were not subject and that it was class legislation because it required a

bond to be taken out with an indemnity insurance company.

The court held that there was nothing in the ordinance that would make it obnoxious to the constitution or to any statutory provision preventing monopolies, but that the very reverse was true. The court stated that there could be no doubt that the city under the charter provisions as presented not only had the power and authority to enact and enforce proper ordinances prescribing reasonable regulations on the subject embraced in those ordinances, but that "it was imperative for it to do so." The agreed facts in the case showed that from the traffic conditions and large number of accidents from the operations of the jitneys, the Commissioners of the city deemed that the passage and enactment of the ordinance was imperative and necessary. The applicant conceded that under its charter power the city could pass and enforce all reasonable regulations. The argument against the ordinance rested chiefly on the contention that the measure was not reasonable, especially in regard to the indemnity contract feature. On this point the opinion states: "Even if the requirement of such indemnity or insurance is a new feature in the regulation of the carriers in the cities, it is not any presumption that it is not a proper, reasonable or valid regulation as conditions now exist."

If injury is caused by the jitney operator's negligence or fault, it is held that the indemnity contract inures fully to his own benefit. If he causes such damage he ought to pay for it or be made to pay for it. If he is insolvent or irresponsible so that he could not be made to pay for it, the more necessity there is for requiring him to provide for indemnity insurance so that the insurance company can be made to pay for it or prevent his operating a jitney. There cannot be any question, in the opinion of the court, but that the jitneys are common carriers. On this point the opinion reads:

"They, as common carriers, subject themselves to all reasonable regulations in the matters mentioned. Being common carriers and subjecting themselves to such regulations the public unquestionably has rights in the premises. . . . If they are to operate as common carriers then the public has the right to know when and where they will operate and to require them to do so with promptness and regularity. . . . They have no more right to shift from time to time and place to place than the street car carriers would have to do so."

The City Council of Augusta, Ga., has passed an ordinance regulating the jitney and the measure is now before the Mayor for his signature. The ordinance requires that the operator of a jitney shall, before receiving a license from the collector and treasurer, file a bond of \$5,000 to secure passengers and pedestrians against injury. The application for a license is to contain a detailed description of the jitney, the make, factory number, motor number and the number of passengers and pedestrians against injury.

The much-discussed jitney ordinance has been adopted by the City Commission of Birmingham, Ala. The provisions of the ordinance come largely within the province of the powers conferred on the policing authority. There is no provision requiring a bond.

The Pennsylvania Senate has passed the House bill permitting street railway companies to operate motor buses. The measure is now before the Governor.

Prospects of a struggle between Philadelphia City Councils and the supporters of the jitney traffic are indicated in the decision of the Philadelphia Jitney Association to appeal to the public in the event that the law committee of Councils should refuse to alter the "rigid" provisions of the jitney ordinance now in its hands. In its present form the ordinance sets forth the requirement of a \$5,000 bond being furnished to cover damages, and in addition the imposing of a license fee of \$75. Under such regulations, say the jitney drivers, the business will be "regulated out of existence." The jitney association expresses itself as willing to furnish a \$1,000 bond and pay a tax of \$15. Select Councilman Louis Hutt, father of the proposed ordinance and chairman of the law committee, has promised another public hearing on the bill.

One of the jitney bus concerns which incorporated in Louisville about three months ago with much fanfare and elaborate prospectuses, the Jitney Service Company, through its president has applied for a receiver to wind up its affairs. It is set forth that the company operated only thirty

days and since then the cars of the company have been in storage for which garage owners now demand pay.

By a unanimous vote the Board of Aldermen of Providence, R. I., on the afternoon of May 13 non-concurred in the jitney ordinance passed previously by the Common Council, and then by vote of nine to one adopted a substitute measure different in many points from the original ordinance. The license fee remains at \$5 per passenger seat, except that no bus shall pay more than \$50 for a license. The provisions of the original ordinance limiting the number of passengers to be carried to the seating capacity and requiring a bond of \$500 per passenger seat are retained. A section permitting jitneys to wait for passengers within three-fourths of a mile of the City Hall has been stricken out and a section substituted allowing the buses to wait as long as desired for passengers anywhere except in a small specified downtown district. In this district they may wait not to exceed five minutes. An additional clause provides that the police commission shall name public places near the center of the city where, during specified hours, jitneys may park for an indefinite period. The section providing that the police commission shall provide routes for the jitneys is stricken out and the machines are allowed under the new ordinance to run anywhere, with the understanding that later if some routing rule is necessary the jitneys must submit to it. The provision requiring that all jitney drivers shall be at least twenty-one years of age is changed to make the minimum age twenty years. The section requiring lights for the rear seats of the buses has been recalled.

The Virginia Railway & Power Company, Richmond, Va., is at present operating thirty-seven Briscoe automobiles in jitney service in that city. Statements made in the daily papers to the contrary notwithstanding, it is not the intention of the company to increase the number of jitneys operated by it at the present time. A number of the independent jitneys operated in Richmond have already discontinued. This is regarded as due largely to the fact that the jitneys of the railway are being operated in the territory that was most profitable to the independents.

Conrad H. Syme, corporation counsel, has reported to the Commissioners of the District of Columbia in regard to his observations of the jitney. Mr. Syme visited New Orleans, Los Angeles, San Francisco, Kansas City and St. Louis recently. In his report he relates the local situation in each of these cities in regard to the jitney as he saw it. His conclusion follows in part:

"In view of my observation of what the jitney service is doing in other cities, and of its possibilities with reference to short-haul transportation in the business section of a city, I am strongly inclined to the opinion that any further extension of street railway tracks in or near the business section of the city may be very unwise. In this day when flexible transportation instrumentalities are more and more demanded, the inflexible street car service in business sections may become an anachronism in a very short time. The movement to supply transportation by cheap motor vehicles is manifesting the practicability of this form of transportation as a commercial fact, and the public demand for a more convenient and elastic transportation system in the business sections of cities has made its commercial success possible. The service is now crude, sporadic and unorganized. By its intelligent organization and systematic application to traffic conditions, it will, I believe, become an important factor in urban transportation."

In the Superior Court at Los Angeles, Cal., Judge Hewitt has held to be valid the ordinance passed in Venice City providing that jitney bus drivers must pay a yearly license fee of \$3 to \$12, put up a \$10,000 indemnity bond, and use a definite route.

A call for a meeting to be held in Rochester, N. Y., on June 3, to form a State organization of jitney drivers and owners has been sent out by William Cross, president of the Rochester Jitney Association.

The bill before the General Assembly of Massachusetts to regulate the jitney was defeated by the House on May 12. It provided for a bond of \$2,000 for each vehicle. Attorney-General Atwill declared that the bill as drawn and as subsequently amended was unconstitutional in that it was class legislation because it did not apply to taxicabs and similar vehicles.

REHEARING IN ALBANY CASE

The rehearing ordered by the Appellate Division of the Supreme Court of the State of New York of certain provisions of the order of the Public Service Commission of the Second District to the United Traction Company for improved service in Albany will begin on May 25, according to the announcement made by the commission. An informal statement from the commission says:

"The order of the Appellate Division confines the rehearing to two points: The financial ability of the company to purchase immediately twelve new modern cars seating forty passengers and thirty more such cars as early as possible, and certain modifications in the emergency telephone system prescribed by the commission's order. As the time for compliance with Clauses 3, 4, 5 and 11 of the commission's order have expired, the court also includes in the subjects for the rehearing a new time to be set for compliance. Clause 3 orders increase of service on the Belt line, Clause 4 increase of service on the Delaware Avenue line, Clause 5 orders transfers to and from the Schenectady cars and Clause 11 relates to the emergency telephone system. The increases of service was ordered for Feb. 15 and the Schenectady transfers 'immediately,' that is, Dec. 11, and the telephone system was ordered installed by April 1.

"The principal point of argument on the rehearing, however, will undoubtedly be the financial status of the United Traction Company and its ability to borrow money during the present conditions, due to the war. In this connection the order of the Appellate Division says: 'Such rehearing shall be confined to the claimed impossibility or difficulty to raise the money that is necessary to carry into effect the provisions of the order by reason of the foreign war now in progress, and as bearing upon such question the present financial condition of the relator (United Traction Company) may be shown.'"

Fare Suspension Date Extended.—The Public Service Commission of Massachusetts has issued an order further suspending until June 15 the proposed increase in passenger fares asked for by the Blue Hills Street Railway, Canton.

Giving Publicity to the Code of Principles.—The United Railroads, San Francisco, Cal., printed on the front page of *Transit Tidings* for May 10 the first of the ten principles included in the code of principles adopted by the American Electric Railway Association, the intention presumably being to publish the others in subsequent issues. *Transit Tidings* is published by the company for distribution in its cars.

C. E. R. A. Map.—The Central Electric Railway Traffic Association has just received from the press a revised map of the interurban railways and steam railroad connections in the states represented by the association's membership. The revisions include principally track extensions to the various interurban systems. A new feature incorporated in the map is a list of all the stations, both steam and interurban, printed on the back with a key letter and number to indicate their position on the map.

Michigan Connection Bill Enacted.—The action of the United States Supreme Court in upholding the State Railroad Commission of Michigan in its case against the Michigan Central Railroad has resulted in the Legislature of Michigan passing a bill regarding physical connections between railroads, in which the commission is empowered to order such connections between steam and electric railroads at its discretion. The decision of the Supreme Court in the Michigan Central case was referred to in the *ELECTRIC RAILWAY JOURNAL* of March 13, page 532.

B. R. T. to Manage Its Own Advertising.—The Brooklyn (N. Y.) Rapid Transit System, which, upon the expiration of its recent contracts with the Inter-City Car Advertising Company, determined to handle the car advertising, vending and news privileges through its own representatives, has announced that it has appointed as its managing director Joseph P. Day, of Manhattan, the well-known real estate man. Mr. Day will have associated with him in the enterprise Stanley Eaton Gunnison, who for the last ten years has been connected with the advertising firm of Ward & Gow.

Fares Apportioned in Transfer Case.—The Public Service Commission for the First District of New York has adopted an order apportioning the fares in connection with the transfer arrangement it recently ordered between the Van Brunt Street & Erie Basin Railroad and intersecting lines of the Brooklyn Rapid Transit System. The order allows the Van Brunt Street line 1½ cents and the connecting line of the Brooklyn Rapid Transit system 3½ cents out of every nickel collected by either company for a transfer fare. The Van Brunt Street & Erie Basin Railroad Company operates only 3 miles of line. It purchases current from the Brooklyn Rapid Transit System.

A Joker Discovered.—The street railways in Kansas City, Mo., under the "new franchise," which is really not yet operative but which as to its provisions for caring for traffic is operative, carry free children under eight years accompanied by an adult. Conductors have been nonplussed but without recourse recently upon discovering that a young woman and a party of thirty or forty children evidently have the right to ride for 5 cents. Under the franchise 5 cents for the adult evidently pays for all the children under eight years. The board of control hopes to solve the problem before the period of the big Sunday school picnics.

Safety-Zone Ordinance in Kansas City.—A safety-zone ordinance is pending in the City Council of Kansas City, Mo., under which 6-ft. poles set in the street 5 ft. from the car tracks where cars stop in the downtown district, would mark a space about equal to the car's length 5 ft. from the nearest line of the cross street. In this area patrons would be safe while boarding or alighting from cars, and vehicle traffic would be allowed to move past this area while cars were loading or unloading passengers. Under the present arrangement in Kansas City, motor cars and other street traffic must wait 10 ft. from a standing car.

New Michigan Road Completed.—It is expected that the new line of the Michigan Railway between Kalamazoo and Grand Rapids and between Kalamazoo and Battle Creek will be opened for regular service within a few days. West-bound limiteds out of Detroit over the Detroit, Jackson & Chicago Railway will make connections at Battle Creek and Kalamazoo with the limited cars leaving those cities for Grand Rapids. East-bound limiteds will meet the cars from Grand Rapids at Gull Lake Junction so that passengers coming from Grand Rapids or other points on that line will transfer to the Detroit limiteds at the junction.

Annual Picnic of I. T. S. Employees.—The fourth annual picnic of the employees of the mechanical, bridge and building and the stores departments of the Illinois Traction System, Decatur, Ill., will be held on June 24, in Washington Park, Springfield, Ill., and employees and their families will travel from Decatur to Springfield in special cars, provided by the management, for the day's outing. The first event on the program is a baseball game in the morning between the shop's team and a team from the general offices at Springfield. After dinner thirteen other athletic events are to be run off. Prizes will be offered.

Railway Vaudeville at Grand Rapids.—A ten-act vaudeville show was staged by employees of the Grand Rapids (Mich.) Railway at the Press Hall on the evenings of May 3 and 4. The show was given as a close to the winter program of dance and card parties enjoyed by the employees. Motion pictures, singing, both vocal and quartet, reading, rope throwing and selections by the railway band were among the numbers on the program. A special act in which a full-sized street car was used upon the stage, was a feature. The arrangements for the performance were under the direction of L. J. Delamarter, secretary of the company.

Special Rate No Criterion for Regular Rate.—That special rates put into effect for charitable purposes by railways cannot be made a basis for an attack on the entire rate schedule has been decided by the Railroad Commission of California in the case of Richmond W. Armstrong and others against the Pacific Electric Railway, which operates lines between Los Angeles and various beach resorts. The complainants alleged the rates between Los Angeles, Venice and Santa Monica were excessive, and asked that a round-trip rate of 25 cents be made effective between these points, claiming that such a rate had been put into effect on various occasions.

Reduction in Wages Suggested in Rhode Island.—The board of trustees of the Rhode Island Company, Providence, R. I., has submitted to officials of the union of employees a new working agreement, which provides a reduction in wages of approximately \$60,000 a year. The Rhode Island Company, by the proposed schedule, would restore the rates that were in force prior to the increase granted two years ago. At that time the company said the advance would mean an expenditure of \$60,000. The present rates of pay per hour and the proposed new rates are as follows: First six months—old 23 cents, new 22 cents; one year—old 24½, new 22½; second year—old 26, new 23; third year—old 27, new 24½; fourth year—old 28½, new 27.

Jurisdiction of Ontario Railway Board.—The Ontario Railway Board insists upon its jurisdiction over electric street railways, whether they cross a steam railway line or not, and the net result is that the Hamilton, Grimsby & Beamsville Electric Railway will have to install sanitary conveniences upon its cars. The matter came up a month ago upon the application of residents in the district and the Ontario Railway Board ordered the conveniences. The company questioned the jurisdiction of the board and quoted a section of the railway act to show that since its line crossed the Grand Trunk Railway on Main Street, Hamilton, Ont., it came under the jurisdiction of the Dominion Railway Board. Chairman McIntyre and his colleagues gave judgment on May 10 against the company.

"Watts Watt" in Portland.—The new weekly publication of the Portland Railway, Light & Power Company, Portland, Ore., the founding of which was noted in the *ELECTRIC RAILWAY JOURNAL* of March 27, page 651, went into the eighth issue with the edition for April 30. For four issues the clever little fellow struggled along without a name. Then he blossomed forth as *Watts Watt*. E. F. Dodson got \$15 for the christening. Second, third, fourth and fifth best selections by the judges were in this order: Between Us, Shake, The Pup and Sketch. While much of the material contained in the various issues has had for its sole purpose putting the reader in good humor with himself, the opportunity has not been lost each week to touch upon some one utility problem of interest to the public, keeping all the while a long way from the shallow "I am holier than thou" waters. Clever without being fresh, courageous without being bold, *Watts Watt* is taking its place in the sun as a Portland booster to the extent of 50,000 copies a week distributed on the street cars.

The Baltimore Pension System.—The recent annual pamphlet report of the United Railways & Electric Company, Baltimore, Md., contained the following reference to the pension system of the company: "The pension system inaugurated on Jan. 1, 1914, has been in successful operation for a year, all expenditures under the system being borne by the company. In addition to his pension, each man upon the honor roll was presented with a service certificate and book of travel over the company's lines. It is believed that the adoption of this plan has tended to increase the loyalty and efficiency of employees, inasmuch as it encourages them to remain in the service, with the knowledge that when disabled or having reached an age necessitating relief from duty they will still be carried on the company's payroll."

Experimental Suburban Fare Reduction.—L. H. Bean, manager of the Tacoma Railway & Power Company and general manager of the Puget Sound Electric Railway, Seattle, Wash., recently announced the reduction of the fare between Tacoma and Puyallup, via the Puyallup, short line, and to intermediate points. The new rate will become effective on June 1. The reduced fare to suburban points is an experiment. Suburban commutation tickets will be issued in books of twenty-five single-trip tickets, unlimited as to time of use, at a 25-cent reduction from regular fares. The suburban tickets will be sold to points between Tacoma and Puyallup, on the Tacoma end, and between Seattle and Renton on the Seattle end of the line. The reduction will make the rate 15 cents each way to Puyallup, against the present rate of 20 cents, with corresponding reductions to intermediate points.

Accidents in New York in April.—According to the report of accidents due to vehicular traffic for April, made

by the National Highway Protective Society, twenty children were killed in the streets of New York City. Automobiles killed nine, wagons seven, and trolleys four. Six were killed jumping on and off trucks. The total of persons killed in the month was thirty-eight. Of these, twenty-one were killed by automobiles, seven by wagons, and ten by trolleys, compared with sixteen by automobiles, fifteen by wagons and fourteen by trolleys in April, 1914. In the State of New York, in streets and highways outside of New York City, twenty were killed by automobiles, two by trolleys, and one by a wagon, compared with nine by automobiles and four by trolleys in April, 1915. In New Jersey twelve were killed by automobiles and seven by trolleys. At railroad grade crossings in New Jersey four persons were killed and in New York State five.

Encouraging Employees to Save.—Fully realizing the value of thrift, Jesse W. Lillenthal, president of the United Railroads, San Francisco, Cal., has made the following proposal to the employees of the company to encourage saving among them: "I could arrange to have someone in the company's employ attend when wages are paid, give a receipt for any amount that the employee might direct and see to it that that amount was deposited to the credit of the employee in any savings bank that he might name, or, if he preferred, in some savings bank that the company would select. The savings bank pass book would, of course, be taken in the name of the employee, and I am only suggesting this method to save the employee trouble and to give him the benefit of our greater experience in financial matters. It goes without saying that the turning over of these moneys will be entirely voluntary and that each man will have the right to determine the matter for himself. I am simply making the suggestion and offering to provide the machinery and save you time and trouble."

President Belden on the 5-Cent Fare.—D. A. Belden, president of the Massachusetts Northeastern Street Railway, Haverhill, Mass., discussed the question of 5-cent fares on electric railways recently in the *Haverhill Gazette*. Mr. Belden thinks that the 5-cent fare will be discarded as a unit. He said the proper fare for a company to charge was the one upon which it could exist and render satisfactory service to the community or communities which it serves. He said that a company must have a living wage or "it would soon begin to shirk its duty, dodge its creditors, and finally resign or be fired." The article was about four columns long and dealt with the matter more particularly from the standpoint of the company with which Mr. Belden is connected. He concluded his summary with this statement: "I believe the people on the whole desire these companies to be prosperous; that they are interested in a square deal for them; and that once they are convinced a company serving them is honestly financed and managed, and is making faithful efforts to furnish safe and reliable service, they will be quite willing that the company shall charge fares adequate not only to meet its expenses and furnish satisfactory service, but to return in dividends a fair profit on the money invested."

Bonus System for Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has notified the employees of the transportation department that commencing on June 1 it will inaugurate a bonus system for these employees and pay them for the individual efficiency attained in the operation of cars, freedom from accidents and improvement in speed. It is planned to lay aside a fixed percentage of the operating receipts from the street railway business to cover the expense of damages and after deducting an estimated amount for additional expense involved in the maintenance of the individual records, to divide the saving equally between the employees and the company. J. D. Mortimer, president of the company, concluded a statement which he issued as follows: "Just what the bonus may amount to in the way of earnings cannot be forecasted with any accuracy. Based, however, on our experience with somewhat similar plans in other departments of the company's business, we anticipate that the bonus earnings will, for the more careful men, soon reach substantial amounts each month. All the bonus earnings will not be paid in cash as it is planned to induce the men to save a part of their surplus through investment in their savings and loan association."

Personal Mention

Mr. C. H. Sanborn has been appointed acting superintendent of the Blackstone division of the Worcester (Mass.) Consolidated Street Railway to succeed the late Thomas A. Leach.

Mr. Clinton White, of the Massachusetts Public Service Commission, who retired from the board on May 18, was presented with a loving cup on the last day of his service by his associates in the office of the commission.

Mr. W. C. Myers, who for some time past has been assistant superintendent of the East St. Louis & Suburban Railway, East St. Louis, Ill., has been appointed superintendent of the company to succeed Mr. A. J. Purinton, resigned.

Mr. W. J. Dibbins, manager of the Guthrie Gas, Light, Fuel & Improvement Company, Guthrie, Okla., has been elected president of the Gas, Electric & Street Railway Association of Oklahoma to succeed Mr. George W. Knox, vice-president and general manager of the Oklahoma (Okla.) City Railway.

Mr. Harold W. Clapp, who has had charge of the physical operation of the properties of the East St. Louis & Suburban Railway, East St. Louis, has been elected vice-president in charge of operation, a new office, relieving Mr. L. C. Haynes at his own request of the responsibility for this branch of the business.

Mr. C. C. Moyer, for the last four years chief dispatcher of the Columbus, Delaware & Marion Railway, with headquarters at Delaware, Ohio, has been promoted to the office of trainmaster. Mr. Moyer has been with the Columbus, Delaware & Marion Railway for the last thirteen years. He served seven years on the road as conductor, two years in the dispatcher's office and four years as chief dispatcher.

Sir Edgar Speyer has resigned as chairman of the Underground Electric Railways, London, England. He contemplates retiring from all his public positions, and has written to Prime Minister Asquith to accept his resignation as a Privy Councillor and to revoke his Baronetcy. Sir Edgar says that he considers it due to his honor as a loyal British subject and to his personal dignity as a man to retire from all his public positions.

Mr. W. H. Sawyer, vice-president of the E. W. Clark & Company Management Corporation, which has general supervision over the East St. Louis & Suburban Railway and affiliated properties at East St. Louis, Ill., will, it is announced, as personal representative of President S. G. McMeen, co-operate with both Mr. Harold W. Clapp and Mr. L. C. Haynes in concerted efforts toward increased efficiency of the railway and light properties in their service to the public.

Mr. Carl H. Fuller, formerly engineer of maintenance of way of the Macon Railway & Light Company, Macon, Ga., is the author of an entertaining short story entitled "The Hunger Strike," which appeared in the *Black Cat Magazine* for May, 1915. The setting of the story is drawn from the hitherto rather surprisingly untrammelled field of fiction, the street railway business. The thread of the plot is woven around the bitter competition between a corruptly operated municipal 3-cent fare line and a privately-owned 5-cent line.

Mr. Alexander Mackenzie has been elected president of the Brazilian Traction, Light & Power Company, Ltd., to fill the vacancy created by the death of Dr. F. S. Pearson. Mr. Mackenzie has also been elected president of the Rio de Janeiro Tramway, Light & Power Company, Ltd., the Sao Paulo Tramway, Light & Power Company, Ltd., and Sao Paulo Electric Company, Ltd., by the boards of these companies. Mr. Mackenzie has been prominently identified with the Brazilian companies since their inception, and was for many years general counsel and resident vice-president of the companies in Brazil.

Mr. J. T. Harmer, who succeeded Mr. L. S. Storrs in 1911 as president of the New England Investment & Security Company, Springfield, Mass., has offered his resignation. Mr. Harmer has been in charge of the electric railways centering at Worcester and Springfield since the departure of Mr. Storrs for Connecticut and is a railroad man of

extended experience, having been connected at various times with the Mexican Central, Santa Fe and New Haven systems. It is understood that he intends to retire from active business life, and that the present labor questions with which the company is involved had no bearing upon the decision to leave the service.

Mr. Stanley Eaton Gunnison, who will be associated with Mr. Joseph P. Day in the management of the advertising for the Brooklyn (N. Y.) Rapid Transit System, was connected with the advertising firm of Ward & Gow, New York, N. Y., for ten years. Mr. Gunnison is the son of Mr. Walter C. Gunnison, principal of Erasmus Hall High School, Brooklyn, and is a nephew of Mr. Herbert F. Gunnison, for fifteen years manager and a director of the Brooklyn *Daily Eagle*. Mr. Stanley Eaton Gunnison is a resident of Brooklyn and was graduated from Adelphi College of that city and from St. Lawrence University. He is active in civic matters in New York and Brooklyn.

Mr. Samuel T. Murdock, who has been prominent in the promotion of Indiana traction lines, was the guest of honor at a dinner given on May 13 at Lafayette, Ind., by 150 of the leading business and professional men of the city. It was a farewell dinner in which the city and Purdue University joined hands in bidding Mr. Murdock farewell and wishing him well in his new home at Indianapolis, to which he has removed. Mr. Murdock recently purchased the Van Camp mansion at Indianapolis with the intention of making that city his future home. He is president and managing director of the Indiana Lighting Company, secretary of the Chicago, South Bend & Northern Indiana Railway, and is interested in other traction and public utility companies in Indiana.

Mr. Joseph P. Day, well known in real estate circles throughout the country, has been appointed managing director in charge of advertising privileges of the Brooklyn (N. Y.) Rapid Transit System. Mr. Day was born in New York City on Sept. 22, 1873. After completing his school course he became interested in real estate and at the age of twenty-one established himself in the real estate and insurance business. In 1898 he negotiated the heaviest accident policy ever written, covering insurance against accident resulting from the change in motive power on the Third Avenue Railroad in New York and on the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad. In recent years he has been especially prominent in the sale of real estate at auction, in which he is perhaps the recognized leader in the United States. He was auctioneer in the now famous Ogden estate sale in New York, the largest absolute partition sale of improved city real estate in the history of the country. In the three years ended Dec. 31, 1909, Mr. Day sold at auction more than \$100,000,000 of real estate in and around Greater New York. He is recognized as one of the foremost experts on values. He sold the Third Avenue Railroad, New York, on March 1, 1910, at foreclosure. Another of his notable sales was that of the Yerkes mansion in New York, the property of the late Charles T. Yerkes.

OBITUARY

George H. Russel, treasurer of the Detroit (Mich.) United Railway, died on May 17. He was president of the People's State Bank, founder of the Russel Wheel & Foundry Company and a recognized power in the financial world in the Middle West. He was a native of Detroit and was sixty-seven years of age. He was a brother-in-law of Mr. J. C. Hutchins, president of the Detroit United Railway.

Calvin Whiteley, Jr., formerly chief engineer of the United Railways & Electric Company, Baltimore, Md., died at the Union Protestant Infirmary in that city on May 4, following an attack of apoplexy. Mr. Whiteley was born in Baltimore on Nov. 2, 1859. He was educated at St. Timothy's School and Stewart Hall, Baltimore, and was graduated from the University of Virginia as a civil engineer in the same year that President Wilson matriculated. Before being appointed chief engineer of the United Railways & Electric Company he was assistant chief engineer of the company. Previous to that he was chief engineer of the Virginia Railway & Power Company for eleven years. He was also at one time employed as division engineer by the Baltimore Traction Company, one of the constituent companies of the United Railways & Electric Company.

Construction News

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

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

RECENT INCORPORATIONS

Willimantic & Manchester Street Railway, Willimantic, Conn.—Incorporated in Connecticut to build an electric railway from Willimantic, south of the tracks of the Central Vermont Railroad, where connection may be made with the tracks of the Connecticut Company, through Pleasant Street and connecting streets to Columbia, extending through to the towns of Andover, Coventry, Bolton and Manchester to a point in Manchester near Manchester Green, where connection can be made with the tracks of the Connecticut Company. Capital stock, \$50,000. Headquarters, Hartford. Incorporators: T. J. Spellacy and Joseph I. Kopelman, Hartford, and Edward M. Yeomans, Andover. [April 10, '15.]

FRANCHISES

Meriden, Conn.—The New Britain, Kensington & Meriden Street Railway has received from the Council an extension of time on its franchise in which to complete the construction of its line between Meriden and New Britain. E. A. Moore, New Britain, president. [March 27, '15.]

Cedar Rapids, Ia.—The Iowa Railway & Light Company has asked the Council for a franchise to build an additional track on Fourth Avenue between Second Street and Third Street and also a track on the parking in the same block in Cedar Rapids.

Kansas City, Kan.—The Metropolitan Street Railway has asked the Council for a franchise to extend its Thirteenth Street line in Kansas City.

Methuen, Mass.—The Bay State Street Railway has received a franchise from the Council to alter, relocate and extend some of its tracks in Methuen.

Worcester, Mass.—The Worcester Consolidated Street Railway has asked the Council for franchises to build various turnouts in Worcester and also for a franchise to relocate its tracks on Main Street near Mills Street, Worcester.

Syracuse, N. Y.—The New York State Railways have received a franchise from the Council to build a single-track line on Elm Street from Shuart Avenue to Burnet Avenue, Syracuse.

Hamilton, Ont.—The Brantford & Hamilton Electric Railway has been granted an extension of time by the Dominion Parliament in which to build its extension from Langford to Galt, Ont.

Hamilton, Ont.—The Hamilton Mountain Electric Railway has received from the Ontario Legislature an extension of time on its franchise to build the projected electric line from the Hamilton Mountain Road, Ancaster, at the crossing of the Brantford & Hamilton Electric Railway, to Mount Albion, Barton, and from the northerly boundary of Hamilton and Caledonia Road to Ryckman's Corners, 3 miles. T. H. Crerar, Hamilton, is interested. [March 13, '15.]

Toronto, Ont.—The Toronto, Barrie & Orillia Electric Railway has received from the Ontario Legislature an extension of time on its franchise in which to build its projected line in Barrie, Ont., northerly to Orillia and southerly to Toronto. [March 20, '15.]

TRACK AND ROADWAY

***Cove, Ark.**—J. P. Harpending and associates are considering plans to build an electric railway from The Narrows, Okla., to Cove, Ark.

Marin County Electric Railway, Mill Valley, Cal.—The California Railroad Commission has issued a supplemental order authorizing this company to begin construction on its 1-mile line from the Northwestern Pacific Railroad depot, Mill Valley, to the Cascades, to be known as the "Throckmorton Avenue Line." [April 17, '15.]

Bristol & Plainville Tramway, Bristol, Conn.—This company has decided to relocate its track on Park Street from the south side of the street to the center of the street. Work will be begun at once.

Danbury & Bethel Street Railway, Danbury, Conn.—Extensive improvements are being made by this company on the roadbed of the Main Street line. New ties are being laid and track is being reset.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—This company has placed in operation its 3-mile line from Lewiston, Idaho, to Clarkston, Wash. [Jan. 19, '15.]

Chicago (Ill.) Railways.—Plans are being made by this company to extend its line on Chicago Avenue from North Clark Street, Chicago, to the lake front.

Chicago (Ill.) Surface Lines.—The local transportation committee of the Chicago City Council has approved the program of track rehabilitation and extensions for 1915 submitted by this company. The program provides for 30 miles of track rehabilitation and 25 miles of track extensions in the outlying districts of Chicago. The rehabilitation work includes track, new overhead, poles and pavement.

La Salle County Electric Railroad, Chicago, Ill.—Representatives of this company advise that the difficulties experienced in financing, due to the business depression, are about to be overcome. Considerable grading has been done and material delivered on this proposed electric line between Ottawa and Mendota, Ill. O. D. Weaver, Jr., formerly treasurer of the company, has been elected president and may be reached at 37 South Wabash Avenue, Chicago, Ill. [July 4, '14.]

Rockford City (Ill.) Traction Company.—Work on the Preston Street extension of this company's line has been practically completed and operation will be begun at once.

Clinton (Ia.) Street Railway.—Plans are being considered by this company to extend its lines to South Clinton.

Tri-City Railway & Light Company, Davenport, Ia.—This company contemplates 2 miles of track extensions and 3 miles of track reconstruction during 1915. This track will be laid with 7-in. 70-lb. rail, continuous joints and oxy-acetylene welded bonds. Creosoted red oak ties laid on a crushed-rock ballast have also been adopted as standard for this work.

Arkansas Valley Interurban Railway, Wichita, Kan.—Work has been begun by this company on its extension from Halstead to Hutchinson and it is expected that the line will be completed by July 1.

Wichita Railroad & Light Company, Wichita, Kan.—Plans are being considered by this company to extend its lines to McLean Park, where it is expected a motor speedway will be built.

Louisville & Interurban Railway, Louisville, Ky.—Several matters in controversy between the city of Shelbyville and this company, having to do with the extension of its lines past First Street, have been referred to a committee, consisting of the Mayor, the city attorney and two councilmen, for consideration. The city has variously asked for removal of these tracks and for rental. Clarence Dallam, representing the company, said it was ready to remove the tracks, but pointed out that in rush periods this would reduce probability of good service. The railway was willing to agree not to interfere with the entrance of any other interurban railway over these tracks, and would give such company free use of the tracks as far as the First Street intersection.

***Rayville, La.**—Plans are being considered to build an electric railway from Rayville to Alto and Mangham. Among those interested are T. J. Coenen, T. H. McGregor, W. T. Oliver and Charles Titche, president Chamber of Commerce of Monroe.

Holyoke (Mass.) Street Railway.—The Gorge Scenic Water Ride Company, Norfolk, Conn., has been granted a permit by the city engineering department to build a new roller coaster for this railway at Mountain Park. The estimated cost of the coaster is \$10,000. Work has been started on the foundation for the structure.

Springfield (Mass.) Street Railway.—Plans are under consideration for the extension of this company's line on St. James Avenue, Springfield, to East Street, Chicopee.

Worcester (Mass.) Consolidated Street Railway.—Work will be begun at once by this company on its extension from Union Street to the Adams Street freight and express station, Leominster.

St. Paul City Railway, Minneapolis, Minn.—This company is considering the suggestion of the Seven Corners Commercial Club to extend its lines on the west side of the city to connect with the Seventh Street and Hill Street lines at Seven Corners via the High Bridge; also a car line on Main Avenue from Seven Corners to Tenth Street and on Rice Street from Rondo Street to University Street.

Southern Railway & Light Company, Natchez, Miss.—Improvements estimated at \$6,000 are being made by this company on its tracks in Natchez.

Metropolitan Street Railway, Kansas City, Mo.—The park board of Kansas City is grading the right-of-way on which this company will build temporary tracks through Swope Park, the line to be ready for use by July 4. There is a fill which precludes permanent improvement of the line, and no decision has yet been reached as to paving or sodding between the tracks. The tracks will extend through a grassed section, and there will be no roadway for vehicle traffic. Two boulevards are crossed and at these points there will be macadam pavement. Following the extensive improvement and reconstruction work on Walnut Street, the company will reconstruct tracks on Delaware Street and Wyandotte Street. Temporary tracks will be laid on top of the present pavement next to the curb while the rails and pavement of the permanent improvements are being laid.

Manchester Traction, Light & Power Company, Manchester, N. H.—Among the improvements planned by this company is the placing of feed wires underground in Manchester. An agreement was reached with the city some time ago by which the company is to spend \$25,000 a year for five successive years, and twice that amount in the last of the five, in putting its wires underground.

Brooklyn, N. Y.—Bids will be received until May 28 by the Public Service Commission for the First District of New York for the completion of certain finish work in the Fourth Avenue Subway. This work will not delay the beginning of operation, which is scheduled for next month.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has completed the work of laying 2320 ft. of new double track on West Eighth Street, Erie. The construction consisted of 6-in. 100-lb T-rail on oak ties with 6-in. concrete base. The pavement between rails and 2 ft. outside was constructed of red shale brick. The company now has under construction 8900 ft. of single track on the East Buffalo Road, Erie. This construction will consist of 80-lb. A. S. C. E. T-rail on oak ties with a 6-in. concrete base. Continuous rail joints will be used and three switches will be laid on this section. The pavement will be the same as on West Eighth Street. The work will be completed at an early date.

Interborough Rapid Transit Company, New York, N. Y.—The Steinway Tunnel, extending under the East River from Manhattan to Long Island City, will be placed in temporary operation about June 15. Transfers will be given to and from the existing subway.

***Olean, N. Y.**—Plans are being made by the Chamber of Commerce to build an electric line from Olean to Hinsdale and possibly to Cuba. Rights-of-way from Olean to Hinsdale were secured some time ago.

Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y.—This company advises that it will rebuild its track in Wappingers Falls for a distance of 0.88 mile, using crushed-rock foundation, creosoted ties, Lorain section 72-64, 7-in. T-rail. The streets will be paved with Tidewater paving block, with 5-in. concrete base and 2-in. sand cushion.

Cleveland (Ohio) Railway.—This company recently contracted with the Algoma Steel Company of Canada for 1100 tons of steel rails. About 3000 tons of rails have been purchased for this year's requirements.

***Sapulpa, Okla.**—Plans are being made to build an electric railway from Sapulpa to the Cushing oil fields. C. N. Haskell, Tulsa, is interested.

Toronto (Ont.) Civic Railway.—Bids will be received until May 25 for the supply of cedar ties for the extension of this railway on Lansdowne Avenue, Toronto (contract No. 53). Specifications and forms of tender may be obtained at the Works Department, City Hall, Toronto.

Toronto, Ont.—A committee of residents from West Toronto, consisting of J. A. Anderson, G. Agnew, Rev. Mr. Morley and Aldermen Ryding and Weir, have asked Commissioner Harris to build a civic car line on Pacific Street and Annette Street, West Toronto, to connect with the line on Bloor Street.

Butler & Grove City Railway, Grove City, Pa.—Work has been begun by this company on its line between Butler and Grove City and it is expected that by October the line will be completed as far as Slippery Rock.

Johnstown (Pa.) Traction Company.—In connection with improvements to be made in Franklin this summer, this company plans to build an extension of its lines on River Street from the Franklin trolley bridge to the Woodvale bridge. T-rail will be used for the track construction.

Lewistown & Reedsville Electric Railway, Lewistown, Pa.—This company advises that it will replace at once its rail on Market Street, Lewistown, with standard T-rail.

Nashville (Tenn.) Traction Company.—This company has completed, on Fifth Avenue, 2 miles of track, which can readily be connected with other lines which the company is constructing.

Dallas (Tex.) Southwestern Traction Company.—Surveys of this company's line from Dallas to Brownwood have been completed and plans are being considered to include the cities of Stephenville and Dublin in the proposed route. [May 1, '15.]

Pier Railway, Port Arthur, Tex.—Work has been practically completed on this company's line from Proctor Street and Austin Avenue to the end of the causeway on the pleasure pier in Port Arthur, and operation will be begun at once.

Roanoke Railway & Electric Company, Roanoke, Va.—This company has placed in operation its extension on Belmont Street, Roanoke.

Tacoma Railway & Power Company, Tacoma, Wash.—Work will be begun by this company at once on the reconstruction and improvement of its tracks in Tacoma.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Improvements are being contemplated by this company to the amount of \$500,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being considered by this company to extend its line on Asylum Avenue, Racine.

Sheridan (Wyo.) Railway.—This company plans to build a 1-mile extension of its line in Sheridan.

SHOPS AND BUILDINGS

St. Johns Electric Company, St. Augustine, Fla.—Plans are being made by this company to build a new carhouse in St. Augustine. The cost is estimated to be \$7,000.

Boston & Worcester Street Railway, Boston, Mass.—J. W. Bishop Company, Worcester, has been awarded the contract by this company to build its new carhouse at Framingham to replace the one destroyed by fire at Westboro. The structure will be 121 ft. x 121 ft. with an extension 58 ft. x 78 ft., one story high, and will be built of brick, mill construction. The cost is estimated to be \$100,000.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—Plans are being made by this company to build an interurban passenger station at Grand Haven in the near future. It is estimated that the cost will be about \$115,000.

POWER HOUSES AND SUBSTATIONS

Manchester Traction, Light & Power Company, Manchester, N. H.—Among the improvements planned by this company is the construction of a new substation on Brook Street, Manchester, and an auxiliary steam power plant at Kelley's Falls. The substation at Brook Street is the main distributing point of the system, and the company plans to erect a new building which shall be adequate for its needs.

Manufactures and Supplies

ROLLING STOCK

Holyoke (Mass.) Street Railway is considering the purchase of two Universal side-dump cars.

Eastern Wisconsin Railway & Light Company, Oshkosh, Wis., is reported as inquiring for six cars.

Cleburne (Tex.) Street Railway is reported as having ordered six new cars. This item has not been confirmed.

East Liverpool Traction & Light Company, East Liverpool, Ohio, is reported as expecting to purchase fifteen cars.

Corning & Painted Post Street Railway, Corning, N. Y., has issued inquiries to car builders for six one-man single-truck cars.

Butler & Grove City Railway, Grove City, Pa., has placed an order for internal combustion locomotive equipment with the Internal Combustion Locomotive Company, Wilmington, Del.

Otsego & Herkimer Railway, Cooperstown, N. Y., has ordered one express car body from the Cincinnati Car Company through the W. R. Kerschner Company, Inc., Eastern agent.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., has ordered five all-steel car bodies from the Cincinnati Car Company through the W. R. Kerschner Company, Inc., Eastern agent.

Brooklyn (N. Y.) Rapid Transit Company is preparing tentative designs for one sample articulated center-entrance car, 62 ft. over bumpers, to be constructed by combining two of its 20-ft. body single-truck cars with a center section of about 14 ft. length, bids on which will be asked of car-builders, though the section will be assembled at the railway shops. Although the details are as yet undecided it is planned to follow closely the design of the Boston articulated center-entrance car. The center-entrance section will have an all-steel underframe, with two air-operated sliding doors on each side. The car will be equipped with four motors, one for each axle, and air brakes. If the operation of this car proves successful, the company may in future reconstruct ninety-two of its single-truck cars into forty-six articulated cars with the view of reducing platform costs and securing additional safety by the installment of the prepayment feature. The drawings will be completed in about a week.

TRADE NOTES

Ellcon Company, New York, N. Y., has moved its office to Room No. 374, 50 Church Street, New York.

U. S. Metal & Manufacturing Company, New York, N. Y., has been appointed general Eastern sales agent for the Union Fibre Company of Winona, Minn., manufacturer of insulation "Linofelt" for refrigerator cars and "Feltlino" for steel cars.

General Electric Company, Schenectady, N. Y., has received an order for motors for the third lot of 100 cars which were ordered by the New York Municipal Railway from the American Car & Foundry Company. The motors are duplicates of the previous order.

Barney & Smith Car Company, Dayton, Ohio, which some time ago formed a committee of its stockholders for the purpose of formulating a plan of reorganization and lifting of its receivership, reports that a definite plan for reorganization is expected to be in shape to submit to the stockholders within a short time.

O. M. Edwards Company, Syracuse, N. Y., writes that its window fixtures and trap doors are used on the steel parlor cars for the Waterloo-Cedar Rapids & Northern Railway, described on pages 932-933 of last week's issue. By an oversight credit for the supply of this equipment was omitted from the article.

G. Drouvé Company, Bridgeport, Conn., was the manufacturer of the sash operating device used in the power station of the Havana Electric Railway, Light & Power Company, described in the last issue of this paper. The same company also furnished the sash operating device for the carhouse and shop of the Holyoke (Mass.) Street Railway, an article on which also appeared the last issue of this paper.

ADVERTISING LITERATURE

Fibre Conduit Company, Orangeburg, N. Y., has issued a price list of its fiber conduit.

Templeton, Kenly & Company, Ltd., Chicago, Ill., have issued a folder in regard to their Simplex emergency jacks.

Indianapolis Switch & Frog Company, Springfield, Ohio, has issued a folder illustrating the accessories and parts of its Indianapolis electric welder.

Ray D. Lillibridge, New York, N. Y., has issued in pamphlet form a brief history of his business which appeared in the *Electrical Review* for April 17. It describes his work, beginning as advertising manager with a manufacturing company and later of handling the advertising accounts of a number of concerns, non-competitive with each other, based on the principle of a salary or per diem charge instead of the former method of a commission. On this basis, Mr. Lillibridge has built up since 1899, when he undertook the work, a large clientele, especially among electrical companies, although he does not limit his business by any means to companies of that character. Since 1909 the business has been conducted as a corporation under the title, Ray D. Lillibridge, Inc.

Dayton Fare Recorder Company, Dayton, Ohio, has issued a folder illustrating its fare recorder equipment as installed in an interurban car. The equipment includes a two-way and double-dial fare indicator, the novelty of construction and operation of which are designed to attract the attention of passengers and make more effective the system of inspecting and checking the fare registrations. Enclosed with the folder is a photographic reproduction of a record made on a 12-fare Dayton recorder, which shows how a detailed registration is obtained of the fare collections on each trip and the classified total registrations for the run, or the entire period of work for each conductor. A "register total" column shows the consecutive registration of all fares and serves to check the registrations from day to day between conductors.

Prepayment Car Sales Company, New York, N. Y., has issued a catalog of highly-artistic embossed cover design which describes and illustrates its manually-operated door and step devices for electric railway cars. The types of equipment described include details of single and double-shaft door and two and three-arm folding step mechanism, also conductor's and motorman's control-stand details. The mechanism is equipped throughout with a special type of universal self-aligning ball bearing which eliminates friction so completely as to enable the conductor to open or close the doors and steps with very slight effort. The weight of the folding step board is counterbalanced by a special spring construction, which can be so accurately adjusted as to have the step stand in whatever position the operator leaves it. The controlling devices are so designed as to lock the doors in either the open or closed position by a "knuckling" or over-center movement.

NEW PUBLICATION

Disturbed Dublin; the Story of the Great Strike. By Arnold Wright. Longmans, Green & Company, London. 1914. 337 pages. Cloth. Price 3 shillings, 6 pence.

The famous labor troubles in Dublin, Ireland, which occurred in 1913 were a good example of the evils which can be brought upon both capital and labor by unionism gone mad. Through the Transport Workers' Union, James Larkin built up an all-powerful organization in Ireland, entirely distinct from the British labor union both in organization and aspirations. Then by a system of sympathetic strikes, the industries of Dublin were soon thrown into a turmoil. For some time a combination of political, social and industrial conditions seemed to favor the Larkinites. But in William M. Murphy, of the Dublin Tramways, the Larkinites met their match. The efforts of the leaders of the Larkin movement seriously to disturb the conditions on the tramways failed, and later, through a committee of which Mr. Murphy was chairman, the employers fought the grotesque organization, masquerading under the title of unionism, which had grown up in Dublin. The details of this struggle and the final overthrow of Larkinism are told in an interesting way in the volume in question.