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The Coming Convention at Saratoga

As announced elsewhere in this issue the executive committee of the American Street Railway Association, in session at Saratoga on Feb. 23, decided by the unanimous vote of all those present to hold the next convention at Saratoga Springs, Sept, 2, 3 and 4. There is no doubt that this is the wisest plan to pursue under the circumstances. It is true that in the past conventions have been held annually in some large city, and that a radical departure from all precedent will be made in going to Saratoga. There are many reasons, however, for making the change just at this time. As many must realize, the attendance at the annual conventions of the association has increased greatly during the last four or five years. The result is that it is now not only a serious task to find a city where the hotel accommodations are sufficient to accommodate comfortably all those who wish to attend, but the expense of entertaining such a large number has grown to large proportions. In the past this expense has been defrayed by the local traction company, and in recent years it has amounted to between $10,000 and $15,000. This is a serious drain on the treasury of even the largest railway companies and shows how conditions have altered since the entertainment of the association meant simply an invitation to a few railway presidents or managers from different parts of the country to meet and discuss questions of technical interest.

Saratoga is in many respects an ideal place for a convention of the kind which the American Street Railway Association holds yearly. In the first place, there is absolutely no question as to the extent and quality of the hotel accommodations available there for all who wish to attend the convention, and even for twice the number which usually gather at a street railway convention. Again, the place is an attractive one to visit, especially at the season selected for the next meeting, and is also well centralized, not only for a great majority of the delegates, but also for most of the manufacturers who have heavy apparatus to transport to the convention and for exhibition purposes. Moreover, Saratoga is used to conventions of this kind and knows how to take care of them. Several technical and many civic organizations hold conventions in Saratoga yearly, and the fact that they return there is indicative of the satisfactory treatment which they receive. The president of the Business Men's Association, the president of the village, and representatives of the hotel interests united in assuring the executive committee that they would do everything to make the September convention a success and of satisfactory treatment at that time. Hon. Addison B. Colvin, president of the Hudson Valley Railroad, which connects Saratoga with Troy and Albany on the south, and with Lake George on the north, has also courteously promised the association his active co-operation in making the convention a success.

The only possible drawback to Saratoga is the fact that there is no large hall suitable for the convention exhibits, and it may be said that this was practically the only factor in the minds of the executive committee against the selection of Saratoga. The Saratoga representatives, however, assured the committee that this important feature of the convention would be satisfactorily handled. The verandas of the Grand Union Hotel, which will be the headquarters of the association, are the largest probably of any hotel in the world, and from 8000 sq. ft. to 10,000 sq. ft. of space is available there. In addition, the court of the hotel is extremely spacious, and guarantees that every possible facility will be given exhibitors in placing their exhibits in position, and that all apparatus will be protected from the weather were secured from the representatives of Saratoga present before the final decision to meet at Saratoga was reached. While, perhaps, from a sentimental standpoint, the arrangement for exhibits may not seem quite as satisfactory as an enclosed hall would be, it has its advantages. The exhibits will all be in or adjoining the hotel where the convention is being held, and where they can easily be inspected by all the railway delegates in attendance, and there are not the same outside attractions as exist in a large city to take the attention of those present from this industrial feature of the convention.

The association made a departure also from established practice in fixing the date of the convention during the first week in September, although one previous convention, that at Boston in 1898, was also held at this same time. The reason for selecting this date was that it was practically the only one during which the full service from the hotel could be secured, as it marks the end of the summer season, and after this time a satisfactory hotel service could not be promised. We doubt

whether this date will prove as convenient to many of the members of the association as October, as the summer rush is usually not over until after Labor Day, which occurs this year on Sept. 7. Nevertheless, it was the only date really available, and it was the consensus of opinion of those present that it would not prove a serious inconvenience to most of the members. Taken as a whole, we see no reason why the traditions of the association that each succeeding convention is the most successful in its history should not be repeated in September, 1903.

Third-Rail Supports

The third-rail support, like the third-rail shoe, is unfortunate, because almost any device will give some results which approximate satisfaction. This has had the effect of making many third-rail installations very unsubstantial, and likely at some time because of their poor construction to cause serious accident in the form of tying up the line.

Many third-rail systems are built of scrap rail, with the insulators spaced so few and far between that the rail noticeably sags between supports, and the insulators themselves are constructed inadequately for securing the third rail in its place. In some instances the rail is held in position by little more than its own weight, the insulator ears, which are to do the duty of grasping the third rail, being so thin that they quickly corrode away. This may ultimately result in the dismounting of long sections of third rail, with a consequent short circuit and tie up.

It must not be forgotten that a third rail on its supports is bound to leak a certain amount, varying with the weather conditions, and that dirt is likely to accumulate on the insulator. Consequently we have the condition of a current passing through a joint in metals which was never intended to carry current, and this means electrolytic corrosion. It is a noticeable fact that third-rail insulator clamps deteriorate much more rapidly than ordinary iron work. This necessitates two things. First, the clamps must be made strong and of much more liberal dimension than would be necessary from a mechanical standpoint alone; and, second, they must be made adjustable so that they can be taken up as they rust away. The lag bolts securing the third rail to a tie or other support must be also liberally dimensioned for the same reason. A ½-in. lag bolt securing the third-rail insulator will rust out or corrode far more rapidly than the ½-in. spike holding down a service rail and driven into the same tie.

The sleet and snow problems which have so recently and formidably come to the notice of third-rail engineers will undoubtedly demand that heavier pressure be used on the third rail, either by heavy substantial cleaning devices or by the shoe itself. Ice adheres very strongly to the third rail, and pressure devices to remove it must be correspondingly heavy, in fact, sufficiently so to dismount readily a third rail installed in the careless manner already referred to. The overhead trolley had its season of insecurity in the early days, and good engineering construction has reduced the danger of accident to a minimum. It should seem that a repetition of history is unnecessary here. There are enough well installed third-rail systems in existence to preclude the necessity of installing any more that are unsatisfactory. The difference in cost is an amount so small that it need not enter into the consideration. The third-rail system is comparatively new, at least commercially, and its beneficial results on electric traction are only beginning to be appreciated. It would be a pity, therefore, that it should be prejudiced by poor construction when the troubles that have arisen have been so thoroughly practically demonstrated and ought to be known to every third-rail engineer.

Strikes and Remedies

The present season has been unusually prolific of strikes on street railway systems, with the usual accompaniment of violence and rioting, abuse and mutual recrimination. And while, as usual, the question of wages has been rampant, that of formal recognition of the unions has been exceptionally prominent. Now, these two phases of the matter stand on entirely different planes, both as regards the parties concerned and the public, which is the chief sufferer by strikes on railways. In the ordinary line of strikes in manufacturing establishments the public is not inclined to take sides with either of the participants, but is disposed to invoke a plague on both their houses and to leave them to fight it out. But in a railway strike the public suffers from the deprivation of its customary means of transportation, and resents it as a personal injury, which, in fact, it is.

Strikes arise from a great variety of causes, good, bad and mostly indifferent, and each has in general to be settled upon its merits. In the case of a public service corporation, where the interests of the community are immediately and deeply touched, public influence ought to be and generally is brought to bear to effect a prompt and fair settlement of the existing differences. But what we wish here to point out is that as regards the rights and interests of the public, strikes for higher wages and strikes for recognition of the union must not be regarded as in the same category. The former is, of course, inconvenient and to be regretted, but the latter involves grave considerations of public safety and is of fundamental importance.

As to the mere matter of wages each community quickly comes to realize the rights of the issue and throws the weight of its influence to one side or the other, generally with effect. The question of generally adequate or inadequate wages is something which is within the knowledge and comprehension of any community. As a matter of fact the average wages paid to a regular motorman or conductor is nearly or quite as great an amount as the salary of the average minister of the Gospel, even supposing that he gets his salary paid promptly and in full. This may or may not correctly evaluate the judgment of the community as to the relative importance of these functionaries, but it is the condition which exists. On the whole, also, the pay of street railway men tends upward rather than downward, and inadequacies may fairly be supposed to be in a way to right itself. Many companies have voluntarily raised the pay of their employees, and still more have shown a disposition to meet fairly any question of pay which may arise. It is, of course, unfortunate if any strike arises over the wage question alone, and to the credit of both parties such strikes are becoming rather unusual. In most strikes the wage question is mixed with other issues, and on these latter the real disagreement occurs. The matter of hours of labor is one that often comes to the front, but it can generally be settled on a reasonable basis without protracted delays. Here, too, the common sense of the community is a powerful influence for good, which at once makes itself felt. Unless strikers estrange the public by acts of violence and unreasonable obduracy they can usually be assured of fair play, and, in our opinion, they generally get quite all the sympathy they deserve.

But the recognition of the union is a very different matter from those just considered. It may mean more or less, but it always means danger. If the issue were merely whether the officers of the road were or were not to deal with certain of their employees as representing the rest, little trouble would arise. A few fanatics might stick from sheer stubbornness at

even this, but on the whole it makes no difference whether motormen 465, 281 and 342 serve as a committee, elected in a mass-meeting or as a standing committee of the union. This is not, however, the real point at stake, but rather the recognition of the right of employees to interfere at will in the management of the road. In this respect the recognition of the union on a street railway differs essentially from a similar recognition on the part of a private corporation. In the latter case only the parties immediately involved are really concerned in the result, while in the former discipline is absolutely necessary to effective and safe public service, and the community should see to it that discipline is rigorously maintained. We hold that the officers of a public service corporation have no moral right to enter into any convention with their employees whereby the power to enforce effective discipline shall be eliminated. The corporation is the legal body which must be held responsible for the evil effects of loose discipline, and the community has a right to demand that it must hold the powers for the proper exercise of which it is responsible. The public probably does not care whether the employees of a street railway belong to a union or not, but it does care whether incompetent and irresponsible servants are entrusted with its safety. The principle here involved is the same that would come to the front if the working force of a steamship could strike for the reinstatement of a drunken engineer who chanced to be the secretary of their union. On the sea striking is mutiny, and is punished because it imperils the safety of the ship. On land the perils from acts of insubordination are less, and less strictness is necessary, but the point at issue is the same. Whatever relations may be established by mutual consent between the employer and the union those relations must not implicitly or explicitly infringe the power of the company to hold its men rigidly in the line of duty.

The Logic of Give and Take

This season the voice of the kicker seems to be raised in the land with unusual frequency. Street railways have been assaulted on all sorts of grounds, good, bad and indifferent, until the manager wonders, when he goes down to his office, what new attack the day will bring forth. Questions of service seem most in evidence, with fares a good second, while that mysterious and intangible thing—congestion—is always with us. Now, there is one phase of the good service question which we propose to discuss, as it plays an important part in the accommodations possible in a given community. All the suburbs of a city, big or little, expect to receive first-class service back and forth at the price of a single fare. Generally they are in a fair way to get it, but how often, in case of difficulty, are they willing to meet the street railway company half way? It is a very common thing to find a single street railway line starting from its urban center and passing successively through several distinct municipalities or towns, but it is very unusual to find each of these communities willing to join with the others in the provisions that make for good service. On the contrary it often happens that one of the nearer districts will interpose all sorts of obstructive measures to lines which are not exclusively devoted to its benefit. The community will howl for more cars with most delightful unanimity, but when a proposition is made to let through new tracks, which reach the outlying communities, the trouble begins.

In theory everybody wants more accommodations—in practice he wants them on the other fellow's street. As a result everybody is inconvenienced. We call to mind numerous instances in which an obstructive community, by severe limitations of speed or by refusal to grant necessary locations, has blocked rapid transit for itself and its neighbors for years. We have some sympathy with the residents on a fine, aristocratic street who wish to keep street railway tracks out of their way, but this is, or ought to be, a democratic country, and as a matter of fact the fine aristocratic street is the very one through which tracks can be run with the greatest convenience and safety. Do not the very people who thus object lead the van when it comes to protests against crowded cars, and denunciation of the street railways for accidents that happen in the crowded and narrow streets of the poorer quarters?

In suburban railway work one of the most important things is easy entrance by various routes to the city proper. If the outer suburbs are to be properly served there must be an increased number of tracks through the inner suburbs or congestion will certainly occur in spite of the best efforts on the part of the railway company to prevent it. Yet the inner suburbs are the very ones that most loudly protest when new locations are asked, and thereby force an abnormal number of cars upon a few lines of track. Traffic comes into a city as it were along the streets of a fan, and trouble begins as the handle is approached. If a street railway expert could start in afresh and lay out the suburban system with a free hand, he could in almost every instance effect immense improvements in the facilities for transportation in every part of the district served, but local authorities are constantly interposing to block the game.

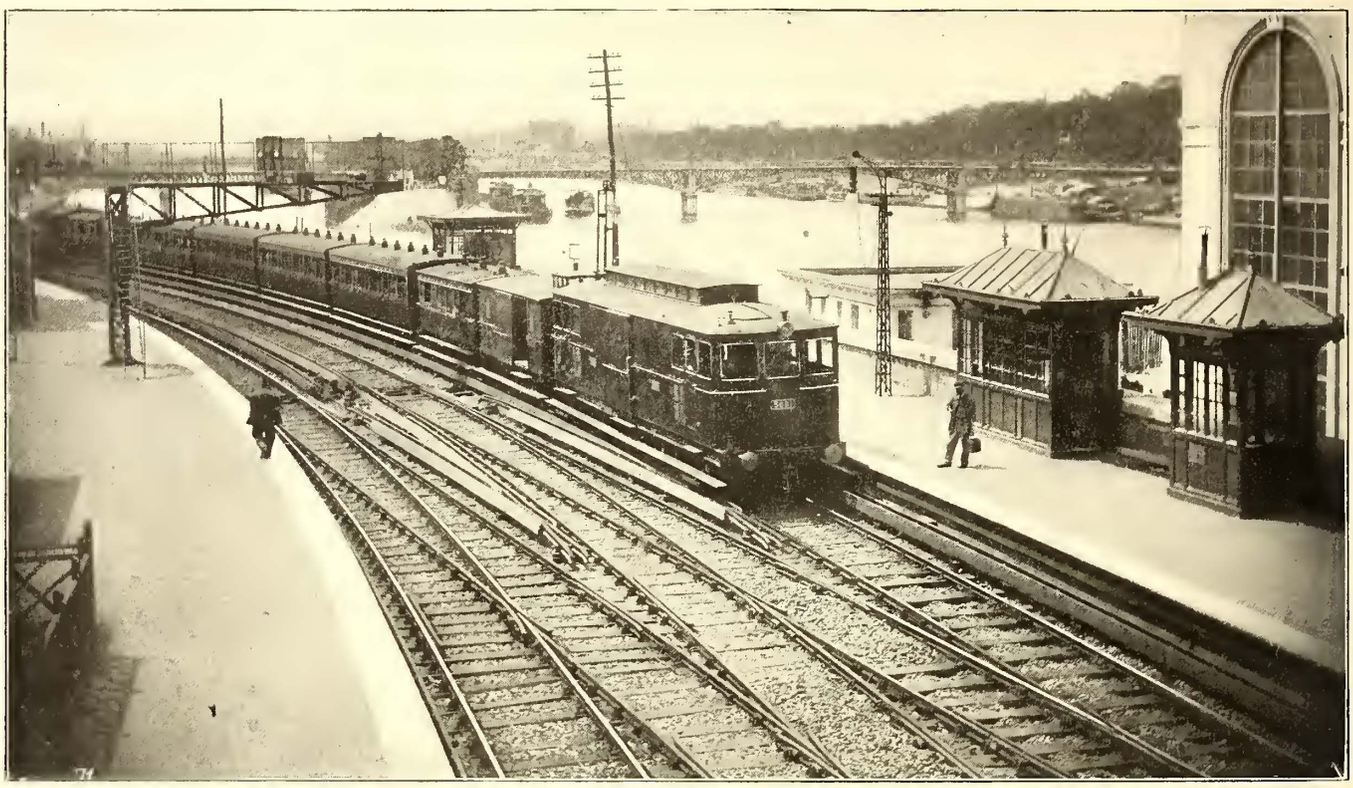
Another fine instance of cold-blooded selfishness and attempted class legislation is to be found in the present agitation for higher legal speeds for automobiles. We have not kept, by any means, complete statistics on the subject, but from the information at hand we venture to say that in proportion to the number of vehicles automobiles cause ten times as many accidents as street cars, even at the present speeds. It is doubtless true that an automobile can be turned out of the way or stopped with a facility that is denied to street cars, but that only makes accidents the more inexcusable. So long as automobiles are relatively few and to a large extent private vehicles, street railways have few complaints to make, but would public automobiles be denied a rate of speed legalized for private ones?

Suppose that the Suburban Automobile Company, Ltd., should be organized for general public service, as is by no means improbable in many cities. Would it be allowed practically unrestrained speed while the street railways were held down to the old limit? The efforts now being made tend in that direction, and if not checked they will certainly lead to disaster. Public safety must be considered whatever the nature of the vehicles that may endanger it, and sauce for the goose ought to be sauce for the gander as well. Until it has been proved that the alleged advantages of automobiles in the matter of safety have a real existence, in spite of the weight of evidence to the contrary, the speed of such vehicles should be rigorously held down to street car limits. An additional reason for such action is to be found in the fact that in a street car accident the responsibility can be quickly located, while the automobile frequently puts on speed and escapes, leaving its victim to be picked up by the ambulance. We have nothing against the automobile as such, but we want to see fair play.

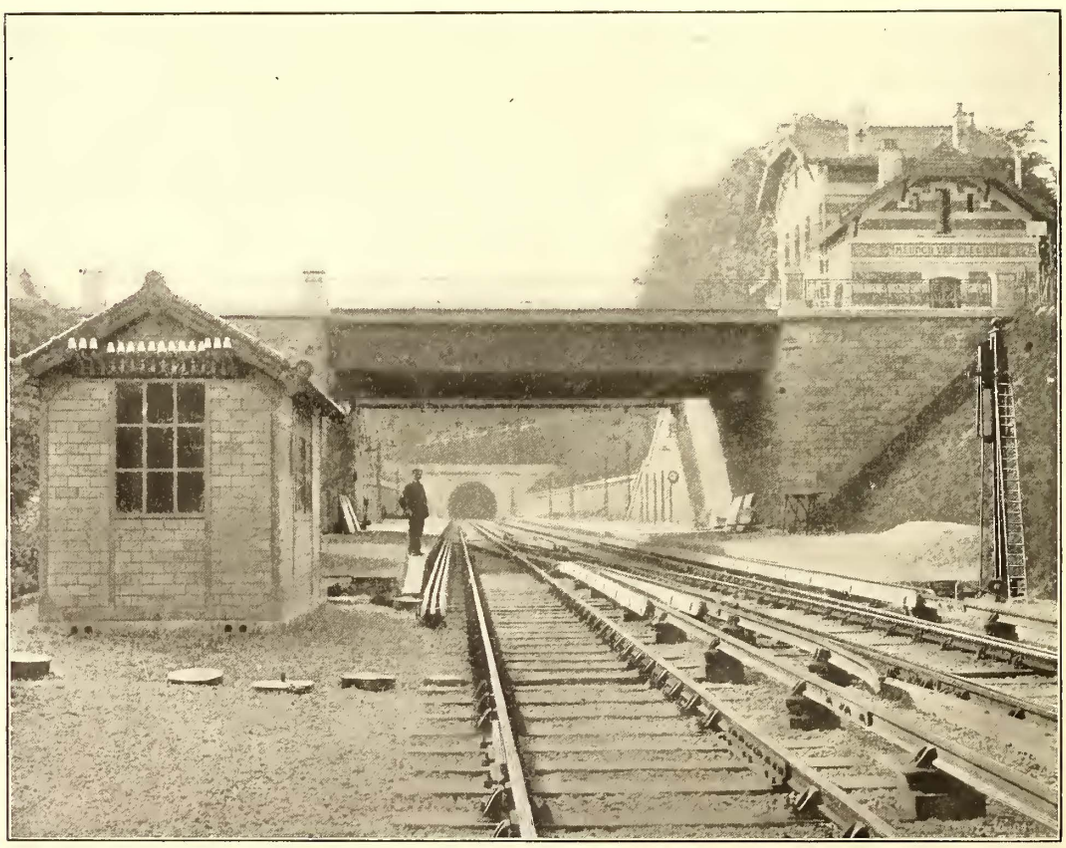
The public expects, and rightfully, that street railway companies will do their best to give good and adequate service, but it ought to be ready to meet them half way, to lend a hand in overcoming the difficulties that may exist, and to assume an attitude of helpfulness instead of getting in the way of improvements. It should give as well as take, and display some of the altruistic tendencies that it is so ready to demand.

THE ELECTRIC LOCOMOTIVES ON THE WESTERN RAILWAY OF FRANCE

A short description was published in this paper about two months ago of the experiments which have been made during the past year on the Paris-Versailles division of the Western Railway of France, and also of the multiple-unit trains at present in use between Paris and Versailles. As the Paris terminal of this line is in the main Invalides station of the company, which is also a steam railroad station, it was only natural that the company should favor the operation of trains by electric locomotives rather than by the multiple-unit system, and should have endeavored to keep the character of the passenger cars of its electric trains as uniform as possible with those used on the steam trains. For this reason the original contract for the electrical equipment of the Versailles division was for locomotives and was given to the Société Anonyme de Locomotion Electrique, of Paris.



ELECTRIC LOCOMOTIVE AND TRAIN ON THE PARIS-VERSAILLES LINE



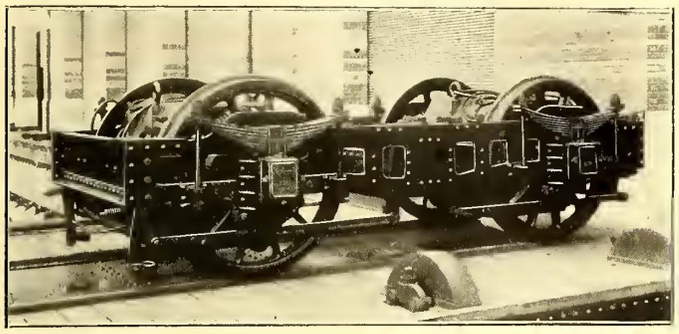
THIRD-RAIL CONSTRUCTION AT A WAY STATION

As stated in the previous articles these locomotives, of which ten were built, possessed a number of very novel features. Through the courtesy of the manufacturers this paper is enabled in this issue to present views and particulars of these machines.

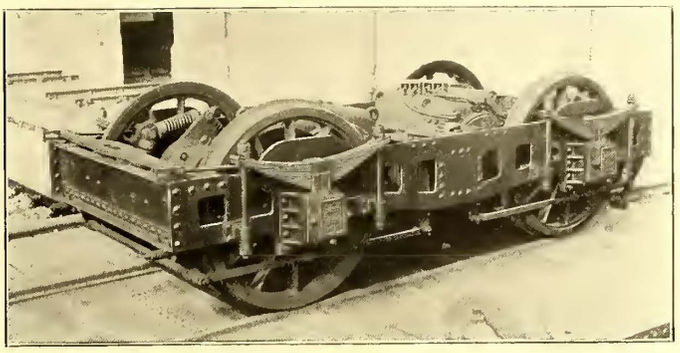
The general conditions on the Paris-Versailles line are as follows: The line is 18 km (11 miles) in length, with double track, and has a maximum grade of 1 per cent. On this grade the locomotives, supplied with direct-current at 550 volts, were to be powerful enough to draw at a speed of 50 km (31 miles) per hour a train of 200 tonnes (440,000 lbs.), or on a level track the same train at 100 km (62 miles) per hour.

In France the railway law compels all passenger trains to include one baggage car, which must be in front of the passenger cars. The Société Anonyme de Locomotion Electrique

adopted the idea of using the locomotive as a baggage car, in this way utilizing the weight of the baggage carried for traction. The ten locomotives have, therefore, been built with a central compartment for baggage, while each end was reserved for the motorman, so that the locomotive could be operated from either end. The car body between bumpers has a length of 13 m (42 ft. 7½ ins.), and is built of wood sheathed with iron. It is mounted on two double trucks, each with a wheel base of 2.6 m (8 ft. 6 ins.), and a distance between axles of 7 m (23 ft.). The wheels are 1.31 m (44 ins.) in diameter.

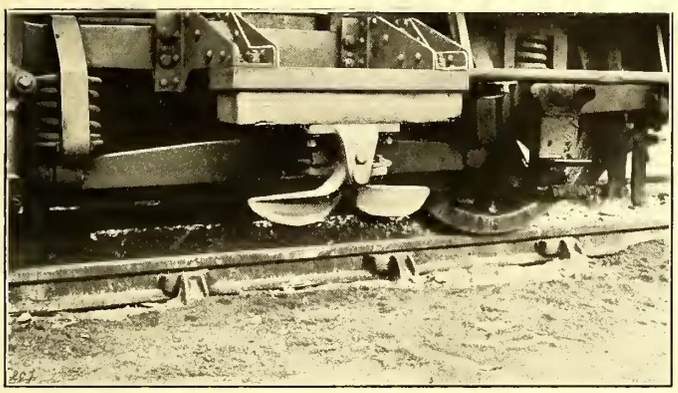


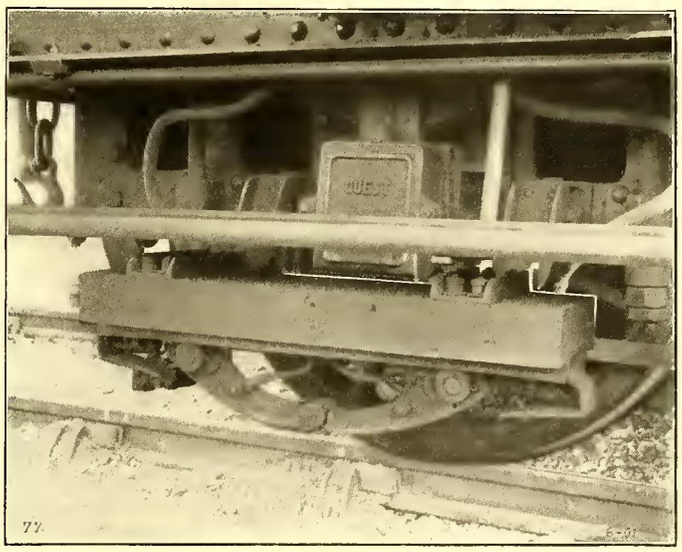
TRUCK WITH GEARLESS MOTORS



TRUCK WITH GEARED MOTORS

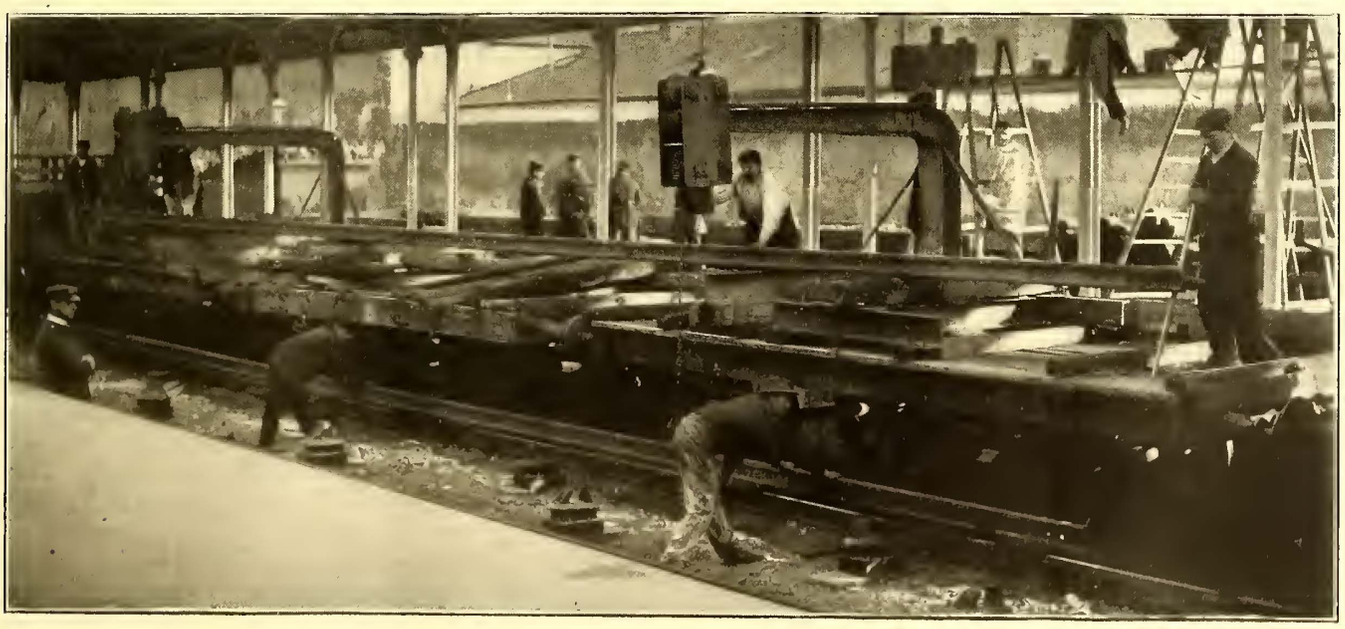
Six locomotives are equipped with gearless motors and four with single-reduction motors. In both cases four motors were used. The methods of mounting the motors, however, are interesting. One of the principal arguments brought against the use of electric locomotives on this line was the destruction which the dead-weight of the motors on the axles might cause to the track at the high speeds (for instance, 62 miles per hour) for which the locomotives were designed. The fact that street railway cars at low speeds do undoubtedly pound a track badly is well known, and it was not without considerable reason that the greater destructive effect of these heavy locomotives at the speed selected was viewed with considerable trepidation by the engineers. The company, therefore, decided flexibly to suspend all motors, whether used with or without gears. The mechanical arrangement adopted was as follows:





TWO TYPES OF THIRD-RAIL SHOES USED ON PARIS-VERSAILLES LINE

The gearless motors were mounted directly on a hollow



METHOD OF LAYING THIRD RAIL

shaft, the interior diameter of which was considerably larger than the axle, and which was slipped over the axle. Power is transmitted from the motor to each wheel through six coil springs, which are connected at each end respectively to a triangular plate crank at the ends of the hollow shaft and to three bosses cast on the wheels between the spokes. This method of securing elastic suspension of the motor has been adopted before in the case of gearless motors, but its application to geared motors as well is novel, so far as is known.

The gearless motors have six poles and have a normal effort of 600 kg per motor at the periphery of the wheels at a speed of 530 r. p. m., and a maximum effort of 1500 kg. The geared motors have four poles and a ratio of reduction of 1 to 3, and are mounted on a hollow shaft like the gearless motors. Both are operated on the series-parallel system.

The third-rail system, as employed, has already been described. The joints are bonded by two protected copper bonds at each joint, having a total cross section of 600 sq. mm. The rail itself is supported in iron chairs, which maintain the top of the third rail a distance of 600 mm (23½ ins.) from that of the service rail and 200 mm (8 ins.) above it. The chairs are

SECTION OF THIRD RAIL AT CHAMPS DE-MARS STATION, SHOWING DOUBLE INCLINE, ALSO METHOD OF RETURN-CIRCUIT BONDING

similar in general style to those used in standard railroad construction in France, and are composed of a casting which embraces the base of the rail and extends half-way up the web. The rail is held in place in this chair by means of steel springs. The springs used on the third rail are, however, less strong than those used on ordinary track. The chairs are mounted on wooden insulators, to which they are held by lag screws. The base of the chair is made broad enough to extend on the top of the wooden insulator so as to shed the water from it. The third rail is protected at certain points where there is danger of accidental contact by two wooden guards and is painted red as a danger signal. The third rail itself weighs 46.250 kg per meter (92½ lbs. per yard).

The construction train for laying the third rail is illustrated in one of the accompanying engravings. Three ordinary gondola cars were coupled together to make the length necessary for transporting the 18-m rails. On each end car was a U-shaped crane. On the top member of this crane was the traveling hand-hoist illustrated in the cut. By means of these hoists the rails were lifted from the cars and lowered into position in the chairs.

The International Railway Company, of Buffalo, has adopted a novel form of service stripe for its men. Each year of service is shown by a small bar on the cuff of the coat, five-year periods being indicated by stars. The bars are less than an inch long and about a quarter of an inch wide, the stars being of corresponding dimensions. For example, an employee who has served, say, seven years, would have one star and two bars.

CAR DESPATCHING BY TELEPHONE IN BUFFALO

The International Railway Company, of Buffalo, N. Y., has recently approved plans for an extensive system of telephones to be installed on all of its city and interurban lines. This system will comprise some 250 individual instruments distributed throughout the system, as shown in the accompanying diagram of the circuits. Up to the present time the despatching has been done by a joint system of telephone and telegraph, although the latter instruments have been used almost entirely on the interurban lines. The general manager of the company, T. E. Mitten, has had considerable experience with the telephone as a despatching medium, and it has been decided, on account of his previous success with the system, to do away entirely with the telegraph instruments and in future depend upon the telephones exclusively. For example, the interurban lines from Buffalo through Lockport to Olcott Beach is a single-track line, 37 miles in length, and a telephone will be placed at every turn-out as well as in some cases between turn-outs. This will require twenty-five despatching telephones on this circuit alone, which means a telephone on an average of every mile and a half. Compared with the telegraph system, with which it would be necessary to have telegraph despatchers at every point where an instrument was placed, the great advantages of the telephone is immediately apparent.

The telephone instruments will be contained in specially designed boxes attached to the poles of the company. These instruments are of the combination receiver and transmitter type, in which the receiver and transmitter are connected by a handle so that the entire instrument is removed from the box when in use, the cord by which it is held being long enough to enable the employee using the 'phone to stand in a comfortable position while talking, no matter what his height may be. The box is just large enough to contain the instrument and cannot be closed unless the instrument has been returned to it. The cord while in use is under tension, so that in returning the instrument to the box the slack is taken up and it is impossible to get it entangled in any of the fixtures. The boxes are, of course, provided with an efficient inside spring lock, all the locks being similar, and all trainmen and other employees who may have occasion to use the instruments are provided with a key.

The accompanying diagram shows the general lay-out of the proposed system, although slight changes may be made in the details before it is installed. The system will be put in by the Bell Telephone Company of Buffalo, which will have entire charge of the maintenance of the lines and instruments. As will be seen from the diagram there are two switchboards in the main office of the company at Buffalo, a despatching board and a private branch exchange, or "commercial" board, as it will be designated. The despatching board connects with the interurban lines alone while the exchange connects directly with the city lines and all lines on the private system. Five trunk lines to the "Seneca" telephone exchange, in Buffalo, are shown in the diagram, but if these are found insufficient the telephone company will supply as many additional as are necessary. The circles shown on the diagonals of the octagon, which represents the railway's private branch exchange, indicate the various desk 'phones of the company's offices. The private branch exchange is an ordinary Bell telephone switchboard working on the common battery system and containing the usual complement of plugs, cam switches, etc. The despatching board will be placed over a large table upon which the despatching sheet can be placed for entries showing the day's run. During the day time there will be two operators, one at the exchange

and one at the despatching board, but at night but one operator will be necessary for both purposes. The circuits from the despatching board, as will be seen, are carried through directly to the exchange board, so that they can be operated from either position, and at night the single operator has to give his attention to but one board.

In the diagram the plain circles shown on the lines represent telephone stations that have no call bell, while the double circles show stations that can be called from the main office. There are two branch exchanges connected to the system and in charge of separate operators, one at Niagara Falls and one at Lockport. These exchanges are both connected by trunk lines to the Bell telephone exchange in their respective towns, and both are connected with the main office of the railway company by two telephone circuits. This gives practically, counting

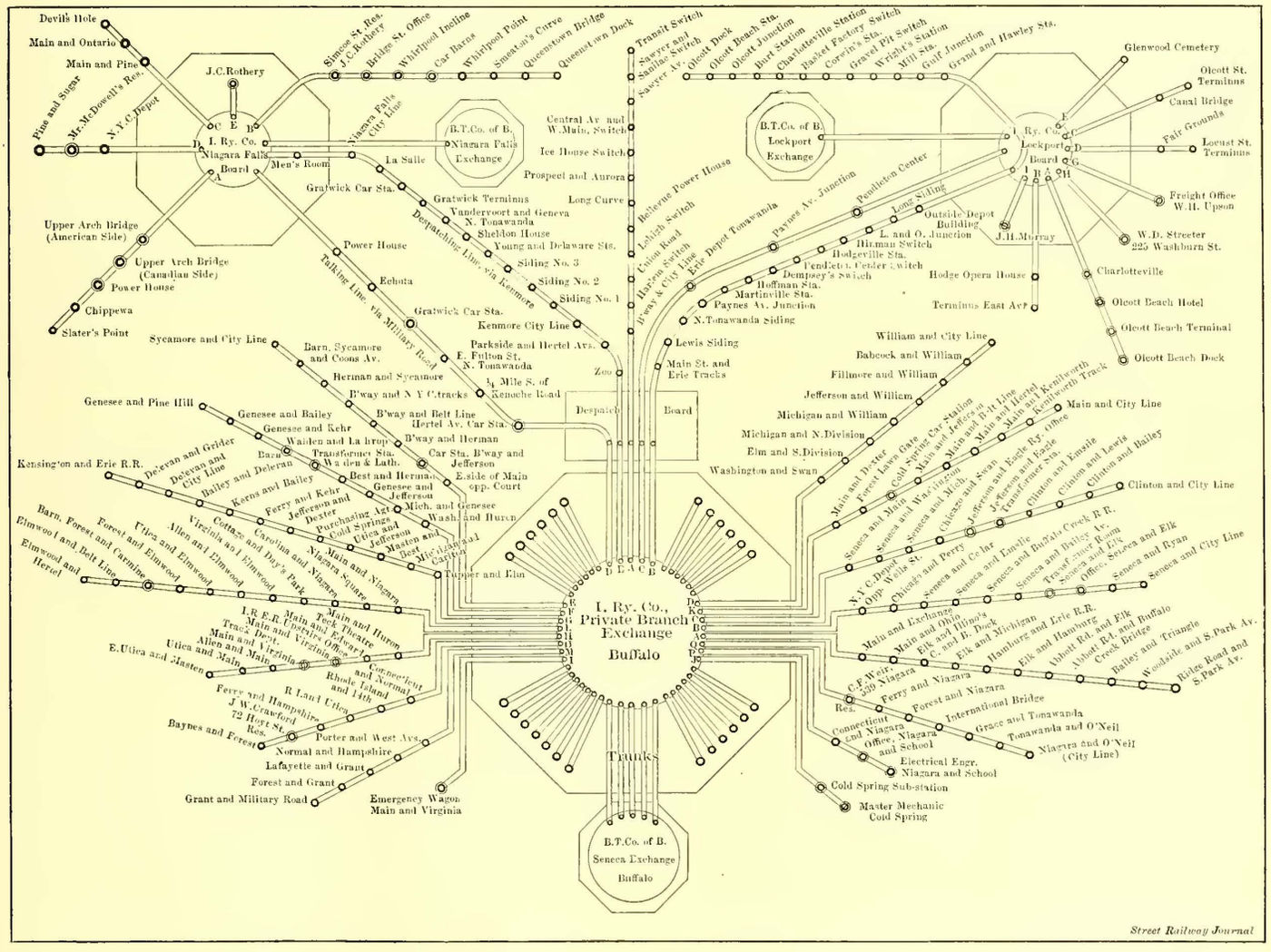


DIAGRAM OF BUFFALO TELEPHONE CIRCUITS

the connections through the Bell telephone trunks, three distinct circuits between the main office and the two branch exchanges.

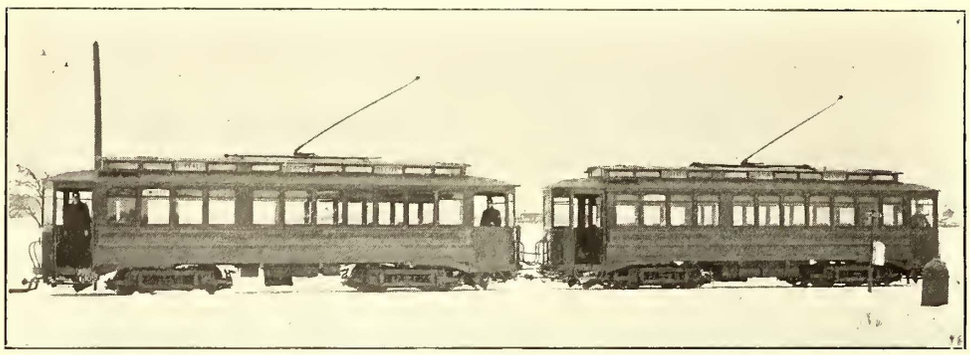
The great advantage of having such a number of "one-way" telephones will be readily appreciated. No matter on what portion of the line a car may be the conductor is able, in case of accident either to his car equipment or from collision, to immediately transmit the details of the trouble to the despatcher or any other official of the company. In case of an accident to a passenger, pedestrian or driver, the conductor can in this way be immediately put in communication with the claim department, which thus not only gets the very earliest authentic statement of the case, but can have its investigators at the scene as soon or sooner than irresponsible or dishonest parties have attempted to obtain evidence to be used in damage claims against the railway. In many cases, furthermore, the company will undoubtedly be able to settle for a few dollars on the spot small injuries which might, if taken into court, cost the company many times their true value.

The system to be adopted in despatching interurban cars is as follows: The motorman goes to the telephone, which, as soon as removed from the hook places him in communication with the despatcher in the main office. He receives his order from the despatcher, repeats it to the conductor, who copies it in a manifolding book. The conductor then steps to the 'phone and repeats the order, note of which is made by the despatcher, who marks it "O. K." In this way each member of the crew has a copy of the order, and the despatcher has a record of it as well, so that should any trouble occur on the line the officials will be able to locate the guilty employee indisputably. The Lockport line, as stated above, has twenty-five despatching telephones, the Buffalo & Niagara Falls line has a double-track line 20 miles in length, and has fourteen despatching 'phones as well as a separate circuit for talking containing a few more. The Buffalo, Bellevue & Lancaster line is a single-track line, 14 miles in length, and has twelve despatching 'phones. The results obtained by the telephone system will be watched with considerable interest, as both city, suburban and interurban lines are united in the International Railway, thus affording an exceptional opportunity of testing telephone despatching on all classes of service.

The secretary of the American Institute of Electrical Engineers has just issued a new catalogue of members of the Institute. It contains 1763 names.

MULTIPLE-UNIT TRAINS FOR BUFFALO INTERURBAN SERVICE

It is the intention of the International Railway Company to operate trains on its interurban lines next summer instead of the single cars, which are now used for this service. With this object in view the present interurban equipment is being changed to multiple-unit control, and trial runs have already been made with cars upon which the new system has been installed. The accompanying illustration shows a view of a two-car train which has been given several severe tests on the Lockport branch, and has proved so satisfactory in its operation that the equipping of the remaining interurban cars of this type is being pushed in the shops of the company as rapidly as possible. It is expected, therefore, that by early spring the entire interurban equipment may be operated in trains, if it is so desired. The electrical control system used is furnished by the General Electric Company, and is a modification of the multiple unit control as installed on the Manhattan (Elevated) Railway in New York, which has been described previously in these pages. This system, it will be remembered, consists of a master controller at each end of each car. The circuits controlled by this master controller operate by means of solenoids a series of contact makers or "contactors," which close and open the various motor circuits, thus making the different motor combinations required in the ordinary series-parallel control. By means of coupling cables between the cars the master control circuits are connected throughout the train, and the operation of any one of the master controllers energizes the sets of contactors of all the cars and places all the motors on the train in circuit under the same conditions.

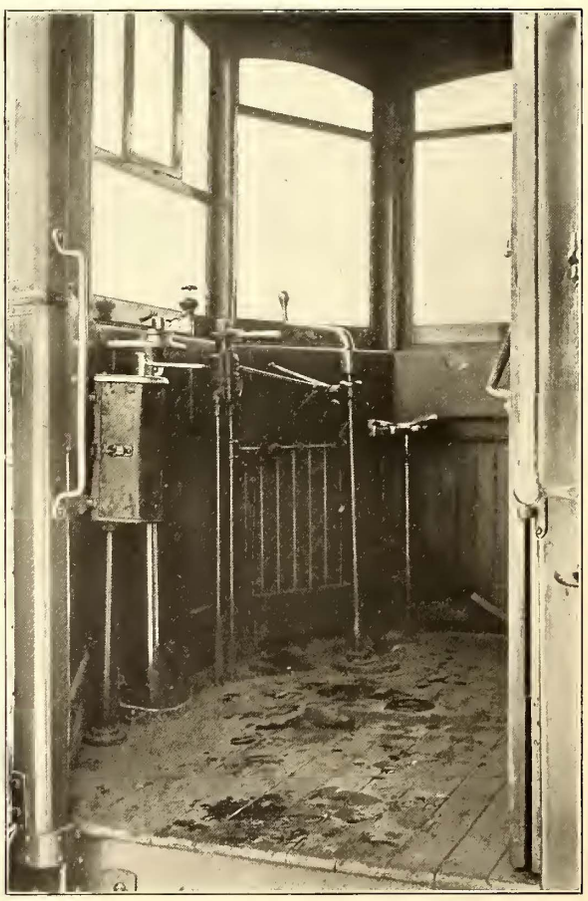


MULTIPLE-UNIT TRAIN IN BUFFALO

The modification mentioned above consists of an auxiliary commutator switch, shown at the left of the master controller in the view of the car platform, which produces different combinations of the motors for a given position of the handle of the master controller. The service being a combined city and interurban one, this commutator has been introduced so that the motorman can operate his master controller in practically the same manner in both his city runs and his interurban runs, but giving him on his last point two distinct speeds. Designating the four motors of which the equipment consists as Nos. 1 to 4, when the commutating switch is on the slow position the series points of the controller give the four motors in series, and the parallel points give No. 1 and No. 3 in series, No. 2 and No. 4 in series and the two pairs in parallel. With the commutator switch handle in the fast position the series points give No. 1 and No. 3 in parallel, No. 2 and No. 4 in parallel and these two pairs in series. The parallel points of the master controller under these conditions give all four motors in parallel. In the Buffalo equipment a special handle may be provided, which prevents the controller from going beyond the first five or six notches in city work. If this device is used the commutating switch is, of course, not necessary, and the control is practically a rheostatic one, with two sets of paralleled motors in series. An inspector at the city line will change the controller handle and render it impossible for the motorman to operate his train at a dangerous speed. At present, however, the commutating switch is being thoroughly tested. There is a large cylinder cut-out switch placed under the seats within the car, which enables any set of motors to be cut out of circuit in case of accident, but this switch, of course, is entirely independent of the commutator switch referred to above.

The air-brake equipment of the cars has been supplied by the Christensen Engineering Company, of Milwaukee. The equipment consists of motor-driven compressors on each car, engineer's valves, brake cylinders, etc, and the special governor designed especially for multiple-unit control systems. With the exception of this governor the Christensen apparatus is of the standard type. The air-brake equipment operates in the same manner as the electrical control, that is, the motorman has each car of his train under complete control from the front platform of the first car, although the train may be broken up and the cars recoupled in any order desired.

An interesting feature in connection with the compressed-air service is the use of whistles on the trolley catcher. The Malloy trolley catcher is employed on all of the large cars. This device consists of an extremely strong spring contained in a long iron tube attached to the back platform. In case the trolley wheel leaves the wire and starts to fly up the cord is immediately gripped, the spring released and the trolley pole hauled down out of harm's way. In single car operation, of course, the motorman knows immediately that his power is off when the trolley wheel leaves the wire, but in train operation



INTERIOR OF VESTIBULE

an accident of this kind to one trolley wheel alone may not be noticed at the controller. For this reason a whistle, operated by compressed air, has been attached to each trolley catcher, and in case the spring of the trolley catcher is released, the whistle blows a continuous blast until attention is paid to it. Another device made necessary by the change in conditions resulting from train operation is what might be called a multiple-unit signal bell. It was not thought safe to operate the cars by means of the ordinary signal bells, passing the signal from one car to the next, as if the conductor of the forward car should be within his car it would be almost impossible to hear the bell in the vestibule of the car behind. Master Mechanic John Millar has designed an ingenious method of overcoming this difficulty. The clapper of the overhead signal bell is insulated and attached to one side of the electrical call-bell circuit of the forward car, the other side of the circuit being connected to a sliding pin, which is placed between the clapper and the bell. The circuit of the call bell in the forward car is, therefore, completed when the bell-cord of the rear car is pulled, and if the cord is held down a continuous ringing is produced in the forward car. Flexible cord conductors between the hoods of the cars carry this bell circuit. The circuits for the electrical control and air-brakes cross from dash to dash, as shown in the illustration of the two cars. The peculiar shaped article at the right of this picture, it may be stated, has nothing to do with the railway apparatus, but is one of the Buffalo city hydrants enclosed in straw and covered by an iron casing to prevent freezing.

General Manager T. E. Mitten has given a great deal of attention to the handling of large crowds. The excellent service given during the Pan-American Exposition will long be taken as an example of what can be done under extraordinary circumstances, but he is now devoting his energies to securing a more perfect service on his regular operation for both city and interurban lines. The running of multiple unit trains on the high-speed service next summer will greatly improve the operating facilities and will give a marked increase to the carrying capacities of these branches of the system.

ADVERTISING AT ROCKFORD

The Rockford & Interurban Railway, which is a consolidation of the city lines in Rockford and the interurban line between Rockford and Belvidere, is being well advertised through the efforts of J. H. Groneman, its passenger and express agent. This advertising matter covers not only resorts on the line but the express and parcel business.

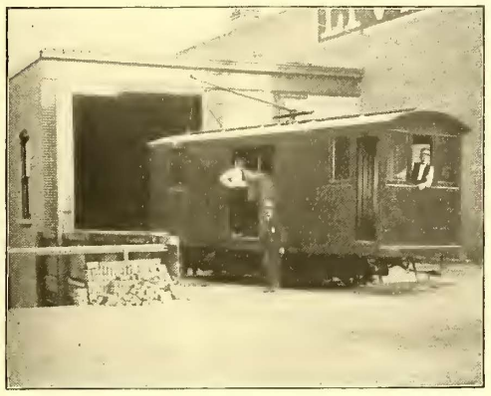
VIEWS IN ROCKFORD PARKS, TAKEN FROM PARK CIRCULAR

It would be impossible to reproduce all of the circulars which have been issued by this company, but the following invitation to visit the principal park of the company will give an idea of the character of the literature published:

Where shall we go? How to get there? Anticipating these inquiries the passenger department of the Rockford & Belvidere Electric Railway Company have issued this small folder giving a part of such information and hope you will read it with care.

The picnic season is again before us, and anticipated with delight, enjoyment and keen relish by the toiler in the crowded city be they business or professional men, clerks, teachers or children at school—all looking forward to a trip in the country; a pleasure to the tired woman upon whom the demands of social life are unremitting—the mother wearied with her household duties.

Nature has scattered her gifts under the canopy of heaven and adjacent to the cities of Rockford and Belvidere, which can be reached by the Rockford & Belvidere Electric Railway line. It has become a difficult part to select a site for picnic and outing parties with good water, tables and ample seating capacity. But we think you will agree with us that we have found a convenient



SUPPLY CAR FOR PARK SERVICE

spot located midway between Rockford and Belvidere, with a fast electric car service. The Rockford & Belvidere Electric Railway Company is now in a position to offer the churches, Sunday-schools and lodges a picnic ground free of charge.

Many of you have often heard the remark, "Oh, if I could only get out in the woods for a day's recreation, how much I would enjoy myself, and would I not be benefited in health?"

Health, recreation and enjoyment, three of the essentials of life, all produced by an outing spent in Washington Park, reached by the Rockford & Belvidere Electric Railway Company.

Don't be selfish. Induce some of your near friends to add to their health and enjoyment and share with you in Nature's remedies for the depression of life's cares.

Information regarding special rates and cars for private outing parties, church and Sunday-school picnics, club and lodge gatherings, can be had by inquiring of Rockford & Belvidere Electric Railway Company.

Special arrangements can be made for outing parties, private parties, church picnics, club gatherings and lodge assemblies. Washington Park is the ideal place, and is easily reached by a delightful ride on the Rockford & Belvidere Electric Railway.

Special cars will run at any hour from any point to any desired place on the line of the Rockford & Belvidere Electric Railway.

The circular is illustrated by the three engravings accompany this article. In addition, the first of the year, calendars were issued advertising the passenger and express service. One of the half-tone engravings used on the calendar is of an express car leaving the Rockford depot.

THE PERFORMANCE OF THE DAYTON & TROY ELECTRIC RAILWAY POWER HOUSE

Although alternating-current transmission to rotary converter sub-stations is now becoming very common for the supply of electrical energy to interurban roads, there still remains a large number of moderate-sized interurban properties on which the installation of an alternating-current transmission system with rotary converter sub-stations would involve too great operating expenses as well as first cost. It is of practical interest, therefore, to inquire into the economy of direct-current power houses supplying boosters for feeding the distant portions of the line, because figures of this kind throw light on the question of where the booster system of feeding can best be used and where the alternating-current transmission is best adapted.

The power house of the Dayton & Troy Electric Railway Company, at Tippecanoe City, Ohio, may be cited as an example. Sargent & Lundy, who were the consulting engineers for this road, decided upon a direct-current power house with booster feed as most suitable to the length of line which this company had to operate, and the results of the operation of this power house seem to show the correctness of this view. For the month of October, 1902, the total output was 173,700-kw hours. The following table shows the total operating cost, and also the several items that go toward making up this amount. The operating figures in this article were furnished by H. P. Clegg, general manager of the company, and William E. Rolston, chief engineer:

PERFORMANCE OF PLANT FOR OCTOBER, 1902

	Total	Per kw-hour
Fuel	$914.45	$0.00526
Labor	435.00	.00250
Depreciation at $3.00 per day	93.00	.00053
Oil, water, waste, repairs and supplies	92.55	.00052
Total	$1,535.00	$0.00883

The supplies are figured at one-third of the amount spent in three months.

The fuel used during this month varied, because of the difficulty of getting enough coal from any one source, the regular coal contractor being unable to supply enough to keep the stations going. The fuel used during October was supplied from the following sources:

Hall's run of mine, 229 tons, at $1.95	$466.55
Hall's slack, 166 tons, at $1.05	273.90
Jackson mine run, 46 tons, at $3.00	138.00
Jackson nut and slack, 28 tons, at $2.00	56.00
Total fuel bill as shown before	$914.45

ASH IN COAL

The amount of ash from some of this coal is very large, because of the presence of slate, stone and fire-clay in the coal. The percentage of ash fuels is as follows:

	Per cent
Hall's run of mine	31
Hall's slack	52
Jackson run of mine	9
Jackson nut and slack	12

Considering the high price paid for some of the fuel and its low heating value, because of the high percentage of ash, the performance of the installation is certainly very good, and ranks well along with larger plants. Following are some further figures on the October, 1902, performance:

Cost per day of power-station operation	$49.51
Car mileage of three city cars in Piqua	16,740
Estimated kw-hours per car-mile of the above cars	1.5
Interurban car mileage, including freight	47,120
Kw-hours per interurban car-mile	3.15

The latter figure is based on the assumption that the estimate of 1.5-kw hours per car mile for the three city cars is correct.

Interurban cars are 49 ft. 5 ins. in length over all. These are Barney & Smith's cars, mounted on class J trucks of the same make, with 36-in. steel-tired wheels. Each car is equipped with four 75-hp Westinghouse No. 76 motors, with a gear ratio of 24 to 58. They are guaranteed to develop a tractive effort of not less than 200 lbs. on 36-in. wheels, at 40 miles per hour, with a rise in temperature not to exceed 60 degs. C. above the surrounding air. The three city cars in Piqua are equipped with two 25-hp motors each.

TYPICAL DAILY REPORTS

To show performance under various conditions the following figures are taken from power house reports of different dates:

June 6, 1902:

Total kw-hours	4,500
Total cost, power-house operation	$40.00
Total cost per kw-hour	.0088
Interurban cars in operation	5
Mileage of each car	345
Total car-miles	1,725
Kw-hours per car-mile	2.6
Number of hours operated	19
Average coal per hp-hour	4.5
Coal consumed	13 tons
Number of men employed	6
Coal used, Hall's run of mine	30 per cent ash

June 26, 1902:

Kw-hours	4,300
Total cost, power-house operation	$37.00
Total cost per kw-hour	.0086
Interurban cars in operation	5
Total car mileage	964 miles
Kw-hours per car-mile	4.3
Number of hours operated	20
Average coal per hp-hour	4.3 lbs.
Coal consumed	12 tons
Number of men employed	6
Coal used, Hall's run of mine	35 per cent ash

Four of the cars made a mileage of 216.

Sept. 25, 1902:

Kw-hours	7,800
Total cost, power-house operation	$55.00
Total cost per kw-hour	.007
Number of city cars in operation	14
Number of interurban cars in operation	10
Total number of cars in operation	24
Car mileage not known.	
Number of hours operated	20
Average coal per hp-hour	3.4
Coal consumed	18 tons
Number of men employed	7
Coal used, Hall's run of mine	35 per cent ash

This record was made during a fair, and an unusually large number of cars were operated. As mentioned, mileage records were not being kept. The report for this day shows what can be done under conditions of heavy loads, the cost for the day being the lowest per kilowatt-hour that has been noted. The report for the following day, Sept. 26, shows practically the same conditions and the same performance.

The following are samples of more recent daily reports:

Oct. 24, 1902:

Kw-hours	5,500
Total cost, power-house operation	$50.00
Total cost per kw-hour	.009
Interurban cars in operation	5
City cars in operation	3
Interurban car mileage	1,365 miles
City car mileage	540 miles
Total car-miles	1,905
City kw-hours per car-mile (estimated)	1.5
Interurban kw-hours per car-mile	3.4
Number of hours operated	20
Average coal per hp-hours	4.1 lbs.
Coal consumed	15 tons
Number of men employed	8
Coal used, Hall's run of mine	35 per cent ash

Interurban cars on the three longest runs made 400 miles each. As the city lines have not a separate wattmeter the city

cars were assumed to take 1.5-kw hours per car mile, and the balance of the output charged to the interurban cars. The same assumption is made in the following tables:

Oct. 25, 1902:

Kw-hours	5,900
Total cost, power-house operation	$55.00
Total cost per kw-hour	.0093
Interurban cars in operation	6
City cars in operation	3
Interurban car mileage	1,365
City car mileage	540
Total car mileage	2,005
Interurban kw-hours per car-mile	3.4
Estimated kw-hours per car-mile (estimated)	1.5
Number of hours operated	20
Average coal per hp-hour	3.9
Coal consumed	15 tons
Number of men employed	8
Coal used, Jackson nut and slack	12 per cent ash

Oct. 26, 1902:

Kw-hours	5,000
Total cost, power-house operation	$45.00
Total cost per kw-hour	.009
Interurban cars in operation	4
City cars in operation	3
Interurban car mileage	1,300
City car mileage	540
Total car mileage	1,840
Interurban kw-hours per car-mile	3.2
City kw-hours per car-mile (estimated)	1.5
Number of hours operated	20
Average coal per hp-hour	3.6
Coal consumed	12 tons
Number of men employed	8
Coal used, Jackson nut and slack	11 per cent ash

Three of the interurban cars made 400 miles each on this day. The fourth 100 miles.

Oct. 28, 1902:

Kw-hours	6,200
Total cost, power-house operation	$55.00
Total cost per kw-hour	.0089
Interurban cars in operation	6
City cars in operation	3
Mileage of interurban cars	1,465 miles
Mileage of city cars	540 miles
Total car mileage	2,005 miles
Interurban kw-hours per car-mile	3.7
City kw-hours per car-mile (estimated)	1.5
Number of hours operated	20
Average coal per hp-hour	4.3
Coal consumed	18 tons
Number of men employed	8
Coal used, Hall's run of mine	33 per cent ash

Nov. 10, 1902:

Kw-hours	6,000
Total cost, power-house operation	60.00
Total cost per kw-hour	.01
Interurban cars in operation	7
City cars in operation	3
Interurban car mileage	1,565 miles
City car mileage	540 miles
Total car mileage	2,105 miles
Interurban kw-hours per car-mile	3.3
City kw-hours per car-mile (estimated)	1.5
Number of hours operated	20
Average coal per hp-hour	3.28
Coal consumed	13.2 tons
Number of men employed	8
Coal used, Milton lump	2.1 per cent ash
Cost per ton	$3.40

EQUIPMENT

The power house is a brick structure, located near the Cleveland, Hamilton & Dayton Railroad and the Miami Canal. Water is taken from the latter for condensing purposes. A plan and a section through the power house are shown in the drawings reproduced herewith. The power house is equipped with two Buckeye cross-compound condensing engines, 18 ins. and 36 ins. x 36 ins., rated at 625 hp each. The accompanying half-tone shows the interior of the engine room. Each engine is directly connected to a 400-kw, 550-volt Westinghouse generator. For feeding the distant portions of the road there are two 100-kw Westinghouse series boosters, driven directly by motors on the same frames. The engine room is spanned by a Chisholm & Moore hand-power crane.

The boiler equipment consists of four Aultman & Taylor 310-hp water-tube boilers. The balance of the steam equipment consists of two 20-in. and 30-in. x 18-in. Dean Brothers jet condensers; two 7-in. and 4½-in. x 10-in. Stilwell-Bierce feed pumps; two 6-in. and 6-in. x 6-in. Stilwell-Bierce service pumps, one type J 500-hp Stilwell-Bierce heater. The stack is 8 ft. 4 ins., inside diameter, and 175 ft. high above the boiler room floor, and is made of steel with brick base.

GENERAL CHARACTER OF THE ROAD

The road was built in 1901 between Dayton and Troy, Ohio, a distance of 17 miles. Recently the electric line between Troy and Piqua and the city lines in Piqua were purchased, making the total length about 34 miles. The power house is situated at Tippecanoe City, Ohio., 13 miles north of Dayton.

A diagram of the arrangement and length of feeders between Dayton and Troy is shown herewith. This gives an accurate idea of the location of the power house with reference to the road. It will be noted that the longest feeder runs 10½ miles before beginning to feed the trolley line. Another feeder is 6 miles long before feeding into the trolley line. These two feeders are, of course, supplied through a booster. The newly-acquired line from Troy to Piqua is not shown on the diagram, but is fed through a booster. The rest of the road, 6 miles each way from the power house, is fed direct. The feeders are of aluminum.

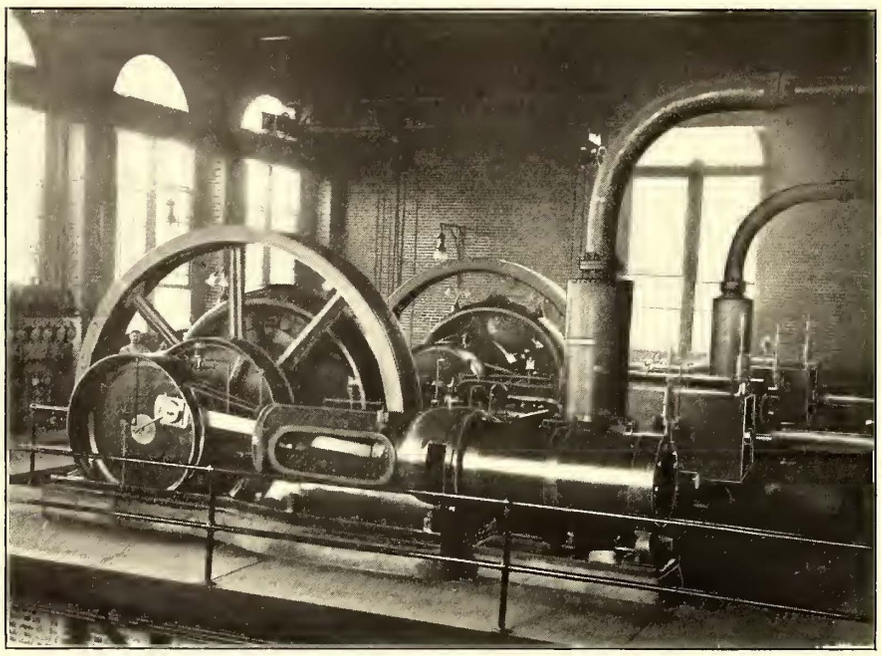
Of course, the loss in transmission with the use of boosters is large, but in a plant of this kind this loss amounts to less in dollars and cents than would the maintenance and losses incurred in rotary converter sub-stations fed by high-tension alternating current. Just what the line losses are in this case has not been determined, but the kilowatt-hours per car mile at the power house are not far from the requirements of interurban roads having similar equipment in the way of rolling stock, supplied through rotary converter sub-stations. The power required per car mile during the time covered by the reports was probably higher than it would be if the track between Troy and Piqua was not under reconstruction. This hindered the cars, as a large portion of the new work was not ballasted. It was necessary to run very slowly there and make up time on other portions of the road. Further than this, the overhead work was not all completed, and the line loss was higher than it would be normally.

To show what the power house is able to do in the way of carrying heavy loads, its performance during the Fair Week at Troy, from Sept. 22 to Sept. 26, is noteworthy. During this week the company had in operation its ten large interurban cars, six city cars borrowed from the Dayton line, and eight M. V. cars. This load was all carried with the two 400-kw generators. The ordinary load is now at about the point where two of the boilers handle it well.

SPECIAL TESTS

At the time of the acceptance of the power house some tests were carried on by Sargent & Lundy, as consulting engineers, both on the engine and the boiler performance. The engines were guaranteed, when working at rated capacity of 625 hp. to consume not more than 15½ lbs. of dry steam per indicated horse-power hour, at 140 lbs. boiler pressure and 26 ins. vacuum; engines working condensing. The dimensions of the engines have been given before. The steam consumption was determined by measuring the water fed to the boiler supplying the engines. The water was measured in two barrels placed on

a raised platform immediately above a tank, from which the boiler feed-pump drew its supply. Each barrel was fitted with a stand pipe, reaching to within 2 ins. or 3 ins. of the rim, passing up through the bottom. The barrels were filled alternately until the water began to overflow down the stand pipe. The boiler used to supply steam to the engines under test was



ENGINE ROOM IN POWER HOUSE

shut off, both on the water and steam piping, from the rest of the plant.

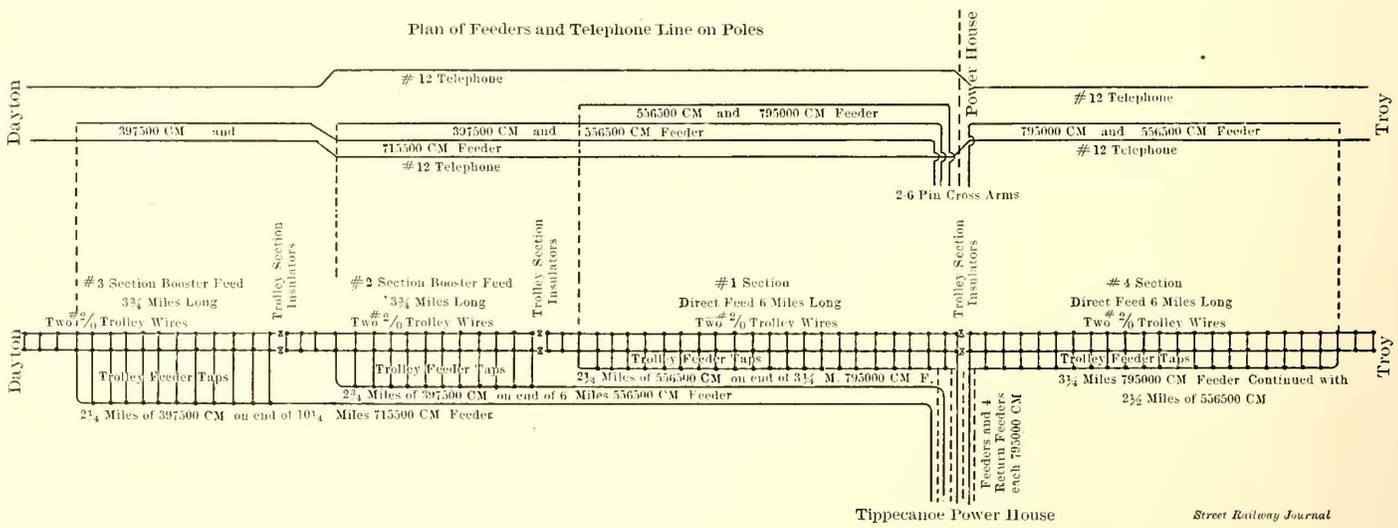
On the conclusion of the main test a careful test was made to determine the amount of leakage, if any, from the system. Steam was carried on the test boiler and also on the boiler supplying the regular load, as nearly as possible at the same pressure as that maintained during the test. After the ebullition had subsided within the test boiler, a reading was taken of the height of the water in its gage glass. This was repeated one hour afterwards, and there was no perceptible difference of level. One-eighth of an inch in the gage being approximately equivalent to 90 lbs. of water, it will be seen that no appreciable leakage was taking place.

The load during the main test was provided by working the generator through a water rheostat. Indicator cards were taken at intervals of fifteen minutes during the test. The quality of the steam was tested by calorimetric observations every fifteen minutes. The steam, before entering the throttle valve, passes through a separator. The water from the separator during this test was collected, weighed and credited to the engine. Ordinarily, this drip is passed through the reheater tubes. The steam to the reheater was supplied through the auxiliary header from the surface boilers. It is, therefore, to be added to the steam consumption as measured by the supply to the test boiler. The condensed reheater steam was weighed after leaving the reheater, and found to be 4.6 per cent of the total steam used by the engine during the test. Four Crosby indicators were used in taking the diagrams, the springs being tested before and after the main test. Several cards were taken for each spring, so as to eliminate accidental error. The duration of the test was five hours.

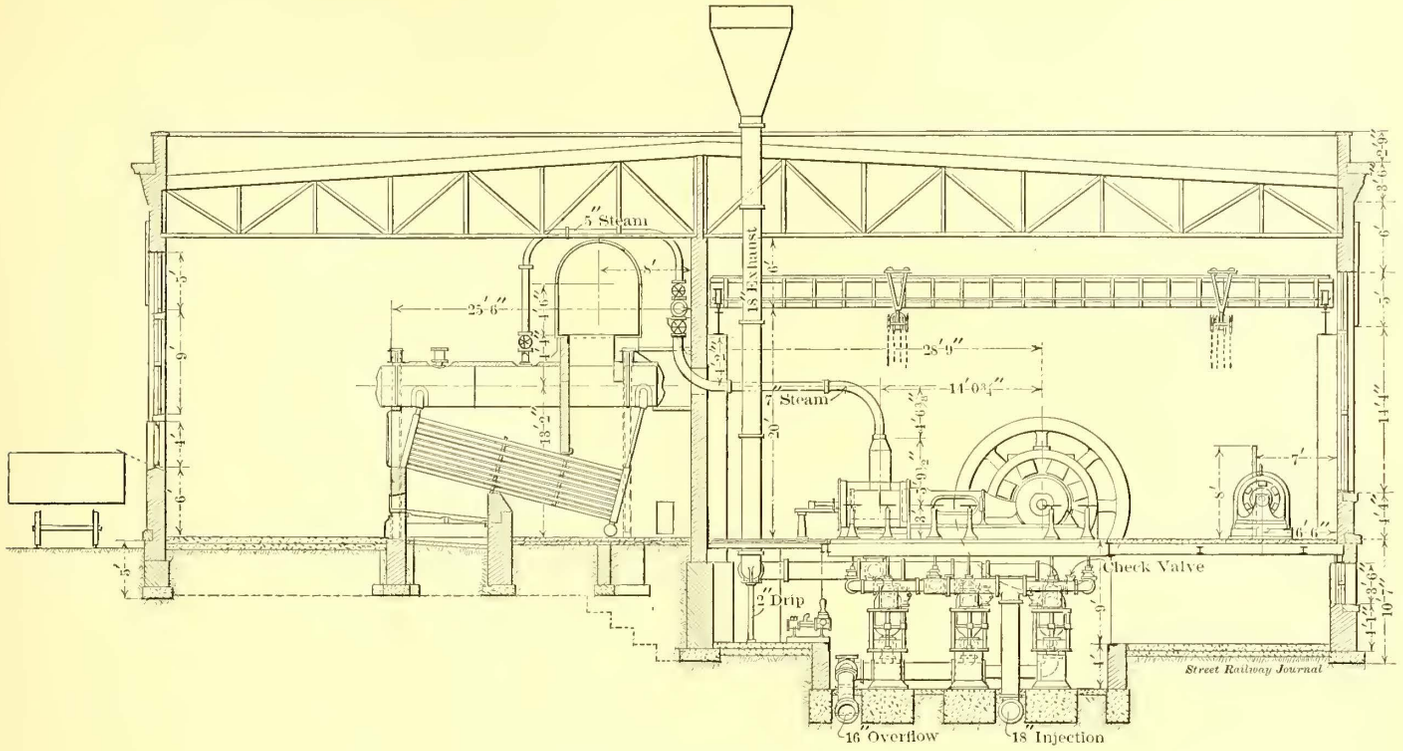
The average indicated horse-power was 639.2, and the steam consumption 14.14 lbs. per indicated horse-power. This brings the steam consumption within the makers' guarantee that it shall not exceed that of releasing-valve gear engines. During this test the efficiency from the cylinder to the switchboard was 80.9 per cent.

Two boiler tests were made. One was to ascertain the economy when burning Jackson run of mine coal and forcing the boiler above its rating. The other was to ascertain the economy obtained when burning Jackson screenings at the rated load of the boiler, namely, 300 boiler horse-power. The boilers were guaranteed to evaporate at nominal rating 10,350 lbs. of water per hour, at 212 degs. F., and while working at this rating to evaporate 7 lbs. of water per pound of coal. They were also guaranteed to have a capacity to evaporate 15,525 lbs. of water per hour, and while working at this capacity to evaporate 6¼ lbs. of water per pound of coal. The entrainment was to be not more than 2 per cent with boilers working at their rated capacity, or 3 per cent when working at maximum capacity. Guarantees were based upon a draft of ¾ ins. in the smoke flue at the top of the boilers, and the use of Ohio screenings containing 10,000 B. T. U. to 11,000 B. T. U. per pound of coal.

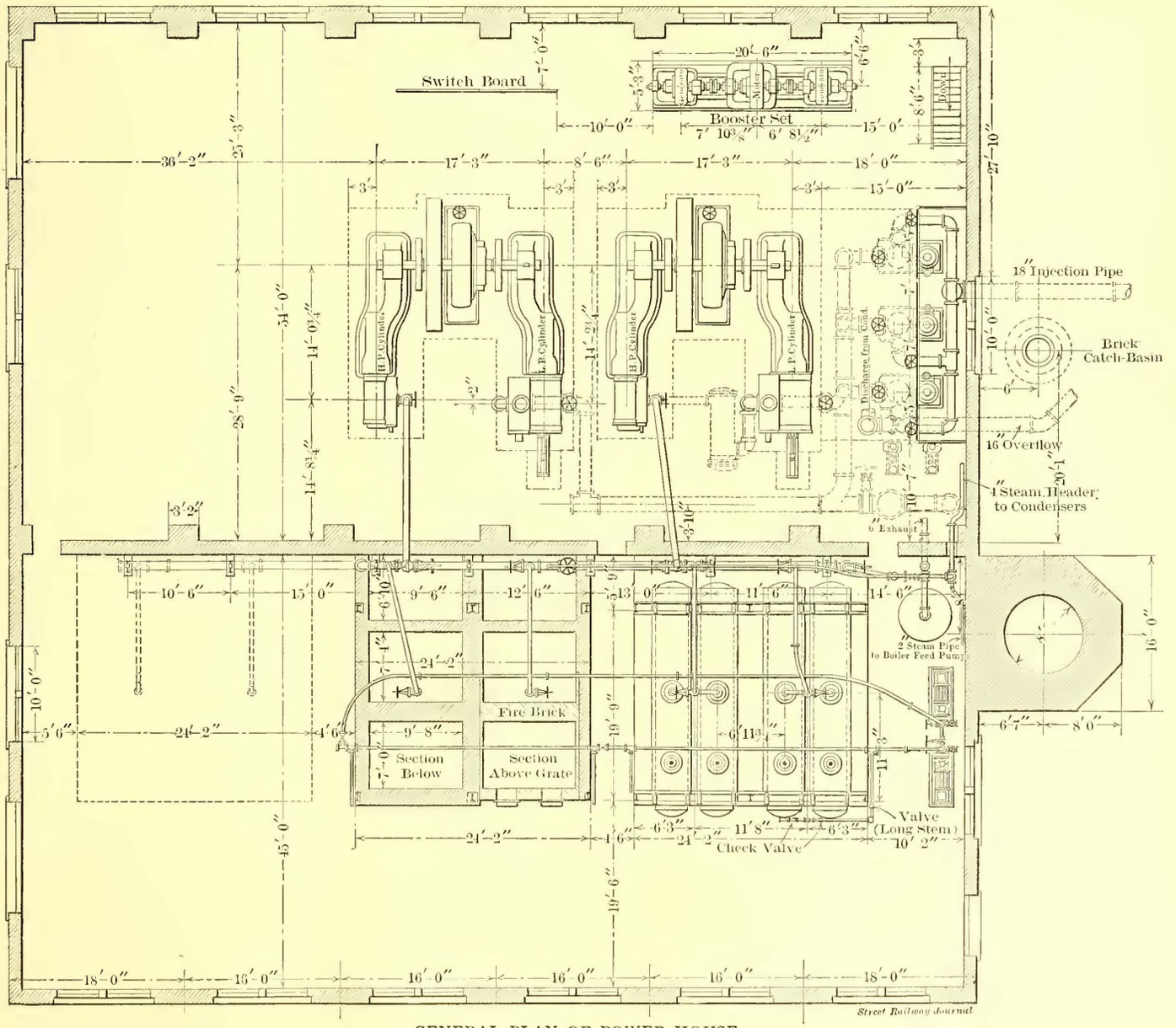
The load was provided by using steam on one of the engines, loaded by a water rheostat. Readings of steam pressure, draft value, temperature, calorimeter thermometers, feed temperature, level of water, etc., were taken every fifteen minutes. Coal



OUTLINE OF FEEDERS



SECTIONAL VIEW OF POWER HOUSE



GENERAL PLAN OF POWER HOUSE

was weighed on a Fairbanks scale, previously tested. A sample of coal was taken from every fifth barrowful on both tests, and after carefully cutting over and quartering down a known weight was placed on top of the boilers and dried for twelve hours to ascertain the surface moisture. Analysis of this dried sample by the Dearborn Drug & Chemical Company resulted as follows for the Jackson run of mine coal:

	Per cent
Moisture	3.60
Volatile combustible matter	38.25
Fixed carbon	43.25
Ash (dark fawn)	14.90
Heating value	11,966 B. T. U.

Analysis of Jackson screenings resulted as follows:

	Per cent
Moisture	3.92
Volatile combustible matter	37.80
Fixed carbon	38.07
Ash (dark fawn)	30.21
Heating value	9,325 B. T. U.

The latter coal did not contain the heating value specified by the boiler contracts.

In making the boiler tests the boiler feed-water was measured in the same way as for the engine tests. The capacity test failed to show what the maximum capacity of the boilers might be, because of the fact that the firemen had been in the habit of working the boilers considerably under their rating, and were without the experience necessary to run the boiler at its maximum capacity for the length of time required for the test. Steam pressure was consequently somewhat irregular, falling during the cleaning of the fires. During this test 12,920 lbs. of water were evaporated per hour, or an overload of 24.83 per cent. Under these conditions the boiler showed an economy of 6.70 lbs. of water per pound of coal, or 7.4 per cent above the guaranteed economy at 50 per cent above rated capacity; from which it would appear that under more favorable conditions for firing the boiler would come up to the guarantee. The coal in this test made considerable clinker, which adhered closely to the grate bars and necessitated frequent slicing. The fires burned about three hours per cleaning. The draft was good, averaging .84 in. for the whole test.

Previous experience with the class of Ohio screenings available for the test showed that it was practically impossible to carry an overload on the boiler when burning this coal, and a capacity test with it was, therefore, not made.

In the economy test the boiler was worked at the average capacity of 303-hp throughout the run, and Jackson screenings were used. It evaporated at this load 6.70 lbs. of water per pound of coal from and at 212 degs. F. The coal was so dirty that it was necessary to clean fires about every 2 1-3 hours, which was a severe detriment to economical working, as they were being cleaned for practically 9 per cent of the duration of the test. The amount of ash and refuse on this test was 45 per cent of the total coal fired. Considerable combustible matter was lost by the necessity for frequent slicing. A sample of the ash analyzed afterwards showed 22.90 per cent of combustible matter remaining in the ash. The coal gave 88.8 per cent of the thermal value required by the boiler contract. It was, therefore, calculated from the result of this test that the boiler performance would have been 7.47 lbs. of water per pound of coal with a coal containing the necessary amount of heat units. It will be noticed that the run of mine coal enabled the boiler to be forced to practically 25 per cent above rating, with about 30 per cent less cleanings than the slack, and gave at the same time as good economy.

A collision occurred Feb. 25 on the line of the Peoria & Pekin Terminal Railway, by which one man was killed and eight injured. The wreck was due to a fog, which prevented the motorman seeing the signals.

A DECADE OF INTERURBAN ELECTRIC RAILWAYS

BY LOUIS BELL, PH. D.

It is now a full ten years since the electric railway, reaching beyond the confines of simple tramway practice, began to fulfil its destiny of revolutionizing rapid transit. How momentous has been the work of the swiftly passing intervening years, the multitude of splendid interurban roads now in operation bears witness. While street railways were limited to animal motive power, high speed was an impossibility, and lacking high speed long distances were impracticable. The ultimate factor in determining lines of traffic is time, and the horse railroad, even at its best, and with every advantage in delivering its passengers at or near to their objective points would not for a moment compete with even a poorly equipped steam road. With the advent of electricity a new field of activity was opened, for cars operated at fairly high speeds along streets and public roads were able to land their passengers at their destinations more promptly than a steam road, possessing, to be sure, greater speed, but confined to a roadway far less accessible.

The electric interurban road came into existence by a process of natural evolution from the extension in tramway practice rendered possible by greater speed, and by a truly Darwinian process of variation and survival of the fittest it has progressed from variety to sub-species, from sub-species to species, and unless we fail to read aright its future, it lacks little of establishing itself in generic rank. The horse has taken a million years or so to work out its destiny from Eohippus to Equas, but electric traction has in fifteen years passed from the grunting little motor, that spat fire on the Richmond hills, to the flying electric train that reels off the miles to the tune of forty in the hour.

The changes that have been wrought are threefold in kind. The motors themselves have been brought to a point that once seemed almost beyond hope; the rolling stock has passed definitively from tramway to railway type; and finally the organism as a whole has ceased to belong in the germs of street railways, and has entered upon a career peculiar to itself, although closely allied to that of railways in general.

The change in the motors has been extraordinary. Not only is the street railway motor of to-day a vastly more reliable, better designed, and more powerful machine than ten years ago, but it represents a radically different type of construction. It was in 1892 that the ironclad waterproof motor with gears running in oil came fairly to the front and gave a feeling of security that was a profound relief. Then real progress began, and with the intramural line of 1893 electric traction began the divergent growth that has led to the art as we have it. The series parallel control once cast into outer darkness and then replevined from the scrap heap by persistent effort gave the key to high-speed working and interurban traction passed from hope into accomplishment. A year or two more and the development of power transmission and the introduction of the rotary converter gave added impetus to long-distance work by the increased facility in obtaining power. Then came the third-rail, and the multiple-unit system of control, and the modern system began to assume something of its present aspect.

Meanwhile the rolling stock had kept up with the pace. Glancing to-day at the ancient cars marooned in vacant lots and doing humble duty as owl lunch carts, it seems hardly possible that the conversion of such as they into electric could ever have been seriously attempted. The very first step in business-like electric traction was the complete reformation of the running gear, and following that, of the car bodies themselves. When an attempt was made at running old single-truck cars on interurban service trouble followed hot-footed. In fact, if memory serves us aright, it took one or two serious accidents, following

repeated warnings, to enforce the lesson that at high-speed double-truck cars were absolutely necessary. With the long and heavy cars solider track construction was imperative, and so it has come about that the track of a modern interurban electric road is even more substantial than is usual on steam railroads. Thirty-two and 40-lb. rail soon had its day, to be followed by rails of double the weight, supported on a roadbed built to match, and the electrical part of the permanent way progressed with even pace. Bonds grew from No. 6 to No. 00, and feed wire from No. 1 to 500,000 c. m. cable.

But, more than all this, the methods of operation in heavy interurban service have undergone a change. There is a vast difference between running horse cars on a single track and driving 40-ft. cars at 30 miles per hour. You cannot say whoa to a pair of 50-hp motors and bring them to a halt when danger impends. Hand-brakes become almost useless in an emergency, and power brakes have steadily, but all too slowly, forced their way into use. The increasing size and speed of cars designed for large work has made running through public roads a procedure of dubious wisdom and one of the most noticeable changes of recent years has been an increasing tendency to operate interurban roads over private rights of way. Similarly some rational system of block signaling and of train despatching has come to be, not a useful adjunct, but a necessary precaution to insure reasonable safety. Happily, with these increasing expenses and responsibilities has come a volume of traffic that verges on the impossible. An ordinary steam road cannot for a moment hold its own with a modern interurban line, and every time they come into competition the result is a foregone conclusion. Hence, as a rule, the interurban lines have prospered to an extraordinary extent, and have amply justified their right to the field that they have made their own. Their effect on the growth of American cities has been little short of prodigious, for where the rails go, there goes population and prosperity.

But what does all this mean? What is to be the future of interurban lines and their relation to the community? Are they to continue their prodigious growth along substantially the present lines, or is the eternal law of change and variation still to act as it has acted in the past. We do not see how there is any escape from the conclusion that the processes of evolution and differentiation will continue, perhaps even with increased rapidity.

Already there is beginning to be evident a tendency for urban and interurban practice to grow apart. The running gear of the two, one designed for moderate speeds over tram rail, the other for high speeds over a true railway track and roadbed, cannot easily be brought to a common basis. If long distances are to be attempted the working voltage must be carried rather higher than is desirable for urban conditions. And for a broader distinction the cars and equipment most suitable for doing the larger interurban work are not suited for safe and easy running through public streets. In fact the time has now come when we must make distinctions between interurban roads—must divide the germs into two species. There are and will continue to be many roads doing interurban business which are simply normal extensions of urban system along which population is steadily springing up, uniting the terminal cities in a practically continuous suburban district. In due process of time these roads, which run for the most part over public streets and roads, should naturally tend to take on the characteristics of urban systems, and to adopt equipment and methods suitable to roads running in frequented thoroughfares.

On the other hand, there is a large and increasing class of roads which is steadily tending in exactly the opposite direction—growing toward railway instead of tramway conditions. The future of these lines is the evolution of a system of high-speed electric railways displacing and crowding to the wall the minor class of steam roads.

Between these two groups of roads there are many individuals occupying still a debatable and uncertain ground. They are the product of their environment and represent the "transition types" familiar to the naturalist. They must work out their own salvation, each in its own fashion.

But the fundamental issue is that the modern interurban road has come to the parting of the ways. It cannot long continue to hold an untenable mean between two radically divergent positions. If its legitimate functions are those of a thoroughly first-class tramway system there is its future, and it must logically accept the limitations that lie in the line of its duty and prosperity. One cannot with impunity long continue to run fast and heavy cars on short headway through public streets. An attempt to do so will inevitably lead to disaster, and to a day of reckoning. The best that can be done is to plan an equipment that will afford a safe compromise within conservative limits, erring, if at all, on the side of caution. There is no excuse for mincing words about this matter, and it is in nowise a misfortune for a road to be so situated that evolution points to an urban future. So long as an interurban road operates wholly or mainly over public streets, it must face squarely the limitations that come from the common use of such streets, and there is no hope trying to evade the issue. There is room for great individual skill in meeting it squarely and successfully, and we believe that the same keen ability that has shown itself capable of building up so great a business will not fail when it comes to meeting another phase of the growth that has brought so much of prosperity to the roads and the public.

The other class of electric roads—those that are to-day doing substantially railway work, and largely over their own rights of way, stand in a different category. Their aims, duties and responsibilities are those that belong to railways in general. In fact, they are ordinary railways in all save motive power and they must recognize the fact. To judge from the achievements of the present their future is a great and prodigiously useful one. They are not tramways in any sense of the word, and their work in the world is not tramway work. They will give a new meaning to rapid transit if they even approximately fulfil their present promise. But they must face their new responsibilities and take advantage of every lesson in safe and successful operation that fifty years of railroading has taught. They have some inherent advantages that are enormously important, and are due to win out if they make wise use of them.

The interurban roads of this country, to whichever class they belong, are a power for public good, and we think that the public fully realizes it. What we wish to enforce is the principle that one cannot reduce all means of transportation to a dead level of uniformity, and that a natural process of evolution has brought about differences in interurban practice so great that they can no longer successfully be reconciled. But these are signs of growth, not of degeneration, and the future will be greater than the past.

MUNICIPAL OWNERSHIP

The national convention on Municipal Ownership and Public Franchises held its first meeting at the Reform Club, in New York, on Feb. 25. The opening session was devoted largely to consideration of the subject of transportation, and several papers were presented on this feature of municipal service by prominent students of these problems. The programme, which has already appeared in these columns, was followed. Charles T. Yerkes, Robert P. Porter and Robert Donald contributed papers on this subject, but they were not present to read them in person. C. R. Bellamy, of Liverpool, gave his impressions of municipal management of electric railways, based upon his experience in Great Britain and his observations on the Continent, and he presented some interesting statistics in support of his contention that in England, at least, the conditions were favorable to city railway control.

PLANS FOR EXTENSION ON NEW YORK SUBWAY AND "L" SYSTEMS

The Rapid Transit Commissioners of New York have under consideration an elaborate and comprehensive report by their chief engineer, William Barclay Parsons, upon an extension of the present "L" system in Manhattan and The Bronx, and additional subways so arranged that they can be operated together, and when practical the cars of one road be run on the other's line for one fare. There is also a proposal to include the New York Central and Pennsylvania companies in the general scheme, so that their tunnels will, in fact, contribute to the facilities for handling local and suburban traffic.

The principal features of the Parsons plan, as outlined in his letter to the Board last week, may be summarized as follows:

The building of 130 miles of subway and elevated single track, at an expense of between $45,000,000 and $50,000,000, about one-half of which will fall on the city.

A new three-track subway line for Lexington Avenue, with a junction with the present subway at Fortieth Street and Park Avenue.

The removal of the New York Central's tracks from the surface of West Side streets and the building of a new four-track elevated structure along the North River water-front for passengers and freight.

Arrangement with the New York Central for its local trains to run in the rapid transit subways.

A new subway from South Ferry through Church Street, Wooster Street or Greene Street, University Place and Broadway to Forty-Second Street, connecting with the main line.

Two new elevated tracks on the Second Avenue line from the Harlem River to Chatham Square and thence on a double-decked structure to the City Hall.

An extension of the Sixth Avenue elevated line along Christopher Street to Greenwich Street.

An extension of The Bronx rapid transit lines to Wakefield and Mount Vernon.

A branch subway line along the Southern Boulevard and westerly in 180th Street.

A subway under Thirty-Second Street from Broadway to Seventh Avenue, to afford distribution of passengers using the Pennsylvania tunnel.

A new third track on the Third Avenue elevated road from Harlem to Ninth Street.

A new third track on the Ninth Avenue elevated road from Fourteenth Street to Cortlandt Street.

A new branch of the elevated road from Fifty-Third Street to Tenth Avenue, to Fifty-Fifth Street, thence by new subway under Amsterdam Avenue to a connection with the subway proper at Seventy-Second Street.

The Board has consistently kept in mind throughout its entire work the central idea of providing a comprehensive system of rapid transit for the entire city, and the recent acquirement of the "L" roads of Manhattan by the interests controlling the subway property contributed in large measure to making it possible at this time to present the plans under consideration. A map showing the proposed extensions and their relations to present "L" system and the subways now under construction is presented herewith. In this map the several lines are indicated as follows:

Heavy dotted lines indicate proposed extensions of the Rapid Transit (subway) system.

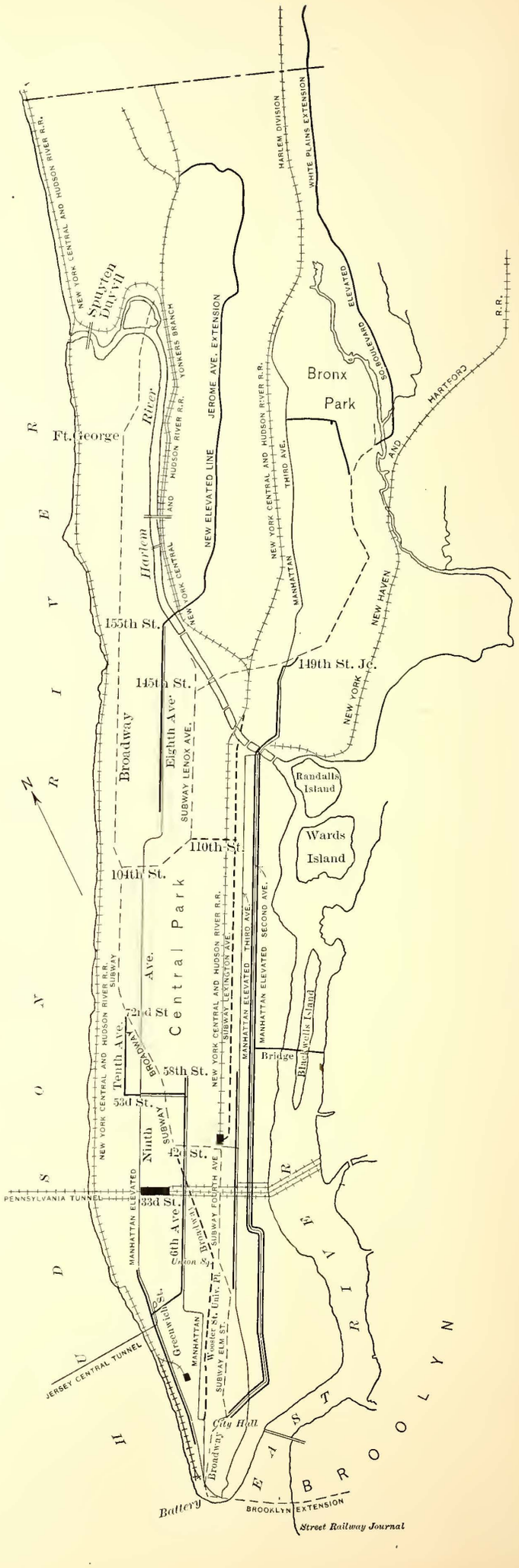
Light dotted lines indicate present franchises of the Rapid Transit (subway) system.

Heavy solid lines indicate proposed extensions of the Manhattan Elevated system.

Light solid lines indicate present tracks of the Manhattan Elevated system.

Heavy crossed lines indicate proposed extensions of the New York Central system.

Light crossed lines indicate existing trunk-line tracks, or those for which franchises have been granted.



MAP SHOWING PROPOSED EXTENSIONS IN NEW YORK CITY

The present plans, it will be noticed, deal entirely with Manhattan, The Bronx and Queens, but there are additional provisions for Brooklyn and Richmond, which will be submitted later, and will form a harmonious part of the general layout. A public hearing on the proposed extensions was ordered.

In order to be carried out, the plans advocated by Mr. Parsons must, besides being endorsed by the Rapid Transit Board, have the consent of the Aldermen and the Board of Estimate. So far as the city's financial ability to carry out the plan went, Mr. Grout said, there need be no doubt, as after July 1 the debt limit will be increased enough to warrant expending the amount named by Mr. Parsons and considerably more. Members of the Board said yesterday that there need be no delay in beginning on the tunnel extensions, and it was said that contracts would probably be let and work actually begun on these before the end of the Mayor's term. Mr. Parsons's report says:

SUBWAY EXTENSIONS

When the bids for the Brooklyn extension were opened it will be recollected that Mr. Belmont, as president of the Rapid Transit Subway Construction Company, offered to build a line from Forty-Second Street to Fourteenth Street at considerably below the estimated cost. Such a line would, however, but transfer the point of congestion from Forty-Second Street to Fourteenth Street, and I therefore propose that this line be extended to the lower end of Manhattan Island at South Ferry, following University Place, Wooster Street and Church Street, and thus furnish two additional tracks south of the postoffice.

From this line at Broadway a subway under Thirty-Second Street to Seventh Avenue should be built so as to bring the new Pennsylvania terminus to a connection with the subway and elevated railway for the purpose of local distribution of passengers.

In like manner I propose to make a junction, as our general plan originally contemplated, at about Fortieth Street and Park Avenue, and carry the new line with three tracks beneath the Grand Central Station to Lexington Avenue, and then along and under that thoroughfare to The Bronx, making a connection with the New York Central and New Haven Railroads at Mott Haven.

Although the line passes beneath the yard of the New York Central between Forty-Second Street and Forty-Fifth Street, property not subject to condemnation, nevertheless, I believe that satisfactory arrangements can be made for the easement. A branch from this line can be carried westward under 110th Street to Lenox Avenue, thus providing a connection between the east and west lines north of Central Park, as the Forty-Second Street subway line provides one south of the park.

On the extreme easterly end the line in The Bronx should be extended from West Farms along the east side of Bronx Park, unless the park authorities prefer a direct route through the park in order to reach Wakefield and Mount Vernon, two rapidly growing sections of the city now without rapid transit facilities.

A branch should also be laid out continuing along the Southern Boulevard and then westerly on 180th Street, thus reaching a section of The Bronx not served by any line.

A connection between the Bronx Park line and the Manhattan Elevated should also be made from Brook Avenue along Westchester Avenue to Third Avenue.

MANHATTAN ELEVATED EXTENSIONS

The additional lines, and especially those in subway, will require some years to complete, and during this time it is absolutely essential that immediate relief measures be provided. For reasons not necessary to discuss the Manhattan Elevated Railway Company has never accepted former suggestions of the Board to provide such additional facilities as the Board deemed advisable. Recently, however, the management of this property has passed under the control of the Interborough Rapid Transit Company, and I am informed by Mr. Belmont that he will gladly and liberally meet the views of the Board and extend the Manhattan lines, and so connect them with the subway system that both systems may be operated as a unit, with through trains at a single fare. Such an arrangement would at once confer a great benefit upon the local traveling public, as presenting the quickest means of securing immediate relief.

To this end I suggest the following alterations in the Manhattan structure and method of operation:

Second Avenue Division—Add two tracks from the Harlem River to Chatham Square, carrying the two new tracks over the Chatham Square junction and over the Park Row line to City Hall.

Third Avenue Division—Extend the third track from Fifty-Ninth Street to Ninth Street, so as to make it continuous from the Harlem River to the latter point.

Suburban Division—Add a third track from south of the Harlem River to Westchester Avenue.

When these lines are completed a rearrangement in operation can be made advantageously. The Third Avenue Division is the main system for local business on the East Side. To-day this local business is greatly interfered with by running The Bronx trains over the same structure, and in like manner The Bronx facilities are much restricted by the impossibility of running more trains over the Third Avenue structure. By converting the Second Avenue Division into a four-track structure, and by extending it to the City Hall, an immeasurably better service will at once be provided for the East Side of the city. Bronx passengers will then be carried direct on a continuously running express structure, while local passengers from points south of Harlem will be carried by trains stopping at or starting from the river, and thus not come in contact with the through passengers. In like manner, by connecting the Rapid Transit Westchester Avenue line with the Suburban line at 149th Street, through trains can be run from points south of Bronx Park, or Wakefield, or Mount Vernon, by a direct line to all points south of the Harlem River, including South Ferry and City Hall, in through trains and for a single fare. This would save passengers from the northeastern portion of The Bronx 1¾ miles of their journey, which would otherwise be involved if they were carried to the west side of the city and back by the present subway.

The saving in time would be even greater than the mileage would indicate, as the express service for such passengers would begin at 149th Street and Third Avenue, instead of 110th Street and Lenox Avenue. The subway proper would then begin at 149th Street and Third Avenue, and furnish the people living in the center of The Bronx with fresh trains, transfers to which could be given at 149th Street for the small proportion of travel that might desire to go from Bronx Park to the west side of Central Park. This would also permit the present Lenox Avenue line to become what it should be, namely, a line for purely local Harlem travel, so that the residents of the Harlem district would be sure of finding seats.

Sixth Avenue Division—In order to furnish special trains for the retail shopping district lying north of Fourteenth Street, and in order to furnish a connection to the terminus of the New York & New Jersey Tunnel at Greenwich Street and Christopher Street, I would propose an extension of the Sixth Avenue Division along Christopher Street to Greenwich Street, connecting with the Sixth Avenue Division at the north end of the Eighth Street station, and thence lay a third track on the Sixth Avenue structure northward. By this means many northbound trains could run "local" through the wholesale dry goods district, as a gathering ground, and, having become filled by the time they reach Eighth Street, could then pass on to the third track and run "express" to Harlem. The relief thus provided to the local track north of Eighth Street would permit trains to start from Christopher Street and run "local" through the retail district.

Ninth Avenue Division—I recommend:

(1) The extension of the third track from Fourteenth Street south to Cortlandt Street, so that the express service may begin from the latter point.

(2) A branch from the main structure at Fifty-Third Street running westerly along Fifty-Third Street to Tenth Avenue, northerly along Tenth Avenue to Fifty-Fifth Street, where, owing to the topography, the elevated structure can be depressed into subway and so carried under Amsterdam Avenue to a connection with the subway at Seventy-Second Street. This connection can be built rapidly, and would serve in connection with the third track extension to Cortlandt Street, as an immediate means of carrying the traffic assembling in the upper limits of the subway direct to South Ferry, thus giving some measure of relief pending the completion of the subway to the same point.

(3) The extension of the third track from 116th Street north to 155th Street, making a continuous third track from Cortlandt Street to the Harlem River.

(4) Make an arrangement with the Putnam Division of the New York Central Railroad by which the present bridge across the Harlem River can be reconstructed into a three-track structure, and then extend the Eighth Avenue line across the Harlem River with the three tracks and by a short tunnel through the high ground on the east bank of the Harlem River to Jerome Avenue, thence northerly along Jerome Avenue to Woodlawn, and thence westerly in the neighborhood of Mosholu Avenue to a connection with the Putnam Division in Van Cortlandt Park. This line will furnish, in the quickest and most direct manner, good service for what constitutes the largest inhabitable area of the old city of New York, which is to-day without rapid transit facilities. When the construction of the Lenox Avenue and Broadway lines south from the Harlem River is completed, the Eighth Avenue elevated will be relieved of a large amount of local travel, thus permitting the additional burden of the Jerome Avenue extension to be successfully carried.

If the consent of the railroads with terminals at Forty-Second Street can be had, connections should be made at as many points as possible with the subway and elevated lines. The points where such connections can be made are with the suburban elevated at Fordham; with the proposed Jerome Avenue extension at Van Cortlandt Park; with the subway at Kingsbridge; with the Manhattan Elevated at 155th Street, to both the main line and the Putnam Division of the New York Central; with the subway to the New York Central at the Harlem Ship Canal; with the Lexington Avenue subway to the New York Central, Harlem & New York and New Haven Railroads at Mott Haven; and all so arranged that local trains from nearby suburban points can be run direct over the rapid transit lines and thus avoid the congestion at the Grand Central Station or the delay in transferring from one railway to another.

NEW YORK CENTRAL WEST STREET VIADUCT

In addition to this, however, the New York Central Railroad Company now owns the railway along its own right of way from Spuyten Duyval to Fifty-Ninth Street, and thence on the surface of Eleventh Avenue, Tenth Avenue and other avenues and streets south to Houston Street and Beach Street. This line might easily be converted into a passenger line and furnish a great measure of rapid transit relief. The existence of the tracks on the street surface south of Fifty-Ninth Street is a great public burden, and should be removed if possible.

I would suggest that negotiations be taken up with this company looking to the removal of these surface tracks, and substituting in place thereof an elevated structure along the same route, or possibly along West Street, and which, if constructed so far south as Beach Street, might be continued south to Battery Place, and so provide not only a freight but also a passenger line along the water front. If this were done the line should be constructed with four tracks south of Fifty-Ninth Street, with the passenger tracks elevated above that point.

I suggest that a branch of the Second Avenue Elevated be constructed along Sixty-Fourth Street and over the Blackwell's Island Bridge to Long Island, and that a plaza be then arranged permitting the present surface lines now plying throughout that district to approach and deliver their passengers to the elevated, by which they can be carried by an express and local service to any point north or south in Manhattan, Brooklyn or Bronx.

COST UNDER $50,000,000

If the Board should carry out these suggestions the city will own a railway system complete in itself, covering 37½ miles in the Boroughs of Manhattan and The Bronx, with 100 miles of track, exclusive of side tracks. On the other hand, the plan proposes to afford the greatest measure of immediate relief by the only way in which such relief can be afforded, that is, by the expansion of existing facilities. Such expansion would be obtained by the use of private capital, without encroaching on the debt-incurring capacity of the city, but under such proper terms as would be laid down by the Board.

The equivalent amount of single track above mentioned is about 130 miles, and the expense of construction, liberally estimated, is between $45,000,000 and $50,000,000, about one-half of which will fall on the city.

All of these lines herein suggested should, if approved by the Board, be placed under construction as soon as the necessary consents can be obtained and the terms of the contract drawn up; and it is hoped that they will be sufficient to provide for the Boroughs of Manhattan and The Bronx for some years to come.

ADDITIONAL SUBWAYS DEMANDED

The Citizens' Union of New York, which is one of the public bodies that has been investigating the transportation problem, has made a report in which it says that the completion of another subway road would accelerate the up-building of unoccupied sections, and the enormous increase in taxable values created would largely contribute the means of constructing it. The report recommends that these changes should be secured at the present legislative session:

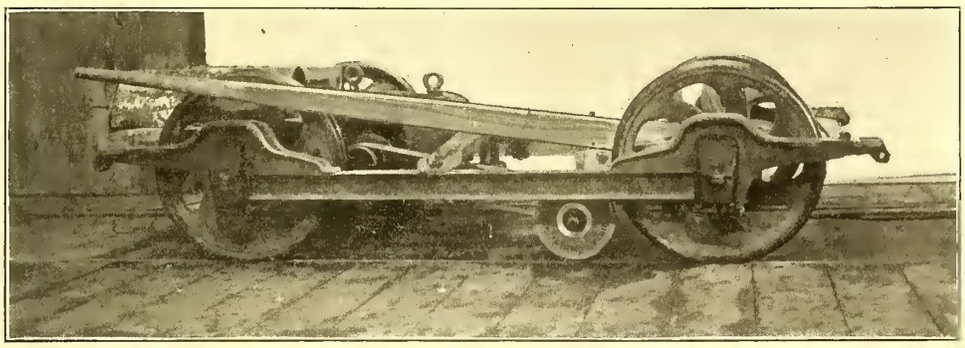
First. The Rapid Transit Act should be amended so as to permit the construction of the roads without at the same time compelling the letting of contracts for their operation.

Second. The city should have authority either to operate them itself, or to contract for their operation, for a period not exceeding ten years if equipped by the city, or not more than twenty years without such equipment.

The union contends that under the Rapid Transit Act the city definitely adopted the principle of municipal ownership, the properties created thereunder reverting to it with all equipment at the expiration of the lease period. Since the passage of the act, the report says, it has become apparent that subway systems are destined to be exceedingly profitable enterprises, and in all boroughs the city should control the additional transit facilities required to meet future demands. Before any extension of the existing subway is determined upon the adoption of a plan for a complete system of transit is urged, with a view to its independent control or operation, yet so related to existing lines as to secure the advantages of a universal exchange of transfers with them wherever practicable. It is further contended that fares should be fixed by the Rapid Transit Railroad Commission, with the approval of the Board of Estimate, at a figure that would provide, at least, for the interest on the construction bonds, a sinking fund for their redemption within a reasonable period, the cost of operation and other ordinary charges.

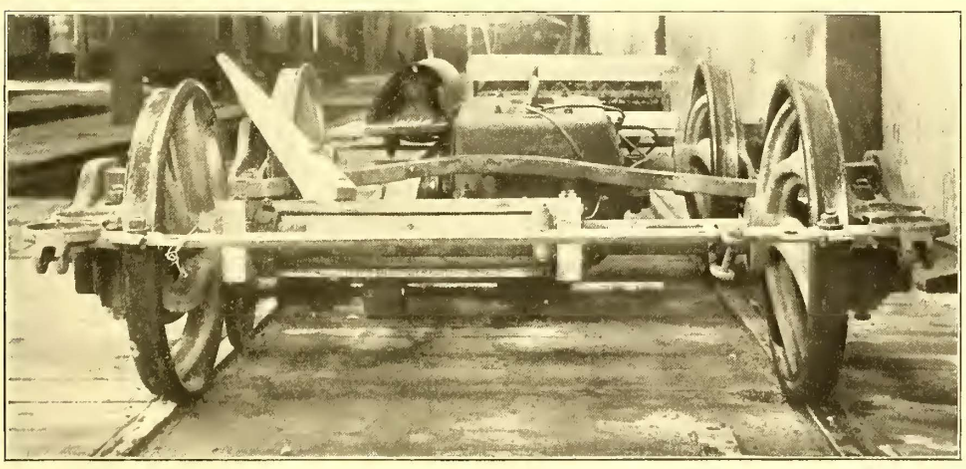
GRINDING SPECIAL WORK FOR INTERURBAN CAR WHEEL FLANGES

Nearly every city road, which had its curves and special work laid several years ago and now finds it necessary to admit interurban cars on its tracks, has found it necessary to provide larger grooves for the flanges of the interurban car wheels than were originally provided for the city cars. Even though the track in general may accommodate large interurban flanges there are likely to be several points where it is necessary either to lay new special work or to grind out the grooves in some way. In Aurora, Ill., the entrance of the cars of the Aurora, Elgin & Chicago high-speed electric line into the city made it necessary to enlarge the grooves in some special work in the heart of the city. These Aurora, Elgin & Chicago cars have standard M. C. B. treads and flanges. The tracks in Aurora belong to the Elgin, Aurora & Southern Traction Company, which, although it operates interurban lines, has no cars with flanges as large as those on the Aurora, Elgin & Chicago.



GRINDING SPECIAL WORK AT AURORA

To enlarge the grooves and the special work, a pneumatic tool is used for most of the work. A regular Christensen air-brake equipment furnishes the compressed air for the pneumatic tool. When, however, the hardened centers of the special work were reached an emery-wheel grinder was used. This grinder was mounted on an old truck, as seen in the accompanying engravings. A railway motor was suspended on one axle in the usual way, but belted to an emery wheel mounted on a frame between the axles. This emery wheel frame is made of timber, and swivels on one axle of the truck. A long lever from the frame enables one man to raise and lower the emery wheel and also control the motor. The controller of the motor is placed on its side at one end of the truck, near the rheostat. The emery wheel is of such a shape as to give just the right form of groove.



EQUIPMENT FOR ENLARGING GROOVES AND SPECIAL WORK

SARATOGA THE NEXT CONVENTION PLACE

A meeting of the executive committee of the American Street Railway Association was held at Worden's Hotel, Saratoga, N. Y., Feb. 23, at which it was unanimously resolved to hold the next annual convention in that city. It was also voted to hold the convention during the first week in September, and Wednesday, Thursday and Friday, Sept. 2, 3 and 4, were the days selected.

There was a good-sized attendance of the executive committee at Saratoga. Those present were: J. C. Hutchins, president; W. Caryl Ely, first vice-president; T. C. Penington, secretary and treasurer, and Messrs. Laffin, of Worcester; Radel, of Bridgeport, and Read, of Salt Lake City. Upon invitation of the committee T. J. Nicholl, vice-president and general manager of the Rochester Railway Company, was also in attendance. At the meeting of the committee the secretary stated that while the association had not received any invitations from any street railway company in any large city for the next convention, several other invitations were before the association. Among them was an invitation from a private party in New York, offering the use of the Grand Central Palace, under certain conditions; another somewhat similar invitation had been received from a number of manufacturing companies in Chicago, in regard to the Coliseum Building in that city; a third had been presented to the association from the Business Men's Association of Saratoga Springs, presenting the claims of that place for consideration. The meeting of the executive committee had been held in Saratoga because that had seemed the most desirable place for holding the next convention, all things considered.

The committee was then addressed by A. P. Knapp, village president; C. B. Thomas, president of the Saratoga Business Men's Association, and C. A. Douglass, representing the Grand Union Hotel. They called attention to the fact that Saratoga is rapidly becoming an important center for national conventions, that several large associations like the National Railway Mechanics and National Car Builders had held conventions in that city for a number of years, and that the city was unsurpassed by any in the country in the way of hotel facilities. Mr. Douglass, speaking for the Grand Union Hotel, stated that that hotel had accommodations for about 1700 guests, and that there were several other hotels nearly as large in Saratoga. He agreed, in the event of the selection of that hotel as the convention headquarters, to give the association, without charge, the use for the meetings of the ball room, seating 600, also to furnish the Accountants' Association and the American Railway Mechanical and Electrical Association with meeting rooms. These rooms will seat each from 60 persons to 90 persons. He also agreed that only regular prices would prevail, and that if the convention was held at Saratoga during the first week in September concerts would be given in the hotel grounds daily by Herbert's band of fifty pieces, conducted by Victor Herbert in person. This is the band which is retained at the Grand Union Hotel during the summer.

As these arrangements seemed satisfactory to the executive committee it was decided to accept them, provided proper arrangements could be made for caring for the exhibits. The secretary then presented the resignation as member of the executive committee of W. J. Hield, of Minneapolis. The resignation was accepted, and Mr. Nicholl, of Rochester, was elected to the vacancy caused by the resignation. A letter was also read from Mr. Vreeland, dated at Aiken, Ga., expressing regret at his inability, through sickness, to attend the meeting. The committee then made an inspection of the Grand Union Hotel and grounds, and finally accepted the proposition to hold the next convention there in September. It was found that the piazzas of this hotel, facing the court, are of ample width for accommodating all of the less bulky exhibits, and that the latter can be located in the court itself. The tracks of the Delaware & Hudson River Railroad are directly in the rear of the hotel, making trans-shipment easy, and electric power is available in any quantity desired from the circuits of the Hudson Valley Railroad Company. All exhibits placed in the court will be covered to protect them from the weather, and those on the piazza itself will also be screened in case of storm. Altogether the arrangement seemed most satisfactory, and the proximity of the exhibits to the hotel itself will undoubtedly prove a great convenience to those who wish to give especial attention to them.

The dining room in which the banquet will be held on Friday evening is 285 ft. long, and is amply large enough for the purposes of the association.

The president of the Hudson Valley Railroad Company, Mr. Addison B. Colvin, was unfortunately prevented from meeting the executive committee while it was in Saratoga. He extended a hearty invitation to the association to meet there next September, however, and promised an enjoyable entertainment to the ladies and all who should attend the coming convention.

After deciding upon the time and place of the next meeting the committee took up the subjects to be discussed at Saratoga, and the following topics were selected and assigned:

Steam Turbines.

Electrically Welded Joints.

The Evils of Maintenance and Champerty in Personal Injury Cases.

Train Orders and Train Signals on Interurban Roads.

Freight and Express on Electric Railways.

The Manufacture and Distribution of Alternating Currents for Large Cities.

Comparative Merits of Single and Double Truck Cars for Street Service.

The Right of Way. Is Not the Public Entitled to It in the Use of Streets?

The companies to whom these topics have been assigned will be announced as soon as acceptances on their parts have been received by the secretary.

The committee also decided to hold one morning session each day of the convention, and no sessions in the afternoon or evening. This will permit the entire afternoon of each day to be given up to excursions or an inspection of the exhibits. The excursions have not yet been absolutely determined upon, but are being arranged by Mr. Colvin, of the Hudson Valley line, and Mr. Thomas, of the local committee. It is understood that at least one excursion will be to visit the General Electric Works at Schenectady, and another will be to Mechanicsville, to inspect the large hydroelectric plant recently installed in that city.

It is also understood that the convention of the American Railway Mechanical and Electrical Association will be held on Tuesday, Sept. 1, and will occupy only one day. This will permit the delegates to that convention to attend also the sessions of the American Association.

In the evening a pleasant dinner was extended to the executive committee and to the technical newspaper men also in attendance at the meeting, by the representatives of the village of Saratoga, who had met the committee. The party, numbering fifteen, was driven in sleighs to a restaurant on Saratoga Lake, located about 4 miles from the center of the town. Those present besides the executive committee were A. P. Knapp, C. B. Thomas, C. A. Douglass, H. L. Waterbury, Dr. B. M. Varney and J. K. Walbridge, all of Saratoga; H. W. Blake, of New York, and D. Royse, of Chicago. The party passed a very enjoyable evening, and if the hospitality and good fellowship of President Knapp, of Saratoga, and his associates presages anything, it is that the delegates and others in attendance at the next convention at Saratoga will be given a most enjoyable time during their stay in that city.

The secretary will in due course issue the usual circulars in regard to hotels, exhibit space, etc.

STRIKE ON THE INDIANA RAILWAY

The strike on the lines of the Indiana Railway Company, operating in and between South Bend, Elkhart and Goshen, Ind., has now been on for about a month. Cars are being operated on the regular schedule, and there has been little disturbance recently, except that a gang of toughs set upon a motorman, one night at the end of one of the lines, and battered him so severely that he is in a critical condition. Although the cars are in operation the strikers have established such a boycott that there is very little passenger traffic. The cars are running nearly empty. The union labor element being strong in the towns through which this company operates, the local merchants are in great fear of giving offense to this class, and do not patronize the cars or allow their employees to do so, which, of course, materially cuts down the riding. The strike is apparently one devised purely for the personal gratification of labor agitators. General Manager J. McM. Smith stated last week to a Street Railway Journal representative that no man on the pay roll of the Indiana Railway Company had approached him regarding the settlement of the strike, or any grievances either just before or since the strike began. Some men who had been discharged for good reasons in December have attempted negotiations, and these men seem to have been the cause of the whole trouble. The only issue in the strike is the reinstatement of these men. It seems to be one of these cases where if the regular employees of the company would take matters in their own hands and not be led around by men who are too dishonest or unfaithful to keep regular positions with the company, there would be no trouble whatever. As the cars are being operated on regular schedule and everything is quiet, it seems to be only a question of how long the citizens of South Bend and neighboring towns will be willing to walk to accommodate labor agitators, who are not able to hold positions on their own merit, but must force their employment on the railway company by a strike of their former fellow employees.

The Fair Haven & Westville Railway Company has begun the work of remodeling and double-tracking its lines in and about the city of New Haven.

The most important of this work will be the extension and double-tracking of a second line from New Haven to West Haven by way of Congress Avenue. There will be about 6 miles of new trackage laid on this work.

The next work of importance is the double-tracking, straightening and regrading of the West Shore Division of the system between Savin Rock and Woodmont. This improvement will call for about 8 miles of rail. The company will also finish equipping some 3 miles of the end of its Derby extension. This road will be opened on July 4, if the Derby end of the line, which is being built by the Connecticut Railway & Lighting Company, is completed by that time.

EXPERIENCE IN THIRD-RAIL OPERATION

H. M. Brinckerhoff, general manager of the Metropolitan West Side Elevated Railway, of Chicago, delivered a lecture before the Chicago Electrical Association, the evening of Feb. 20, on the third-rail system for electric railways. The lecture was illustrated with stereopticon views of the third rail as used by Mr. Brinckerhoff's company.

Mr. Brinckerhoff referred with some amusement to articles which appeared in the New York daily papers about a year ago, when the first trains were run by electricity on the Manhattan Elevated, which would give the impression that the third rail was something very new and wonderful, whereas it had been working in regular service for years in Chicago. The Chicago elevated roads had not only done all the pioneer third-rail work in the United States, but it was significant that, in the equipment of the Manhattan Elevated Railway, of New York, all the skilled heads of departments involved in the practical work of making the change had been supplied by Chicago.

The first third-rail road in the United States was the Intramural Railway at the World's Fair in Chicago, 1893. The Liverpool Elevated in England was also equipped with a third rail about that time. The use of the third rail made possible the operation of heavy trains by electric motive power, because of the large area afforded by the heavy contact-shoe sliding on the third rail.

FUEL SAVING BY ELECTRIC TRACTION

It was shown by Mr. Brinckerhoff that the actual cost of fuel for the operation of the Chicago elevated roads by electricity was only one-third the amount per car-mile that it would be with steam. Part of this economy was, of course, due to the fact that Chicago was near the coal fields of Illinois and Indiana. In New York City, where the distance to the bituminous coal fields was greater, and to the anthracite fields less, there would not be as great a saving, because the difference between the cost of anthracite and of low-grade bituminous coal was less in New York City than in Chicago, and anthracite was cheaper per ton in New York than in Chicago.

TRAFFIC CONDITIONS WITH ELECTRICITY

As a practical example of the value of electric traction in the prompt movement of trains by virtue of rapid acceleration, Mr. Brinckerhoff stated that the present service around the Union Elevated Loop, of Chicago, would be absolutely impossible if the roads using the loop employed steam. Some traffic figures were given for the loop. During the month of January the loop accommodated 1523 trains in twenty-four hours, or an average of one train every fifty-three seconds for the whole day. This, of course, meant trains at much shorter intervals during the rush hours. During the rush-hour period trains average thirty-three seconds headway. During fifteen minutes of the evening rush forty-six trains passed each junction point. During fifteen minutes of the morning rush fifty-four trains passed each junction point. For one hour trains are operated on an average headway of nineteen seconds. Between 5 p. m. and 7 p. m. 54,000 passengers take trains on the Union Loop. Between 5:15 p. m and 6:15 p. m. 40,000 take trains on the Union Loop.

THE SLEET QUESTION

Much interest was manifested in the precautions taken to prevent the accumulation of sleet, and many questions were asked Mr. Brinckerhoff about this. The Metropolitan Elevated uses wire brushes in advance of each contact-shoe, and if the ice gets very thick, as happens about once in two years, a man is put on each motor car to hold a spud or hand scraper on the third rail in advance of the contact-shoe. Ordinary gardeners' spuds are used, being bought in quantities from the regular hardware dealers. The brushes, however, Mr. Brinckerhoff stated, would take care of any ordinary sleet. The Lake Street Elevated uses a scraper with several blades instead of a brush. This was devised by the former general superintendent of those roads, Frank Hedley. It is very efficient, but could not be used on the Metropolitan Elevated because of the wooden sections in the third rail, where the third rail is interrupted, and where it is necessary to have an incline for the contact-shoe to run up onto the level of the third rail. The incline approaches to the third rail at the special work on the Metropolitan are all made of wood, and a scraper would destroy them. While there is no doubt as to the efficiency of the Hedley scraper it more than is necessary for ordinary work.

In regard to the use of brine to prevent the accumulation of sleet the corrosion caused by the brine was very objectionable, mainly on account of its effects on the rail-bonds. It also had a tendency to coat over the insulators and cause leakage.

The feeders on the Metropolitan Elevated consist of iron rails run in boxes between the tracks. Recent third-rail construction had been done principally with a special rail having a low percentage of carbon, and consequently too soft to be fit for track rail work. By using a rail with a low percentage of carbon a conductivity of 1 to 7, as compared to copper, could be obtained, while with the ordinary composition of track rail the ratio of conductivity was only about 1 to 10.7.

THE DEAD MAN'S HANDLE

Feb. 12, 1903.

Editors Street Railway Journal:

A certain practical question has come up in connection with the operation of the type-M controllers, made by the General Electric Company, for train control, and recommended also for all very heavy motor equipments where the use of a cylinder controller is inadvisable because of the heavy currents that must be broken at the controller. The controller handle of the master controller on the type-M control has what is commonly known as the "dead man's handle," which is a knob or button placed on top of the controller handle, which button must be depressed as long as current is on the motors. Whenever this button is released the current is cut off from the motors, without regard to the position of the controller handle at the time. The object of this, of course, is to shut off the current in case the motorman should drop dead at his post or become otherwise disabled. I think it is admitted by everyone that this provision made by the manufacturers to prevent accidents through the disabling of the motorman is a wise one. It has at various times been urged against the usual practice in electric traction as compared to steam locomotive practice, that the former places the entire control of the train in the hands of one man. This objection the "dead man's handle" overcomes. However, when we get this type-M control into practical operation on interurban lines where there are long runs without shutting off the current, there come at once complaints from some of the motormen that the holding down of this controller-handle button constantly is a nuisance, and adds to the daily wear and tear on a motorman more than is necessary. Now comes the question, whether the superintendent is justified in allowing the motorman to plug up this "dead man's handle" so that it will be inoperative, and so that the motorman can take his hand away from the controller while the current is turned on. Is the safety to passengers which is given by the "dead man's handle," when it is operative, of less value than the added comfort to the motorman when the "dead man's handle" is plugged up? I think the majority of superintendents do not want to add to the burdens of the motorman any more than is necessary. At the same time a road is not being run for the comfort of the motorman, especially when the safety of passengers is at stake. I think an exchange of opinions on this question right at this time, when the "dead man's handle" feature is being introduced, may be worth while.

Superintendent.

ELECTRIC RAILWAY ENTERPRISE IN PORTO RICO

Mention has already been made of the plans for building an electric railway system in Porto Rico, and the awarding of the contract for this installation to the Vandegrift Construction Company, of Philadelphia. J. N. Vandegrift, vice-president of the company, who has just returned from the island, where he has been engaged in directing preliminary operations, announces that the route has been selected and the general plans adopted for the equipment.

The line of railway is 80 miles in length, extending from San Juan to the valley of the Rio Loiza, and thence through Caguas and Cayey, the former being in the center of the sugar and the latter in the heart of the tobacco and coffee belt. From Caguas to Coamo, a distance of about 18 miles, the line will be constructed with comparatively heavy grading, and the Cordillera will be crossed between these points, with a maximum ascending and descending grade of 4 per cent and a summit tunnel of about 1100 ft. in length. From Coamo the line passes Coamo Springs, with its famous thermal baths, where a pretentious hotel has obtained a popularity for many years throughout Spain and the West Indies. The line will be constructed from Juana Diaz to Ponce, a distance of about 8 miles, upon the side of the Military Road, and will also extend from the Plaza at Ponce to the Playa or Port of Ponce.

The roadbed throughout will be constructed on standard gage, with 70-lb. T-rails, connected by No. 0000 Protected copper bonds. Standard ties, spaced 2 ft. centers, will be used, partly of creosoted pine and partly native woods. The line will be ballasted throughout with rock.

There will be several small bridges of 20 ft. to 40 ft. spans, which will be constructed of steel girders, with masonry or concrete abutments, and one large bridge near San Juan, about 1500 ft. in length, which will be constructed of steel girders, with concrete steel tubular piers, supported by pile clusters.

The overhead construction will consist of standard flexible bracket construction, except where centers of streets in the towns along the line are occupied, and then span construction will be employed. A No. 0000 trolley wire will be used, in connection with a three-phase alternating-current transmission line.

Water-power will be utilized at two points in the interior of the island to generate electricity for railway, industrial and lighting purposes.

The power plant at Comerio Falls, on the Rio de la Plata, will develop about 3000 hp. The dam will be about 200 ft. in length and about 40 ft. in height, and will be connected with the turbines at the power station by a short canal and steel pen stocks, feeding directly twin turbine horizontal water-wheels, direct connected to two 400-kw generators, alternating at 400 volts. Step-up transformers will raise the voltage to 15,000 volts and 30,000 volts for the transmission lines, depending upon the distance of the railway section to be fed. An additional dam will be erected on the Rio Loiza, near Caguas, about 600 ft. in length and 30 ft. high, which, with the storage reservoir, will develop about 5000 hp. A canal about 900 ft. long will connect with pen stocks at the power station, which will contain similar turbine and electrical units to those described. This dam will be convex in plan, to resist the current of the river during the rainy season, and will embody the most substantial masonry construction, as will the power station and foundations. The latter will be of a concrete in a monolithic block for the five 1000-hp units proposed to be installed.

The cars will be of the modern interurban high-speed type, about 45 ft. in length, with center aisles, cross reversible seats, smoking compartments, parcel racks, toilet and all conveniences of steam coaches. The cars will be equipped with four 50-hp motors each, designed to maintain a maximum speed of 50 miles per hour, thus enabling the through run to be made between San Juan and Ponce in three and one-half hours. At least sixteen of these cars will be at present provided with two additional Pullman buffet cars for the rapidly increasing tourist travel which is developing in the island. The major part of the traffic will, of course, be freight business from the interior of the island, including sugar, coffee, tobacco and fruits to the coast ports at San Juan and Ponce, for foreign export as well as for local consumption in these two cities. It is proposed to install at present, for the handling of this business, fifteen large freight motor cars, and at least thirty standard flat cars and box cars, besides two electric locomotives. The line will serve 260,000 people, passing through the heaviest populated section of this densely populated island, which has about the same area and population as the State of Connecticut, and is, at present, without passenger transportation, except in coaches at the rate of 10 cents per mile, with freight transported by ox teams at an average charge of 30 cents to 75 cents per ton per mile. As the exports from Porto Rico during the last two years have been increasing at the rate of 50 per cent over those of the preceding year, the freight business is likely to be enormous. The region through which the road passes is one of the most fertile and productive sections of the globe; but has, for centuries, been retarded in its development by adverse political conditions and entire lack of modern transportation facilities. The products of the island besides sugar, tobacco and coffee are oranges, bananas, pineapples, cocoanuts and all known varieties of tropical fruits, and the culture of fruit and the planting of large groves of oranges is being rapidly pushed, now that free trade with the United States has been secured. The franchise to the Vandegrift Construction Company for this railway and industrial enterprise, including lighting and industrial power, allows three years for the completion of the work. The cost is estimated at $2,800,000.

HARVARD ENGINEERING SOCIETY

At the regular meeting of the Harvard Engineering Society, in Cambridge, Mass., on Thursday evening, Feb. 19, Chief Engineer Howard A. Carson, of the Boston Transit Commission, delivered a lecture upon the East Boston Tunnel, and showed stereopticon views of Boston Harbor, South Boston and East Boston, Fort Winthrop, the Cunard Docks and numerous views illustrating methods of tunnelling. A brief history of the development of the tunnel project and the work of the Boston Transit Commission was given, including the litigation which greatly delayed actual work on the tunnel. It was originally planned to run the tunnel beneath the harbor in such a way as to strike the existing subway at Hanover Street, and effect a physical connection with it at that point. The distance through to Scollay Square by this route was 1.4 miles. When the tunnel reached Lewis Street, on the East Boston side of the harbor, the route was changed, so that the tunnel now passes from Maverick Square by Lewis Street, across the harbor to Long Wharf, and thence up State Street and Court Street to Scollay Square. Last week the Boston Elevated Railway Company gave permission for the tunnel to pass under the existing subway. At first it was thought desirable to connect the tracks of both subway and tunnel at Scollay Square, but a closer study of the traffic problems brought out the conclusion that no advantage would be derived from such a course, on account of the present large traffic of the subway and the undesirability of adding more cars or trains to its already heavily burdened tracks. The grade from Maverick Square west is 5 per cent, as the law fixes the exit point and depth at the Harbor Commissioner's Line. The top of the tunnel is 5 ft. below the bottom dredging of the harbor, in order to escape anchors, and to be free from accident in case a vessel should sink over the tunnel itself. Under the harbor the grade is one-half of 1 per cent, with a 2½ per cent grade coming up under Long Wharf.

Stations are located at Maverick Square, Atlantic Avenue, corner of State Street, Congress Street at the old State House, and Scollay Square. Thus when the present transportation facilities are extended by the addition of the Washington Street Subway and the East Boston Tunnel, there will be not over a quarter of a mile walk between any office in the business center of Boston and the nearest subway or elevated station.

Mr. Carson then gave a brief sketch of the history of tunnel building since the time of Brunel, who finished the Thames tunnel in 1842, describing the improvements in method adopted by Cochran, Barlow and Greathead, the latter being the first to use screw-jacks for forcing the construction shield ahead. Among the tunnels which he mentioned were the City and South London, which was started in 1886, with tubes 10 ft. 2 ins. to 10 ft. 6 ins. inside, and 3½ miles long, and the Hudson River Tunnel of 1879, which was begun by Colonel Haskins, who used compressed air in its construction. He stated that the walls of the new East Boston Tunnel are of concrete, and that the Tremont Street subway in Boston was the first tunnel in the world to be built by running a roof shield inside the walls. He then closed his lecture by a description of tunnelling in connection with the Boston sewage system.

INNOVATION IN ELECTRIC RAILWAY SERVICE

There is now before the Massachusetts Legislature a bill which, if it becomes law, will establish an important precedent in future electric railway work in that State. The bill accompanies the petition of Frederick Winsor, John B. Paine, Chas. J. Paine, Jr., W. B. Chamberlin and H. C. Sweetser, asking to be incorporated as the Concord & Chelmsford Street Railway Company, to run from Concord to Carlisle and Chelmsford, there to connect with the Northern Street Railway for Lowell. The Middlesex School for Boys is located on the road from Concord to Lowell, via Carlisle and Chelmsford, and is about 3 miles from Concord Square. The only way in which those residing at the school can now reach the steam railroad stations, the town hall, churches, stores, postoffice and banks in Concord village is by carriages, barge transportation or walking, and all freight, merchandise and supplies for the school have to be teamed over the road. Mr. Winsor is head master of the school.

The village of Carlisle is also practically cut off from all connection with the outer world except by similar conveyances. Scattered along the line of the proposed street railway are numerous farms, and if the new company should secure the right to carry freight, which it asks, it would be a great relief to their owners, as it would enable them to reach the market more easily. All of the classes here referred to are extremely desirous that the road shall be built.

The promoters of the enterprise assert that electric street railways are now here to stay, and that the points for legislatures and municipal boards to consider now when charters and locations are asked for have narrowed down to the following: Are the terms of the proposed charter reasonable? Are the public interests properly safe-guarded? Do public convenience and necessity require the construction of this road? Are the proposed route and locations the best available? Will this road be built and operated?

The petition of the company which asks to be allowed to carry freight is not now as novel a proposition as it was in Massachusetts a few years ago. The steam railroads are naturally objecting to this feature through self-interest, but there seems to be no valid reason why this and other electric railways should not be granted the privilege under proper regulations. It would, of course, be unfair to the steam road to allow any electric road to take away a freight business which the former was already doing without imposing similar restrictions upon the latter. It has been pointed out, however, that a large class of people would be greatly benefited if the electric roads were allowed to carry freight; that is, farmers and market gardeners. There is no reason, for instance, why the farmers and market gardeners of Concord, Carlisle, Chelmsford and other Middlesex County towns and similar communities should have to team their products 20 miles or 30 miles to market two or three times a week, and some of them daily. There ought to be facilities for daily shipment on electric freight cars running close to their farms, and it is undoubtedly true that the near future will see such lines established.

The second important feature of the bill is the provision to give the proposed company permission to run over private land, which has been taken by right of eminent domain. Counsel of the steam roads of the State vigorously oppose this proposition, but the advocates of the bill urge it on the ground that private right of way is safer and cheaper than public highway. Furthermore, it is pointed out that permission to carry freight is now not an unusual request, and so far as the taking of private land by the right of eminent domain, a similar charter was granted to the New York & Berkshire Street Railway Company by the Legislature of 1902, and the bill was approved by former Governor Crane, who is famous the country over as a keen business man and able guardian of the people's interests. It is argued that certain property owners, over whose land the company wishes to run, are so strongly opposed to any electric railways being built near their premises that the taking of the land by right of eminent domain offers the only feasible means of securing a location for the tracks. The length of the proposed line is about 10 miles, and for the larger part the company wishes to run over private land. Public convenience and necessity require the construction of the proposed road and there is a strong probability of its being built.

NEW RAPID TRANSIT BILL

Senator Elsberg has introduced a New York City rapid transit bill, which, he declares, is not intended to affect existing rapid transit work or the provisions of the present law with respect to either the contract already made or the railroad now in process of construction. The proposed bill, however, gives broader powers to the Rapid Transit Commission with respect to the extension, obstruction and operation of rapid transit railroads in the future, but it is not aimed at the constitution or organization of the present Rapid Transit Commission.

Senator Elsberg explains that under the present law the railroads to be built and owned by the city must be handed over to private control, theoretically for not less than thirty-five years, practically for seventy-five years, as in the case of the road now under construction. This compulsory alienation of city control over its own railroads is eliminated by separating the construction contract from operation and leaving to the Commission all the power and authority it now possesses to lay out and construct new roads at the city's expense.

The bill adds to its powers in this regard by eliminating the provision of the present law, which requires a cash deposit of $1,000,000 from every contractor in addition to whatever bond the Commission may require. The whole matter of cash deposit is left to the discretion of the Commission. This will make possible the letting of contracts by sections and the saving in the future to the city of millions of dollars of construction work. The Board of Rapid Transit Railroad Commissioners is to have full control of all future roads and their appurtenances when constructed.

It may contract for the equipment at private expense and for operation, for a period not exceeding twenty years; or it may equip at the expense of the city and contract for operation for a period not exceeding ten years, with renewals in either case.

OFFICE CONFUSION

BY ACCOUNTANT

To one who has had the opportunity of visiting many street railway offices—accounting and operating—there comes the thought how these offices appear to other eyes than his own. And he also wonders how they appear to those who have built and arranged them as they are, or, in other words, to those who are responsible for the present condition under which the companies meet their public and their visitors from other localities.

At first thought it would seem that all railway offices would, of necessity, be more or less alike—that the nature of the business would make them so. But the actual facts prove that this is far from the fact. Individuality plays an important part, and it is not as far from the truth as it seems to say that the general condition of the company and property can, in a measure, be gaged by the condition of its general offices.

As an instance, not long ago the writer had occasion to visit the offices of an important railway company. After entering a large and splendid building, which was entirely devoted to the company's purposes, he could not find any sign or directory of the location of the different departments nor any one to give such information. So it became necessary to try doors—without signs upon them—until some one was found to assist in the location of the officer wanted. Now, this company is in a prosperous condition, but its operation is more or less "happy-go-lucky," and so is the office.

It seems that a company would always serve its own interest by thinking how the public is going to find its way around when bent on doing business with it in its own home.

The most pronounced discord in office arrangement is the habit of piling packages and books under desks, on the top of cupboards, on window sills and in other prominent places. These packages are usually of various sizes and always dusty, and they are nearly always subject to doubt as to what is in them. I call this a habit, because there is rarely much excuse for it. Every office has a place for filing records, sometimes not large enough, it is true, but it is safe to say that there is always a corner or other vacant spot into which shelves may be placed for the receipt of whatever it is necessary to save but is not valuable enough to file in the vault. Such open shelves are easily hung with roller shades or soft curtains to keep out the dust—the expense is small compared with the benefit derived.

Papers so filed should be carefully labeled. This is of as much importance as the labeling of a book upon its back, frequently more so.

This brings up the relative merits of filing papers in packages wrapped and labeled or in compact pasteboard boxes labeled on the ends. It is a subject for each company to decide as the element of expense enters into the question, but the special boxes have advantages in the matter of space filling and ease of handling which sometimes offset other expense.

I am also led to wonder, while on the subject, if the office manager has ever gone through his office and opened every drawer of desks and tables as a sort of inspection tour? There are matters always covered up, and the result of such an inspection will be a surprise, I assure you. Not so very long ago the writer made an examination of a property whose office was in such condition that little headway could be made until the office force took a half-day off and got the safe, vault and desks in something like order. I am convinced that this example is not a wide exception, but only in degree.

The first excuse for confusion is lack of time and lack of office help, but it is a rare case where the habit of proper filing takes more time and more help than the lack of it. The habit of confusion is a bad one, and usually, if not always, the office manager is the one at fault, for it is well understood that his ideas govern the methods of work. The habit of system and precision is easily formed, and in the end it saves money to the extent of ease in locating papers, and it is not unknown that a clean and well-regulated office is an asset of the office manager. I know of one instance where an orderly office—all else being equal—gained an invitation to join another company to an office man who, with the impetus gained from the new connection, coupled with his orderly habits, has since materially widened the space between himself and the man with whom he was compared.

It is not necessary to enlarge upon or discuss the relative merits of cleared flat-top desks and filled roll tops, for each may be clean or may be filled. Each has advantages of its own, but it is well to touch upon the subject that in plans for new offices consideration may be given it.

It should be borne in mind that the office is not simply a place in which to do the office work of the company; it is also the place where the public is received, and it is an important point of contact where courtesy and cleanliness will have much to do in solving or dissolving difficulties.

There is a well-known saying that a man entering an office in clean clothes, clean linen and with a business-like demeanor, will always receive more consideration than one whose linen is soiled, and whose face is dirty and unshaven. Can this not be applied in reverse order? I think it can.

Many companies at the present time prohibit smoking on the part of the office employees, for the reason that it is not only offensive in a closed room, but it is expensive in the point of companies' time consumed keeping the tobacco lighted and picking it up and laying it down. But the cuspidores for the chewers are just as large and numerous under your feet as ever.

From boyhood up to be "business like" is impressed upon the youngster as one of his best targets at which to shoot his new ideas, but later, in the anxiety to get results, office appearances are liable to be overlooked as part of the definition of business like.

May be it is not fair to compare the order of one's home with one's office, but it is worthy of some thought, and at any rate the office is the home of the company.

It may be said that these things do not have any effect upon the success of the company, but I have not touched upon the mental attitude of the clerks nor of the officers themselves while working in clean, orderly offices, as compared with those in confusion, nor upon the ultimate effect upon the work itself, the consideration of which will be answer enough.

There is no desire to scold in this article, but simply "to stir up by putting in remembrance" a condition which has grown up as a habit and been overlooked. Details are watched very carefully at the present time, and this is an important detail.

NEW POWER HOUSE AT DUBUQUE

Among the important improvements which will be made by the Union Electric Company, of Dubuque, Ia., the coming season is a new power house for railway and lighting purposes. There will be two 2500-volt three-phase alternating direct-connected units of 500-kw capacity, and two direct-current railway units of the same capacity. Sargent & Lundy, of Chicago, are making the plans for the new station. F. L. Dame, formerly of Tacoma, took charge of this property recently as general manager.

About $400,000 will be expended in improvements, including the new power house and also a car house and additions to park facilities, together with some new rails.

The Twin City Rapid Transit Company has closed a contract with the Christensen Engineering Company for 176 air brake equipments, which will completely equip all of the Twin City Rapid Transit Company's double-truck cars.

FINANCIAL INTELLIGENCE

The Money Market

WALL STREET, Feb. 28, 1903.

A general hardening of the rates for time money during the week is the natural outcome of the very rapid depletion in bank resources which has been in progress since the beginning of the month. Last Saturday's Clearing House statement showed that this process has by no means exhausted itself. An expansion of $13,000,000 in loans combined with a loss of over $3,700,000 in cash, brought down the surplus reserve to $9,000,000, which is not only well below the corresponding figure of last year and the year before, but is the lowest for the period in the last fourteen years. The reasons assigned for this condition are, first, that the interior markets have begun to draw freely upon their New York deposits, as they are accustomed to do at this season; and, second, that heavy borrowings are in progress outside the Stock Exchange, the purpose of which is not altogether clear. Either the financing of syndicate undertakings are the cause of these heavy demands or else loans are being shifted in quantity from Europe to this country, taking advantage of the ease in home money rates as compared with those abroad. Very likely it is neither one nor the other of these factors, but both of them in a certain degree, to which the recent loan increase is assignable. Obviously, however, a halt must very soon be called to this wholesale creation of new bank liabilities or the situation in the money market will become uncomfortable. Already the average of loans from sixty days to four months, which a fortnight ago was 4 per cent, has risen to 4½ per cent. The interior currency requirements, moreover, must be expected to continue for another month at least, and the outgo through the Treasury will more likely increase than diminish. If on top of this loans were to be extended at the pace of the last four weeks it would very quickly use up the remaining surplus reserve and bring about a more or less serious pinch in the market. We do not, however, expect to see this contingency actually realized. In the first place the rise in money rates that has already occurred has eased the exchange market sufficiently to preclude all idea of gold exports. Secondly, we are in a position now to draw exchange against anticipated credits abroad, that is to borrow from Europe, and this will act as a check upon our loan expansion if it does not produce some decrease of loans. Finally, the higher money market which is bound to accompany the low bank reserves will modify the cash withdrawals by other domestic centers and will postpone the collection of cash by the trust companies in compliance with the recent decision requiring them to keep reserves of their own. Surplus will probably continue to shrink for the next few weeks, and money rates will doubtless work higher, but the present resources on hand ought to suffice to tide over the interval before the season of increasing money supply and rising bank reserves in April, May and June.

The Stock Market

During the four business days which have intervened since the last of these articles nothing of importance has occurred to change the position of the general stock market. Prices as a rule have had a downward inclination, but there have been frequent interruptions in the shape of sharp recoveries and certain stocks have moved rather vigorously against the general tide. In this last-named category may be mentioned in particular Copper, Sugar, the Wabash issues, St. Louis and San Francisco and one or two securities of less note. In most of these instances special incentives have appeared which would account for their advance even in face of an unfavorable market position. But it is also clear from these individual advances, as well as from other indications, that the present market is pretty well under control of the cliques, and that the supply of stocks which might be dislodged by a decline is comparatively small. This being the case, good judges do not look to see any bear campaign make much headway. They admit that the chances are against any general rise for some little time, but they expect to see irregularity and inertia occasionally relieved by rapid movements in specialties, rather than any important weakness. The money market is now, and seems likely to be, the controlling influence in the speculation. When this difficulty is removed, as is hoped for, in four weeks or so, it will be time to consider the prospects for a reversal of the upward movement which outside financial and business conditions plainly justify.

Interest in the local traction stocks has centered around the "raid" upon Metropolitan shares, which met with some temporary success in the closing days of last week. The prompt denials of the sinister rumors which were circulated on that occasion has convinced everyone that the whole operation was nothing more than a bear manœuvre shrewdly planned and skilfully executed. There is certainly nothing in the published earnings of the Metropolitan Company which need have frightened genuine holders into selling. On the contrary, advantage was no doubt taken of the break to pick up some cheap stock. The pressure against Metropolitan also extended to Manhattan, which has been weaker than for some time past. The market for this stock has reflecting liquidation by speculators wishing to shift their capital into other quarters which seem to have better promise of activity. Brooklyn Rapid Transit showed more resistance than any of the others to the selling movement. Its action tends to inspire confidence in the ability as well as the intention of the inside interests to support the stock whenever circumstances require it.

Philadelphia

The rumor which was used to depress Metropolitan stock in New York was not without its effects upon the Philadelphia market, owing to the identity of interests between the traction properties of the two cities. Rapid Transit was the only one of the three leading issues, however, to show any weakness. The stock, which had risen to 15⅜ a week ago, broke sharply on Thursday to 14¾, and did not recover its lost ground. On the other hand, Philadelphia Traction held very steady at 99, and Union Traction at 47⅝. Accumulation of both of these stocks appears to be continuing. There were no other important transactions in the street railway securities during the weeek. Sales were reported in Railways General at 4½, Consolidated Traction of New Jersey at 65, and United Traction of Pittsburg preferred at 51, all of them unchanged from the last previous quotations.

Chicago

The latest gossip in connection with the Chicago traction deal is that J. P. Morgan & Company have been quietly picking up City Railway shares and have acquired a large block at private sale recently. This rumor finds as yet no confirmation, however, outside of speculative circles. A few lots of the stock have changed hands in the open market, some of it as low as 221, but the greater part at 225. Union Traction trust receipts, issued against deposits of the stock with the Protective Committee, were traded in for the first time this week, selling at 9¾ and 10. Union Traction common shares have been again rather heavy around 10. Desultory liquidation continues in Lake Street Elevated, with sales as low as 6¼ and only a fractional rally thereafter. Metropolitan issues, reflecting neglect more than pressure to sell, are weak, the common dropping to 34½, later recovering to 35⅛, and the preferred declining from 85½ to 84½. Northwestern stocks are also heavy, with scattering sales at 31 for the common and 70 for the preferred.

Other Traction Securities

What appears to be a fresh attempt to start speculation in the Massachusetts Electric stocks has proceeded with difficulty owing to the dullness of the general market. Nevertheless, the common got up at one time to 37¾, which is two points higher than it was two weeks ago, while the preferred rose from 92 to 92⅞. In both instances business was unusually active. Boston Elevated again did nothing, simply holding its own around 151. West End common sold at 97 and 96⅞, and the preferred at 115½ and 115. Profit-taking has been a feature in the United Railway securities on the Baltimore Exchange. Although the stock has hardly had any rise to speak of lately, it reacted from 14 to 13¼ on very light sales. The income bonds meanwhile fell off from 68¾ to 68½, and the general 4s from 97 to 96¾. Norfolk Railway 5s, after a long spell of inactivity, suddenly jumped up three points to 113. Nashville Railway shares sold at 4½, City Passenger (Baltimore) 5s at 108, Anacostia and Potomac 5s at 100, and Charleston Electric Railway 5s at 106. On the New York curb St. Louis Transit, after holding steady for a time at 30, broke suddenly on the sale of 300 shares to 28¾. Interborough Rapid Transit (50 per cent paid) sold down to 111 and then rallied to 111¾, while the full paid stock rose from 112 to 112½. American Light and Traction stocks

were in some demand, the common selling at 60 and the preferred from 95 to 96. San Francisco 4s, interest on, were comparatively steady around 81. Other sales for the week comprised: New Orleans preferred at 42 to 42½, the 4½ per cent bonds at 78½, Brooklyn City Railroad at 245½, Brooklyn Rapid Transit new 4s at 86, Nassau Electric 4s at 83½, St. Louis Transit 5s at 95 to 95½, United Railways of St. Louis 4s at 84¾, and Washington Traction 4s at 80.

Tractions were more active on the Cleveland Exchange last week. Sales numbered 2062 shares. The new Northern Ohio Traction & Light stock had a decided run, and sales numbered 1508 shares, advancing from 19½ to 24, with a small lot at 25. In view of the remarkable increase in earnings for this road, friends of the stock think it is due for a further advance. Cleveland Electric and Cleveland City were both weak with nothing to account for it. The former sold at 85 for 200 shares, the previous week's range being from 86½ to 88. A small lot of Cleveland City sold at 101¾, a decline from 105. The new Cleveland & Southwestern, which succeeds the Cleveland, Elyria & Western, established an initial quotation of 30, 100 shares selling at that figure. There were bids for more, but none offered. Two small lots of Lake Shore Electric common sold at 14 and 14½, and two small lots of Western Ohio receipts at 26¾ and 27.

On the Cincinnati Exchange tractions were unusually active. Sales numbered about 5500 shares of stock and about 250,000 worth of bonds. Cincinnati Street Railway sold to the extent of 1898 shares, ranging from 142 to 143. Cincinnati & Hambleton common sold for 1871 shares at from 44 to 44½. Cincinnati, Dayton & Toledo 5s had a pronounced run, and $191,000 worth changed hands at between 87½ and 88¾, the latter the closing figure. The Cincinnati, Dayton & Toledo stock sold to the extent of 372 shares, ranging from 38 to 39. Toledo Railway & Light Company sold to the extent of 797 shares, at from 35 to 36⅛. Columbus, Delaware & Marion 5s sold to the extent of $47,000 worth, all at 101.

Securities Quotations

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

	Closing Bid	
	Feb. 17	Feb. 24
American Railways Company	51½	51
Aurora, Elgin & Chicago	a36	a32
Boston Elevated	150½	150¾
Brooklyn R. T.	70¼	68¾
Chicago City	220	220
Chicago Union Tr. (common)	10	10
Chicago Union Tr. (preferred)	44	44
Cleveland Electric	86	84¼
Columbus (common)	—	70
Columbus (preferred)	104	105
Consolidated Traction of N. J.	64¾	64¾
Consolidated Traction of N. J. 5s	108	108¼
Detroit United	88¾	86
Electric People's Traction (Philadelphia) 4s	98	98
Elgin, Aurora & Southern	50¼	51½
Lake Shore Electric	14	—
Lake Street Elevated	7⅛	6¼
Manhattan Railway	143⅞	141⅞
Massachusetts Electric Cos. (common)	36½	36¼
Massachusetts Electric Cos. (preferred)	92¾	92
Metropolitan Elevated, Chicago (common)	35	34
Metropolitan Elevated, Chicago (preferred)	*85½	84½
Metropolitan Street	139½	137¼
New Orleans Railways (common)	14½	14½
New Orleans Railways (preferred)	40	42
North American	115	116
Northern Ohio Traction & Light	20¼	23¼
Northwestern Elevated, Chicago (common)	—	31
Philadelphia Rapid Transit	15½	14⅝
Philadelphia Traction	98¾	99
St. Louis Transit (common)	29⅞	29
South Side Elevated (Chicago)	110	109
Syracuse Rapid Transit	a32	a32
Syracuse Rapid Transit (preferred)	a80	a80
Third Avenue	125	124
Toledo Railway & Light	a36⅛	a36
Twin City, Minneapolis (common)	121⅛	119
United Railways, St. Louis (preferred)	—	—
United Railways, St. Louis, 4s	84¾	84¾
Union Traction (Philadelphia)	47⅝	47⅜

a Asked. * Ex-Div.

Iron and Steel

The tendency toward firmer prices in pig iron seems to have been emphasized, if anything, during the week. The bad weather has impeded the movment of railway traffic, still further intensifying the already serious freight blockade. This has reacted upon the iron market, increasing the difficultics of obtaining prompt delivery of raw material, restricting production of pig iron and stiffening prices. The Iron Age notes, however, that consumers are still clinging to the idea that they can obtain better terms for their second half-year requirements by waiting. Steel is quiet, with some inquiry for foreign billets, but no new business. Bars are active, and so is plate and structural material. In the last-named, builders have about given up all hope that they can obtain easier prices by delaying their purchases now. Quotations are unchanged on the basis of $22 to $23.50 for Bessemer pig iron, $30 to $31 for Bessemer steel, and $28 for steel rails.

Metals

Quotations for the leading metals are as follows: Copper, lake, 12.90 to 13 cents, tin 29½ cents, lead 4⅛ cents, and speiter 5 to 5.05 cents.

AMENDING THE PENNSYLVANIA RIPPER OF 1901

Senator Focht, one of those who put through the famous "rippers" in Pennsylvania in 1901, has introduced in the Legislature a bill to amend the elevated and underground railway act of June 7, 1901. The original act says that corporations may construct branches and extensions, but shall first file in the office of the Secretary of the Commonwealth a resolution of the board of directors approved by the stockholders giving the route of such branches and extensions. The part of the act is amended so as to provide that corporations incorporated under the act may construct branches and extensions, but that these shall first be filed in the office of the Secretary of the Commonwealth a resolution of the board of directors approved by the stockholders giving the route of such branches and extensions, and every company incorporated under the provisions of the act is authorized and empowered, with the consent of the local authorities of any city, borough or township within which said railway is located, to abandon any portion of its road without prejudice to its right to operate or complete and operate the remaining portion of its railway by appropriate action of its board of directors with the aproval of a majority of its stockholders. The amendment further provides that every company incorporated under this act shall have the right to use any part or all of the tracks of any other company incorporated under this act, provided the consent of such other is expressed by a resolution of its board of directors and ratified by a vote of a majority in value of the stockholders of the company. Such use may be exclusive or in conjunction with such other company as the said companies shall agree, and companies incorporated under the original act are to have the right to merge their several rights, privileges and franchises with other companies so incorporated whenever in the opinion of the directors and stockholders of such companies it shall be for their mutual interest. However, such merger is not to take place until a resolution to that effect has been adopted by the boards of directors of the respective companies. It is also provided that "whenever two or more roads shall be merged the commencement of work in good faith upon any part of the route of any of such merged roads shall be held to be a commencement upon all the merged lines or roads within the meaning of this act and a complance with the provisions hereof as to the time within which work must be commenced, provided, however, that the work shall be completed within five years upon all the said merged roads unless the time for such completion shall be extended by the proper local authorities of the city, borough or township within which the said roads are located."

NO STRIKE ON THE CHICAGO CITY RAILWAY

Danger of a strike of the employees of the Chicago City Railway Company has been removed by the action of the employees in deciding to submit their differences to a board of arbitration. The arbitrators are to be selected within a few days, and they will begin at once the work of taking testimony. A joint committee of the union appeared before General Manager McCulloch, of the company, on Feb. 20, and each of the committee was presented a written reply containing the arbitration offer. After a few hours of deliberation the employees decided to accept the offer.

NEWARK GRADE CROSSING ACCIDENT

A trolley car crowded with boys and girls on their way to school was wrecked at Newark, Feb. 19, on a grade crossing at the foot of the slight hill in Clifton Avenue. The rails were slippery and the motorman was unable to control the car. It crashed through the railroad safety gates that had been lowered, and out on the Delaware, Lackawanna & Western Railroad tracks in front of an eastbound express train. The trolley car struck the locomotive in front of the engineer's cab, and the train tore the car to pieces, killing eight of the young passengers and injuring twenty-six more, some seriously. One has since died from injuries.

The crossing where the accident occurred lies between two hills, over which the tracks of the North Jersey Street Railway Company run along Clifton Avenue. On the south of the railroad the hill rises at a grade of about 5 per cent for a distance of a little more than one block, or to a point a short distance beyond Orange Street. On the north the incline is about the same, but in that direction it rises for a little more than three blocks.

Trolley cars going north or south on the Clifton Avenue line are required to stop at the bottom of the hill before proceeding across the railroad tracks. Crossing gates are lowered at the approach of a train, but whether these gates are up or down, the stop must be made, according to the rules of the street car company, and the conductor must go ahead and see that the tracks are clear before the trolley car crosses. The slippery rails made all of these precautions worthless, as the motorman lost control of the car absolutely.

An investigation has been in progress since the accident, in which business men of the city and the officials have co-operated. A meeting was held before the Board of Works, at which Vice-President David Young, Superintendent Charles M. Shipman and Trackmaster A. W. Pratt, of the North Jersey Street Railroad Company, and ex-Chief Engineer McFarland, of the Delaware, Lackawanna & Western Railroad, appeared.

Mr. Young produced a contract signed in June, 1898, by Superintendent Reasoner, of the railroad company, in which it was agreed to co-operate with the trolley company in installing at the Clifton Avenue crossing a derailing device, to be locked automatically by electricity and operated in connection with the block signals of the steam road whenever a train approached within 1200 ft. of the crossing. That would make it impossible, according to Mr. Young, for a trolley car to go within 75 ft. of the tracks at this crossing until a train had passed, when the rails could be switched into place again. Mr. Young further stated that a similar system had been installed at the Bloomfield Avenue crossing of the Lackawanna and the trolley line, and had worked well since 1899. The switches for the system, Mr. Young continued, had been hauled to the Clifton Avenue crossing, but Chief Engineer McFarland had refused to co-operate with the trolley company, and the system never was installed. The switches finally were hauled away.

Mr. McFarland denied that he had ever heard of such an agreement, and said that the device described could not be operated successfully where there were trains passing every few minutes throughout the day.

"When a signal showing that a trolley car was approaching was seen by our engineers," Mr. McFarland is quoted as saying at the hearing, "they would heed it were the signals made not too frequently. But where they were there every few minutes, as at Clifton Avenue, the engineers soon would disregard the signals. They would simply say: 'Oh, that's only a trolley car; it will be across before I get there.' "

"Do you mean to say that your engineers would deliberately disregard a danger signal?" exclaimed Mayor Doremus, in amazement.

"Well, human nature is human nature," was the reply. "I don't believe in making the danger signal too common."

It was finally decided by the Board that the steam and trolley railroad officials should confer and report to the Board a plan for installing a derailing system at the crossing immediately.

When asked after the meeting regarding the statements that no evidence of sanding could be found on the rails on which the trolley car had slipped, Superintendent Shipman said:

"The forward part of the car was smashed to pieces, and I cannot say of my own knowledge whether there was any sand in the sand-box at that end or not, but I do know that the sand-box at the rear end of the car was two-thirds full of sand, for I myself filled my hat with sand from that box after the accident, to put on the rails to enable the assisting car to haul it away. All our sand is heat dried, and runs freely from the box. Furthermore, I want to contradict the report that the car was fitted only with a hand-brake. It was fitted with an electric brake of the latest pattern. There is not the slightest doubt but that the wheels of that car were locked and that it slid along as would a sled. No brake could stop it. Furthermore, we not only have sand in our cars, but in bad weather we have special men stationed at bad declivities like that at Clifton Avenue, whose business it is to keep the tracks sanded. We had a man there Thursday morning, and there was sand on the tracks."

On Feb. 24 the special committee appointed by the Board of Trade to investigate the cause of the trolley wreck submitted its report to the Grand Jury with an urgent request that immediate action be taken by that body. At a meeting of the Board of Trade a communication from a member of the committee was read, charging the company with negligence.

ANOTHER ACCIDENT AT ORANGE

A trolley car of the Orange & Passaic Valley Railway, laden with men and women on their way to work, crashed through the lowered gates of the Lackawanna Railroad at the Orange Station, and stopped with its fender under one of the cars of a train which was just about moving out of the Orange Station on Tuesday morning. The trolley car was going down a grade which is near the crossing, and the motorman, John Ober, who was discharged by Superintendent Ely immediately after the accident, lost control of the car, and in his haste forgot to use the sand-box.

Ober explains the accident by stating that there were a number of people in the car who were desirous of catching the train which was standing in the station, and he raced for it. When he tried to stop he found he could not. People in the car saw their peril, and there was an immediate panic and a wild scramble to get out of the car. Many received bruises and scratches in the stampede.

The wreckage at the smashed gate had barely been cleared away when along came another car of the same line down the hill, and the motorman of this car, too, lost control of the vehicle. There was no train on the crossing, but there was a milk wagon, and into this the car ran full tilt, partially wrecking it and knocking the horse down.

FAST RUN ON ELECTRIC ROAD

Car No. 53 of the Schenectady Railway Company, which is operated on the Albany Division of that company's system, made a remarkable showing in a recent trial run during the regular hours of traffic. A run from the Federal Building, in Albany, to the car houses in Schenectady, carrying several officials of the road, was made in 20 minutes and 22 seconds. Taking into consideration the time lost by running at the rate of 8 miles an hour within the city limits of Albany and Schenectady, as demanded by the ordinances of these two cities, it is estimated that the car must have made through the country section of the division over 2 miles a minute.

Since the time this test was made the car has demonstrated that the regular run between this city and Albany, carrying eighty people and more, can be made in less than 30 minutes. Much of the credit for this remarkable performance is attributed by the officials of the railway company to the installation of two new trucks built by the J. G. Brill Company, of Philadelphia, and known as No. 27-E-2. The exact time made on the run was 20 minutes and 22 seconds, and the distance covered was 15.01 miles, of which 2.49 miles were within the city limits of Albany, and 1.96 miles within the Schenectady limits. Three dead stops were made along the route. Four new motors have also been put in position under the car, furnishing 500 hp. All of the cars in the system are to be similarly equipped.

OFFICIAL FIGURES OF THE RAILWAYS OF CANADA

The annual report of the Department of Railways and Canals of Canada is in press. The report contains statistics of all the railways in the Dominion, and is to a great extent an index of Canada's growth. The report this year shows many marked increases, and below are given the official figures in regard to the electric railways of the Dominion: There are 558 miles of electric railway laid. The gross capital invested is $41,593,063, of which municipal and other aid composed $173,000. The number of miles in operation is 557. The gross earnings were $6,486,438; increase, $778,155; the working expenses, $3,802,855; increase, $367,692, leaving the net earnings $2,683,583; increase, $350,463. There were passengers carried, 137,681,402; increase, 16,744,746. Freight carried amounted to 266,182 tons; decrease, 21,744 tons. The car-mileage was 35,833,841.

FROM ROCHESTER TO GENEVA

Work on the Rochester & Eastern Rapid Railway, now under construction from Rochester through Canandaigua to Geneva, is being pushed just as rapidly as the present severe weather will permit, and the prediction is made that the road will be in operation between Rochester and Canandaigua early in July.

The roadbed between Rochester and Canandaigua has been entirely graded, and a portion of the track has been laid outside of the city limits. Active preparations are being made to complete the laying of track as soon as the ground is in condition in the spring. These preparations consist of the hauling and distribution of rails and ties along the line. With the exception of a short distance outside of Rochester and in the villages through which the line will pass, the road is being built on a private right of way. The original route along the public highway has been almost entirely abandoned. The route which has been substituted is shorter, straighter and more direct, there being but two sharp curves along the entire line.

The power station is being erected at Canandaigua, and is in an advanced stage of construction. The building proper is practically completed. The foundations for the machinery are completed, and the installation of the apparatus will be begun at once. In addition to the main station at Canandaigua, there will be three sub-stations. The contract for all the electrical apparatus for these stations is held by the Westinghouse Company. The equipment is to include two 650-kw 390-volt three-phase engine-type alternators, which will be direct connected to cross-compound engines running at 150 r. p. m.; seven 300-kw three-phase rotaries; four 500-kw and nine 200-kw oil-cooled transformers, arranged for stepping up the current to 16,500 volts, and two 37½-kw direct-current engine-type exciters operating at about 320 r. p. m.

The contract with the Westinghouse Company also includes switchboards, high-tension switches and lightning arresters for the main generating station, and three sub-stations. The Comstock-Haigh-Walker Company is building and equipping the road.

INCREASE IN WAGES OF EMPLOYEES OF THE MASSACHUSETTS ELECTRIC COMPANIES

The Massachusetts Electric Companies, controlling all the electric street car lines in Eastern Massachusetts outside of Boston, have granted the request of their employees for increased wages. The decision was announced Feb. 15. It affects 2522 conductors and motormen, who are divided into six classes, the average increase for all being 12.18 per cent, or $154,667, based on last year's pay rolls. The classification and increase is as follows:

In class No. 1, 26.25 per cent; an increase from nominal to 18 per cent.

In class No. 2, 15.42 per cent; an increase from nominal to 5 per cent.

In class No. 3, 18.36 per cent; an increase from nominal to 10 per cent.

In class No. 4, 18.52 per cent; an increase from nominal to 15 per cent.

In class No. 5, 11.10 per cent; an increase from nominal to 20 per cent.

In class No. 6, 9.55 per cent; an increase from nominal to 25 per cent.

Men in class No. 1 at present receive rates varying from 17 to 20 cents per hour. Twenty-three per cent of the total number of this class receive an increase varying from 11 to 18 per cent, and 50 per cent of them will within two months be advanced to class No. 2.

THE SITUATION AT WATERBURY

There is no change in the situation at Waterbury, Conn, where the employees of the local railway lines of the Connecticut Railway & Lighting Company are on strike. Cars are still operated under the protection of the police, but, despite this, acts of violence continue. For the most part the demonstration are confined to stone-throwing, but in the outlying districts plots to dynamite cars have been discovered. As a safeguard to passengers, the windows of some of the cars now in operation are covered with heavy wire netting. On Feb. 23 the motorman of a car was stoned by the occupants of the labor union 'bus, and was knocked senseless. A new feature of the strike developed Feb. 23, when six lamp trimmers, who trim the electric arc lamps which light the city, went out on strike. Power-station employees were called upon to do the work of these men, so the lighting service was not seriously affected.

SOLIDIFIED OIL

The term solidified oil has probably never before been applied to a lubricant, yet it is, however, an exact description of a lubricant now being placed on the market by the Bruck Solidified Oil Company, of Boston. It is distinguished from saponified oil or grease by the fact that, although it is solid, it contains absolutely no alkalics, acids, chemicals or water. It is a pure mineral oil, whose specific gravity before solidification is 23; fire test, 450 to 475, and viscosity, 375. The most remarkable property of this lubricant, however, is its ability to withstand heat and cold. It requires 250 degs. of heat to melt it into a liquid. After this heat is withdrawn, however, the oil immediately solidifies again. It has stood a temperature of 30 degs. below zero in actual service without showing any sign of freezing. It will not gum or congeal, but in service it remains in its original form until used up. In actual practical tests made under the supervision of the company on some of the leading electric railroads in the East, journal boxes packed with solidified oil have been left untouched for eleven months, the car running over 60,000 miles without replenishing or receiving any attention whatever. This statement is certified by letters from the leading roads in the East, and the company has gathered much valuable data upon the performance on these lines. The process by which the pure mineral oils used in the manufacture of this lubricant is solidified after being properly proportioned and mixed is the invention of J. N. Bruck, who has spent many years experimenting on this particular product. His object was to supply an oil which would be suitable for the lubrication of bearings on electrical machinery, especially motor and journal bearings on the rolling stock of electric roads. These bearings, being exposed to all kinds of weather and used under exacting conditions, are more liable to give trouble than bearings of other machinery or those less exposed. Ordinary oils and greases will congeal in cold weather and run in hot weather. Solidified oil, being practically immune from heat and cold, remaining always the same under all conditions, will never congeal nor run. It will lessen the chances of the bearings becoming overheated or the oil running out in hot weather, making the tread of the wheel slippery, hindering the operation of the brake-shoe when applied.

The application of solidified oil is simple and direct. It is applied in cups, in waste or through felt wicking. The oil applied in cups is heavy, and is especially adapted for motors. That applied in waste is used mostly for journals. After being packed in the journals it is guaranteed to last six months without touching or replenishing. A soft form of oil is also manufactured, which is applied by being fed through felt wicking. This form of solidified oil is probably the only known lubricant which will successfully feed through felt wicking or waste, especially in cold weather.

The immense advantage that an oil of this form and composition has over the ordinary oils and greases can readily be seen and appreciated. The manufacturer of this product is the Bruck Solidified Oil Company, of Boston, which has been incorporated with $50,000 capital stock. The officers are: President, Frederick Kendall; vice-president and manager, J. N. Bruck; assistant manager, F. C. Dennis; treasurer, J. T. Lennox; secretary, Andrew A. Highlands.

ANOTHER VICTORY FOR ELECTRIC RAILWAY

Another attempt by the New York Central Railroad to block the building of a proposed electric railway has resulted disastrously to the company, for the Appellate Division of the Supreme Court, in the action brought by the New York Central Company against the Auburn & Syracuse Electric Railroad Company, has decided in favor of the electric railway company. It appears that the Auburn & Syracuse Company was building its road in sections, extending it a piece at a time with the ultimate object of extending the line from Auburn to Syracuse. The Central brought an action asking for an injunction restraining the electric railway company from extending its road from Skaneateles to Syracuse, claiming that the electric railway company was circumventing the statute and under cover of the extension which is permitted by the statute, was to build a road over an entirely new line, and one not suggested in its original certificate of public necessity and convenience. The action was first brought before Justice Andrews, who dismissed the complaint on the ground that the road was being built in compliance with the statute. The Central took an appeal to the Appellate Division, and that court has now handed down a unanimous decision in favor of the electric railway company.

MOTORMEN AND CONDUCTORS

"How Street Car Men Live" was the subject of a lecture recently delivered by Robert Erskine Ely at the League for Political Education, in which he reviewed the wages, hours of work and difficulties of the employees of the trolley and elevated railways of New York. Among other things he said: "As a class, street car employees are not so well paid in comparison with wages earned in other occupations that their lot is desirable, although they are better off than teamsters and express drivers. By working seven days a week a conductor on the trolley car or elevated train or a motorman earns from $13 to $15. The income of these men, when they have reached the highest limit possible to them, is only about half the maximum income of the fireman or police patrolman." Mr. Ely and others who criticise the transportation companies fail to realize that the class of employees mentioned do not require any special training for the duties they perform; that they serve no protracted apprenticeship and are really unskilled laborers who enjoy better pay and easier work than their fellows, and have steady employment every week in the year while they behave themselves and resist the importunities of walking delegates and other mischief makers.

CAR HOUSE DESTROYED AT ST. LOUIS

The mammoth car sheds of the St. Louis & Suburban Railway Company at De Hodiamont were destroyed by fire Tuesday morning, Feb. 24. Sixty-seven cars were burned, entailing a loss placed at $150,000. The property was well insured. The sheds will be rebuilt at once, and although passenger service must necessarily suffer some, it is promised that full service will be resumed this week. Some 129 cars now being constructed for the company are expected to be completed within two weeks.

PERSONAL MENTION

MR. HOWARD E. AHRENS, president of the Kutztown & Fleetwood Street Railway Company, of Kutztown, Pa., succeeds Mr. G. H. Gerber as president of the Allentown & Reading Traction Company, and Mr. W. D. Mahn succeeds Mr. Ahrens as treasurer of the company. Mr. Gerber has also resigned as a director.

MR. M. C. AULENBACH, secretary and treasurer of the United Traction Company and the allied lines controlled by the United Power & Transportation Company, of Reading, Pa., has tendered his resignation, to take effect March 1. Mr. Aulenbach has been secretary and treasurer of the Reading system since the adoption of electricity as a motive power, over ten years ago. He perfected the system of accounting that has been adopted by the United Power & Transportation Company. Mr. Aulenbach's plans for the future are not fully matured, but he will take a much-needed vacation.

MR. C. R. BELLAMY, general manager of the Liverpool Corporation Tramways, reached New York Feb. 23 on the Etruria. Mr. Bellamy is one of the speakers at the national convention on municipal ownership and public franchises being held this week in New York, and to which reference has already been made in these columns. Mr. Bellamy is known as one of the most progressive tramway managers in England, and his system is the second largest in Great Britain. During his trip to this country Mr. Bellamy will improve the opportunity of visiting some of the typical American tramway installations. He is planing to return to Liverpool March 7.

MR. J. C. KENNEDY, connected with the Montreal Street Railway Company for twenty-one years, and for three years general superintendent of the montreal Street Railway Company, of Montreal, Que., has just resigned from that company. Mr. Kennedy began his street railway career as a conductor on the horse car line in Montreal twenty-six years ago, and since then he has been continuously in the employ of the Montreal Street Railway, with the exception of a period of five years, 1886 to 1891, when he served with the Twin City Rapid Transit Company, of Minneapolis. In his Montreal career Mr. Kennedy passed through the evolution of the service, and filled every position from a collector of fares to that of general superintendent, a post he was appointed to fill when Mr. McDonald resigned three years ago to go to Paris. Mr. Kennedy's successor is Mr. Luke Robinson, formerly superintendent of the Montreal Park & Island Railway.

STREET RAILWAY PATENTS

[This department is conducted by W. A. Rosenbaum, patent attorney, Room No. 1203-7 Nassau-Beekman Building, New York.]

UNITED STATES PATENTS ISSUED FEB. 17, 1903

720,612. Trolley Wheel; T. McWilliams, Kings Park, N. Y. App. filed April 12, 1902. A self-lubricating wheel in which the tread portion can be easily renewed.

720,633. Trolley; J. Spena, Lilly, Pa. App. filed Aug. 4, 1902. Relates to means for holding the wheel on the wire until the cord is pulled to release it.

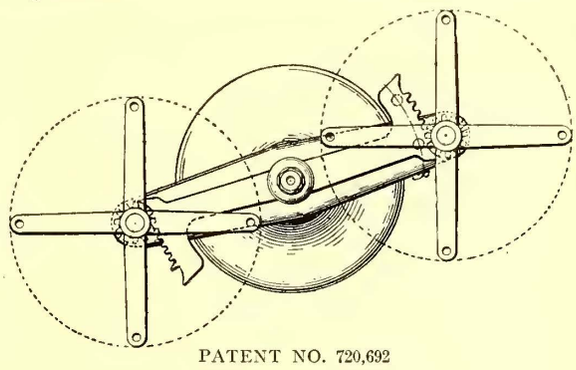
720,684. Electric Railway; G. L. Fowler, New York. App. filed July 18, 1900. Each side of a third rail is adapted for contact, and is protected by a sheet metal hood.

720,692. Revolving Twin Chairs; G. C. Hawkins, Boston, Mass. App. filed Jan. 31, 1902. Comprises two seats mounted to rotate about fixed axis on a standard, means connecting said seats whereby they rotate in unison, a locking device for said connecting the means, and means independent of the locking device to limit the turning movement of the seats.

720,704. Rail for Street Railroads; W. Kuske, Berlin, Germany. App. filed Oct. 3, 1902. The tread of the rail is grooved in its lower surface to fit over the upper edge of the web, whereby the tread of the rail may be renewed without tearing up the pavement.

720,809. Life Guard for Road Vehicles; A. Hudson, Gorton, Manchester, England. App. filed Oct. 20, 1902. Details.

720,879. Overhead Trolley; J. J. Bouchard, Bradford, Pa. App. filed Nov. 15, 1902. The trolley wheel is mounted upon a kind of universal joint which affords it freedom to alter its position when rounding curves.



PATENT NO. 720,692

720,917. Electric Brake; J. C. Henry, Denver, Col. App. filed April 1, 1901. A reversing switch having contacts to connect the motor in a local circuit with a braking magnet, and also provided with contacts to connect the motor with a power circuit to drive it in either direction.

720,942. Device for Removing Snow; J. A. Manion, Montreal, Canada. App. filed April 19, 1902. A scraper or scoop is pivotally mounted in advance of the car in combination with an elevator, whereby the snow is carried to the top of the car and there deposited in a chute adapted to discharge over the side into receiving cars.

720,951. Electric Brake; F. C. Newell, Wilkinsburg, Pa. App. filed April 18, 1901. Consists in means whereby the same contact points on the controller may be used for braking as for running, while at the same time the controller handle is adapted to be moved in opposite directions from its "off" or neutral position for regulating the current in the running and breaking circuits, respectively.

720,978. Electric Vehicle Brake; C. J. Specht and C. R. Kreuger, New York, N. Y. App. filed June 7, 1902. The brake-shoe is hollow and contains electrimagnets, thereby transforming the shoe into a magnet.

721,000. Street Railway Switch; W. J. Bell, Los Angeles, Cal. App. filed July 25, 1902. The switch tongue and switch-throwing rail are normally coupled together to move simultaneously means for electrically uncoupling the tongue and rail from the car when the latter is to be switched from the main track.

721,129. Railway Crossing; C. A. Moreno, St. Louis, Mo. App. filed Nov. 10, 1902. Provides for the insertion of a block of wood in the crossing block, thereby forming a substantial noiseless crossing.

721,131. Bolster; J. C. Wands, St. Louis, Mo. App. filed Dec. 18, 1902. Consists of a commercially rolled compression member of channel beam form, a tension member with perforations in its end portions, and a head-block formed of a plurality of sections adapted to interlock with each other and with said tension member.

NEWS OF THE WEEK

CONSTRUCTION NOTES

HUNTSVILLE, ALA.—It is said that the Huntsville Railway, Light & Power Company has decided to extend its lines to McCalley Grove, 2 miles west of Huntsville, and that a summer pavilion will be built there.

TUSCUMBIA, ALA.—Colonel R. H. Wilhoyte, of Sheffield, has been granted a franchise for the construction of an electric railway here. Colonel Wilhoyte and his associates who are interested in the Sheffield Company, recently incorporated, have in contemplation the construction of an electric railway from Sheffield to Florence. Colonel Wilhoyte has already negotiated the purchase of the water works at Sheffield and secured electric light franchises in Sheffield and Florence.

WALNUT RIDGE, ARK.—Engineers are said to be at work estimating the cost of building an electric railway between Hoxie and Walnut Ridge.

LITTLE ROCK, ARK.—A site has been selected for the new power house of the Little Rock Traction & Electric Company, and the work of building the plant is to be begun soon. New machinery will be installed in the plant, nothing being taken from the present power house except some auxiliary apparatus installed in that plant during the past six months.

HARRISON, ARK.—The Arkansas Traction Company has been incorporated, with a capital stock of $500,000, to build an electric railway from Harrison to Keener, in Boone County, thence to Lead Hill and other cities, including Dodd City, Marion County. About 30 miles of line will be built. The charter of the company permits the company to generate electricity for commercial purposes. The officers and directors of the company are: Thomas Helin, of Harrison, president; R. M. Fellows, of Harrison, secretary and treasurer; C. Irving Page, of Rochester, N. Y., vice-president.

LOS ANGELES, CAL.—Notwithstanding considerable opposition to a third rail, the City Council has adopted the majority report of the Board of Public Works, and a standard-gage franchise is to be offered for sale on First Street from Los Angeles to Main Streets and on Main Street from First to Second Streets in accordance with a petition of the Pacific Electric Railway Company. This action is in line with a policy that will permit the Huntington-Hellman syndicate to run its broad-gage interurban cars through the city streets to the big depot that is now building at the corner of Sixth and Main Streets.

LOS ANGELES, CAL.—C. S. Campbell-Johnstone, of Campbell-Johnstone Brothers, has been awarded by the City Council of Pasadena, for $300, a franchise for an electric railway to enter Pasadena from the west and to form the Pasadena entrance and terminal of the line which the Campbell-Johnstones are now building from Los Angeles. The contract for the work has been given to Sherer & Crowley, and 150 men and sixty teams are on the job. It is still believed in many quarters that the entire venture is backed by the Pacific Electric Railway Company, which may be desirous of making its Pasadena system more complete by reaching the South Orange Grove section of the city, with which there never has been street car connections. While for the immediate present there will be no local travel worth mentioning along the Campbell-Johnstone route, the line will open up a section of country perfectly adapted to residence purposes and give another direct line between Los Angeles and Pasadena.

SANTA ANA, CAL.—Application has been made to the City Council by Collins & Scott for a franchise to build an electric railway from this city to Newport Beach, a distance of less than 10 miles. The applicants are owners of Newport Beach, which is a popular summer resort.

OAKLAND, CAL.—The City Council has passed an ordinance granting a franchise to the Oakland Transit Company for the construction of an electric railway on Market Street, Alcatraz Avenue, Twenty-Second Street and other thoroughfares.

MODESTO, CAL.—Notice is given that application has been made to the County Commissioners by Herschel F. La Motte for a franchise to construct an electric railway commencing at Chinese Station and following the county road to the western boundary of Yosemite National Park via Chinese Camp, Jacksonville, Hughes Station, Priests, Groveland and Colfax Springs. Franchise is to be offered for sale March 16.

BAKERSFIELD, CAL.—Articles of incorporation have been filed by the Bakersfield & Ventura Railway Company, capitalized at $1,000,000. The plan of the company is to build an electric railway over the route for which J. W. Burson was recently granted a franchise. Surveys are now in progress. The directors of the company are: Eben Smith, J. W. Burson and Gervaise Purcell, of Los Angeles. The headquarters of the company are to be at Los Angeles.

SAN FRANCISCO, CAL.—Surveyors are laying out a route between a point on San Francisco Bay and Petaluma for an electric or steam railway. The identity of those behind the project has not been disclosed.

HANFORD, CAL.—L. M. Cole, of Bakersfield, plans to apply to the Supervisors of Kings County for a franchise to build an electric railway to connect Hanford, Armona, Grangeville and Lemoore.

SAN FRANCISCO, CAL.—Application has been made to the Supervisors for a renewal of the franchises of the Geary Street, Park & Ocean Railway. It will be recalled that a plan to take over the property of the company at the expiration of its franchise a few months hence was voted down at a special election a few weeks ago.

SAN BERNARDINO, CAL.—The San Bernardino & Highlands Electric Railway Company has been incorporated, with a capital stock of $150,000, to build an electric railway from San Bernardino to Highland and thence to Redlands, a distance of 15 miles. Interests identified with the San Bernardino Valley Traction Company are interested in the new company. The directors of the company are: Henry Fisher, J. H. Fisher, A. C. Denman, Jr., of Redlands; H. H. Sinclair, George B. Ellis, of Los Angeles; George M. Cooley, E. P. Roberts, of San Bernardino.

LOS ANGELES, CAL.—The Los Angeles Railway Company is to reconstruct thirty-one single-truck cars built by the Pullman Company in 1895 and 1896. At present they seat twenty-six passengers each, and are 25 ft. 2 ins. over all. When reconstructed they will be 33 ft. 10 ins. over all, with a seating capacity of thirty-eight passengers. Ten of these cars are being designed for use on the company's Second Street line to Westlake Park, which is very hilly, and for that reason each will be equipped with four motors. The new Westinghouse magnetic brake will be used on these cars. All the other cars will be equipped with two motors, Christensen air brakes and arc headlights. Walkover seats will be used.

LOS ANGELES, CAL.—The Los Angeles Railway Company has placed with the St. Louis Car Company another order for thirty-five new cars, making a total of 100 cars ordered from this company within the last year. The cars just ordered are for delivery in June. The Downey Avenue viaduct, about a quarter of a mile long, over which the new cars will operate, will be reinforced to meet the extra strain on the structure, and the T-rails will be substituted for the old combination rail of the former cable system now laid on the viaduct.

PUEBLO, COL.—The Pueblo & Interurban Railway & Power Company has just been granted franchises by the County Commissioners to operate electric railways over certain highways in the county for a period of twenty-five years. If the plans of the company, as outlined in its petition to the commissioners, are carried out, Pueblo will soon be connected by electric lines with Florence, La Junta, Rocky Ford and Canon City.

NEW LONDON, CONN.—It is understood that the two local petitioners for an electric railway franchise between Groton and Westerly have decided to combine their interests. The petitions in question are those headed by B. A. Armstrong and others, represented by H. A. Hull, and by A. H. Chappell and others, represented by C. B. Whittlesey.

HARTFORD, CONN.—The Branford & Clinton Street Railway Company is seeking incorporation.

ATLANTA, GA.—The Chattachoochee Terminal Company has just been incorporated, with a capital stock of $250,000, to build an electric railway from Atlanta to Marietta. The road will extend from Atlanta in a northwesterly direction through Fulton and Cobb Counties to Marietta and will be 20 miles long. The incorporators of the company are: Newton A. Morris, T. W. Glover, John Awtry, of Cobb County, and H. L. Collinsworth, W. F. Spalding, Alexander C. King, J. J. Spalding, Charles D. Tuller and B. M. Fowler.

SPRINGFIELD, ILL.—J. G. Schmidlapp, B. M. Campbell and H. A. Perkins, of Cincinnati, Ohio, are securing estimates for material for the construction of an electric railway from Decatur to Springfield. They will use the third-rail system will be used, and the line will be built on private right of way.

DIXON, ILL.—The City Council has granted a franchise to the Sterling, Dixon & Eastern Electric Railway Company.

ROCK ISLAND, ILL.—At a meeting of the stockholders of the Kewanee, Cambridge & Geneseo Railway Company, held here a few days ago, it was decided to increase the capital stock of the company from $100,000 to $850,000. Plans were discussed for building the road, and the erection of the main power house at Cambridge was considered. No official announcements have been made in regard to the project.

ROCKFORD, ILL.—The Rockford & Interurban Railway Company is to apply to the Council for franchises for two extensions, one in the Southeast End the other from Rockton Avenue to Independence Avenue, in West State Street.

CHICAGO HEIGHTS, ILL.—The Chicago Heights Street Railway Company has applied to the Council for a twenty-five-year franchise to construct a street railway here.

DANVILLE, ILL.—The interests that already have the necessary franchises and right of way for an electric railway between Danville and Lafayette, Ill., have organized a company to build the road. The directors of the company are: C. M. McCabe, W. W. Luke, A. E. Harrison, of Covington, Ind.; H. C. Martin, of Attica, Ind., and G. T. Buckingham, of Danville.

PEORIA, ILL.—The Central Railway Company is to apply to the Council for the right to extend its lines.

KOKOMO, IND.—The Kokomo, Converse & Marion Traction Company has just been incorporated, with a capital stock of $10,000, to build an electric railway from Kokomo to Marion via Converse. O. V. Darby, G. E. Bruner and T. C. McReynolds, of Kokomo; J. E. Kenney, Converse, and H. D. Thomas, of Marion, are interested in the company.

NEW CASTLE, IND.—Harrison Township has granted a subsidy of $10,000 to the New Castle & Pendleton Interurban Railway Company. A proposition to give the company $18,000 was defeated a short time ago.

LA PORTE, IND.—Judge C. M. Stone and others, of Cleveland, who are interested in the Toledo & Western Railway, are securing right of way between Michigan City and South Bend. The Hobart & Western Railway Company, of Chicago, is securing right of way between La Porte and South Bend. These are on the line of a through Cleveland-Chicago road.