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## EDITORIAL NOTICE

Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

All matter intended for publication must be received at our office not later than Tuesday morning of each week, in order to secure insertion in the current issue.

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## Penalties for Improving the Service

The City Council of Minneapolis last week received a lesson which we heartily wish might be impressed on people of all the cities of the United States, namely, that it does not pay to impose penalties on improvements of service. The sentiment is becoming entirely too general that any move a large city railway company wishes to make in the way of extension or alteration of existing lines is a matter which benefits no one but the company, and that every move should be paid for and all attempts at improvements stopped until the company will accede to exorbitant demands. The public in various cities where these sentiments are strongest is the sufferer. In Chicago we see unnecessary congestion and public inconvenience on the Union Elevated Loop going on month after month because of the refusal of the city to permit of an extension of a few feet on each

elevated platform, the object of the city being to squeeze a few more sheckels out of the elevated companies of Chicago, none of which are at the present time paying any remarkable dividends. In Minneapolis the Twin City Rapid Transit Company asked the Council for permission to lay tracks for a new loop in the business district. This loop would have been of benefit to the people of the whole city as well as a benefit to the business streets over which it would run. The railroad committee of the City Council, however, thought it saw in the company's request an opportunity to make the company pay for something which the city had before been fully intending to pay for, namely, the strengthening of one of the bridges across the Mississippi River, and recommended that the company be required to do this if the loop ordinance was passed. President Lowry very promptly gave instructions that the company's petition for this new loop be withdrawn from the Council, since the loop had been asked for only to benefit the public, and, under Minneapolis conditions, just as many people would ride whether the loop is built or not, and the company will be spared great expense. The absurdity of asking the company at Minneapolis to pay \$100,000 for constructing a loop, the benefits of which would be enjoyed by the public more than by the company, might be laughed at were it not an indication of a very prevalent epidemic in American cities.

## Advantages in a Receivership

It is not usually supposed that a company is in an enviable position when it is in a receiver's hands, but apparently there are times when a receivership can smooth out tangles which could be straightened in no other way. Chicago street railway men, lawyers and citizens have long been guessing as to how franchise matters could ever be settled as regards the Chicago Union Traction Company. The Chicago Union Traction Company leases the property of underlying companies. What the Chicago Union Traction Company directors might agree to would not necessarily bind the stock and bondholders of the underlying companies, who actually own the franchises. The Chicago Union Traction Company directors might assent to what seemed to them the best bargain that could be made under the circumstances, and this might be upset by the stock and bondholders of the underlying companies, who are the ones actually owning the property. Any one familiar with the Chicago situation knows that it will be difficult enough to get a franchise ordinance that the City Council on the one hand and a single board of directors on the other will agree to, but when it comes to satisfying not only these two bodies, but several others to which the matter must be referred, the chances for any kind of a settlement seemed to recede into the very distant future. The Chicago Union Traction Company, however, is in receivers' hands, and Judge Grosscup, in a letter addressed to Mayor Harrison last week, made a very interesting suggestion as to the powers of the court, which would indicate that the receivership under these circumstances will have some decided advantages. Judge Grosscup, under whom the receivers of the Chicago Union Traction Company are acting, had been

asked by the Mayor whether he could not arrange for a settlement of the Chicago Union Traction Company's franchise problems on the same basis as proposed for the Chicago City Railway Company in an ordinance recently drawn up. Judge Grosscup did not commit himself as to this ordinance in particular, but expressed a desire for the settlement of the difficulties, and suggested that the physical structure of the property interests embraced in what is known as the Union Traction lines, is such that a settlement out of court of their franchise relations with the city, and particularly the merging of all outstanding franchises in a new franchise, would be a task of great difficulty. But the company is now in the court's hands, and the court's possession of the properties, together with its jurisdiction over the questions that the proposed settlement is bound to raise, would be helpful to a complete adjustment of all matters involved. Judge Grosscup's letter to the Mayor will be found in full in another column.

### Keep Before the Public

Steam railroad passenger agents have regular and established channels for getting information to the public on the time of trains and the other information that the traveler wants. Time tables when published are distributed to certain definite places where experience has shown that they are likely to be wanted, and the public naturally looks in these places for them. Interurban roads being of comparatively recent origin, have not established anything like as thorough a system of reaching the public. It is simply astounding to any unprejudiced traveler who wishes to make use of interurban roads how little attention interurban managers pay to getting information for the public about their service. There are some interurban centers where this is not true, but there are plenty of others where the interurban managers have very much to learn about publicity. We have said so much about this in the past that we are almost ashamed to refer to it again, but there is certainly need of something more to be said. An interurban railway system reaching over 20 miles to 100 miles or more is not something of entirely local interest. A prospective passenger, 100 miles away, may want to see a time table in order to plan his trip. To the discredit of interurban business, it must be admitted that in many cases not only can no such time tables be found within a radius of 100 miles of an interurban road, but, worse than this, very frequently the only printed time table in existence is the one made out by the management for the government of employees. Time and again, in various places, the writer has asked for time tables of interurban roads to be told that none were available. The only means many roads seem to have of getting time-table information to the public is through the interurban waiting rooms and the daily papers in the cities which they reach. Of course, it is true that when a road operates on a certain time table for a year or more the entire community gets posted on the time of the cars, so that the inquiring stranger has a fair chance of finding out at least the leaving time of interurban cars in the town in which he happens to be. Further information than this is liable to be very indefinite. It is a very "penny wise and pound foolish" policy that begrudges a little money spent in printer's ink and distribution of time tables. The trouble with many interurban managers is that they are so well acquainted with the schedules themselves and are so constantly in touch with people who are, that it does not seem to dawn upon them that every possible passenger may not be entirely familiar with when and where the cars on their roads run.

### Concerning the Telephone

The value of the telephone as an aid to operation has become well appreciated of late in the electric railway field, but a very casual study of the instrument's use shows that the full benefit of the apparatus is often missed in practice. The use of the telephone is such a simple matter that the press of other business frequently crowds out the consideration which ought to be given to the design and installation of any system of communication upon an operating road. Instruments are likely to be set up without much regard to extraneous conditions, and there is a tendency in more than one repair department to let the apparatus alone after it is once installed, unless it becomes flagrantly out of order. The importance of keeping the cars moving casts such a large shadow over the odds and ends of work which are always waiting to be accomplished that it is hard to find time to maintain the telephone system in perfect condition, even on interurban lines which depend upon it for the safe movement of their traffic.

It is worth while in this matter to take a leaf from the book of the steam road, which generally spares no pains to keep its telegraph lines and apparatus in good condition. The safe and expeditious handling of both freight and passenger traffic is so bound up in the telegraph system of the modern railroad that a break-down of communication demoralizes business to the verge of paralysis.

The electric road is prone to make the mistake of getting along with a system of telephones which works only passably well. This is often not so much the fault of the apparatus as it is the error of those who install the equipment. It is no uncommon thing to find a sub-station telephone, for example, set up without any sound-proof booth in the midst of operating machinery which renders the reception and transmission of speech nearly impossible; in other cases the telephone will be installed in a corner of a despatching office in such a way that the despatcher is obliged to turn his back upon the tracks when talking, and in still other instances the despatcher has to raise himself in his chair in order to see the tracks which he governs, thereby laying himself open to the chance of cutting off part of his conversation with trainmen at turn-outs at times when every word is of critical importance. Misunderstanding of orders and all that it implies hang over an imperfectly working system like the famous sword of Damocles, and in times of emergency both life and property may go to the wall through the indistinctness or interruption of the telephone service. In like manner the importance of equipping large power stations with extension sets is not always appreciated. A plant of 10,000 or 15,000 kw capacity deserves more than a single telephone mounted on a second-story switchboard gallery perhaps 50 ft. above the engine room floor and accessible only by two or three long flights of stairs.

Considerable advantage arises on city systems in having telephones located near the posts of inspectors and starters whose duty requires them to be in close touch with both the street traffic and various car houses and division headquarters. In case of break-down it is most convenient to be able to send for the emergency crew within a moment of the accident's occurrence, and when such delays happen in rush hours every half minute cut from the blockade time means money in the company's pocket. The cost of installing a telephone set in a locked box near the busiest tracks of a system weighs but little against the saving effected by inspectors being able to call up any department at a moment's notice. The cost of relieving a blockade generally amounts to a comparatively small sum of money,

the vital element being the time required to set the system in motion.

As for the type of telephone apparatus best suited to electric railway purposes there is little doubt that the common battery central-energy system is superior to every other form of equipment, at least for city roads where the distances of transmission are short. Some form of automatic apparatus may do well enough for the departments of a repair shop, but experience seems to indicate that for serving the whole street railway system, from the street to the office of the manager, the centralized battery apparatus possesses great advantages in point of quickness and simplicity of operation, coupled with moderate maintenance charges. Here, as elsewhere, inferior equipment is dear at any price.

### The G. E. Alternating-Current Motor

In our editorial reference to the new alternating-current motor of the General Electric Company last week, we discussed the general theory of magnetic distribution and compensation as applied to series-commutator motors for a. c. railway service. The development of a railway motor for a. c. and d. c. work by such a large company as the General Electric constitutes, has such an important bearing on electric railway affairs that we cannot but refer again to some of the principal features in the machine and system described last week.

The tests published in the last issue give a forcible impression of general usefulness and of a degree of adaptability which is very gratifying, in view of the many difficulties surrounding the problem. Looking at the matter quite impartially, we believe that the designing engineers did well to lay aside the repulsion type of motor in spite of its fair promises, and to apply themselves to the development of the series form, of which the value had been realized by Mr. Eickemeyer more than a decade since. The point of the matter is that a thoroughly practical a. c. railway motor must be able to run effectively as a d. c. motor in order to find free applicability on existing systems. Were this not so, the a. c. motor in some one of its polyphase forms would long since have made a powerful impression upon the art. As the case stands, the most serious obstacle which the a. c. railway motor has to encounter is not ultra conservatism, or commutation difficulties, or hysteresis losses, but connections with d. c. roads. So long as these exist the a. c. motor must be prepared to meet them more than half way, which seems to be the policy indorsed by the motor before us.

In a repulsion motor, as in all other induction motors, the structure must be a first-class transformer. This requirement does not seem to be compatible with good performance as a d. c. motor, and approaching the problem from this viewpoint, the course which has been followed in the design of the motor under consideration is strictly logical. To put the matter in a nutshell, it is a d. c. motor adapted for use on certain alternating circuits rather than an a. c. motor workable at a pinch on d. c. circuits. This condition could not be properly met by any form of transformer motor, but could be met by a properly planned series motor. The crux of the problem is the maintenance of proper commutation in both functions of the machine. So far as we can judge, the tests have indicated at least a very encouraging degree of success, although, as we have often remarked in this connection, the final test is a test of endurance, of power to stand up steadily to work for long periods without developing trouble at the commutator. This matter aside, one must realize that in this, as in every other case of design, the final result is due to a series of compro-

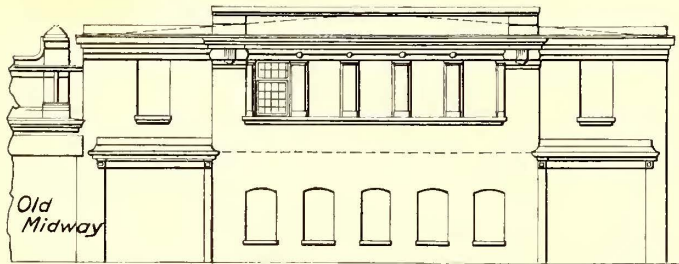
mises. Given a general structure which will answer measurably well for both d. c. and a. c. currents, the final form is a question of sheer finesse. By taking advantage of a fairly high armature speed and not stinting in quality of iron, weight of copper and structural expense, one can hold up the efficiency and operative qualities very creditably, both as regards d. c. and a. c. currents. If one particular property is very highly developed it will infallibly be at the expense of some of the others. This idea of compromise holds good as regards the respective performances with d. c. and a. c. supply. The present motor impresses us as a clever compromise in this last particular, since it is a well-known fact that the conditions of service which in themselves demand a. c. supply most forcibly are those in which something can be spared in acceleration power, and even in efficiency, since they in themselves favor efficient operation, while in d. c. working with the same motor large accelerative power is highly important, and efficiency under these trying circumstances, although never at its best, must be earnestly cultivated.

The success of a d. c.-a. c. motor must be measured not by numerical results under specified conditions, but by all around results. It reminds one of the case of warship design, on a given tonnage, in the last resort determined by the vote of the honorable member from Waybacque, a delicate compromise must be made between protection, speed, coal endurance, battery power and other factors scarcely less important. The usefulness of the ship is not determined by the predominance of any one factor, but by the co-ordination of all. Just so in the case of this new motor—its value in the art must be judged not by one particular feature of its performance, good or bad, but by its operation in all its functions under existing conditions upon electric roads. And these cannot accurately be foretold by the results we have published, but must be tested by hard experience, just as the success of a warship design must be demonstrated under hostile fire. Our general impression of the motor here discussed is distinctly favorable as regards its practical usefulness, but we are anxious to see it tried out on a large scale in actual hard railway work. As compared with others of the type, it is far too early yet to pass judgment upon it. Electric railroading, as we have often pointed out, is undergoing steady segregation. We have to deal not only with urban roads rich in suburban and interurban connections, but with interurban roads approximating ordinary railroads very closely in their structure, service and general functions. It is altogether unlikely that any one generalized type of motor can be made to meet fully all these conditions. It is certainly a material advance in the art to have developed a motor to meet successfully a substantial part of them.

We feel, however, that for the larger railway work all these series alternating motors leave something to be desired. Whether it is practicable to construct an alternating motor for such service which still will be capable of working measurably well over d. c. lines, remains yet to be seen. As a practical matter, such a motor as this series-compensated one seems to have before it a considerable field of usefulness. The power of working well on an ordinary tramway without essential change in equipment or method of operation, and then slipping upon an outlying a. c. system and doing interurban service with effectiveness, is a very valuable one. The weight and expense required as the price of this facility must, however, be taken into account. Only considerable experience will enable a proper judgment to be made on this point, but the engineering skill shown in so deft a compromise is worthy of congratulation.

## A NEW CONCRETE PAINT AND OVERHAULING SHOP— PHILADELPHIA RAPID TRANSIT COMPANY

The Philadelphia Rapid Transit Company is making extensive improvements in shop facilities at its Kensington Avenue shops by an addition to the former large repair shop at that point of a new two-story building which will provide the greatly needed additional room for properly maintaining their largely increased rolling stock equipment. This company has for some time past maintained two large overhauling and general repair shops, one at Eighth and Dauphin Streets, and the other at Kensington Avenue and Cumberland Street, where all heavy



FRONT ELEVATION OF THE NEW SHOP BUILDING FOR THE PHILADELPHIA RAPID TRANSIT COMPANY

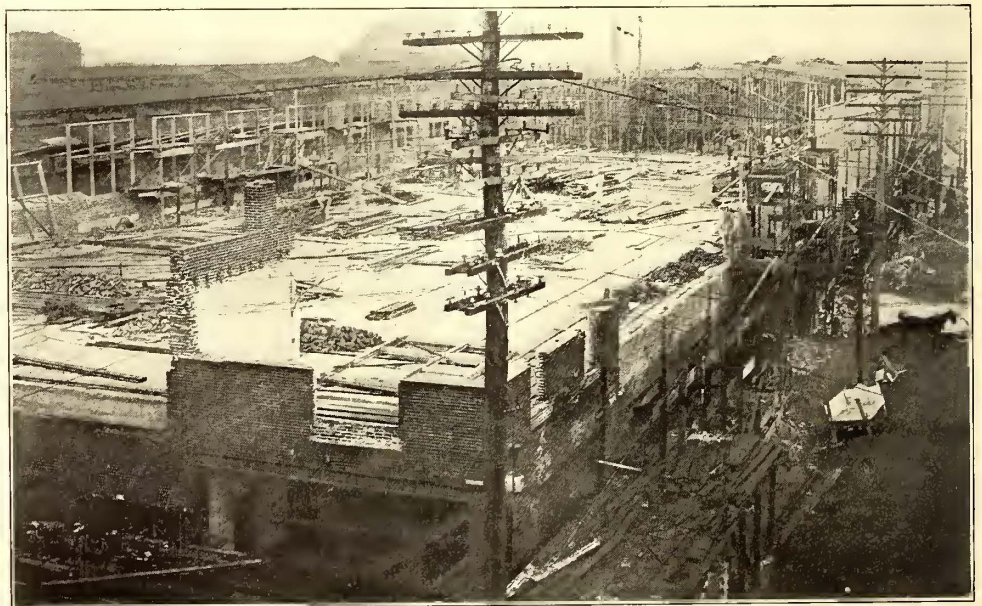
overhauling work to the rolling stock has been carried out. With the recent large additions to the equipment of the system, however, these two shops have become heavily overtaxed with work, and they have for some time felt the need of additional room for greater facility in carrying on the work. The number of cars which this company now operates has been increased to 3900, and the mileage of track now totals 520 miles. The Kensington Avenue shops had become so crowded that in some departments the work has been carried on at a great disadvantage, and tools which have been added to facilitate work could not be located with advantage in reference to the work handled.

In considering the problem of extension of the shop a serious difficulty was met in that each of the shop plants occupied an entire city block, so that there was absolutely no room left for extension of plant except upward, by increasing the height of the buildings. The Kensington Avenue shops offered the most available opportunity for extension on the Cumberland Street side of the plant. The old car depot, which had of late been used mainly for car storage, painting, etc., formerly located there, was not adapted to car repair work and had been little used except for light work only. It was decided to tear out this building and replace by a two-story structure, the lower floor of which should be used for heavy overhauling work, and the second floor for a paint shop. Accordingly, an interesting shop plan was designed and adopted, and the new structure is now under construction.

The layout of the plant of the Kensington Avenue shop installation is illustrated in an accompanying engraving. As shown, it occupies the entire block upon Kensington Avenue, bounded by Cumberland and Sergeant Streets at the two sides, and Jasper Street at the rear. The location and arrangement of the new building at the Cumberland Street side, as being installed, is clearly indicated therein. The older shop buildings lie between this building and Sergeant Street, and embrace a

woodworking shop, machine shop, blacksmith shop and electrical repair shop, in addition to the extensive erecting shop facilities. An excellent idea of the relative sizes of the older shop buildings as compared with the new shop is shown in the accompanying general cross-section of the entire shop structure, which is given upon a following page; the new shop building occupies a much larger ground area than any one of the other buildings, and is, in addition, two stories in height. The machine and overhauling shop, which is shown at the extreme right, formerly took care of the greater part of the heavy machine and electrical repairs, while overhauling was taken care of in the two buildings immediately to the left. Hereafter a large part of the overhauling work as well as all the painting will be handled in the two-story building at the extreme left, at the Cumberland Street side.

The work of construction upon the new shop building has only recently been begun, but by reason of the possibility of using portions of the walls of the older building remarkable progress has been made, and at the present time the new building is nearly completed, so that the shop will be opened up for work early this fall. The photograph, which is shown herewith, illustrating progress of the work and incidentally the method of erection of the concrete roof, was taken Aug. 6, and serves to indicate the rapidity with which the work has been carried out. As may be seen by the same, practically the entire first-story portions of the former walls of the car depot building are being made use of for the new building. For this reason the outside construction of the new building will be of brick, but the interior construction, including all columns, girders and floors, as well as also the roof, will be of reinforced concrete construction of the latest and most approved type; this renders the structural features of the new shop, irre-



CONSTRUCTION VIEW OF THE WORK OF ERECTING THE NEW REINFORCED CONCRETE SHOP BUILDING, SHOWING ERECTION OF FALSE WORK UPON SECOND FLOOR, TO SUPPORT THE ROOF FORMS

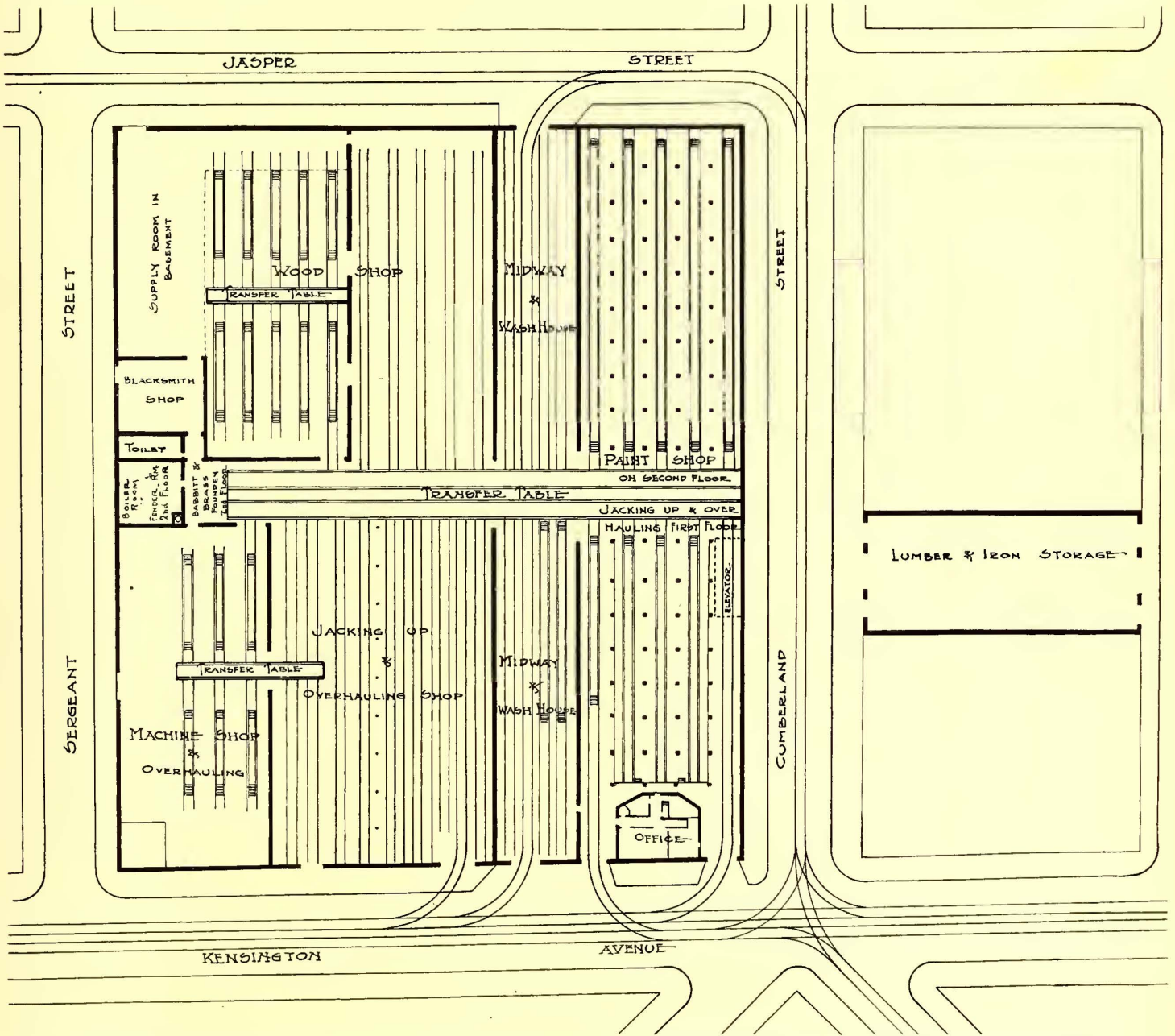
spective of the very interesting details of its equipment, of more than ordinary interest to street railway officials on account of the supreme advantage of the fireproofing qualities afforded.

The drawings on the following pages indicate the disposition of space in the new building and the arrangement of tracks, pits and the transfer tables. The building is 90 ft. x 389 ft. in size outside, the first floor having a clear height under beams of 18 ft., and the second floor a clear height at eaves of 15 ft. 2 ins. As may be noted, the first floor provides for five lines of track, while the second floor has six. Upon the first floor all tracks, at the rear of the transfer table, are provided with

pits, while those at the front, or Kensington Avenue end of the building, are provided with pits in each case except the track at the south side, which contains the elevator for raising cars to the second floor. The track at the opposite or north side of this floor, leading out upon Kensington Avenue, will not be used for overhauling work, but will be kept free for cars entering or leaving the shop, the pit being intended to facilitate inspections of incoming cars or final inspections of repaired cars leaving the shop. The nine sections of track upon the first

particularly on account of the importance of fireproof construction for urban building conditions. The result has been that not only this shop but also many important new sub-stations, power plant and other buildings of the company are being erected in this way.

The design of the structural features of the building was intrusted to the Reinforced Cement Construction Company, of Philadelphia, engineers and contractors for this class of construction. They have provided for the construction, out of re-



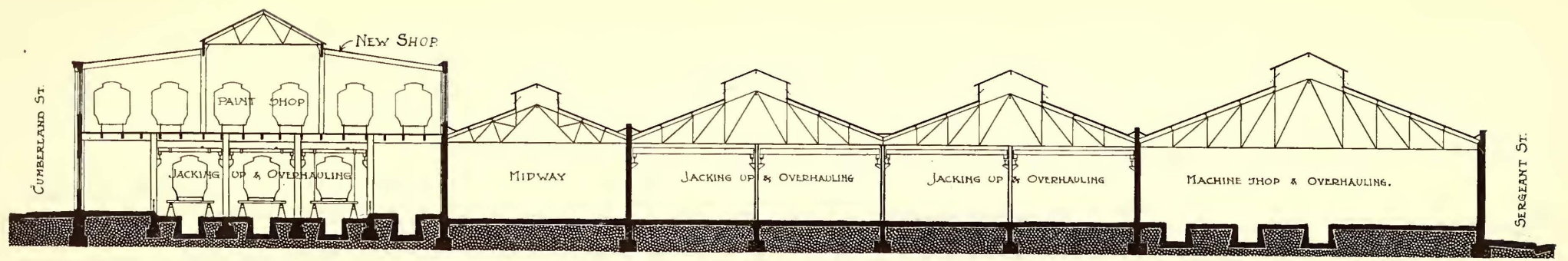
GROUND LAYOUT PLAN OF THE KENSINGTON AVENUE SHOP PLANT OF THE PHILADELPHIA RAPID TRANSIT COMPANY, SHOWING LOCATION AND ARRANGEMENT OF THE NEW STRUCTURE UPON THE CUMBERLAND STREET SIDE

floor having pits will provide for the overhauling of twenty-two cars simultaneously, while upon the second floor thirty-four cars may be painted at one time. This addition to the Kensington Avenue shop will increase the number of men employed there to 350 men.

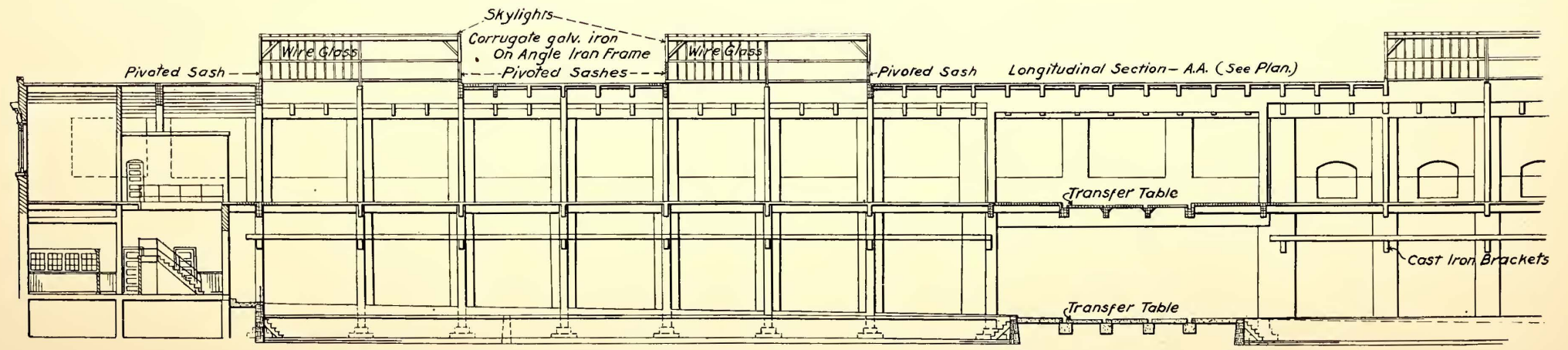
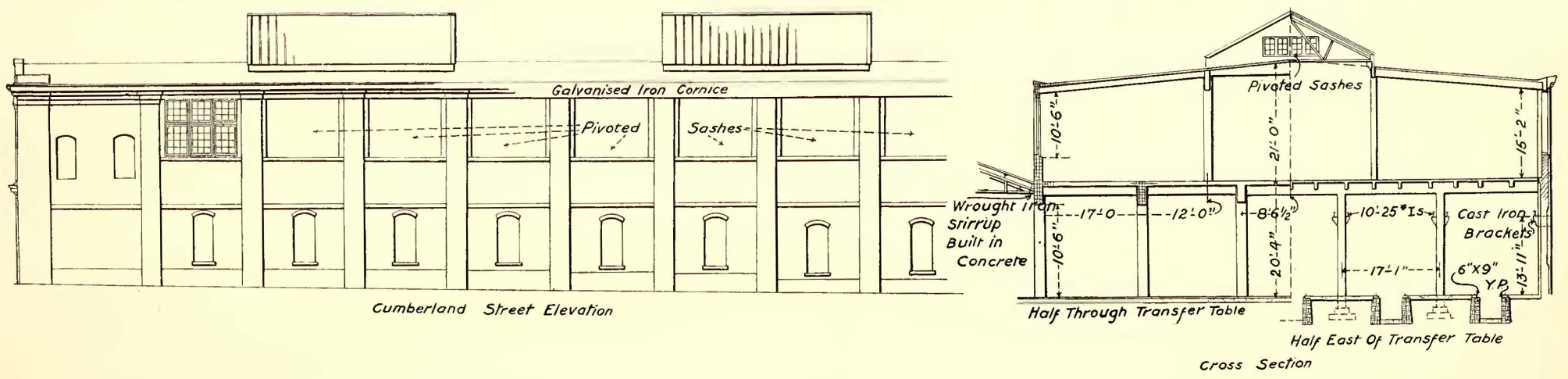
One of the most interesting features of this shop lies in the interesting type of construction which was resorted to. Concrete construction was decided upon by the engineering department of the company after a long and careful study of the subject as well adapted to requirements of this new shop. The excellent results which have resulted from the greatly increasing use of reinforced concrete construction led the Philadelphia Rapid Transit Company to carefully investigate its merits,

inforced concrete of the type indicated in the following drawings, of the girders, trusses and floor and roof members, for which particular details steel I-beams would ordinarily be used. The system used by this company is a modification of what is known as the De Vallière system, which has been largely employed in Switzerland and Italy. This company has made many installations of important buildings upon this principle, and also has recently satisfied the building inspectors of the cities of New York, Philadelphia and others as to the strength and general merits of the system.

In a test which was recently made upon this system of concrete construction, a section of floor, 8 ft. x 18 ft. in size, with cross girders of moderate size, was erected upon 16-in. columns



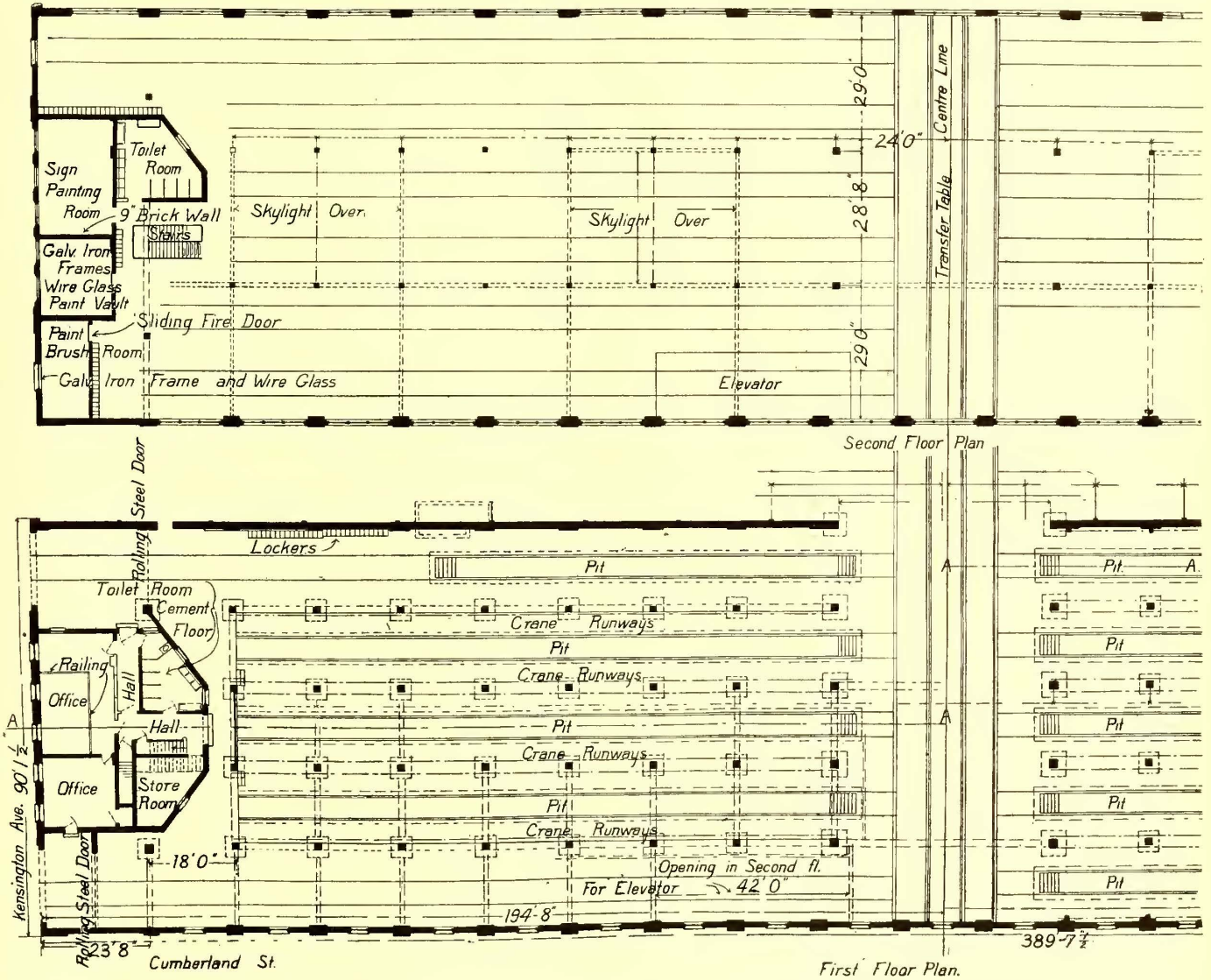
CROSS SECTION THROUGH THE KENSINGTON AVENUE SHOP BUILDINGS, TO SHOW RELATIVE SIZES AND TYPES OF OLD AND NEW BUILDINGS, AND CAPACITY OF THE NEW SHOP



PART SIDE ELEVATION, CROSS SECTION AND PART LONGITUDINAL SECTION DRAWINGS OF THE NEW TWO-STORY OVERHAULING AND PAINT SHOP

and surrounded by brick walls to a height level with the top of the floor, the brick structure acting as a furnace by which to submit the concrete construction to the test of extreme heat. The sample floor was supported upon two 8-in. x 14-in. reinforced concrete girders, which spanned the spaces between the columns. Each girder was reinforced by four 1-in. round steel rods at the bottom, hung in stirrups of twisted 5-16-in. round steel and having an eye at the top through which the 5-16-in. round rods of the floor slab were inserted. The girder rods were placed within 2 ins. of the bottom of the girder, the two lower rods running straight from end to end, while the

this length of time a stream of cold water was turned upon the floor from a regular fire hydrant delivering at 65 lbs. pressure, and the structure was cooled as rapidly as possible in this way. It is interesting to note that the total deflection under the load of 150 lbs. per sq. ft. and the effect of the fire was only 2 5-12 ins. at the center of the floor slab, although the floor recovered 1 5-12 ins. of this after thoroughly cooling. It was found that no separation had taken place between the slab and the beams, and no spalling of exposed surfaces was found, even though the bottom surface of the slab had been at a cherry red heat. After the concrete had become thoroughly cooled it required a total



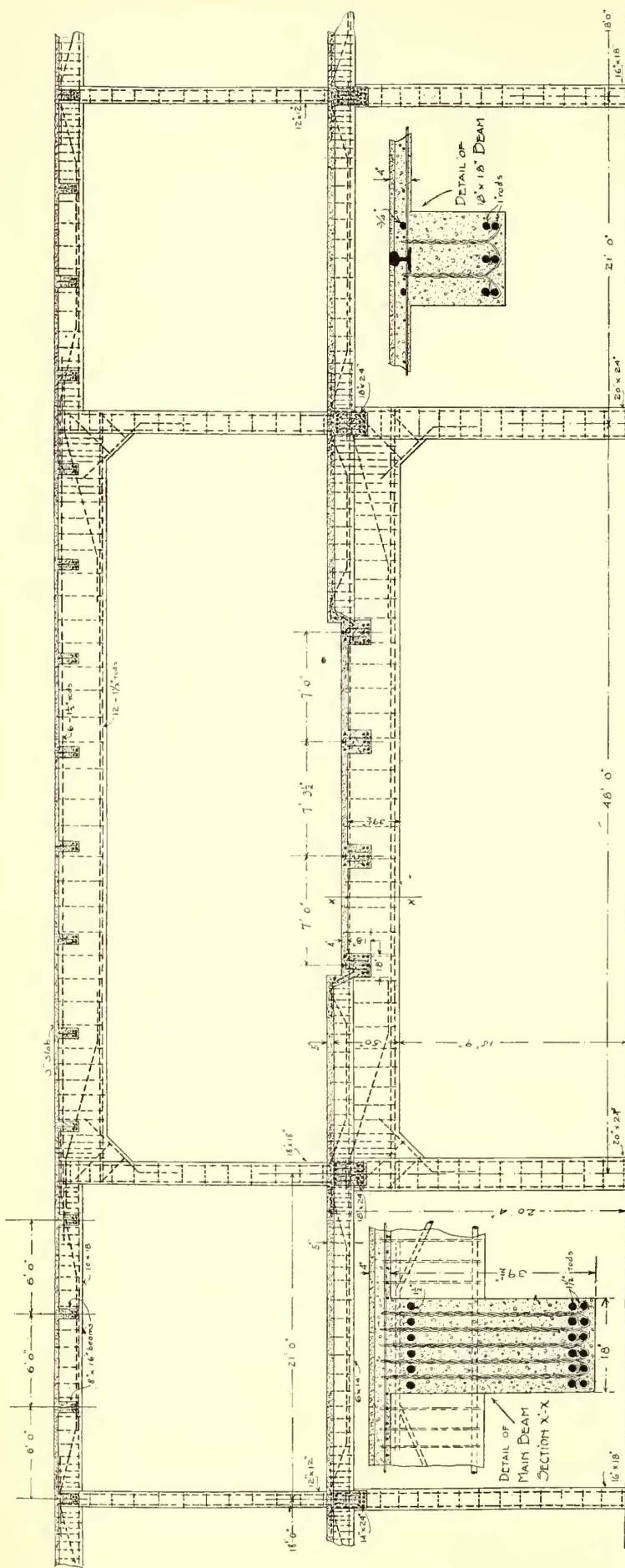
PART FLOOR PLANS OF THE FIRST AND SECOND FLOORS OF THE NEW SHOP BUILDING, SHOWING ARRANGEMENTS OF TRANSFER TABLE RUNWAYS, TRACKS, PITS, OFFICES, PAINT VAULT, ETC.

two upper rods were bent up at each column support in order to resist horizontal shear and take up any negative bending movement due to the monolithic structure, as this system of construction provides for. The floor was 5 ins. thick, having one layer of 5-16-in. round steel rods, spaced at 8-in. centers, at the bottom, and another layer of similar rods running from the bottom of the slab at the center to the top of the floor at the outer edge, in order to strengthen the overhang of 14 ins. beyond the girders.

After the structure had become thoroughly set, a load of pig iron, amounting to 150 lbs. per sq. ft., was placed upon the floor, although no deflection whatever was noted as a result of this load. After this an intense fire was started from oak cord wood within the furnace enclosure beneath the floor and was allowed to burn for over three hours, the high temperature of 1859 degs. F. having been reached. After having burned for

of 336 lbs. of load per sq. ft. to cause the floor to crack, after which the floor slab was loaded with a total of 602 lbs. per sq. ft., giving a maximum deflection of 2 5-12 ins. This indicates that the type of construction used provides a liberal factor of safety.

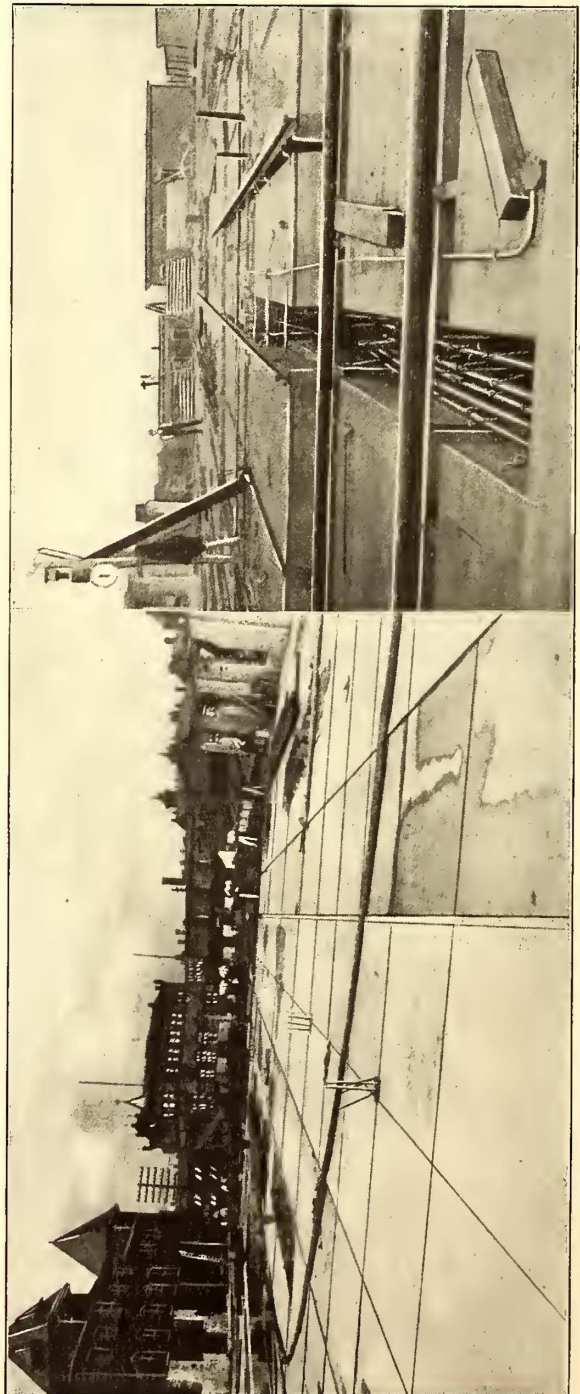
The details of this type of concrete building construction as applied to the Kensington Avenue shop addition are clearly shown in the two accompanying drawings, one a detailed cross section through the new building, with part detail plans of roof bays and transverse girders, and the other a part longitudinal section to show the complicated special construction at the transfer table pit. As may be seen from the street layout plan of the shop site, the various buildings are served from transfer tables, the lack of room under city conditions of operation preventing the use of ladder tracks for entering from the streets onto the various floor tracks of the buildings. In the construc-



PART LONGITUDINAL SECTION OF BUILDING TO SHOW DETAILS OF THE LONG-SPAN REINFORCED CONCRETE GIRDER CONSTRUCTION TO CARRY THE TRANSFER TABLES

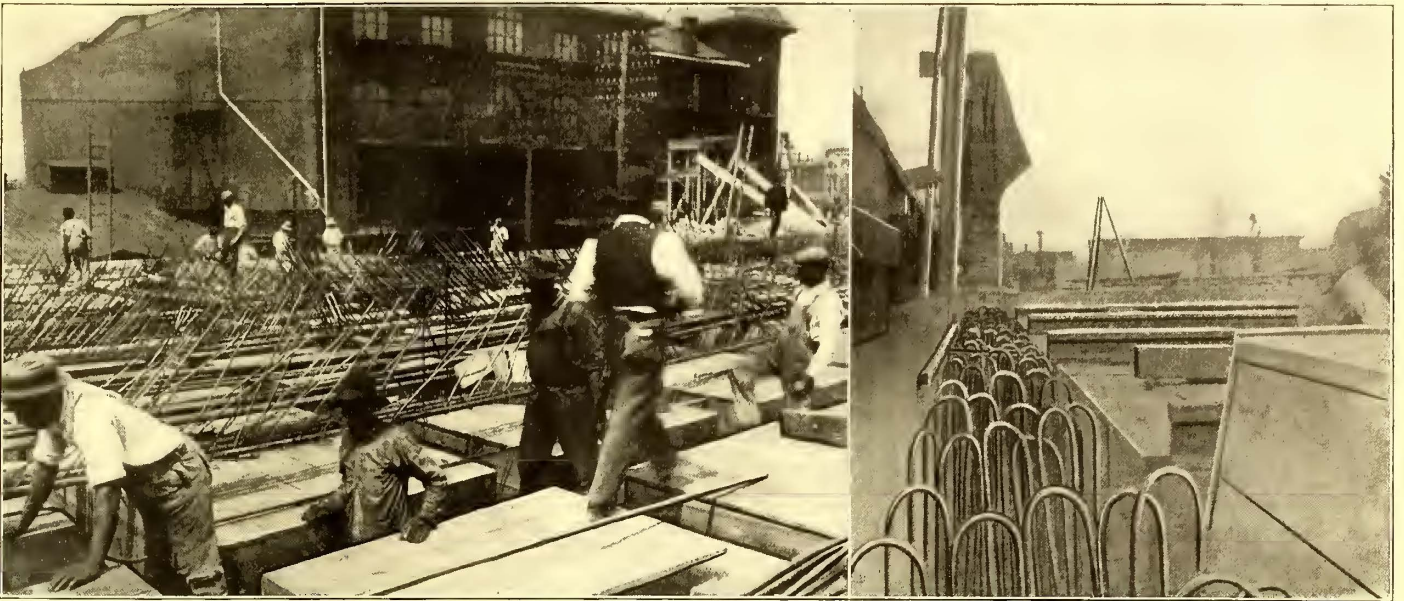
tion of the new two-story addition it was therefore found necessary to make use of the transfer table idea upon the second floor as well as the first floor, which has been worked out in an interesting manner. As may be noted, the table construction on each floor permits of handling double-truck cars as large as

45 ft. in length. The peculiar adaptability of this method of reinforced concrete construction to a problem of such a difficult nature as this is readily seen by an examination of the longitudinal sectional drawing. As may be noted therefrom, the transfer table is carried in a pit 23 ft. wide, which is depressed 11 ins. beneath the level of the shop floor and extends crosswise of the building. Four running rails are used, as shown, for carrying and guiding the transfer table, and under these are arranged cross concrete supporting girders 18 ins. x 18 ins. in section. These cross girders distribute the load to heavy longitudinal girders of very novel construction; as shown at section X-X, these longitudinal girders are 18 ins. x 39 1/2 ins. high at bottom side of floor, although in reality they may be said to be 47 1/2 ins. high, including the thickness of the floor which is built in with the beam to form a monolithic structure. There are four of these heavy longitudinal girders spanning between columns. This is an example of probably one of the

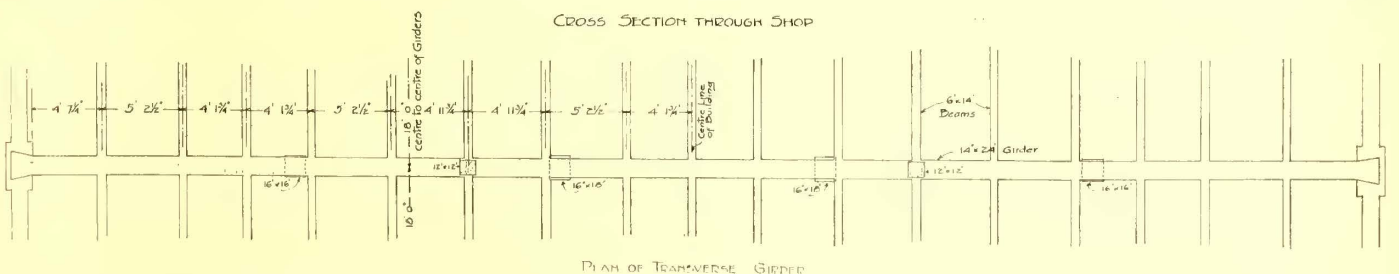
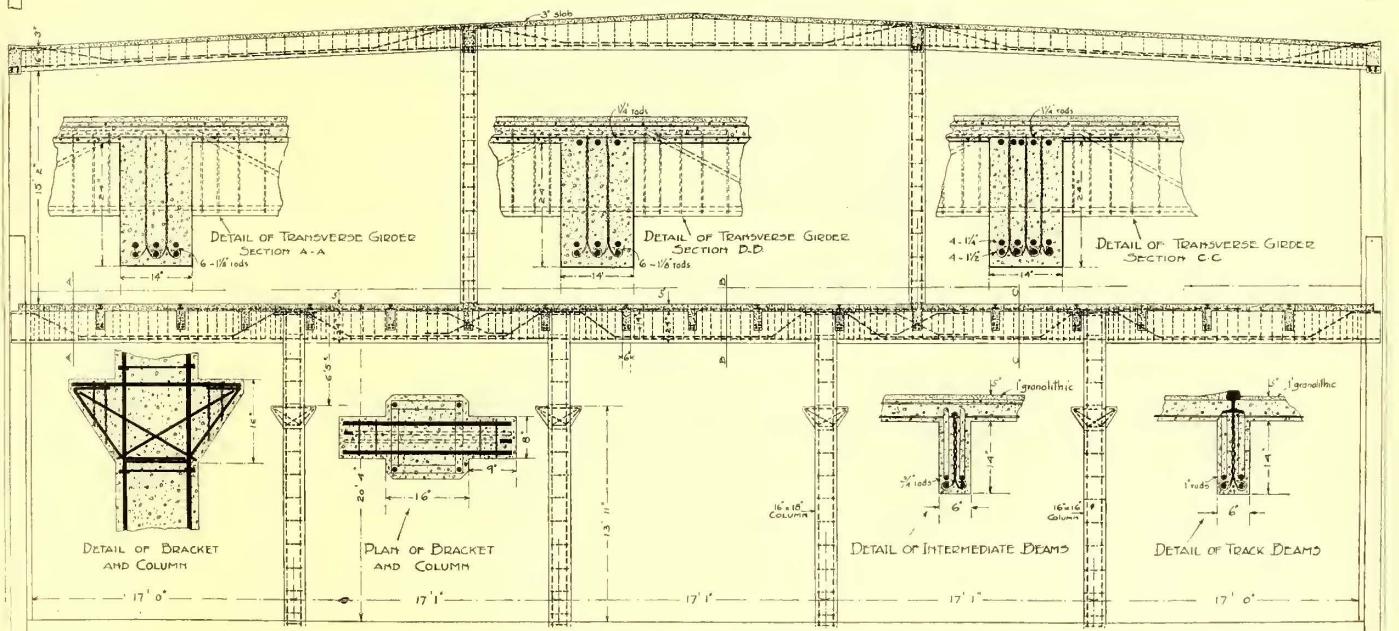
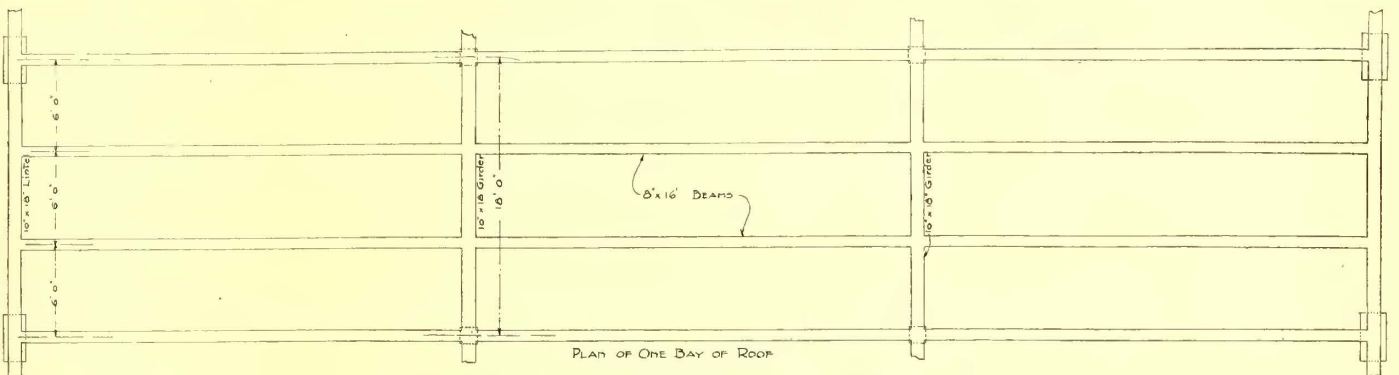


CONSTRUCTION VIEWS, SHOWING COMPLETED SECOND FLOOR AND FORMS FOR THE 4-FT. CONCRETE GIRDERS

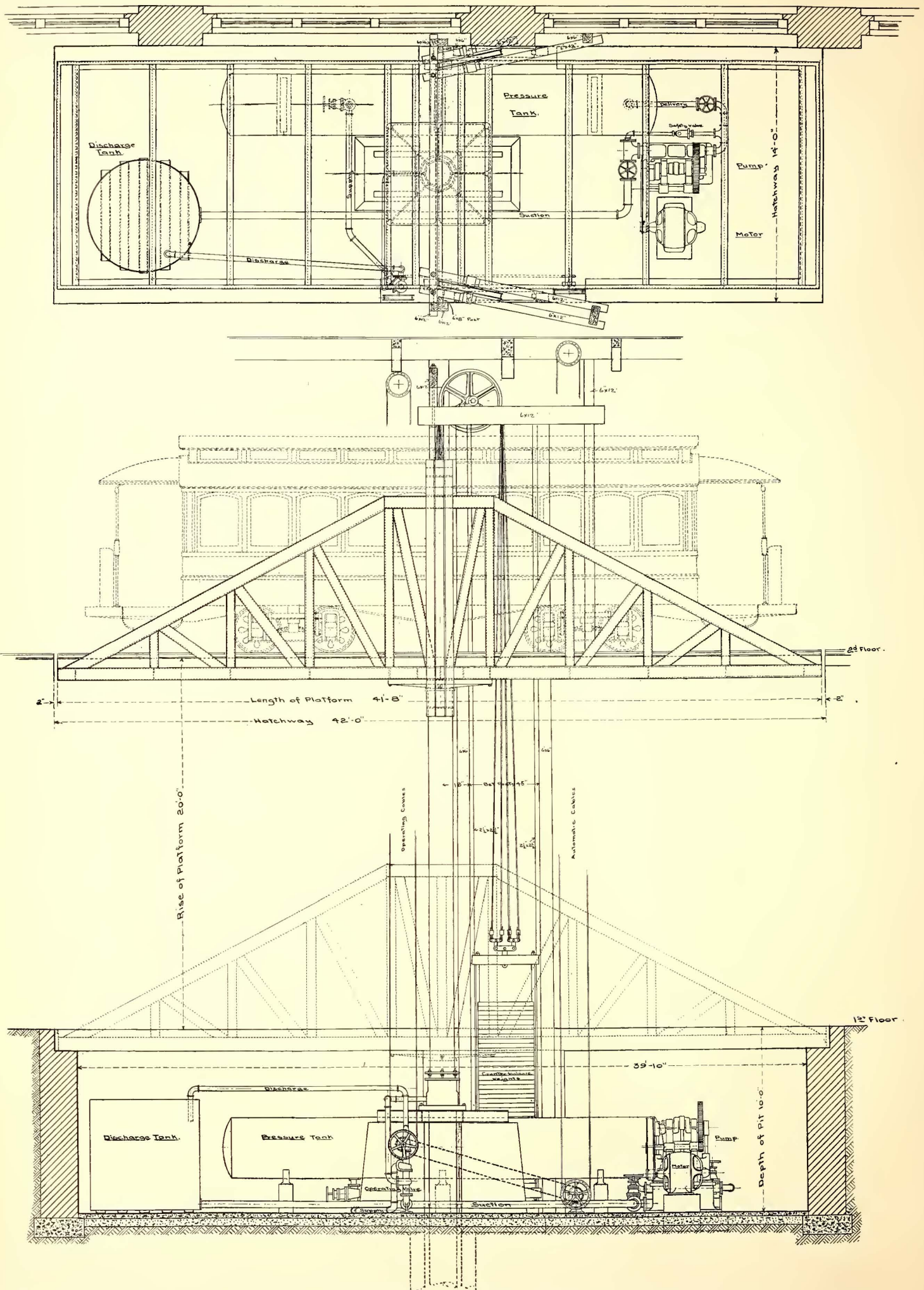




METHODS OF INSERTING REINFORCING STEELWORK IN THE CONCRETE BUILDING CONSTRUCTION



CROSS SECTION OF BUILDING, SHOWING DETAILS OF REINFORCED CONCRETE CONSTRUCTION , PLAN OF ROOF, BAY, ETC.



DETAILS OF THE SPECIAL ELEVATOR CONSTRUCTION FOR THE NEW KENSINGTON AVENUE SHOP BUILDING FOR HOISTING CARS TO THE PAINT SHOP, UPON THE SECOND FLOOR

largest girders of concrete construction that has up to this time been constructed especially for handling live loads of the nature of moving cars. These beams all involve the same general principles of construction as were embodied in the girders of the test floor previously referred to.

Other interesting details are to be noted in this construction in the method of tying these longitudinal girders into the 20-in. x 24-in. building columns upon which they are supported. The columns and the girders are built together to form a monolithic structure, the load from the girders being distributed to the columns by a special bracket form of construction, as shown. The brackets are heavily reinforced by the use of diagonal bracing of round steel rods. It may be thought that a considerable risk is being taken in providing for the carrying of the weight of moving cars upon girder construction of this nature, having a clear span of 46 ft. between

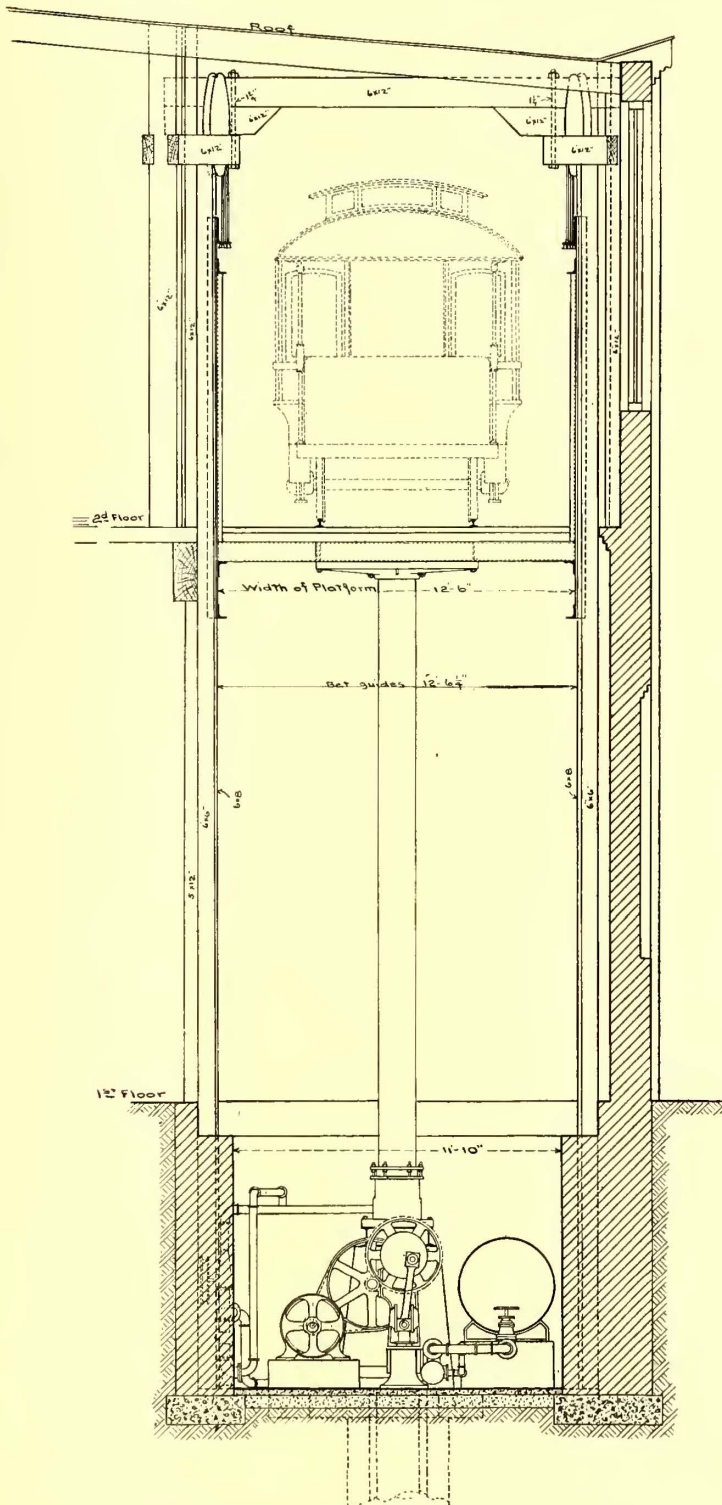
the columns, but it has been proven by the most careful tests that the capacities of these girders may be predetermined with as great accuracy as is possible in the case of steel I-beams or plate girders. Another interesting feature of construction is the method of building up the floor at the edges of the transfer table pit on the second floor, as shown in the longitudinal section. There was insufficient room over the 18-in. x 18-in. cross girders, so that a novel method of diagonal tying was resorted to.

The roof girders which carry the long span over the transfer table section were required to meet conditions similar to those imposed upon the second floor girders. The use of the transfer table to carry heavy double-truck cars required a free open space of at least the size shown, and it was therefore necessary that no intervening columns be used. The longitudinal roof girders at this section of the shop were therefore also required to cover a span of 48 ft., and for these reinforced girders 10 ins. x 18 ins. in size are used. The cross roof beams are 8-in. x 16-in. beams, of similar construction, and are located 6 ft. apart. The style of roof construction and proportion of slope given for drainage are made clear in the cross section. The roof covering will be a concrete slab flooring, 3 ins. thick, which will be covered with felt, tar and gravel.

The other interesting details of the construction of the new building are shown in the detail cross and longitudinal sectional views, which are well drawn to illustrate the arrangement of reinforcing steel in each girder. It is to be noted that the Reinforced Cement Construction Company advocates the use of round sections of steel only as embodying the greatest security against the development of fissures in the concrete matrix when the different members are overloaded. It is found by them that by the use of such round sections the steel is more surely embedded in its matrix of concrete, whereby it is best protected against the external influences, and the full value of the cohesion between steel and concrete (estimated by Baushinger at 600 lbs. per superficial square inch of surface contact) is realized. The methods employed by this company for determining the required sections of steel and concrete were based upon the work of the most noted of the concrete building authorities of Europe. In general, it may be said to consist of locating the neutral axis of the members by taking into consideration the relation of the modulus of elasticity of steel and that of concrete; while with this method a greater amount of steel and concrete is required than with some other systems, the results are found to be sure and the uncertainties of empirical formulæ are said to be avoided.

It is interesting to note that in the construction of this building over 2000 cu. yds. of concrete construction were used, while the total weight of reinforcing steel rods ran up to 250 tons. An excellent idea of the enormous strength of this construction may be gained from the extreme difficulty that was experienced in tearing out a piece of floor which had been faultily set by the workmen; in removing a section of the second floor, approximately 5 ft. x 18 ft., it required the efforts of two men working hard for three days—a remarkable test of its strength and durability.

The arrangement of tracks, columns, etc., upon each floor of the new building is shown in the accompanying plan drawings. It will be noted that upon the ground floor of the new building a liberal amount of space is provided for the offices at the shops. The present office facilities are located in the rooms on the Sergeant Street side, which, as shown upon the layout plan, will in the future be occupied by the boiler room. In the new building a large space will be devoted to the shop offices, which will be well lighted and roomy, and will liberally provide for the facilities required. An inner office is provided for the master mechanic in charge, Frank Wampler, while the outer office will be devoted to the time clerks in connection with the checking in and out system for keeping time. A set of lockers



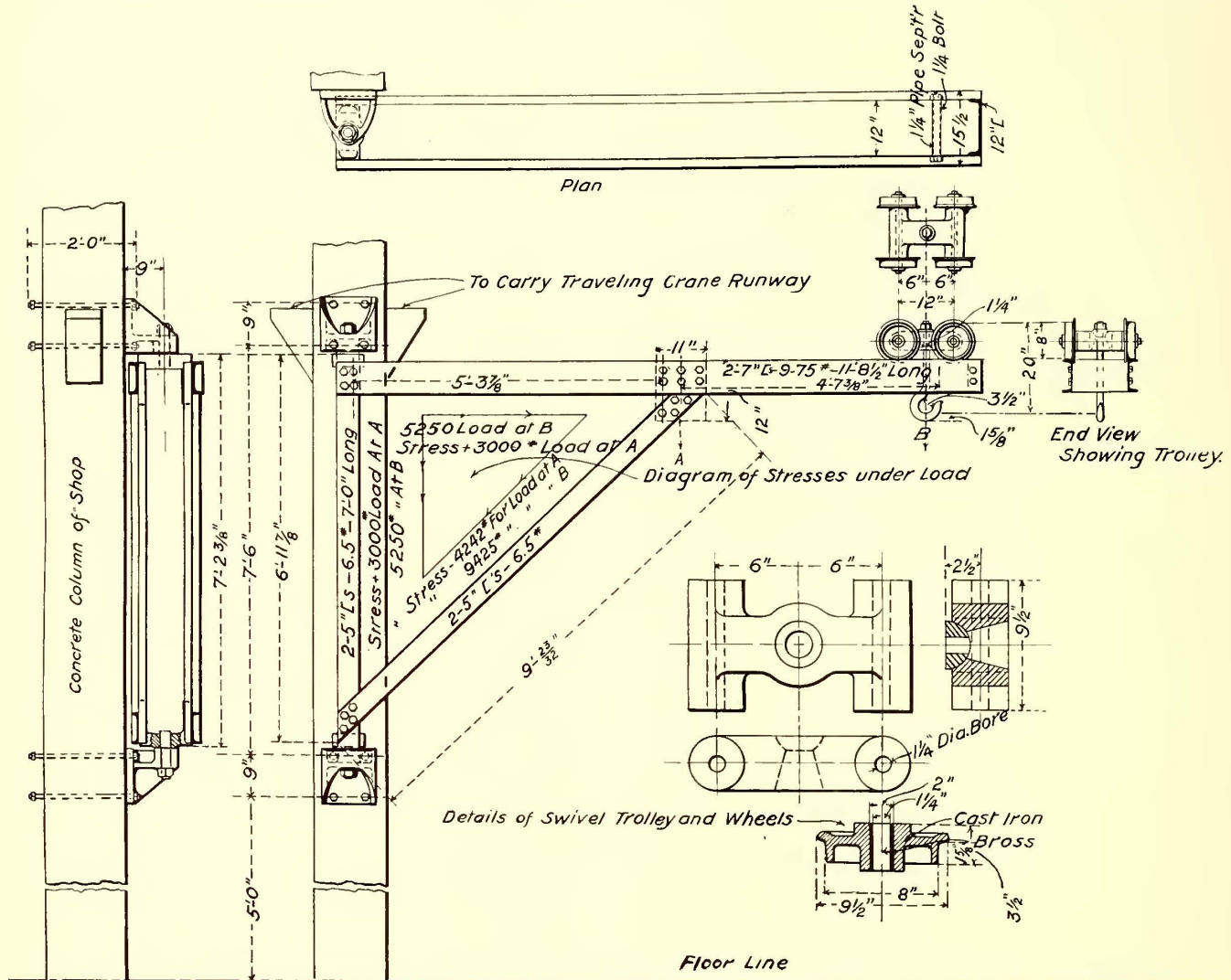
END VIEW OF THE CAR ELEVATOR, SHOWING CLEARANCES

for the use of the workmen are arranged along the north side of the shop just beyond the entrance, while the toilet rooms adjoin the hall which leads from the offices to the stairway.

Upon the second floor four rooms are laid off at the front end, two of which are strictly fireproof, and provide for the storage of paint and paint brushes, while the largest one will be devoted to sign painting. At the rear is the toilet room, and outside of this are arranged the lockers for the use of the painters. The sign painting room is provided with large windows, which will give the excellent lighting facilities required for this class of work. The paint vault and paint-brush room are each provided with concrete walls, sliding metal doors and

details are shown in the accompanying drawings, which also illustrate a typical car in position thereupon and give an idea of its capacity. This elevator was designed and built by the firm of F. A. & H. P. Bates, engineers, of Swarthmore, Pa., who make a specialty of high-grade passenger and freight elevators.

The capacity of the elevator is 50,000 lbs. at a speed of 20 ft. per minute for the rise of about 20 ft. The pumping plant is proportioned to allow the car to make one round trip every three minutes. The elevator machinery is located in the pit at the bottom of the shaft, 10 ft. deep below the ground floor level. The travel of the elevator is from the level of the



THE TYPE OF JIB CRANE TO BE USED IN THE NEW OVERHAULING SECTION, SHOWING DETAILS OF TROLLEY, ETC.

fireproof window construction, consisting of metal galvanized iron window sash and wire glass. The location of these two latter rooms at the front end of the building and at a portion of the block which is most frequented is a wise precaution, as in case of a possible fire it will be much more readily discovered than if the room had been located at the rear or in any other out-of-the-way location. The longitudinal section of the front end of the building shows the arrangement of the stairways, as well as also the partitions and windows.

An interesting feature of the equipment of this new shop is the elevator, which is located in the south track near the Kensington Avenue entrance, for raising cars to the paint shop upon the second floor. This elevator is of the direct-acting hydraulic-plunger type and involves some interesting features of design. Especially heavy construction has been resorted to, and its capacity has been carefully determined to provide for any abnormal increase in size of cars which may be determined upon. The construction of the elevator and arrangement of the

ground floor to the level of the second floor, a distance of about 20 ft.

The elevator car is 12 ft. wide and 42 ft. long, made of steel strongly braced and stayed, so as to withstand the full load when applied at either end of the car. The truss work on the car is 10 ft. high, of 8-in. channels, with heavy gusset plate connections, and the framing of the floor is of 8-in. steel beams, covered with the floor of yellow pine. The guides on the car are of steel, 12 ft. long, and arranged so as to give bearing surface on the strips for their full length, thereby giving a rigid connection between the car and the guide strips.

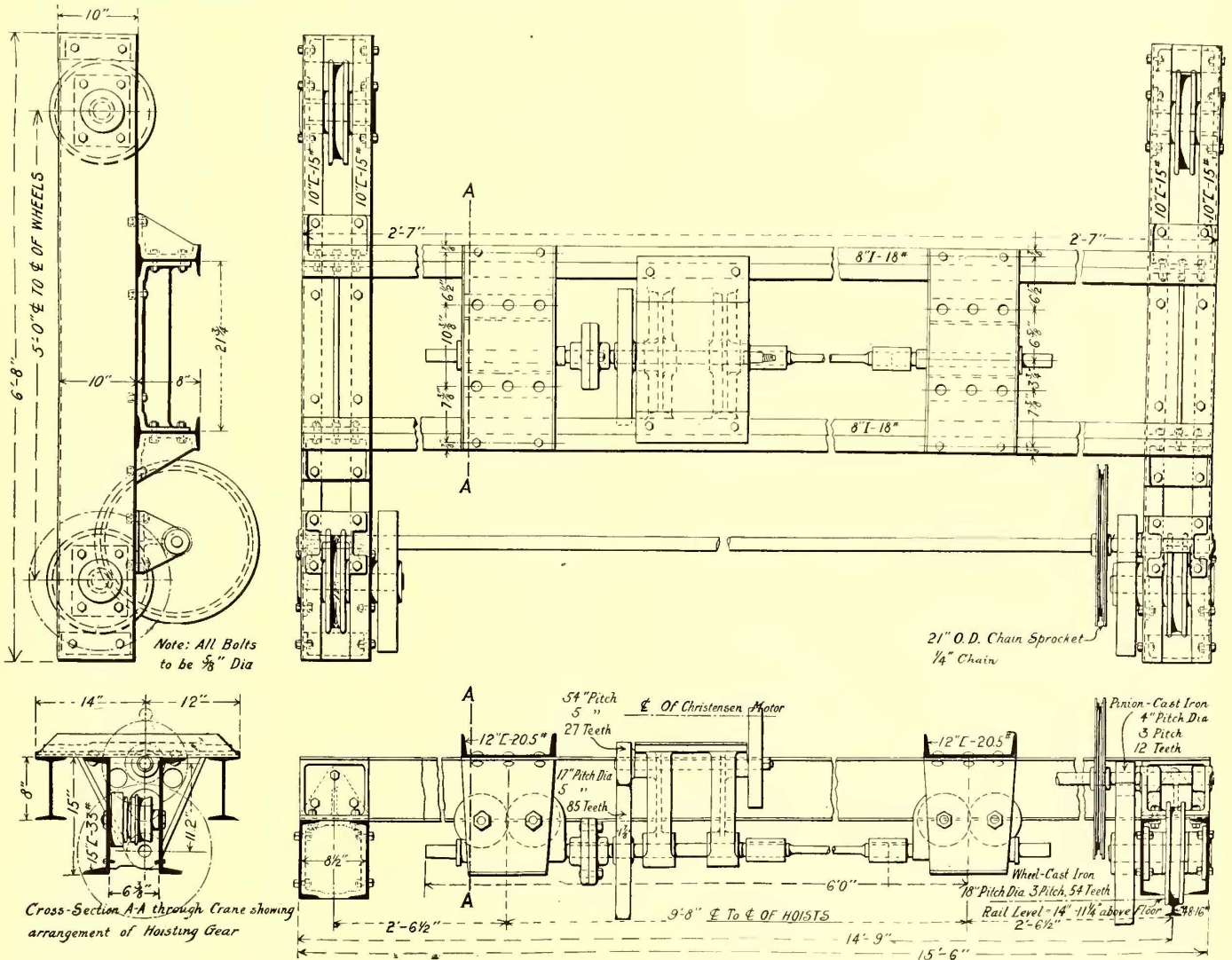
The elevator engine is of the direct-acting plunger hydraulic type, consisting of a hollow steel plunger, turned perfectly straight and polished true and smooth to a uniform diameter of 16 ins., and connected to the platform by means of a heavy cast-iron spider. This is operated in a heavy cast-iron cylinder 18 ins. in diameter, which is fitted with a heavy cast-iron stuffing box provided with follower and gland to admit six rings

of square hemp packing, which can be readily removed or renewed. This forms a water-tight joint and rigid guide for the plunger.

For controlling the movements of the car a water-balanced valve 3 ins. in diameter is used, to which the controller is connected directly without a pilot. The valve is fitted with bronze piston rods, bronze pistons, and bronze rack with steel pinion, brass lined, with graduated openings to receive and discharge the water at the top and bottom landings without shock or jar. It is directly connected to an operating cable conveniently located to the elevator platform. The elevator is provided with an independent automatic stop, connected to the operating valve and arranged to stop the car at the top and bottom land-

power pump, which is direct driven by a Diehl direct-current motor through a Reynolds silent-chain for silent and smooth operation. The pump has pistons 5 ins. in diameter, with an 8-in. stroke, and is fitted with a by-pass to prevent the pressure exceeding the maximum of the pressure tank. A pressure regulator is used in connection with the motor drive, which automatically starts and stops the motor as the pressure in the pressure tank falls or rises, the motor thus running only when water is required for operation. The pressure can be reduced by properly setting the regulator, and the current used in the motor will thus be in accordance with the load lifted.

The pressure tank is a long horizontal tank provided for a capacity of 1500 gallons. Its heads are dished out to the radius



DETAILS OF THE TRAVELING CRANE FOR THE OVERHAULING SECTION OF THE NEW SHOP, SHOWING ARRANGEMENT OF THE MOTOR-DRIVEN HOISTING MECHANISM, ETC.

ings without shock, and independent of the elevator operator.

The elevator will be provided with two counterweights placed at the sides of the hatchway and equal in weight to that of the car and part of the plunger, so as to require the minimum power for operation. Each counterweight will weigh about 8000 lbs. and will be connected to the car by means of four 5/8-in. cables, arranged so as to equally take the weight of the counterweight.

A locking device for holding the car stationary will be placed on the underneath side of the platform, operated by a lever on the platform, and so arranged that this device cannot be operated until the car gets to the upper level; it will then be released by an incline at the side of the hatchway, and can then be operated to hold the car at the level of the floor until the load is taken on or off.

The hydraulic pressure pump consists of a Deming triplex

of the tank's diameter, the design of the tank providing for a working pressure of 300 lbs., the test pressure to which it is subjected before going into service being 500 lbs. hydraulic. The discharge tank is of 1/4-in. tank steel, made water-tight and having a capacity of 1200 gallons. The arrangement of the apparatus in the pit beneath the first floor position of the table is clearly shown in the engravings. All parts are easy of access and may be readily adjusted, the result being a model plant in every respect for heavy service.

Other important details of the new shop are to be noted in the special crane equipment for the erecting floor, consisting of traveling and jib cranes, the former to be located upon the concrete columns for assisting in the overhauling work and the latter for hoisting cars up to remove the trucks from beneath them. On account of the importance of these details both the jib cranes and the traveling cranes are illustrated by the

detail sectional drawings presented on the preceding page. In each of the 18-in. x 24-in. main columns in the first floor of the new building, supporting bolts are built in upon which to fasten the special pivot brackets for the jib cranes. The arrangement of these bolts and the supporting brackets are clearly shown in the accompanying engraving. The crane is built up of structural work, the upper horizontal member consisting of two 7-in. channels 11 ft. long, while the vertical and slanting members consist of two 5-in. channels each; these are built up very strongly upon cast-iron separators, in the manner shown in the drawing, two of which act as pivots upon which the crane swings. This crane is provided for an extreme lifting radius of 10 ft. 5 ins. from the pivot centers, and is designed for a capacity of hoisting 3000 lbs. It is swung and the trolley is traversed by hand.

A novel construction of trolley is used upon these jib cranes, the runway for which is formed by the opening between the two 7-in. channels of the horizontal member. A simple small four-wheel car of 12-in. wheel base is used for this, from which a hook, carried in a universal ball joint or swiveling base in the trolley frame, projects downward. Upon this is hung the air hoist, or block and tackle, for the hoisting, as desired. The other interesting features of this design, such as the details of the trolley wheels, etc., are made clear in the accompanying engraving.

The details of the traveling crane are shown in another engraving. The traveling cranes span the spaces over tracks between the columns of the first floor. The columns have solid brackets near the top, built in and heavily reinforced by angling steel rods in the concrete construction, and upon these brackets the crane runways are located. The crane runways consist of I-beams rigidly bolted to the columns above the brackets by special through bolts provided in the columns, and upon them are located the rails carrying the crane wheels. The runway rails are located 15 ft. between centers.

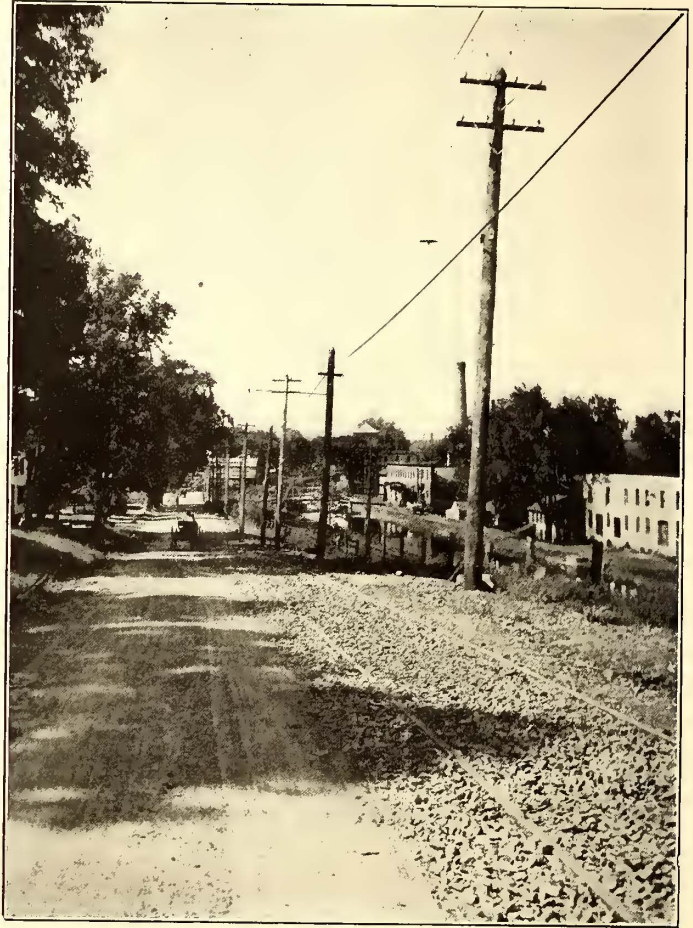
The traveling crane consists of two wheel carriages or frames, built up of heavy 10-in. channels, so located as to bring the centers of wheels 5 ft. apart; between these are carried two 8-in. I-beams, which are rigidly bolted beneath the carriages by special cast bracket construction, as shown in the drawings. Particularly strong and stiff construction is here resorted to, with the result that a very rigid and serviceable crane structure is secured. The motor operating the hoisting mechanism is one of the 2-hp Christensen air-compressor motors, furnished by the National Electric Company, which drives through reduction gearing to a shaft beneath the crane members leading from one side to the other and operating the hoisting drums through worm-gear drives; the Christensen motors are of the series type, and thus are well adapted to this service—particularly so as the Christensen air-brake system is the standard of the road, and thus no special equipment is introduced. The arrangements and proportions of this mechanism are clearly shown in the drawing. The crane is moved longitudinally along the track by hand power, a hand chain connection being provided which extends down to the floor within easy reach. This chain wheel drives the shaft extending across between the two wheel carriages from which the drive is delivered simultaneously to the crane wheels through gearing.

The designs of the jib and traveling cranes were worked out by the engineering department. They were built by Alfred Box & Company, Philadelphia, Pa., but are being assembled and installed by the company. The three transfer tables are being built at the shops of the company. The general contractor for the building construction is F. T. Maguire, of Philadelphia, who expects to have the building completed and ready for occupancy by Nov. 1 next. The total cost of this improvement, including building construction, tracks, elevator, transfer tables, heating and lighting equipment, etc., will be about \$125,000.

## NEW EXTENSION OF THE HARTFORD & SPRINGFIELD

A new branch of the Hartford & Springfield Street Railway Company has been formally opened by the Street Railway Commissioners of Connecticut. The cars began to run on Monday, Aug. 29. The road is 10 miles long. It starts from Windsor Green and runs due north to Windsor Locks, and thence to Suffield, where it joins with the Suffield Street Railway Company, thus completing the circuit between the cities of Hartford and Springfield.

The track is ballasted for the most part with a foot of coarse sand or gravel, though in some places crushed stone is used. In parts of the route through Windsor Locks the regular State highway macadamized construction has been employed. About 26,000 ties have been laid. These were all furnished by local contractors. The Weber railway joint has been put in through-



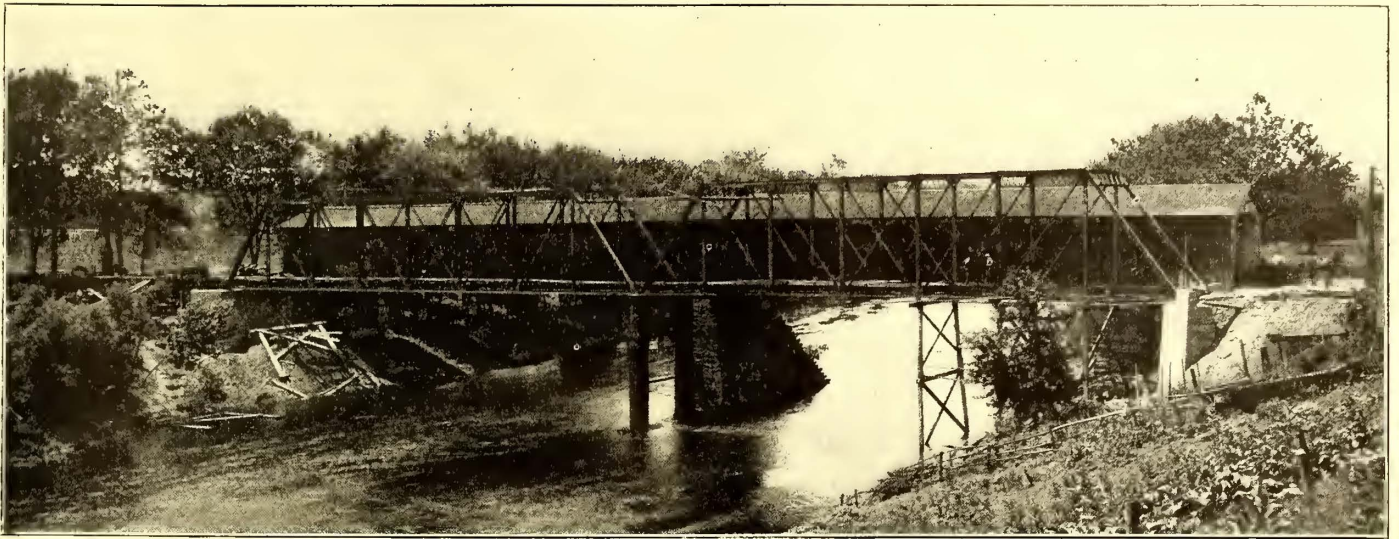
AT THE ENTRANCE TO WINDSOR LOCKS

out. Seventy-pound T-rails, furnished by the Pennsylvania Steel Company, have been employed. The line is "bonded" throughout with 8-in. all-copper wire bond of No. 0000 capacity, and it is "cross-bonded" every 1000 ft. with 60-in. copper bonding of No. 0000 capacity.

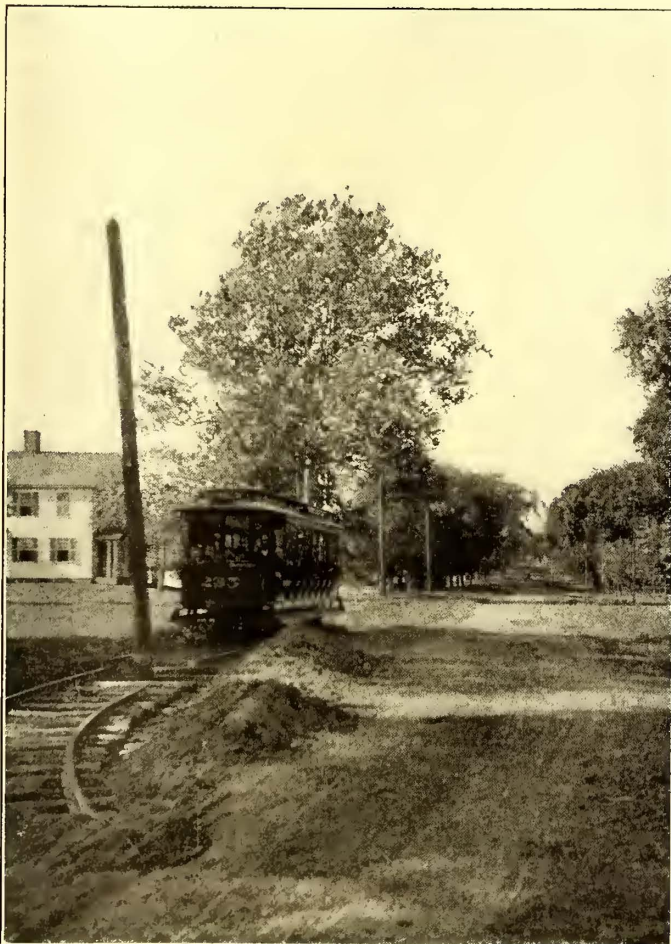
The bridges and trestles are said by Joseph D. Evans, who has had charge of the work as representative of the National Construction Company, to be strong and well built enough for the purposes of any steam road. The principal piece of bridge construction was the new steel bridge over the Farmington River in Windsor, standing alongside of the old covered bridge of wood which carries the highway, which was built in accordance with plans approved by the engineering department of the New York, New Haven & Hartford Railroad and by the State Railroad Commissioners of Connecticut. The new bridge is in two spans of 115 ft. and 135 ft., respectively. The abutments are of concrete construction. The center pier consists of two steel cylinders, each containing five piles.

The trestle approaches to the bridge over the western branch of the New York, New Haven & Hartford Railroad are together about 950 ft. in length. They are on piles of Georgia pine, driven into the ground to a depth of 18 ft. to 24 ft. The stringers are 8 ins. x 16 ins., and are 30 ft. long. There are

the United States Signal Company's automatic electric signal system. At each of the three large turn-outs, capable of holding three cars, the Couch and Seeley pole telephone is found. Both telephone and signal systems are protected from the danger of thunder storms by twelve Shaw lightning arresters. The



THE NEW BRIDGE OVER THE FARMINGTON RIVER



THE ROAD IN SUFFIELD STREET

two of them under each rail. The ties are 7 ins. x 7 ins., and are 9 ft. long. They are placed 15 ins. apart. The wooden guard rails outside of the steel rails have a cross section of 6 ins. x 7 ins., and run continuously on the trestles. There is also a T-guard rail inside the other rails which runs continuously across the trestle. The trestles are all constructed in accordance with standard steam railroad specifications.

Elsewhere the most advanced appliances for safe-guarding traffic have been employed. The line is operated by blocks of

trolley itself is similarly protected by eighteen General Electric M. D. lightning arresters.

For the overhead construction about 600 trolley poles have been planted. On these a new style of flexible brackets has been employed. Grooved trolley of No. 00 capacity is used, as well as the West End hangers. On all curves and pull-offs solder bronze ears have been introduced, and on straight lines the ordinary 8-in. mechanical ear.

The line is fed by an aluminum cable 1 5-16 ins. in diameter, equivalent in cross section to a 500,000-circ. mil copper feeder. The power is supplied from the power house of the Hartford & Springfield Street Railway Company at Warehouse Point. It is brought over the Connecticut River to Windsor Locks by means of an aluminum feeder cable strung along the north side of the historic toll bridge.

The equipment at the outset includes four 42-ft. closed cars equipped with Christensen air brakes, two 34-ft. closed cars with air brakes, and three 14-bench open cars with air-brake equipment. Each of these cars is provided with four G. E.-67 motors. There is also included a large double-track snow plow of Wason type with four G. E.-67 motors. A new car house for storage and maintenance of the cars has been constructed just south of Windsor Locks.

The construction of the road has been in the hands of Joseph D. Evans, of Boston, who, previous to his connection with the Windsor Locks Traction Company, had charge of the construction of an important interurban road between Newark and Zanesville, Ohio.

A through service will be established by means of traffic arrangements with the Hartford Street Railway Company, the Suffield Street Railway Company and the Springfield Street Railway Company, whereby passengers will be conveyed without change of cars from the center of Hartford to the center of Springfield. Direct connection will also be maintained on the west side of the river with the cars of the Springfield Company that run to Holyoke and Mt. Tom. A special feature of the operation will be the opportunity to start in Hartford and make a trip through Springfield and back down the east side of the river as far as the New England road's crossing in East Hartford without change of cars. This will give a unique circuit of about 50 miles through the beautiful Connecticut Valley. H. S. Newton will be general superintendent of the lines on both sides of the river.

IMPORTANT NEW SYSTEM OF CAR-EQUIPMENT RECORDS FOR THE BROOKLYN ELEVATED RAILROADS

A new era, mechanically, has been instituted in the mechanical department of the Brooklyn Rapid Transit Company, in connection with the recent new work of reconstruction of rolling stock for the elevated lines, in the inauguration of one of the most complete systems of car-equipment and trouble records that has ever been applied to cover the rolling stock equipment of any railroad in this country.

met in operation; from these the results of the various changes and innovations will be carefully traced as to the amount of labor and material expended and the costs, and their value may thus be determined. The requirements of each branch of the work were carefully studied and the record blanks were prepared with particular reference to the important features of the repair and reconstruction work to be recorded.

Special blanks were designed for use in the repair shops, for the different gangs of workmen, and for the inspectors to indicate over their signatures the proper completion of their work, and also for trainmen to report troubles, defects, etc., occurring to the apparatus, and also the results of accidents. Furthermore, at the general offices of the company record blanks and filing systems are provided, which will enable the reports of reconstruction, new equipment and equipment troubles to be filed and cared for.

EQUIPMENT RECORDS

When a car has been overhauled, rebuilt or re-equipped at any of the shops of the elevated division, a complete report of

Form No. 467: The Brooklyn Heights Railroad Company. MECHANICAL ENGINEER'S DEPARTMENT. ELEVATED DIVISION. REPORT OF EQUIPMENT. Overhauled, Re-Built and Re-Equipped at 39th St. Shops on Request No. 92. CAR BODY, TRUCK, CONTROL, MOTORS, AIR BRAKES, CONTACT SHOES, SNOW EQUIPMENT.

THE NEW ROLLING STOCK EQUIPMENT REPORT FOR THE BROOKLYN RAPID TRANSIT COMPANY—NO. 467

results of break-downs and accidents, work of repairs and mechanical changes upon both elevated and surface cars was recognized by the company soon after the installation of the electrical equipment, and much study has been given to the subject by the mechanical department. It is the practice of all large steam railroad systems to keep records of this character with more or less care, not only for the purpose of tracing the efficiency in service of the various classes of cars, but also for ascertaining the cost of the repair work upon each individual car.

As referred to in the two articles in preceding issues of the STREET RAILWAY JOURNAL, the work of reconstruction of the elevated rolling stock of the Brooklyn elevated lines is being carried out with great care as to detail, in hopes of greatly bettering the condition of and the service rendered by the equipment. In arranging for this new work, it was decided to carefully test the results by providing for an elaborate system of records of not only the new equipment, but also the troubles

Form No. 468: The Brooklyn Heights Railroad Co. MECHANICAL ENGINEER'S DEPARTMENT. Inspection of Motor Car Equipment at the 39th St. Elevated Shops. TO MECHANICAL ENGINEER: DEAR SIR: Motor Car No. 463 turned out on Request No. 421...

The above car has also been wired for lights, heaters and motor compressor governor, as well as arc headlights, and has been thoroughly tested out, inspected for service and found O. K. in all respects. The above car has also had Westinghouse Control, type 160 installed upon it, and is mounted on motor truck and trailing truck, the motor truck containing 2 Westinghouse Motors, type 50 L...

Car No. 463 equipped as above turned over to Operating Department at 39th St. Shop on Date March 12 1902

THE REPORT OF INSPECTION OF MOTOR CARS LEAVING THE REPAIR SHOP—NO. 468

the new equipment is there made out upon the blank No. 467, which is herewith illustrated. This blank is arranged to include information regarding every important detail of any car, whether a motor or trail car. It contains a large number of entries under the heading of car-body details, as well as also referring to the subjects of truck, control system, motors, air brakes, contact shoes and snow equipment.



been made over the former equipment. The truck records are arranged to assist in the matter of keeping records of wheel service. For the air-brake systems, the Christensen compressor equipment has been adopted as standard, while the New York Air Company's brake-cylinder equipment, motorman's valve, etc., are used; entries are provided for these equipments and their details, as shown.

This record No. 467, when made out, is manifolded in five copies, the original being on white paper, to be sent to the mechanical engineer; the duplicate is on blue paper and is sent to the chief mechanical draughtsman, the triplicate on yellow and sent to the East New York shops, the quadruplicate on pink and sent to the Thirty-Sixth Street shops, while the quintuplicate is on green paper and retained at the Thirty-Ninth Street elevated shops. This provides a very complete system of records, and being maintained at five different points, will be available for reference in spite of almost any possible contingency; it is improbable that fire or damage to buildings and records should occur at all five places at once, so that in case

manifolded in three copies, the original, on white paper, being sent to the mechanical engineer, while the duplicate on yellow paper goes to the Westinghouse Electric & Manufacturing Company, and the triplicate on pink paper is retained at the Thirty-Ninth Street elevated shops.

An important method of keeping track of the details of work at the elevated shops is provided for in the blank No. 462, which, as presented herewith, is filled out for the date of June 10. This report indicates the number and class of workmen upon each request (company order) for work upon the

ORIGINAL

Form No. 462  
C-4115

**THE BROOKLYN HEIGHTS RAILROAD COMPANY**  
MECHANICAL ENGINEERS DEPARTMENT.  
DELAY OF WORK AT THE 39TH STREET ELEVATED SHOPS.

DATE May 23, 1904 1904

To Mechanical Engineer:  
DEAR SIR:

We are delayed by the non-receipt of material, requisitioned for on Purchasing Agent, as follows:

Request Number	Description	Requisition Number	Dated	Order Number	Dated	Ordered From
42	35 Nos. Iron Saw Blade Special Tools	23	7/5/04	4115	7/21/04	Spay, Wm. Snow
44	375' 1/2" Sweet Lead Chain	31	4/1/04	47023	4/22/04	Carpenter, W. H. H.
32	100 A. J. Johns Manned C. Saw Combs	32	4/3/04	47023	4/16/04	A. J. Johns - Mac.

We are delayed by the non-receipt of the following material, being made up at East New York Elevated Shops.

Saw Risers and Window Sash for Pullman Trailing Cars, Request #42

We are delayed by the non-receipt of the following material, being made up at the 52nd Street Surface Shops.

Disc Springs for Dec. Cars, Request #42

Original (White) to M. E.  
Duplicate (Blue) to M. M.  
Triplicate (Yellow) to E. N. Y. "E" Shops.  
Quadruplicate (Pink) to 36th St. "E" Shops.

Signed: R. J. Beers  
Assistant Master Mechanic.

**THE DELAY REPORT FOR INDICATING TO THE MANAGEMENT REASONS FOR DELAYS AT SHOPS—NO. 463**

cars. The workmen are divided up into the following classes: carpenters, painters, blacksmiths, pipe fitters, boiler makers and machinists, tinsmiths and wiremen, while the overhauling work is divided up with reference to the work upon the motors, upon trucks, upon the air-brake system and upon the control system. As may be seen, this blank provides for the reporting of the number of workmen of each class, upon the overhauling work for each request number, upon maintenance work and upon machine shop orders, while a total column is provided for recording the total number of workmen in the entire elevated shop. This blank is manifolded in three copies, the original, on white paper, to be sent to the mechanical engineer, and the duplicate in blue to the assistant mechanical engineer, while the triplicate in yellow is retained at the shop from which the report is sent out. This is one of the first successful attempts that has been made by an electric railway system for the accurate reporting of the number of men employed upon each specific job in the shops, and is a very commendable move on the part of the company. Its greatest importance is that of enabling the labor cost of each order for reconstruction to be accurately traced; this blank provides for any changes of men from one request or machine-shop order to any other, this being one instance where reports of this character are liable to become confused under most shop systems.

Another report form of more than usual importance is the one shown as No. 463, with sample entries made out under date of May 23. This report places upon record, in the most concise possible manner, the reasons for any delay of work at the

ORIGINAL

Form No. 462  
C-4115

**THE BROOKLYN HEIGHTS RAILROAD COMPANY**  
MECHANICAL ENGINEERS DEPARTMENT  
ELEVATED DIVISION  
DAILY REPORT East New York SHOPS Mac DAY June 10 1904

Class	No. of Requests	No. Men	Maintenance	No. Men	Machine Shop Orders No.	No. Men	Total
Carpenters	* 26 * 18 * 20	6 4 7	Genl Repairs	17			31
Painters	* 12	8	Genl Repairs	7			15
Blacksmiths	* 17 * 10	8 6	Genl Repairs	10			24
Pipefitters	* 19	20	Genl Repairs	8			28
Boilermakers and Machinists	* 13 * 15	2 3	Genl Repairs	10			15
Tinsmiths			Genl Repairs	6			6
Wiremen	* 27	5	Genl Repairs	11			9
Motor Overhauling			Genl Repairs	20	670-430-220		20
Truck Overhauling			Genl Repairs Sags on Road	16 2	110-229-670		18
Air Brake Overhauling			Genl Repairs	5			5
Control Overhauling			Genl Repairs	2			2
Total		69		107			176

S. J. Jordan, General Foreman

Original (White) to Mechanical Engineer  
Duplicate (Blue) to Master Mechanic  
Triplicate (Yellow) Shop Manager Report


**THE REPORT OF LABOR DIVISION AT THE ELEVATED REPAIR SHOPS—NO. 462**

of loss of one complete system of records it might be duplicated from any one of the others.

Upon completion of the work of reconstruction or the overhauling of a motor car, an inspection report is required to be made out upon blank No. 468, which is reproduced herewith. The report blank is addressed to the mechanical engineer and provides for the reports of inspection of the foreman of the air-brake gang, the foreman of the wiring gang, of the electrical inspector and of the inspector provided by the Westinghouse Company to supervise the installation of the Westinghouse motor-control system which is used by the Brooklyn Rapid Transit Company as their standard equipment. Upon receipt of this report, filled out in the manner indicated on the sample, the mechanical department officially turns over the completed car, to which the blank refers, to the operating department of the company. This report, when made out, is

Thirty-Ninth Street elevated shops. It is addressed to the mechanical engineer, stating that the delay of work is due to the non-receipt of material, requisitioned for on the purchasing agent, as shown. It also provides for reporting non-receipt of materials which are being made up at either the East New

York elevated shops or the Fifty-Second Street surface car shops of the company. This report is intended to prevent the shifting, verbally, of responsibility for delays to places where it is not due, and also permits the mechanical engineering department to intelligently order investigations made at the points of delay reported upon. This report is manifolded in four copies, with the original in white to the mechanical engineer, the duplicate in blue to the assistant master mechanic of surface divisions, who is directly in charge of the Fifty-Second Street shops, while the triplicate in yellow goes to the East New York shops, and the quadruplicate in pink is retained at the Thirty-Ninth Street elevated shops.

Form No. 1000; 5-504  
**THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.**  
 CAR NO. **563** PERMANENT DATA AND DIMENSIONS. 

STANDARDIZED *May 20<sup>e</sup> 1904* 1904. ORIGINALLY CAR NO. *371* LATER NO. *473*.

Type of car *Convertible*  
 Builder *John Stephenson Co*  
 When built *Dec 20 1901*  
 Side doors { Original  
 Converted  
 Total weight of car body *2,960*  
 " " inc. trucks and equipment *62 H.P. M.L. 125-1,237.50*  
 Length of car body *42'-6"*  
 " over platforms *45'-10"*  
 " face to face of car couplings *46'-1"*  
 Height of car body *9'-2"*  
 " above rail to top of trolley stand *12'-5"*  
 " to center of draw bar head *29 1/2"*  
 Width over step *8'-7"*  
 " eaves *8'-9"*  
 " of platform opening at gate *2'-10"*  
 " bolster { Built in  
 Supplementary *8"*  
 Distance C to C. of king bolts *32'-5"*

Make of automatic car couplings *Low Bow #18*  
 " " fare registers *Towler #10125 # 3214*  
 " " platform gates *Bliss May 6*  
 " " heaters *Consolidated Ind. Type #118 X*  
 " " seats *H.B. car #*  
 " " trolley pole and stand *Frederickhouse class 11'-3"*  
 Style of seating *Recliner Capacity 60*  
 " " curtains and fixtures *Red painted "B" back 22 Hones. Bannan*  
 Number of heaters *20*  
 Size of advertising sign racks *11 inches*  
 Standard motor car switchboard  
 " trail " switchbox  
 Heat and light couplings *Consolidated Car Heating Co.*  
 Adapted to *Frederickhouse* Type of motor *50 L.*  
 Truck wheel base No. 1 end { Motor  
 " " " " { Trailing *6'-4"*  
 " " No 2 end { Motor  
 " " " " { Trailing *6'-4"*  
 Adapted to *Parkway* Type of truck { Motor  
 " " " " { Trailing *33"*  
 Size of wheels *33"*

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heading of the Brooklyn Heights Railroad Company, this company being the operating head of the various railroad companies which combine to form the Brooklyn Rapid Transit Company; all operating and mechanical reports bear this standard heading, while a special monogram, including the letters B. R. and T., referring to the controlling company, is incorporated as shown.

The above-mentioned records form a basis upon which the permanent data and reference system is made up. As before stated, a very complete permanent record system has been designed, involving the use of an extensive card index filing system, for ease of manipulation, and also for ready reference; by this means the work in the mechanical division may be studied with the utmost facility. The cards used in this card index are of the standard 5-in. x 8-in. size, and are printed in special standard forms, with the Brooklyn Heights Railroad Company heading and the standard B. R. T. monogram, as will be shown in accompanying half-tone engravings. These card index blanks have been printed with special reference to the permanent records which

THE FORM OF INDEX CARD USED FOR THE PERMANENT RECORDS OF DATA AND DIMENSIONS OF EACH ELEVATED CAR OF THE SYSTEM


When it is desired to investigate the causes of delays in the work as reported upon blank No. 463, or the cause of any accident, mishap or other trouble in the mechanical department, the mechanical engineer issues to the foremen concerned an order for investigation of the particular delay or trouble upon a special investigation blank, which notes briefly the trouble, where it is reported to have occurred, etc., together with explanations of the details which are required. This blank also contains a vacant section for reply, on the lower end for the insertion of the statement of the foremen. This investigation report is very easily handled, and its concise and effective form make it of more than usual value. This blank is manifolded in three copies, which are distributed to the mechanical engineer, the assistant mechanical engineer and the shop concerned, in the same manner as above mentioned in the weekly report No. 462.

All of the five above-mentioned classes of reports are made out upon the specially printed blanks of the standard size of 9 ins. x 12 ins., with the arrangements of headings as shown upon the reproductions. These blanks all bear the standard

Form 4483; 11-03 10000  
**THE BROOKLYN HEIGHTS RAILROAD COMPANY** *Patrol July 10 1902*   
 Armature No. **3333** Purchased *July 10 1902* Date of Contract *Oct 11 1902*  
 Sold or Scrapped

CAR NO.	DATE		COILS			COMMUTATOR			LEADS	SHAFT	PINION	BANDS	P.W.G.	MECHANICAL DEFECTS				CAR SHOP	
	In	Out	Gd.	SC	OC	BL.	W	O						S.C.	GJ.	Rph.	Sub P.P.		Hol of W.O. bearings
<b>109</b>	<i>6/2</i>	<i>1/5</i>																	<i>36<sup>e</sup> S.</i>

THE IMPORTANT ARMATURE RECORD UPON WHICH THE HISTORY OF EVERY ARMATURE IN THE ELEVATED SERVICE IS CAREFULLY TRACED

Form 1111; 11-03 10000  
**THE BROOKLYN HEIGHTS RAILROAD COMPANY, ELEVATED DIVISION** *36<sup>e</sup> S.* SHOP   
**MOTOR AND TRUCK REPORT.**

Motor Truck No. *677* Taken from Car No. *1202* Date *April 6 1904*

REPAIRS NEEDED: *Open armature coil in armature*

REPAIRS MADE: *Put in new armature*

REMOVED.	CAUSE.	PUT IN.
No. 1 Motor No. _____ Arm. No. _____	<i>Open car coil</i>	Motor No. _____ Arm. No. _____
No. 2 Motor No. <i>172431</i> Arm. No. <i>271436</i>		Motor No. <i>172431</i> Arm. No. <i>271210</i>
No. 3 Motor No. _____ Arm. No. _____		Motor No. _____ Arm. No. _____
No. 4 Motor No. _____ Arm. No. _____		Motor No. _____ Arm. No. _____

Wheel Nos. \_\_\_\_\_  
 Put Under Car No. *1202* Date *April 10 1904* Inspected by *A. J. Jones*


THE FORM OF SHOP ARMATURE REPORT FROM WHICH THE PERMANENT ARMATURE RECORDS ARE MADE OUT

are inserted from week to week, as reported from the shops. The methods of making the entries and use of the card index system in general is shown upon the accompanying card forms.

CARD INDEX RECORDS

The card index record, which is of the greatest importance, is the permanent data and dimensions record, as shown herewith, which provides for a tabulation of data and dimensions of all cars upon the elevated division. One of these cards is made out for every car which is overhauled, rebuilt or re-

reproduced in the accompanying half-tone. This record gives complete information about the armatures upon any particular motor car; it gives the date when the armature was put in or removed, the trouble that may have occurred in the coils, the commutator, the leads, the shaft, the pinion, the armature bands or other mechanical details. Provisions are also made

Form No. 406  
 THE BROOKLYN HEIGHTS RAILROAD COMPANY. ELEVATED DIVISION *East New York Shop* 

**REPORT OF TURNING STEEL TIRED WHEELS**

Wheel No. *1637*

Received From *36<sup>th</sup> St* Shop *July 4<sup>th</sup>* 190*2*

Reason for Turning *Flat wheel*

Measurement (Circumference) Before Turning *103.67"*


Measurement (Circumference) After Turning *103.05"*

Tire Loss (Calipered) *.20"*

Work Done By *J. Duraw* Date *July 20<sup>th</sup>* 190*2*

Inspected by *Thomas Judson* Foreman.

Date Date Date  
 No. of Wheel Scrapped  
 No. of Axle Scrapped  
 No. of Tire Scrapped  
 Reason for Scrapping

Form No. 407  
 THE BROOKLYN HEIGHTS RAILROAD COMPANY. ELEVATED DIVISION *East New York Shop* 

**REPORT OF PRESSING ON OF NEW WHEELS OR RENEWAL OF STEEL TIRES**

Wheel No. *1321* Tire No. *601014*

Make of Wheel *Taylor Steel & Iron Co* Make of Tire *Satrobe*

Wheel Fitted By *J. Duraw* Tire Fitted By *J. Murray*

Pressed On By *A.P. Thomson* Outside Diameter *33"*

Tons Pressure *65*

Axle No. *1627*

Make of Axle *Middvale Steel Co.*

Diameter of Axle *6 1/2"*

Fitted By *J. Murray* Date *April 5<sup>th</sup>* 190*3*


Inspected By *Thomas Judson* Foreman.

THE TWO SHOP REPORTS OF WHEEL SERVICE AND REPAIR WORK FROM WHICH THE NEW WHEEL-RECORD SYSTEM IS KEPT

equipped at the elevated shops, entries being made mainly from the report of equipment record upon blank No. 467. This record is of great importance, as it includes information as to the type of car, the builder and date of purchase, the principal dimensions of the car body, platforms and interior details of the car, together with truck and motor information. From this card all the general dimensions of any car may be learned at once, while it also serves as a guide to additional information

upon this record for the entry of the purchase date and date of selling or scrapping.

The above armature record is made up from a special motor and truck report form (No. 407), which is also reproduced herewith. This report, which is made out upon a blank 7 ins. x 10 ins. in size, indicates the repairs needed upon any of the motors of a certain car, and also the nature of the repairs made, together with the armature numbers for those removed and for the new ones replaced; the middle column below indicates the cause of the trouble for which an armature is removed, which thus completes the necessary information from which the armature record may be made up. It permits any armature to be traced by number from one car to the repair shop and back under its next car. This report is made out by the shop superintendent, and after the repairs are made is turned in, with the proper entries, to the main office, to serve as a basis for the permanent armature record.

Form No. 40, 83-21-03-10000  
 THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION *36<sup>th</sup> St Shop* 

**WHEEL RECORD**

Wheel No. <i>4132</i>	Diam of Centre <i>28 1/2"</i>	Material <i>Cast Iron</i>	Wheel Fitted by <i>J. Duraw</i>	Pressed on by <i>J. Murray</i>
	Made by <i>Taylor Steel &amp; Iron Co.</i>	Purchased <i>July 5<sup>th</sup> 1901</i>	Put in Service <i>June 14<sup>th</sup> 1901</i>	Tons Pressure <i>65</i>
Axle No. <i>241</i>	Diam. <i>6 1/2"</i>	Material <i>Open Heart Steel</i>	Put in Service <i>June 14<sup>th</sup> 1901</i>	Fitted by <i>A.P. Thomson</i>
Tire No. <i>523, 519</i>	<i>33"</i>	Material <i>Steel</i>	Material <i>Satrobe</i>	Material <i>Taylor Steel &amp; Iron Co.</i>

Car No.	Date Put In	Measurement	Removed		Measurements	In Service	Loss	Turned	Ground	Work Done by
			Date	Cause						
<i>1024</i>	<i>4/14/01</i>	<i>33"</i>	<i>1/10-01</i>	<i>Flat</i>	<i>32.80"</i>	<i>57</i>	<i>.20"</i>	<i>X</i>		<i>J. Duraw</i>
<i>852</i>	<i>4/12/01</i>	<i>32.80"</i>	<i>4/18-02</i>	<i>Shop flange v.</i>	<i>32.55"</i>	<i>211</i>	<i>.25"</i>	<i>X</i>		<i>J. Duraw</i>

THE NEW WHEEL-RECORD CARD FOR THE ELEVATED SYSTEM, WITH SAMPLE ENTRIES TO SHOW METHOD OF TRACING THE SERVICE OF STEEL-TIRED WHEELS

by giving the original number of the car, its new number since reconstruction, and serial numbers of parts of the equipment.

While the above permanent data card is one of the most important records that can be kept in connection with the work of maintenance of the elevated rolling stock equipment, there is another record, however, which is of practically as great importance on account of its covering the most vital factor of the motive power equipment of the trains, this being the armature record for the car motors. This record is kept on a similar card of a light green color, one of which with sample entries is

steel tires. These records are also turned in to the main office, and serve as a basis for the permanent wheel record. The report of turning steel-tired wheels indicates not only the permanent data regarding the wheels, but also the reason for turning, the circumferential measurements before and after turning, from which the loss may be calculated, and the workmen in charge of the wheel lathe and inspection.

The report No. 501 supplies complete information in the case of a new wheel, about the wheel number, make of wheel and who fitted and pressed on by, or the number, diameter and who

fitted by in the case of renewal of a steel tire. This report includes information also as to the number, maker and dimensions of the axle, the tons pressure in pressing wheels onto the axle, and who the wheels were fitted by. These reports are made out by the wheel foreman and are turned into the main office upon completion of the work.

The permanent wheel record is reproduced herewith with sample entries, from which its use will be clearly understood. This blank refers to a single wheel and provides for all possible entries that may be needed in connection with the care and maintenance of steel-tired wheels. The number of axle upon which the wheel is mounted and also its tire number are given,

Form N.S. 410. O-41294. 11-03-20M.

THE BROOKLYN HEIGHTS RAILROAD CO. ELEVATED DIVISION.



Motorman's Report of Defects in Motor trailing Car No.

Date: Feb 11 1904 7:10 A.M. Route: Ridge road. Length of Detention: 1 Min's. Train No. 463. Place of Trouble: Myrtle Ave. Motorman: A.B. Johnson No. 4632. Conductor: J.D. Thomas No. 1221. Place laid up: East New York.

- Car Body Troubles: End Door, Side Door, Broken Glass, Ventilator, Bell, Bell Cord, Light or Light Switches, Heaters, Platform Gate, Safety Gate, Platform Chain, Pull Chain, Brake Chain, Broken King Pin, Draw Bar, Coupling Link, Car Seats, Car Floor Dirty. Motor Troubles: Armature Trouble, Motor Flashed, Motor Bucked, Motor Leads, Motor Bearings. Truck Troubles: Motor Truck, Trailing Truck, Flat Wheel, Hot Box, Brakes Noisy, Broken Brake Rigging, Truck Noisy, Contact Shoe Trouble, Dead Car, Track and Signal Defects.

Please check mark opposite defect reported. If the defect cannot be readily located, give, in addition to check mark, particulars which will assist in locating trouble. Original (white) of this report MUST be sent to Shop with defective car and given Division Shop Foreman; send carbon copy (yellow) to Division Train Master. In case the trouble is such as to allow the car to remain in service, report will be made out and both original and duplicate sent to Division Train Master who must immediately forward original to Division Shop Foreman.

Form N.S. 410. O-41294. 11-03-20M.

The Brooklyn Heights Railroad Company ELEVATED DIVISION



February 4 1904

Inspect the following MOTOR cars for

Motor Compressors and put in good condition.

Table with 5 columns and 10 rows for Motor cars. Entries: 463, 540, 1023, 475, 1109.

I have inspected and put above in good condition, except the following, which must have special attention.

(Sign)

Form N.S. 416. O-41183. 11-03-20M.

The Brooklyn Heights Railroad Company ELEVATED DIVISION



February 11 1904

Inspect the following TRAILING cars for

Broken side glass and put in good condition.

Table with 5 columns and 10 rows for Trailing cars. Entries: 463, 540, 1023, 475, 1109.

I have inspected and put above in good condition, except the following, which must have special attention.

(Sign)

THE INITIAL FORMS OF THE NEW SYSTEM OF TROUBLE REPORTS, CONSISTING OF DEFECT REPORT BLANKS FOR THE MOTORMEN, INSPECTION ORDER BLANKS, ETC.

together with all possible dimensions, the maker, when purchased, who fitted by, tons pressure in wheel press, etc. The car records in connection with the wheel appear in the lower part of the wheel record card, and show the date and measurement when put under any particular car, the date, cause and measurements when removed, number of days in service, tire loss, etc. This provides for everything that is needed in the calculation of wheel costs, a knowledge of which is becoming so necessary in connection with the use of steel-tired wheels.

Other important data is provided for, namely, the life of the wheel's steel tire, the amount of loss in turning or grinding, and all other possible information in this connection, from which to not only compare different makes of steel tires and wheels in general, but to give accurate data concerning the

wheel wear in relation to the character of the particular service in which the car is operated. This form of wheel record is one of the most complete that has ever been designed by any railroad company, and rivals those kept by the steam railroad companies in regard to detail. It will be of great value in supplying the information which is, at present, so greatly needed in reference to the more general use of steel wheels.

TROUBLE RECORDS

An elaborate system of reporting and recording defects and troubles in car equipment has also been provided for use between the operating and mechanical departments. In no other way can troubles be traced and taken care of so systematically and accurately as by having them reported from the operating side and then traced out, repaired and recorded by the mechanical department; this will enable the mechanical department to keep closely in touch with the condition of both the electrical and detail equipment of the rolling stock, and also will be of great value in indicating the prevalent troubles that need special attention for their eradication.

The trouble reports from the operating department are made out primarily by the motormen, who use a special defect report blank, form No. 410, which is reproduced with sample entries.

When trouble occurs, the motorman fills in this report blank as to the time, route, length of delay, place and other detailed information in regard to the troubles that were encountered; it will be noted that a classification of the troubles provided for is made, involving the five general departments of a car's equipment, namely, car-body troubles, motor troubles, truck troubles, controller troubles, air-brake troubles. Under each of these heads the principal details under which trouble may occur to them are given in full, with blank spaces in which to check off the kind of trouble. Two blank spaces are also provided for referring to a dead car and to track and signal defects.

Directions are given at the bottom of this blank to instruct the motorman as to its use. These blanks are made up in books 4 ins. x 9 ins. in size, so as to be readily carried by the motor-

THE BROOKLYN HEIGHTS RAILROAD COMPANY				ELEVATED DIVISION				DAILY REPORT					
Weather <i>Clear</i>		Date <i>July 12 1904</i>		Shop <i>36</i>		Time <i>7 P.M. to 7 P.M.</i>		Car No. <i>563</i>		Weather <i>Clear</i>		Time <i>7 P.M.</i>	
CAR RUN IN	TIME IN	TROUBLE REPORTED	TROUBLE FOUND	REPAIRED BY	TIME OUT	REASON	DETENTIONS	TIME	LENGTH	CAR NOT RUN IN	REMARKS	REMARKS	REMARKS
<i>No. 1000</i>	<i>5:20 P.M.</i>	<i>Spring trouble Bottoms roller Broken glass</i>	<i>Two new pairs wide rollers Two side glass broken</i>	<i>A. Jones &amp; side B. Jones</i>		<i>By the End of the Day 4:45</i>					<i>Repaired at good</i>		

THE FORM USED FOR THE DAILY SUMMING UP OF ALL CAR EQUIPMENT TROUBLE REPORTS, FROM WHICH RECORD THE PERMANENT CLASSIFIED CARD RECORDS ARE MADE OUT—NO. 408

man in his pocket, and reports are made out in duplicate, one upon white and the other upon yellow; the pages are arranged with the white and yellow sheets alternating, a carbon being used when making out a report. The white sheet, or original, is sent to the shop with the defective car, for the use of the division shop foreman, while the yellow duplicate, or carbon copy, is sent to the division train master; in case the trouble is such as to allow the car to remain in service, both reports are given by the motorman to the division train master, who forwards the original to the division shop foreman.

In investigating the reports of defects in this connection, an inspector's blank is used for directing the inspection of cars upon which trouble is reported. For this, blank form No. 405 is used. As may be seen, it directs the inspection of motor and

An important detail record is made up of all troubles reported upon the elevated cars. A special blank 12 ins. x 24 ins. in size is used for this purpose, as shown herewith (form No. 408), with sample entries. This blank provides for keeping records of all cars which are taken to the shop for overhauling or repairs. Under the main heading, which is the usual Brooklyn Heights Railroad standard, spaces are provided for recording the state of weather, name of the elevated shop at which repairs are made, date and the time covered by the report. The columns upon the blank provide for the numbers of the cars run in, the time in, trouble reported, trouble found, repaired by, time out, detentions in service when trouble was found, reasons for any delay in repairs and remarks. This is an important record, inasmuch as it furnishes a basis for the

Form No. 405-1103-2000  
THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.  
Car 563  
Type CAR BODY  
Built by *W. J. Johnson Co.*  
Date of Contract *July 6 1904*

Date *July 2*  
*Broken spring broken*  
*3 Broken glass broken*  
*6 Two new pairs rollers*

(Blue)

Form No. 405-1103-2000  
THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.  
Car 563  
Type OPERATING BOX AND CIRCUIT BREAKER  
Built by *W. J. Johnson Co.*  
Date of Contract *July 6 1904*

Date *July 3*  
*Spring broken see previous list*  
*9 Circuit breaker trip not set*  
*15 Work expanding spring*

(Buff)

Form No. 405-1103-2000  
THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.  
Car 563  
Type MOTOR TRUCK  
Built by *P. C. Brown Co.*  
Date of Contract *July 6 1904*

Date *July 7*  
*Flat wheel*  
*6 Not set*  
*12 Spring flange*

(Salmon)

Form No. 405-1103-2000  
THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.  
Car 563  
Type AL VALVE, TRIPLE AND DRAKE CYLINDER  
Built by *A. V. Decker Co.*  
Date of Contract *July 2 1904*

Date *July 2*  
*Broken wheel broken*  
*9 Slack traps*  
*31 Bottoms roller diff.*

(Pink)

Form No. 405-1103-2000  
THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.  
Car 563  
Type MOTORS AND ARMATURES  
Built by *P. C. Brown Co.*  
Date of Contract *July 6 1904*

IN	OUT
<i>2216, A. 3333 June 11 1904</i>	<i>2217, A. 3334 June 11 1904</i>
	<i>2216, A. 3333 July 5 1904 Insulated commutator</i>

(Green)

Form No. 405-1103-2000  
THE BROOKLYN HEIGHTS RAILROAD COMPANY—ELEVATED DIVISION.  
Car 563  
Type CONTACT SHOES, BEAMS AND TROLLEY  
Built by *W. J. Johnson Co.*  
Date of Contract *July 6 1904*

Date *July 4*  
*Two new beams*  
*20 Broken pins*  
*22 Broken shoe brass*

(Yellow)

REPRESENTATIVE PERMANENT RECORD CARDS FOR THE SIX GENERAL CLASSIFICATIONS OF CAR EQUIPMENT TROUBLES, SHOWING METHODS OF TABULATING AND RECORDING THE EQUIPMENT TROUBLES MET IN SERVICE

trail cars of the numbers indicated, with orders to put them in good condition. After inspection, the inspector reports at the bottom of this blank as to the condition of the various cars as shown; those which were found to be in good condition or require very little work to remedy the same are not mentioned, while the numbers of those requiring repairs or overhauling are inserted below. This blank is 4¼ ins. x 8½ ins. in size, and is not made in duplicate. As may be noted, separate forms are used for motor and trail cars.

keeping of the regular permanent trouble records and gives the mechanical department a most excellent and accessible knowledge of the prevalent troubles and condition of the rolling stock and its equipment. These records are kept on file in the main office until entered upon the permanent record cards of the card index system, and furnish excellent means of investigating the trend of troubles met in the operation of the system.

The permanent record cards are shown in the following

engravings. The troubles as reported upon the large daily report blanks are transcribed to the various card index permanent record cards, being sorted upon various colored cards according to the department of the equipment in which each of the troubles occurred. Only a few representative cards of the trouble records are reproduced herewith, although there are in all thirteen required for properly assorting these entries. The trouble reports are classified in much the same order as upon

These record cards are similar to those above mentioned for use in the card index, being of the adopted standard size of 5 ins. x 8 ins. Each card bears the standard Brooklyn Heights Railroad Company's heading, together with the B. R. T. monogram, as shown upon the equipment record cards. Sample entries are made upon these cards in order that the method of making the records may be more easily understood than can be made possible by a description. The varied colors used for the

THE BROOKLYN HEIGHTS RAILROAD COMPANY, *Seaboard L* DIVISION  
 Tabulation of Control Troubles *January*

DATE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	

*Blue spring lock*  
*Large hand 35*  
*Barley 200 work*

BRT  
3  
1  
2

THE BROOKLYN HEIGHTS RAILROAD COMPANY, *Seaboard L* DIVISION  
 Comparative Monthly and Yearly Tabulations of Trolley and Contact Shoe Troubles

	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	TOTAL
JANUARY	12										
FEBRUARY	9										
MARCH	6										
APRIL											
MAY											
JUNE											
JULY											
AUGUST											
SEPTEMBER											
OCTOBER											
NOVEMBER											
DECEMBER											
TOTAL											

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THE FORM OF CARD USED FOR THE MONTHLY TABULATIONS FROM DAILY REPORTS OF CAR EQUIPMENT TROUBLES, WITH SAMPLE ENTRIES

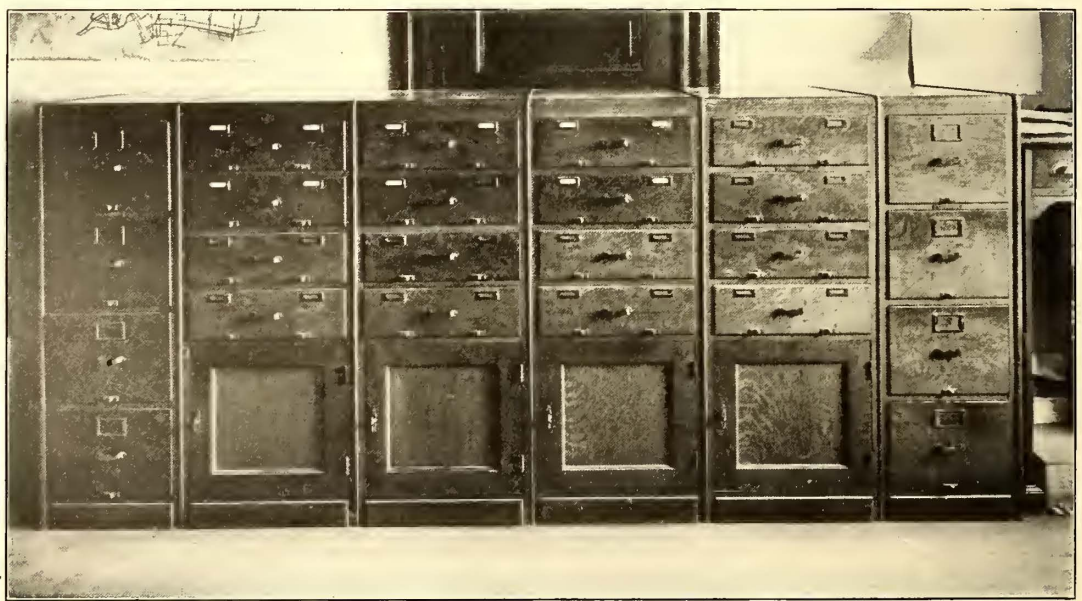
A SAMPLE OF THE COMPARATIVE MONTHLY AND YEARLY TABULATION OF TROUBLES, FOR INDICATING THE CONDITION OF THE EQUIPMENT

the motorman's defect blank (No. 410), the card records being arranged as follows:

different records have made it extremely difficult to reproduce them in engravings, but the results are sufficiently clear to permit the forms to be readily distinguishable.

All car-body troubles are grouped together and recorded upon the blue card, the heading for one of which is reproduced in half-tone herewith. The truck troubles are recorded upon salmon-colored cards, on account of the importance of which two cards are used, one devoted to motor trucks and the other to trail trucks. The control troubles are entered upon four buff-color record cards, the importance of this feature of the equipment, together with its complication of detail, making this number of sub-divisions necessary; the first of these is devoted to troubles in the controller reverser and the operating head, the second to those in the operating box and circuit breaker, the third to those in the limit magnet and switchboards, and the fourth to those in the storage batteries, jumpers and grids. A single green record card is used for the recording of motor and armature troubles. This card, which is reproduced herewith also in half-tone, is divided into two parts, one for armatures in and the other for those out. The air-brake troubles are divided into three general classes, for which three pink cards are used; the first referring to those met in the motorman's valve and the brake cylinder, the second to those of the motor controller and governor, and the third of those in the air pipe and hose. Two yellow record cards are used for the record of troubles in auxiliary apparatus, one providing for those in contact shoes, beams and trolleys, and the other for those met in the sleet scrapers, brushes and snow equipment.

It is important to note that the keeping of these records in the above indicated system provides for the tracing of any trouble which may have occurred at any time, and thus for the investigation of the class of troubles which become prevalent in any branch of the work for the application of such cor-



THE LARGE CARD INDEX CABINET IN THE MAIN OFFICE OF THE MECHANICAL DEPARTMENT, WHICH WAS SPECIALLY DESIGNED FOR THE NEW SYSTEM OF RECORDS

rective treatment and changes as will tend to remove them; if, for instance, any particular trouble becomes prevalent in the control system, as discovered by carefully watching these records, investigation may be at once instituted in preference to other work, and the proper attention given to this particular feature of the elevated equipment by the inspectors in view of its speedy removal. One of the greatest difficulties that is met in the operation of a large system, of the character of the elevated division of the Brooklyn Rapid Transit Company, is the proper watching of details by the officials, as is so necessary

in keeping the equipment in proper operating condition; this system of records, however, enables the mechanical as well as the operating officials to readily trace the character of troubles that are being met with so that if any one becomes unduly large a study may be instituted of the governing conditions. The importance of such a system is best appreciated by the steam railroads who have gone through this experience in a general way and have learned the absolute necessity of such records for economical operation.

For the convenience of the officials interested in the removal of rolling stock equipment troubles, monthly and yearly tabulations are made up from the daily reports, as shown upon sample tabulation cards, reproduced herewith in half-tone with sample entries. In each of these sets of records six cards of the various colors used in the daily records are provided, the blue to receive the tabulation of car-body troubles, the salmon the tabulation of truck troubles, the green the tabulation of motor troubles, the buff the tabulation of control troubles, the pink the tabulation of air-brake troubles, and the yellow the tabulation of trolley and contact-shoe troubles.

Each of the six cards for the monthly tabulation is made up with the same general form of heading as is used upon the daily report cards, the lower part of the card being ruled dif-



TYPE OF GUIDE CARD USED IN THE CARD INDEX CABINETS, SHOWING STYLE OF FILING SYSTEM

ferently, however, for the summation entries. As may be seen, the wide column is ruled at the left for the name of the month, while thirty-one small vertical columns are provided, one to correspond with each day of the month, while at the right is a column for totals; thus, for the month of January, 1904, six troubles were found under the control-trouble classification, of which one was a short-circuit upon the finger board, two were battery cells weak, and so on. These cards are of the standard card index size used by the company, and are filed in the same manner.

The yearly comparative tabulations are made out upon a similar set of six cards of corresponding colors, and similarly arranged as to heading and classification. These cards are ruled off horizontally to correspond with each month of the year, while the vertical columns provide for succeeding years from 1904 to 1913. In the column for 1904 will be recorded the total number of troubles in each classification for each month of the year. The sample entries indicate plainly the method of making records upon these blanks. Both the monthly and the yearly tabulations will be of great value to the operating officials in studying the mechanical department of the system, to watch for diminutions of the troubles that may formerly have been prevalent.

The card index system used for filing these card records is also of considerable interest on account of its size, and also the careful provisions made for future growth. The mechanical

department took up a study of this matter, and as a result designed a special card index system involving the use of a very neat and attractive set of card index cabinets. These cabinets, as well as the special card index record blanks, were made to the specifications of the Brooklyn Rapid Transit Company by the Library Bureau, of New York, the well-known specialists in card index system of accounting and recording. As may be seen from the accompanying view of the cabinets, they resemble the general style of cabinet furnished by this company, except that they are provided with storage quarters in the lower portion. Each drawer in the cabinet contains two rows of cards, this arrangement having been found preferable to the more usual method of providing single drawers; it results in stronger cabinet construction and will be much more convenient in making possible the arrangement of similar records side by side.

The method of filing the cards in the drawers conforms to the general practice of using special lettered guide cards of the type shown in the accompanying engraving; this sample guide card is presented to indicate the style of card index drawer used, and it also indicates the method of separating the different branches of the record work. It will be noticed that the letter "L" is printed at the left hand side of the thumb projection of the guide card to indicate that all cards covered by this guide refer to elevated car records; this provision has been made for the reason that it is intended to later on extend the system to cover the mechanical work upon the surface car division, in which case the guide cards would probably be given the distinctive letter "S," to distinguish the surface-car records from those of the elevated. These guide cards are permanently held in the draws by the center-rod style of fastening, the rod passing through the brass-lined hole in the projection from the lower side of the card.

#### MUTUAL INSURANCE ASSOCIATION FORMED AT CLEVELAND

For some time the managers of Cleveland city and inter-urban roads have been discussing the possibility of reducing the important item of insurance premiums by the formation of a mutual insurance association similar to the well-known factory mutual insurance associations which take care of certain lines of risks. Recently the co-operation of Henry N. Staats, a well-known mutual insurance man, was secured, and last week two insurance associations were incorporated. One of them is known as the Electric Mutual Insurance Company of Ohio and the other the Traction Mutual Insurance Company of Ohio. The incorporators of the associations are identical, and include the following well-known traction operators: Horace E. Andrews, president of the Cleveland Electric, Syracuse Rapid Transit and Utica & Mohawk Valley Traction Companies; Henry A. Everett, president Northern Ohio Traction & Light Company, Toledo Railways & Light, and chairman of the board of the Detroit United Railway; Luther Allen, president of the Toledo & Western Railway Company; Fred T. Pomeroy, president, and Albert E. Akins, vice-president of the Cleveland & Southwestern Traction Company; Warren S. Bicknell, president, and Fred W. Coen, secretary of the Lake Shore Electric Railway Company; Henry J. Davies, secretary of the Cleveland Electric Railway Company; George T. Bishop, receiver of the Eastern Ohio Traction and president Northern Texas Traction Company; Charles W. Wason, president Cleveland, Painesville & Eastern Traction Company; Henry N. Staats, underwriter.

Two associations were formed to take care of two classes of risks. The Electric Company will insure power houses, substations and similar equipment, and electric lighting companies will be eligible as well as traction companies. The Traction Insurance Company will insure car houses, cars, repair shops,

office buildings and other risks which are considered more hazardous than power stations. The associations will be national in scope, and all companies in the lighting and railway business will be invited to participate. Risks will be divided into classes and premiums will be charged on practically the same basis as with the old-line insurance companies. The plan provides for a contingent fund for the payment of losses under which each member may be assessed to the amount of five times the annual premium. At the end of each year all premiums not consumed in payment of losses and in payment of operating expenses will be returned to the members. The associations will aim to reduce the initial cost of insurance by doing away with all unnecessary expenses in the operation of the business. The greatest saving will be effected through the fact that no agents will be maintained, thus eliminating agents' commissions, one of the greatest items of expense with the old-line companies.

The officials of the association will use great care in selecting risks, thus lowering the chance of losses, and they will endeavor to induce members to equip their plants and buildings with the latest methods of fire protection. The officials of the Cleveland Electric Railway are displaying great interest in these plans for fire protection and are equipping several of their car houses after plans suggested by Mr. Staats. To demonstrate his methods, Mr. Staats has arranged with the Cleveland Electric to furnish cars and a car house for an interesting experiment. The cars and building will be deliberately set on fire and by short circuiting wires, by means of waste and by building a fire under a car, and it is claimed that the automatic sprinklers will take care of the fire in each case before serious damage has been done.

As yet the two associations are merely in a formulative stage, since the insurance laws of Ohio require that no policies shall be issued until contracts for \$20,000,000 of insurance have been secured. When the company secures this amount it will have a yearly income of \$200,000.

The officers of the associations are now presenting their plan to all the electric railway and lighting companies in the country, and an effort will be made to have the scheme become operative in the shortest possible time.

The idea of applying the mutual insurance plan to traction and lighting companies was suggested by Mr. Horace Andrews while in a casual conversation nearly a year ago with Mr. Staats. The plan was drawn up by Mr. Staats and presented to the Cleveland roads on Aug. 1, and the success of the move seemed conjectural until Mr. Andrews came out openly and declared himself in favor of the plan. The other companies speedily fell into line, and have agreed to place their insurance with the associations as soon as the plans become operative. The companies represented by the incorporators have a combined capital stock of over \$40,000,000; the valuation of the property likely to be insured by them is estimated at \$5,000,000.

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## RAILS AND JOINTS

BY WILLIAM H. COLE, M. A. I. E. E.

There is probably no subject in the construction of street railways that is more important than that of rails, their installation, upkeep and jointing, and there is probably no department where its deterioration or neglect of upkeep works an ultimate greater trouble than that of permanent way. Upon the perfection of the work depends the life of the rolling stock, the rails themselves, the smooth, even riding of the cars, and the return of the current to the power station. •

So much has been written as to the best method of installing the track, the hardness of rails, their life and their joining together that to the average man it is in a measure confusing. The writer has given the subject some attention, especially in the direction of rail bonding and welding, and has tried to

come to some definite conclusions as to the hardness of rails necessary to meet traffic requirements in a crowded city.

There is no question as to the fact that a rail for electric street railway work should be much harder than for steam railway work, for the conditions are entirely different. It must be remembered that the problem of wear upon a steam railroad is a very different thing from that upon a street railroad. The rail on steam railroads presents a clean head, because the rail is not buried, and it has to oppose principally a rolling friction, for the number of times per mile steam railroad trains are stopped is very low, taking a general average. Not only are the stops incomparably more frequent, but they are again multiplied into a greater number of units, as many individual cars are the rule on street railroads, as against the occasional train of the steam railroad.

As far as the writer has been able to see in the published authorities, as well as personal contact with steel experts, there seems to be considerable difference of opinion as to the combinations of the different ingredients composing the steel in the rails, and there seems to be a wide difference of opinion as to the hardness of the steel. The decided want of uniformity of ideas in this matter has led the writer to have conducted a series of experiments as to the wear of the rails under different conditions, the results of which might be of interest.

It is to be remembered that "each chemical ingredient places its own particular stamp upon the steel which contains it" and the stamp varies with each combination of ingredients, that the number of variations are infinite, and that each different heat at which the rails are rolled affects the problem. While the prayer in making the investigation was only "that light might be thrown in the right direction," an effort was made to find a compromise of ingredients that might be near some standard for general use.

The observations covered a full year on a line under heavy traffic conditions, in Europe, and special attention was given to the joints at the different times of making the observations.

Five different types of bonding and welding were under observation, and it must be confessed here that the principal object of the tests and observations were with regard to the joints, but it was the writer's firm endeavor to arrive at some definite conclusion in his own mind with regard to hardness of rails for different conditions of traffic, as well as to find the best possible method of joining and bonding the rail ends, having regard to the life of the joints as well as their electrical conductivity.

The rails were laid on a concrete stringer, paved with Belgium granite blocks, with a luting of coal tar at the joints. They were of the grooved girder type, 6½ ins. high, and weighing 95 lbs. to the yard. They were selected from out of a stock at the works of one of the largest rolling mills in Europe, and were, as can be seen, of three degrees of hardness.

An analysis was made of the ingredients of the rails at the beginning of the test and at the close, all by a reputable steel expert, and special attention was given to the fact that a part of the rails were heated at their ends when making the Falk and Goldschmidt welds.

There were fifteen rails in all, giving three joints for each of the five different classes of joints, and in making the tests and observations an average of the results for the three rails of its class was given. Micrometer calipers were used in measuring the wear of the rails each month, three different measurements were made at each place, and an average was calculated from these three measurements, viz:

- A. At a point at or near the gage line.
- B. At a point in the center of the tread.
- C. At a point near the outside of the rail.

The joints that were bonded were fished with standard fish plates, bolted with eight 1-in. bolts, screwed up as tight as could be, the rail ends laid close or butting each other, laid



fished and bonded in the maximum heat of the day and immediately covered and paved around them.

No. 1. Three joints fished as above and bonded around the fish plates with standard Chicago bonds No. 00 B. & S. gage, two bonds to each joint.

No. 2. Carefully bonded with "Crown" concealed bonds, with two bonds of a section equal to two No. 00 copper bonds B. & S. gage, and the fish plates carefully bolted over them.

No. 3. No. 2 plastic bonds, made by Harold P. Brown, and carefully installed according to instructions, by a man formerly experienced in this work.

No. 4. Three joints welded by the Falk process.

No. 5. Three joints welded by the Goldschmidt thermit process.

The rails were laid continuously so the same cars were obliged to pass over the same section containing the different types of joints. The subjoined tables will give an idea as to the results, and from the results of these tests the writer has arrived to the following conclusions:

That for electric street railways under average traffic conditions rails should give a life of about forty years if the joints are made continuous, and are composed of

Carbon .....	.55 to .58
Silicon .....	.10 or under
Phosphorus .....	.08 or under
Sulphur .....	.06 or under
Manganese .....	.83 or under

This is comparatively a hard rail, as will be seen by the amount of carbon it contains. I think .55 is about the amount of carbon to make the best all around rail, and that any rail having more than .58 of carbon is too hard, and that perhaps the leeway of .55 to .58 is quite sufficient for manufacturing contingencies. It is quite certain that a rail within the above limits will give approximately the longest average life, based upon the writer's experience and observation.

The weak spot in all lines is the joint, and out of all the tests made the point that showed the greatest weakness and the most wear was at the joint. By far the best section in wear, as well as electrical conductivity at the end of the tests, was with the butt-welded joints made by the Goldschmidt process. As a matter of fact, there seemed to be no more wear at the joints thus welded than any other part of the rail. And at the end the relative conductivity seemed to be the same as at the beginning.

With two of the Falk welded joints there appeared marked corrosion between the rail proper and the cast-iron sleeve, and one was apparently as good as at the beginning. The resistance was plainly less in the case of all of the bonded joints at the finish, and indeed one of the copper-bonded joints was actually loose.

One of the plastic bonds held up very well, and the other two were not in very good shape, and had very little contact between the fish plates and the web of the rail.

All of the fished joints showed appreciable wear at the joints, with considerable pounding as the wheels rolled over them.

One of the fished joints required attention during the time of the test, and one of the copper bonds had to be riveted, as it had become loose.

As a conclusion, I think it is more than manifest as to what make the shortness of the life of the rail, and I think it cannot be too strongly emphasized, because it discloses one of the greatest evils existing to-day in street railway work, and in which the stockholders are suffering without realizing the extent, and that is defect in the joints.

Measurements taken at any other part of the rail than the joint show an even fair wear, with a good long life, but rails are being taken out and being replaced all over the world, not because they have been worn to the point of destruction, but because the joints have become too bad for further use, and

another thing to be remembered is that when wear at joint reaches a certain point the rest of the rail wears with very much increased rapidity.

As time goes on we hear less of the joint question, for managers are commencing to weld their joints and to use heavier rails, with stronger fish-plates; nevertheless, the evil still exists, and a few years from now those who are deluding themselves in the belief that they have a long life for their existing tracks will awake to find out that even the construction of to-day, unless it is a type that virtually makes a continuous rail, is wasteful and extravagant.

The greatest lesson these tests, as well as an experience covering many years in connection with electric traction work, gives to me, is one that I cannot emphasize too much, and it is that, unless a perfect joint is obtained, no one need worry too much about the quality of the steel in the rail, for any of the standard makers produce a satisfactory rail—any one may buy—the very cheapest one can buy—will last longer than any of the joints, unless it is welded properly and made into a continuous rail.

Carbon	Soft	Medium	Hard
Carbon.....	.284	.572	.591
Silicon.....	.061	.25	.057
Phosphorus.....	.105	.052	.098
Sulphur.....	.065	.078	.060
Manganese.....	.784	.981	.830
Iron.....	1.299 98.701	1.918 98.082	1.636 98.364
	100.000	100.000	100.000

Note.—Metal lds ignored

The following are figures of monthly and yearly wear in inches:

Kind of Rail	Chicago	Crown	Plastic	Falk	Goldschmidt
Soft.....	.0023	.0026	.0024	.0018	.0014
Medium.....	.0012	.0013	.0012	.0011	.0009
Hard.....	.0028	.0028	.0027	.0024	.0019

Soft.....	.0276	.0312	.0288	.0216	.0168
Medium.....	.0144	.0156	.0144	.0132	.0108
Hard.....	.0336	.0336	.0324	.0288	.0288

Soft.....	.0168	.0168	.0168	.0168	.0168
Medium.....	.0120	.0120	.0120	.0120	.0120
Hard.....	.0228	.0228	.0228	.0228	.0228

Taking a wear of .2 in. as being the extreme permissible wear at the joint under the best conditions, the life of the different types of joints would be as follows, in years:

Kind of Rail	Chicago	Crown	Plastic	Falk	Goldschmidt
Soft.....	7.2	6.14	9.9	9.2	11.9
Medium.....	14.5	12.8	14.5	15.1	18.8
Hard.....	5.8	5.1	6.1	6.9	6.9

The estimated life of rails as per the same series of observations, if the rail were a continuous one and the joint did not in-

terfere, giving a permissible wear of .2 in., would be as follows, in years:

Kind of Rail	Chicago	Crown	Plastic	Falk	Goldschmidt
Soft .....	11.9	11.9	11.9	11.9	11.9
Medium .....	16.6	16.6	16.6	16.6	16.6
Hard .....	6.9	6.9	6.9	6.9	6.9

The following would be the electrical efficiency and loss at the beginning and end of the first year:

Class of Joint	Electrical Per Cent Efficiency at Beginning of Year	Electrical Efficiency at End of Year	Per Cent Below Equal Section of Rail
Chicago bonds. ....	89.51	74.43	29.57
Crown bonds.....	86.71	73.72	26.28
Plastic bonds .....	89.72	77.84	22.16
Falk cast weld.....	101.16	86.53	10.44
Goldschmidt thermit weld.	101.14	100.39	00.39 +

The following would be the loss in electrical efficiency at the end of the first year's service:

Chicago Bonds.—Starts with 89.51 per cent and ends with 74.43, or 29.57 per cent below the resistance of an equal section of rail.

Crown Bonds.—Starts with an efficiency 86.71 per cent and ends with 73.72 per cent, or 26.28 per cent below the resistance of an equal section of rail.

Plastic Bonds.—Starts with 89.72 per cent and ends with 77.84 per cent efficiency, or 22.16 per cent below the resistance of a section of rail of equal length.

Falk Welds.—Starts with an efficiency of 101.16 per cent and ends with 86.53, or 10.44 per cent below an equal section of solid rail.

Goldschmidt Welds.—Starts with an efficiency of 101.14 per cent and ends with 100.39 per cent, or 00.39 per cent above the resistance of an equal section of solid rail.

### PAPERS AT THE VIENNA CONVENTION

In addition to the abstracts already published of the papers to be presented at the Vienna meeting of the International Tramways and Light Railways Association of Europe, digests are given below of three papers:

#### BRAKES

The report by Th. Scholtes, director of the Nuernberg-Fuerth Street Railway Company, on brakes for electric street railways, is based on information received from fifty-four companies and on a former report of Mr. Poetz, which covered the practice of twenty companies. Mr. Scholtes distinguishes the following three groups:

In the first group hand brakes, operated by the motorman, are used and only in special cases are short-circuit brakes applied. Information is given on thirty-seven companies which use this system (63 per cent of all companies which replied to the inquiries). In this case the trailers, which are mostly inherited from the horse-car service and are therefore of light weight, are not mechanically braked. To keep them at rest on grades or in emergency cases the hand brake is available; in some cases the trailers are provided with electro-magnetic brakes. The author calls attention to the hand brake used by the Leipzig Street Railway. In the same a sufficient braking effect is obtained by a friction device between brake gear and brake staff without any exertion of the motorman, since the momentum of inertia of the car is utilized for pressing the brake shoes against the wheels. This brake is stated to have proved very satisfactory. Besides the hand brake, most of the companies in this group use the electric short-circuit brake as an emergency brake.

The second group comprises those companies which use in general electric brakes, together with hand brakes. Thirteen companies (22 per cent) use this system. In this case the

trailers are also generally braked electrically. The author seems to be rather favorably inclined toward the electric brake. The motors should be chosen of sufficient capacity to prevent undue heating. On grades the cars must be stopped, of course, by means of the hand brake.

The third group comprises air brakes, and is sub-divided by the author into classes. One class comprises four companies which have air brakes on all motor cars, the other six companies which use air brakes only on a portion of their cars, only the heavy trains and cars being provided with the same. The author has made careful measurements of the power required for operating the air pump; the energy consumption with electric braking and without the air brakes was 429 watt-hours per km, with the air brakes 456 watt-hours per km, so that the difference of 27 watt-hours = 6.3 per cent was the energy consumed by the pump.

The statements of the different companies as to cost of operation and maintenance are scarce and vary greatly, the average values being as follows:

- Hand brake, 0.06 cents per car-km.
- Electric brake, 0.02 cents per car-km.
- Air brake, 0.08 cents per car-km.

They show that the air brake is the most expensive. The general conclusions of the author are as follows:

In selecting the system of braking, the local conditions are to be taken into account. The brakes should not cause any jerking. There should always be two independent brakes. The operation of the brakes should not require such manual strength as to tire the motorman out.

If the hand brake is insufficient as a main brake on account of power to operate it, or too great a number of trailers, or too difficult conditions of the track, a mechanical type of brake should be used and the electric brake should be introduced.

Under special conditions (for instance, if the motors have not a sufficient capacity or if the controllers and rheostats have not enough steps) air brakes may be used to advantage. For heavy loads, high speeds and with more than two trailers, air brakes should always be used.

Mr. Scholtes concludes that the resolutions adopted by the Congresses in Geneva in 1898 and in London in 1902 are still valid, namely, that "for electric tramway service two brakes are desirable, of which one should be a hand brake, while the other may be a mechanical (electric, magnetic or air) brake. The electric brake is in most cases preferable on account of its simplicity and safety, and is recommended for use."

#### SAVING OF ELECTRICAL ENERGY IN STREET RAILWAY SERVICE

A paper by W. Klitzing, director of the street railway company in Magdeburg, deals with this subject and gives the summary of the replies sent by forty-seven street railway companies to the inquiries of the society as to methods of reducing the consumption of electrical energy. That it should be possible to accomplish some valuable saving is indicated by the fact that the energy consumption of the different companies varies between 350 and 962 watt-hours per car-km, and between 50 and 105 watt-hours per ton-km. It is, of course, to be taken into consideration that the energy consumption depends to some extent on local conditions, such as grades and curves, number of stops, conditions of weather and snow, etc. But nearly all the companies who sent replies thought that it would be possible to reduce the energy consumption.

The means proposed for this purpose are schools for motormen, temporary employment of the motormen in the repair works, introduction of the three-wire system, payment of a premium to economical motormen, control by meters installed on the cars. A larger number of companies have installed meters, varying in price from \$18 to \$79 per meter. They are mostly placed below the passenger benches. The payment of a premium to motormen for economy in current consumption has

been introduced by very few companies only, although some of them think this desirable.

#### SYSTEM OF CURRENT DISTRIBUTION FOR URBAN AND INTERURBAN RAILWAYS

The report on this subject is written by Ph. Pforr, chief engineer of the Allgemeine Electric. Ges. of Berlin. The author first compares the three-phase and single-phase alternating-current traction systems, and concludes that the three-phase system is not so desirable as the single-phase. The necessity of using a commutator with a single-phase motor is considered to be no disadvantage, since on many roads it will be necessary for the cars to run on existing direct-current lines so that the single-phase motor should be able to be operated as a direct-current motor, which is only possible if it has a commutator.

The author then compares the direct-current system with the single-phase alternating-current system, and bases his discussion of the latter on the results obtained with the Winter-Eichberg motor. The latter is inferior to the direct-current motor only with respect to efficiency and weight. The lower efficiency is due to the fact that the operating current (which in the case of the direct-current motor passes through the armature only) passes through both stator and rotor in the Winter-Eichberg motor. The copper losses of the alternating-current motor amount, therefore, to about twice the copper losses in the direct-current motor, which means a decrease of efficiency by 4 per cent or 5 per cent. Moreover, for a frequency of 40 to 50 periods the iron losses are also greater, while for a frequency of 16 to 25 periods per second the iron losses are about the same as in the direct-current motor. The lower efficiency and the fact that the space cannot be so well utilized, results in an increased weight of 10 per cent to 20 per cent for the alternating-current motor, the weight being the higher, the higher the frequency.

On the other hand, the direct-current motor requires regulation by means of resistances during the period of starting, while the alternating-current motor is regulated by transformers. In the latter case the energy loss is much smaller than in the former. The lower efficiency of the single-phase motor is therefore compensated for to a large degree by better regulation.

For the single-phase system it makes no difference whether the voltage at the trolley wire is 500 or 10,000, since the regulation is not accomplished in the high-tension circuit, but in a special branch circuit, in which the voltage is only about 200. With direct current the highest voltage which has been used with the ordinary traction system is 800, that employed on the Berlin Elevated Railway. Thury has installed a direct-current system on the St. George de Commiers-la-Mure line, in which current is transmitted at 2400 volts. For this purpose he connects four motors, each of 600 volts, in series. However, since it appeared dangerous to interrupt this high-tension circuit for the sake of regulation of speed, he does not use the rails for the return currents, but has installed a separate overhead return wire. He was thus enabled to make a connection between the rails and the central point of the four motors so that each overhead wire has a voltage of 1200 against the rails, the voltage being positive in one wire and negative in the other. For interrupting the circuit he uses oil switches, which take considerable space and are expensive.

The author divides interurban railroads in two classes. The first comprises those lines in which the power house generates energy at 1200 volts or less for transmission. This plan can be employed by operating not too heavy trains, and where the terminals are not further away from the power house than 12 km to 15 km (7 miles to 9 miles). The second class comprises those roads in which the currents must be transmitted at a higher voltage than 1200; it includes roads with a more extended system and using heavy trains.

The author concludes that for the second class using more than 1200 volts, the single-phase system is far superior. He

believes that the first cost of installation will not be higher than for the direct-current system, while the cost of operation will be smaller since there are no converter stations. It is only for railroads with a voltage less than 1200 that the advantages of the direct-current system manifest themselves, and they are the greater the lower the voltage. For 600 volts to 700 volts the direct-current system is surely preferable, for the simple reason that the equipment of the cars is cheaper.

Between 700 volts to 1200 volts the equipment of the direct-current system requires special devices, the motors are somewhat more expensive, the controllers are considerably more expensive, and the danger for the attendants and for the passengers are greater. The question which of the two systems is preferable in such cases will depend on local conditions.

### DESIGNING AT ARM'S LENGTH

Chicago, Aug. 27, 1904.

EDITORS STREET RAILWAY JOURNAL:

The editorial in your issue of Aug. 20 on the value of statistics refers briefly to the advantages of centralized management in connection with power transmission, lighting and electric railway systems. There is no doubt that a considerable economy can be secured from concentrating the technical staff at headquarters, contrasted with the often-times prohibitive expense of maintaining experts in different branches of engineering at the local offices of small companies. Like many other propositions, however, this statement deserves some qualification as carried out in practice, for it is only when high efficiency is obtained in the centralized engineering department that any great saving may be effected. The expenses of management are likely to be heavier as the responsibilities of the headquarters' officials increase, and although this is legitimate within pretty wide limits, it does not take long for all general expenses to reach a formidable total if a sharp eye is not kept upon them.

In some organizations of this character, however, the technical staff is seriously hampered in doing its best work by an ultra-conservative policy in regard to traveling expenses. It is no uncommon thing to find a power station in the Far West being designed, root and branch, by an engineer 2000 miles to 3000 miles away, in Chicago, Philadelphia, New York or Boston, who is not privileged to visit the scene of his work from the time when the first pencil sketches are made to the days when steam is first turned into the engine cylinders and current switched upon the distributing circuits. Of course, some responsible member of the syndicate or centralized organization has visited the site of the plant and sized up the general lay of the land in the intervals between dinners with the Mayor and Aldermen or with representative citizens at the clubs. But the subordinate engineer whose detailed work designs every cubic foot of the station is often left in the lurch as far as any real knowledge of local conditions goes. An instance of this occurred recently in the case of a power station located in a distant city. The capacity of the plant was somewhere around 5000 kw, and about three-quarters of a million of dollars represented its cost. From start to finish the designing engineer in charge was not allowed to take a trip to the spot, and as a result, the completed station stands to-day so crammed with machinery in inconvenient locations that it is difficult to operate the plant. From time to time during the construction period, local conditions demanded radical changes in design; the piping system became more and more complicated; storage batteries were added to the original layout, and finally an enormous booster joined the happy family of rotaries, transformers, switchboards, cables and steam pipes which filled the establishment until it only needed the Hebrew three balls over the entrance to mark it as a sort of power equipment pawn shop. By dint of

much coaxing the booster was finally assigned a place between the bases of two adjoining rotaries, the terminal board being set up in the basement below. The wiring diagram of the plant resembled a map of the Evil One's nervous system, and it was almost impossible for the draughting department to keep the drawings up to date, so frequent were the changes which followed the arrival of the trans-continental mail. It is no exaggeration to say that the \$250 required to send the designing engineer to the station and back on a three weeks' trip would have been saved many times over in the construction cost of the plant, which ran up to about \$150 per kilowatt at the time of completion.

Another case of the same sort was that of a Canadian plant designed by an American firm. Here the plans were carried through without much change in the home office until after construction began, when one of the non-technical officials of the firm decided to cut down expenses by shrinking the dimensions of the station. None of the responsible designers had visited the plant, so the paring down took place with the result that when operation began, it was necessary to climb a ladder in order to shut off steam from the boiler room, after the attendant had squeezed through a narrow passageway that placed a premium on a thin fireman. Other inconveniences were also brought out when operation commenced, many of which might have been foreseen if the designer had visited the plant during construction.

It is not the object of these comments to deprecate the designing of large power stations in a distant city, but it is intended to point the necessity of following the work in person upon the ground as far as possible, if it is decided to direct it in general at arm's length. The practice of the great manufacturing companies in encouraging their designing engineers to visit the shops and testing rooms is well worth following under the different conditions which accompany the design of power plants by firms of engineers.

OBSERVER.

### SIX-WHEELED TRUCKS

Minneapolis, Aug. 25, 1904.

EDITORS STREET RAILWAY JOURNAL:

The increase in car speeds upon electric railways during the past few years has brought about many interesting changes in the design of equipment. The demand for higher rates of acceleration and braking, coupled with the necessity of maintaining faster maximum speeds for considerable periods of time, has raised the standard of power house, line, track and rolling stock construction so that a general strengthening of design is at once apparent when one compares the equipment of 1904 with that of five or ten years ago. This improvement in the quality and increase in the quantity of material used is particularly evident in the case of cars, and goes a long way toward explaining the advance in rolling stock prices during the past decade. Thus, \$2,500 was not long ago considered a fair valuation for a car representative of advanced practice in urban transportation, capable of attaining a maximum speed of 25 miles per hour and carrying some thirty-eight passengers. To-day a car costing \$7,500 and running at 35 miles per hour, with fifty-two passengers aboard, is far from unusual in city and suburban service, and it is no exaggeration to charge a considerable part of this increased cost to the faster schedules demanded at the present time.

One of the most notable points brought to light by the recent high-speed tests in Germany was the influence of roadbed and track upon high-velocity car and train movements. It was thoroughly demonstrated that without the most substantial track construction, heavy motor equipments could not be safely worked to their full speed possibilities. In the same way the trucks must be unusually strong if a car is to safely run at high speeds, as irregularities occur even in the best laid track.

Six-wheeled trucks are now so common upon the standard

Pullman cars of steam roads that the absence of the third pair of wheels immediately strikes the attention at a railway station of one interested in transportation matters. It is pretty certain that electric railway speeds have not yet reached a maximum limit, and the time has come for the consideration of the six-wheeled truck as a factor in the movement of rolling stock at speeds upward of 60 miles per hour. The ordinary trolley road is probably better off with four-wheeled trucks, as the acceleration drops off with the introduction of the third pair of wheels, while the first cost of the six-wheeled truck runs from 50 per cent to 100 per cent more than the other. The maintenance expense is greater with the six-wheeled truck, other things being equal, and the maximum speed of the average trolley car is certainly not high enough to warrant incurring any considerable expense in trying to excel the very satisfactory four-wheeled trucks now upon the market. In other words, there is little reason to believe that the difference in safety and comfort at speeds of 35 miles to 50 miles per hour would be worth the extra expense of the six-wheeled truck over the present type in suburban and interurban service.

A different proposition confronts us, however, in the cases of extra high-speed interurban roads and of steam roads contemplating the adoption of electrical equipment for high-speed branch lines or fast suburban service upon main line routes. Here the superior running qualities and safety of the larger truck have an important bearing upon operation at speeds of from 60 miles to 80 miles per hour, and even beyond. No one can safely fix the speed limit of the next five years upon American railways at these figures—in fact, they are exceeded practically every day. Although the electrical equipment of a steam road does not imply extraordinary speeds in future schedules, it is certain that as the field of electric traction expands, the speed problem is not one to fall out of sight. The suspension of two heavy motors upon a truck for fast running demands a much more solid construction than is the case with even a heavy trailer car, and the employment of the center pair of wheels as idlers helps to carry some of the extra weight and strains, at the sacrifice of an accelerating power, which diminishes in importance as the length of run between stops increases. Every one appreciates the difference in comfort between a six-wheeled truck and a four-wheeler at 60 miles per hour, because the former fails to register the defects in track construction which make such an impression upon the latter. The six-wheeled truck is easier upon the track and roadbed also. On account of the heavy motors used in very high-speed equipments, 36-in. or 42-in. wheels are preferable to the 33-in. size. Little trouble should be expected in obtaining a high rate of retardation with the six-wheeled truck, as the present idea fits shoes to every wheel, although the pressure at the center wheel is lessened somewhat. Certainly as heavy electric railway work comes more and more to the front, the advisability of adopting six-wheeled trucks is bound to be more carefully weighed in comparison with adherence to present four-wheeled standards.

R. P. WILLIAMS.

### CONCRETE BUS-BAR AND SWITCH-CELL COMPARTMENTS

Philadelphia, Pa., Aug. 26, 1904.

EDITORS STREET RAILWAY JOURNAL:

I notice an editorial in your issue of Aug. 20 in which you advocate the use of concrete in bus-bar and switch-cell compartments. I wish to call your attention to the fact that the new station of the United Railways & Electric Company, of Baltimore, which has been in use for about two years, has concrete switch-cell compartments, and all the work of this character which the Philadelphia Rapid Transit Company has done during the past year has been of concrete exclusively. The Baltimore construction proved very satisfactory during the recent fire in that city.

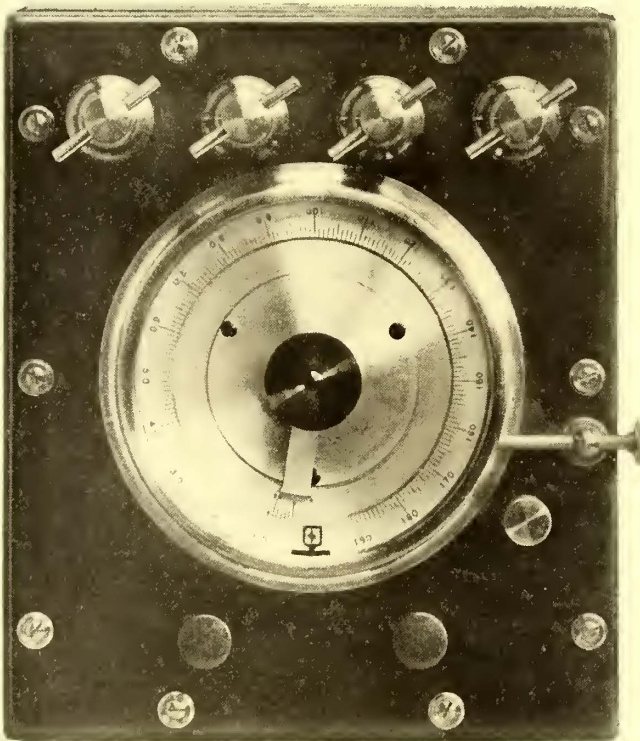
ENGINEER.

### A NEW STANDARD FOR CHECKING SERVICE METERS

The most important and frequent use made of standard instruments in central stations is the checking of the wattmeters upon the service circuits, yet it is the use for which they are the least adapted. Wattmeters when properly tested are checked under different loads, from one-fiftieth to one and one-half times their rated full-load capacity, and the range thus covered so greatly exceeds that of the portable standard instruments in general use, that ordinarily three of these standards are required to check one service meter.

To facilitate rapid checking of the integrating wattmeters and to insure accurate results, the Westinghouse Electric & Manufacturing Company has designed the special precision wattmeter illustrated herewith. It has the same characteristics of high accuracy and ease of manipulation of the other Westinghouse instruments of precision, and has a special provision by which connections may be made for three different currents, of 5 amps., 20 amps. and 100 amps. maximum capacity, respectively. The precision resistance or multiplier is used in connection with this instrument, which, with resistance in circuit suitable for 100 volts, will accurately measure quantities of from 10 watts to 10,000 watts, and proportionate amounts at other voltages.

This instrument is easily manipulated. The construction of



PRECISION WATTMETER FOR CHECKING SERVICE METERS

the binding posts facilitates the making of quick connections and insures good contact. When current is passed through the circuits the sight wire moves to the right, and is brought back to zero by turning to the left the central knob, which moves the vernier head along the scale. A fine adjustment is obtained by the knob at the side. Readings are made in tenths of a division without estimation, giving, in the instrument shown, 2000 readable deflections on a 5-in. circular scale.

In designing this instrument the intention has been to provide a single checking standard that will cover the entire range of all the service wattmeters used in ordinary installations, and thus to avoid the use of several standards, with the accompanying disadvantages and inconvenience in handling. By agreeing to keep this and other instruments of precision correctly calibrated for five years, it is further sought to eliminate any trouble caused by inaccuracy or doubt of the correctness in the standards themselves.

### CONVERTIBLE CAR FOR GRAHAM, VA.

The Bluefield & Hinton Electric Railway Company has lately finished the construction of a road at Graham, in the extreme western part of Virginia, near the border of West Virginia. Among the equipment ordered for the new road are convertible and semi-convertible cars built by the J. G. Brill Company. The convertible car shown in the illustration has been lately received and put in operation. It is 20 ft. 7 ins. long over the end panels, and 30 ft. over the vestibules; from the panels over the vestibule, 4 ft. 8½ ins. The width over the posts at the belt is 7 ft. 9 ins. The distance from center to center of posts is 2 ft. 7 ins., and the sweep of the posts, 5 ins. The side sills are 5¼ ins. x 6 ins., and the end sills, 4¼ ins. x 6 ins. The car is seated for thirty-two passengers, the seats being cane uphol-



CONVERTIBLE CAR FOR THE BLUEFIELD & HINTON ELECTRIC RAILWAY COMPANY

stered and of the step-over type. Brackets connecting the backs of the seats to the posts form grab handles and obviate the necessity of grab handles on the outside of the posts. The guard rails are arranged to slide on the inside of the posts, and when raised are held above the curtain roller covers, and appear to be a part of the woodwork of the car. The interior is finished in cherry of natural color, and the ceilings are decorated birch veneer. Single seats are placed at each corner, under which are located the large hoppers of the sand boxes. The metal runways which guide the sashes into the roof pockets have five lock-bolt stops, so that the windows may be held at any desired height. The flexible metal panels have strong locks at the base, by which they are securely held when raised into the pockets. The furnishings are of the builder's make, and include "Dumpit" sand boxes, "Dedenda" gongs, brake handles, radial draw-bars and round corner seat end panels. The car is mounted on No. 21-E trucks.

### CONVENIENT TRANSIT IN NEW YORK FROM ELEVATED RAILWAY TO DEPARTMENT STORE

What will unquestionably prove a great boon to the shopping public, particularly on disagreeable days, is the entrance to one of the large department stores which the Interborough Rapid Transit Company has constructed at its Eighteenth Street "L" station. Tens of thousands of shoppers patronize the Sixth Avenue "L" system daily, and of these multitudes visit the store in question. Traffic at the intersection of Eighteenth Street and Sixth Avenue is frequently congested and occasionally perilous, and travelers on the "L" will be glad to know that they can enter the store without having to descend to the street, as formerly. The entrance to the mammoth department store is virtually a bridge built across the tracks. It is strongly constructed, and from an architectural point attractive to the eye. Passengers coming from uptown points alight from trains, ascend to the bridge, and in a moment are within the attractive walls of the big and busy center of retail shopping. The view from the bridge is inspiring, because it conveys a graphic impression of the restless activity of the populous dry goods district. Passengers on northbound trains do not have to cross the tracks by way of the bridge. They simply ascend a short stairway, turn to the right, and soon are in the store.

## ST. LOUIS CAR COMPANY AT LOUISIANA PURCHASE EXPOSITION

In previous issues some brief descriptions have been given of the St. Louis Car Company's extensive exhibit at the Louisiana Purchase Exposition. The exhibit has had a number of interesting features added to it since, and it is only recently that the magnificent private car "Milwaukee" for John I. Beggs,



THE LONDON AND DUBLIN DOUBLE-DECK CARS ON EXHIBIT

president of the Milwaukee Electric Railway & Light Company, has been finished to complete the exhibit. A full description of this exhibit, which is the largest of its kind in the Palace of Transportation as well as the largest made by any other St. Louis concern, has therefore been deferred until the present. In making this display what it is, the company must be credited with something more than a desire to impress electric railway men who may visit the Exposition. As a St. Louis manufacturer, it has shown a commendable desire to contribute generously to the popular educational value of the transportation exhibits, and so to the success of the Exposition. Besides being a display of the many types of car construction turned out at the great shops in Baden, St. Louis, the exhibit is a history of street railway car construction from the mule car to the present coaches for high-speed interurban service.

The features illustrating the progress in construction are arranged in the order of time along one aisle. The first exhibit in this section is especially appropriate to the position it occupies. This is the old stage coach of the kind in which Horace Greeley, Schuyler Colfax and others viewed the glories of some of the territory included in the Louisiana purchase. Nothing could be more indicative of the improvements in the methods of travel through the region acquired by the purchase, or of the progress in that territory, than the contrast between this simple vehicle and the magnificent private car forming the last feature of the historical exhibit.

Next in order is an old "bob-tailed" horse car, contributed to the exhibit by the Louisville Railway Company. This car was used in Louisville in 1870. It has a platform for the driver,

and at the rear end only a pair of steps, leading directly into the car. Two single-hinged doors, one on either side of a center post, lead from the car to the driver's platform. A noticeable feature resembling modern construction is that the side panels are plain—that is, neither concave nor convex, giving the car the same width over the side sills as at the belt rail. Thus, in this car at least, the concave panel idea inherited from the omnibus had been abandoned. Two brake wheels with separate chains are provided, presumably for safety, the brake wheels being about 10 ins. in diameter.

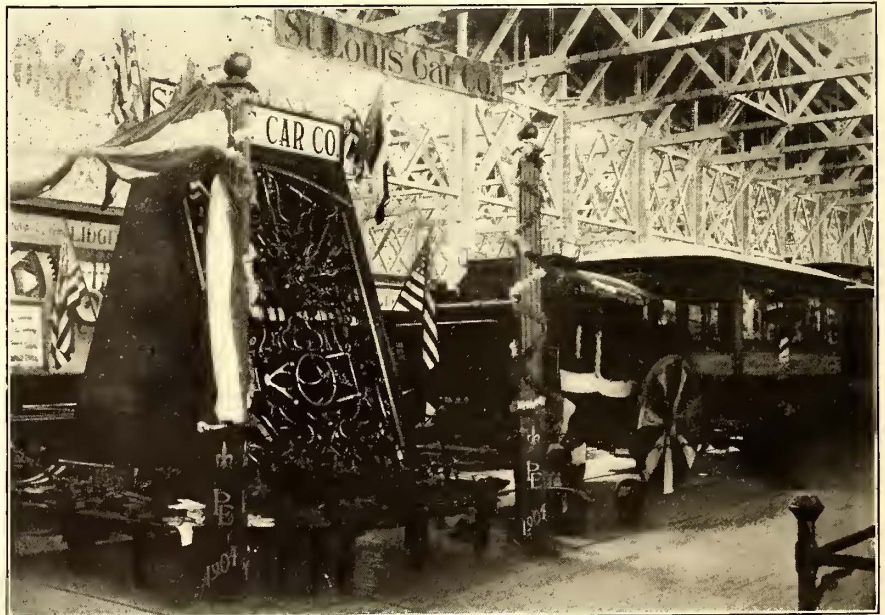
A horse car of modern construction, but very abbreviated in length, is also shown. This is of a type built by the St. Louis Car Company for large plantations in the Southern countries.

The first cable car ever operated is also an interesting feature. All the original appliances, the grip, the rails, the slots, etc., are shown in position. The track on which the car rests is raised several feet above the floor, giving a good view of the grip and underground construction. The car bears the name "Clay Street Hill Railroad Company," and was used in San Francisco in 1873.

To those who have not had shop experience with the early types of electric motors and car apparatus, the old car used by the Topeka Railway Company is of special interest. This car was built by the St. Louis Car Company in 1887, its first year of operation, and was in continuous service until 1904.

The car body is raised from the trucks to show the motors and equipment. The motors are of the old double-reduction gear type. The gears as well as the armature are unprotected. The controlling device is of the Thomson-Houston type, in which the rheostat, placed under the car, is operated from the platform by rods and bevel gears.

The "knock down" car, one of 650 sent to Buenos Ayres,

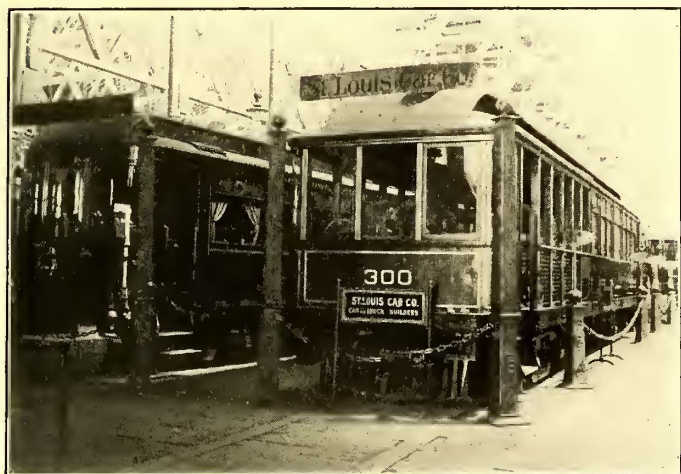


THE DISPLAY OF BRASS CASTINGS, THE OLD STAGE COACH SHOWN ON THE RIGHT

Argentina, will illustrate to many a new type of car construction. To economize room in shipping, these car bodies are so built that they can be easily taken apart and packed very compactly. The car as exhibited has its sides, top and ends wedged away, showing the method of construction. One platform is

removed and crated, as in shipment. When so crated it is composed of three parts—the hood, the dash and the platform, with the extending timbers.

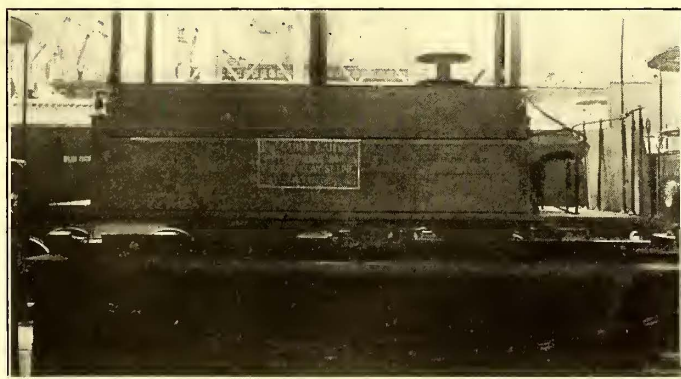
It is not generally known that many of the street cars of London are of American construction. One of the type of which several were constructed by the St. Louis Car Company for use in London is among the exhibits. The distinctive feature of this car is that it is a "double-decker," the roof being utilized to carry as many passengers as the interior. Access to the upper deck is gained by stairways on each platform. The car is elegantly finished throughout, the windows being supplied with draped curtains. Similar in many ways is the next



THE BEGGS PRIVATE CAR AND CAR NO. 300 OF CALIFORNIA COMBINATION TYPE FOR THE PACIFIC ELECTRIC RAILWAY COMPANY

exhibit. This is a car made for use in Dublin, Ireland, and is likewise "double-decked."

Of more than usual interest to the car builder and user is the car for the New York subway, built for the Interborough Rapid Transit Company. The copper sheathing below the belt rail, together with the decrease in width at the eaves, makes the car distinctive in appearance from the many around it. It was constructed according to very rigid specifications, every precaution being taken against possible crushing or telescoping



THE FIRST CABLE CAR

in the event of accidents. The car is mounted on the St. Louis Car Company's Interborough Special M. C. B. trucks.

A distinctive type for elevated railways is the car constructed for the Northwestern Elevated Railroad of Chicago. It is 46 ft. 9 ins. long, having a width over all of 8 ft. 8 ins. The bottom framing is of wood composite construction, being thoroughly reinforced with steel.

A car closely resembling a steam railroad coach is the closed trail car for the "Key Route" in Oakland, Cal. It is entered from the street by a flight of steps, but the extreme width of

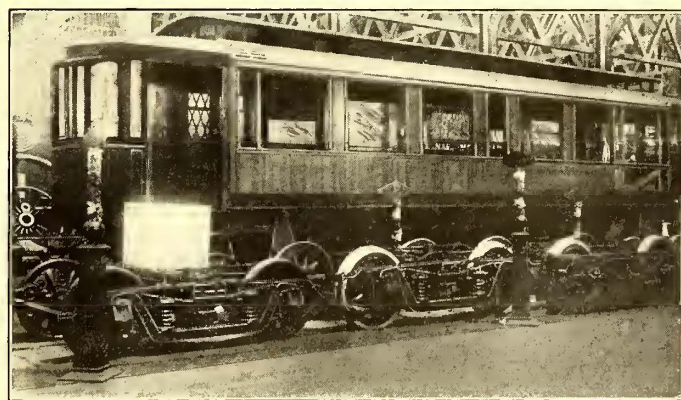
the vestibule steps permits rapid loading and unloading. The interior of the car is supplied with three St. Louis interior arc lights. In addition, incandescent lamps with opalescent globes are placed at frequent intervals on the molding just underneath the upper deck sill, there being used for this purpose more than sixty lamps. The rich mahogany finish harmonizes well with the green tint of the head linings.



THE GLOBE SHOWING FOREIGN PORTS WHERE THE ST. LOUIS CAR COMPANY'S PRODUCTS ARE USED

Another car for service in the West is that constructed for the Pacific Electric Railway Company. This is a combination car, the open forward compartment seating twenty passengers, while the closed rear section seats thirty-six passengers.

One of the most interesting of the exhibits is the partly finished car of the kind employed on the Intramural Railroad. Large numbers of this design are being built for city service. On one end the siding of the car is completed. The other end shows merely the posts and trusses. Between are the inter-



CAR, SHOWING DIFFERENT STAGES OF CONSTRUCTION

mediate stages of construction, showing the wood trusses, furring, etc. The opposite side of the car illustrates the process of painting. Near one door post the siding is unpainted. A short section is then shown treated with primer. The other sections illustrate continually advancing stages of the painting until at the opposite end the finished state is shown.

The different steps are as follows: (1) primer, (2) lead coat, (3) putty and knifing in hardwood, (4) first coat rough stuff, (5) second coat rough stuff, (6) third coat rough stuff, (7) guide coat, (8) rubbed out, (9) first coat color, (10) second

coat color, (11) color varnish, (12) first coat varnish, (13) second coat varnish, (14) third coat varnish.

The interior of the car is likewise shown in an incompleated state. One side is finished, having the seats in place. On the opposite side, however, none of the interior finish has been fitted, so that the posts, tie rods, etc., are visible. On this side the method of running the light wires is shown, the top sill and side plate being grooved for them.

The highest type of car construction is represented in the private car "Milwaukee," constructed for President John I. Beggs, of the Milwaukee Electric Railway & Light Company, and described in a recent issue. This car contains kitchen, dining room, office, observation compartments and state rooms, several different choice woods being used in the interior finish. Marquetry work of varied designs relieves any undue plainness in the woodwork, which is comparatively free from paneling and molding.

In addition to the trucks under the cars exhibited, several others are shown. Among these is the No. 50 for elevated and interurban service. Another for elevated and heavy interurban service is the No. 32. The side frames of this type are of solid steel. An unfinished side frame lies beside the truck, showing the one-piece construction. A truck for high-speed service on interurban lines is type No. 23-B. Among other places this truck is used under the private car "Martha" of the Indiana Union Traction Company. For city service where turns of short radii are necessary, the short wheel base type No. 47 is shown. This has a wheel base of 4 ft. 6 ins., the motors being outside hung.

In recent years the St. Louis Car Company has put on the market several street railway specialties. These, including arc headlights, interior arc lamps, journal bearings, roller side bearings, etc., are shown in appropriate places in the exhibit.

The office is in a neat booth just across the aisle from the main exhibit. The space immediately in front of the booth is occupied by car seats of the many designs manufactured by the company.

A description of the exhibit of the St. Louis Car Company would be incomplete were mention not made of the large globe occupying a position near the western entrance to the Transportation Building. This globe, representing the World, has marked over it, in their proper position on the map, the places where the products of the company are used. The whole surface of the globe is well dotted, showing many points in Africa, South America, Australia and other foreign lands which have been supplied with cars by this company.

**RECEIPTS AND SHIPPING BILLS FOR ELECTRIC FREIGHT SERVICE**

On many electric railways, particularly interurban lines, the freight carrying department has become a very important feature. The public has shown a disposition to recognize the economies and conveniences incident to freight carriage by electricity, but to attain the highest degree of success it is essential that every precaution should be taken to give no cause for complaints relative to lost or delayed material. This difficulty is easily minimized by using shipping forms and receipts which can be quickly filled out and easily understood.

The receipt shown in the accompanying illustration is employed on the electric package and freight line operated by the Pennsylvania & Mahoning Valley Railway Company, and was designed by the General Manifold Company, of Franklin, Pa. It is printed in triplicate, requiring two carbon sheets, a number of such sets being arranged to form a pad. The original is given by the freight clerk to the shipper, the first copy is kept by the freight clerk, who sends it to the auditing department with the cash received, and the second copy, which is printed in red, goes with the freight to the freight agent at the other

end, who secures thereon the receipt of the consignee. This copy is then also returned to the auditing department for checking purposes. The first and second copies differ slightly from the original. Where the shipper's form is marked "Received from" and "By —, Agent," the copies for the conductor and freight agent are marked "Shipped by" and "Received by —, Agent," thus making one writing suffice for all forms. The lower part of the copies also contains instructions for

**ELECTRIC PACKAGE & FREIGHT LINE**  
OPERATED BY  
**Pennsylvania & Mahoning Valley Railway Company No. F 49553**

190

Received from \_\_\_\_\_  
The property described below, in apparent good order, except as noted, contents and condition of contents of packages unknown, by \_\_\_\_\_ Agent

NO.	ARTICLES	DOLLARS		CENTS	
		10	9	10	9
		7	8	70	80
		6	7	60	70
		5	6	50	60
		4	5	40	50
		3	4	30	40
		2	3	20	30
		1	2	10	20

Consigned to \_\_\_\_\_

Which said Company agrees to deliver to said destination if on its lines, otherwise to point on its lines nearest said destination, upon payment of amount indicated by punch marks in margin hereof, receipt of which amount and articles listed is hereby acknowledged.

**NOTICE.** All packages must be marked plainly as to consignee and destination. We do not deliver packages or freight to points off our line, and assume no responsibility for packages or freight not called for upon delivery to point on our line nearest destination or address marked on package. All perishable articles received at shipper's risk.

4965 General Manifold Co., Pat. Jan. 12, 1904, Jan. 8, 1906.

SHIPPING RECEIPT EMPLOYED BY THE PENNSYLVANIA & MAHONING VALLEY RAILWAY COMPANY

marking the amount paid by the consignor, space for the consignee's receipt and for indicating where the goods were delivered in case there is no one at the destination to receipt for the goods. The General Manifold Company has also prepared a similar set of forms for the electric package line operated by the Youngstown (Ohio) & Sharon Railway & Light Company, the main difference being provision for checking material.

These forms are also used extensively by the large express companies, and are reported to be giving unqualified satisfaction. They save a great deal of time, are much more convenient than the old system of loose carbons, and the possibility of error or fraud is practically eliminated. As the carbons are waterproof they are not affected by dampness, and should the sheets become wet the copy will not run. The forms described are but two of the many manufactured by this company for various purposes.

The Trenton & New Brunswick Railroad is now carrying more passengers than ever before, and the service has been doubled within two months. The Public Service Corporation's cars are now running every hour from 6 a. m. to 7 p. m., and are carrying a large number of through passengers. This service, coupled with the Trenton & New Brunswick Company's own car service, gives a half-hour headway through a country where not a single town or village is encountered for 25 miles. yet nearly every car is filled.



**THE NEW AMERICAN UNIVERSAL SAW BENCH**

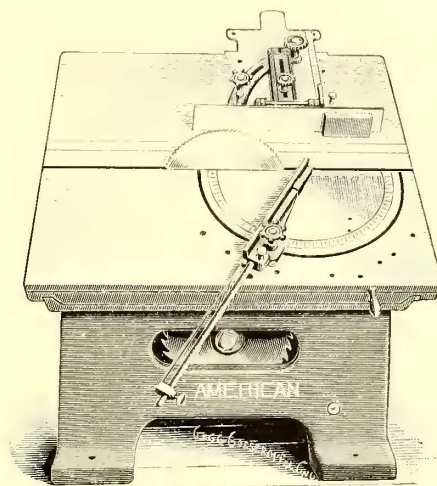
The accompanying illustrations show something of a novelty in saw-bench design, which has recently been placed upon the market by the F. H. Clement branch of the American Woodworking Machinery Company, New York. This machine differs radically from former machines of this class, in that the table is arranged to tilt in one direction only, whereas it has formerly been the practice to have the tables of saw benches tilt in both directions; the latter resulted in rather complicated and cumbersome construction, whereas in the new construction, in which the table is arranged to tilt to one side only, a great simplification of detail has been obtained. The changes of detail by which this new departure has been made possible are illustrated in the accompanying engravings of the new design.

The first illustration shows the table from one side when tilted forward to the extreme angle of 45 degs.; this serves to show the arrangement of gages, the ripping gage being located upon the rear stationary portion of the table, while the cut-off or miter gage is shown attached to the rolling portion of the table. Another engraving illustrates the saw bench from the rear while tilted to this position, and serves to indicate the construction of the table mechanism as well as the double arbor arrangement of mounting the two saws, one rip and the other cross-cut saw for interchangeable use. The two following views illustrate the saw bench first with the ripping gage transferred to the rolling table section, while in the remaining view the machine is shown as used with a dado head mounted upon the arbor in place of one of the saws. The construction of the saw bench is such that dado heads up to 6 ins. thick may be used by means of a special sleeve, which takes the place of the nut and loose collar on the saw arbor. Dado heads thicker than 2 ins. at the eye may be used, but they must be recessed to receive the nut.

The box frame of the saw bench is cast in one piece, and has three points of support on the floor, which insures rigidity and avoids any tendency of springing or straining of any part. The saw arbor yoke is of extremely heavy construction, and carries two cast steel arbors, with the pulley between the two bearings

much as the work guides are all detachable; this allows them to be mounted on either side of the saw so as to enable work to be beveled at any possible angle.

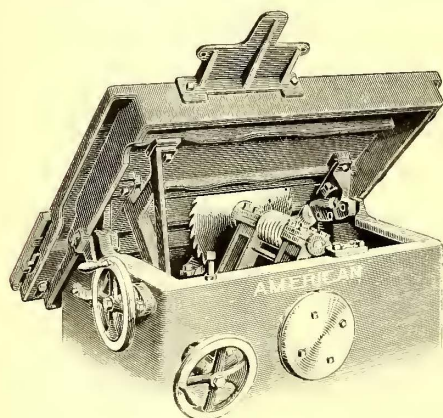
The gage plate, or guide for use when rip sawing, moves over the entire width of the main table, and will admit of any width of board up to 24 ins., while its fence may be tilted to 45 degs. from the vertical. The entire gage also swings on any one of the retaining pins to any horizontal angle with the saw for cutting core boxes, large grooves or similar work. In ad-



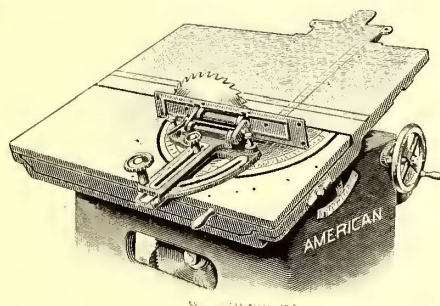
VIEW OF THE NEW DESIGN OF SAW BENCH, SHOWING TABLE TILTED FORWARD AND ARRANGEMENT OF GAGES

dition to the positive adjustment by means of the table pins, there is a micrometer adjustment of 8 ins. afforded by a steel rack and pinion, which makes the movement quick and accurate. This side of the table has a rule graduated to eighths of an inch for facility in setting the gage.

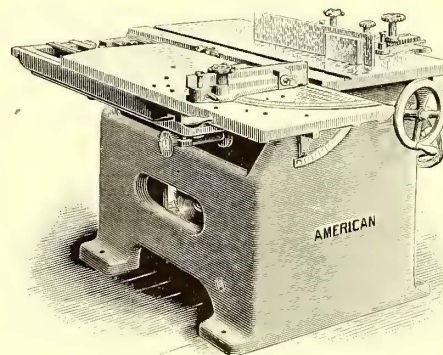
The cut-off or miter gage is swiveled on the rolling table section and may be accurately set at all angles by means of a taper pin and stop holes. A complete half-circle protractor is cut into the table, which assists in setting for intermediate



VIEW OF THE SAW BENCH FROM THE REAR, WITH TABLE TILTED TO SHOW THE SAW ARBOR MECHANISM



VIEW SHOWING RIPPING GAGE TRANSFERRED FROM THE REAR TO THE ROLLING TABLE SECTION



SPECIAL ARRANGEMENT OF ROLLING TABLE SECTION TO ACCOMMODATE DADO HEADS AND SPECIAL CUTTERS

and the saw overhung at one end. The yoke swings upon gudgeons on both sides of the saw line, the circular attachment and rotation of the yoke being accomplished by a heavy worm wheel and double-pitch worm. This construction permits of the interchanging of the saws with the greatest facility, which may be accomplished without stopping the machine.

The rolling portion of the table moves on non-friction rollers and is guided on a planed and scraped way, thus insuring an accurate cut; by means of an intermediate frame or spider it can be drawn away from the main section to a distance of 2½ ins. to admit the dado heads or special cutters. As above mentioned, the table is arranged to tilt in one direction only, inas-

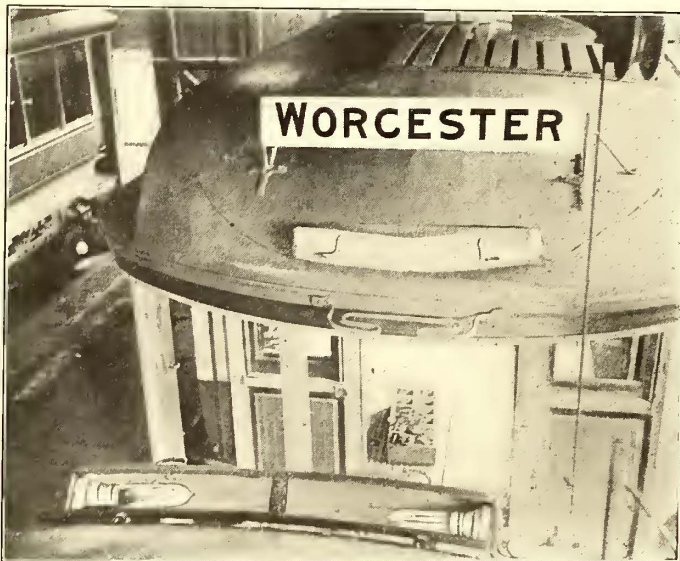
angles. A novel feature of this portion of the machine is the providing, as a part of this protractor, of a cross-graduated sector, by which angles corresponding to any required dimension of work can be set without previously determining the angle in degrees, thus saving time and calculating; if, for instance, the two sides of a right-angled triangle, which it is desired to cut, be known, this cross-graduated sector permits the piece to be readily set without reference to the resulting angle of the hypotenuse.

A supplementary cut-off gage is fitted to the right hand table, consisting of a long tongue moving freely in a slot, to which is attached a swiveling head or fence graduated to 45 degs. both

ways, and arranged to connect when desired with the main cut-off gage by a yoke or arch, which passes over the saw, and thus makes a long, well-supported gage for large work. When the supplementary cut-off gage is not in use the fence is detached from the tongue, and the latter is turned over in its slot so as to make a flush surface on the table, as indicated in the first accompanying engraving. The machine is driven through a countershaft and idler jack, by which any combination of drive connections may be easily made. It is estimated that this machine will require only  $\frac{3}{4}$  hp for driving under normal conditions of operation. Its total weight is 2100 lbs.

### NOVEL CAR SIGN

The need for a sign on street cars which would be luminous at night has already been felt, and in a degree been met by



ILLUMINATING DEVICE FOR CAR SIGN

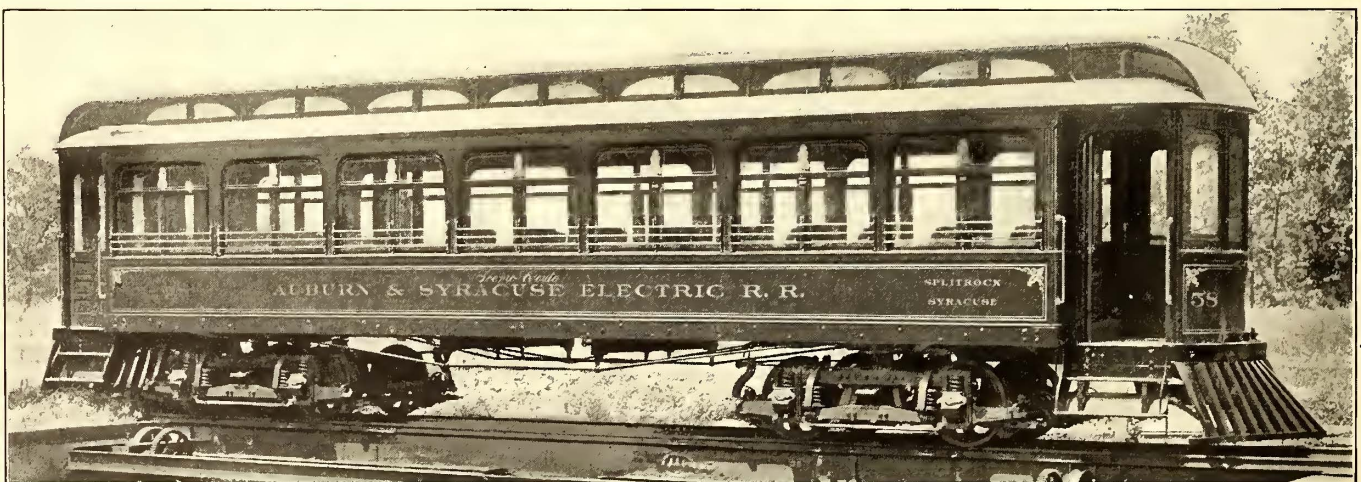
electric street railway inventors. These signs are, of course, all electrically illuminated and employ many different principles. The Worcester Consolidated Street Railway Company,

shielded lamps upon the roof. The shielding consists of a cast-iron housing about  $\frac{1}{8}$  in. in thickness. This housing is of the section of a deep U, and is shaped to fit the car roof, and is adapted to be bolted thereto. The casting is mounted on the roof so that the opening thereof points directly at the sign to be illuminated. The interior of the casting is painted with white enamel, and installed therein, lying sideways, are two incandescent lamps pointing toward each other. The upper part of the casting is milled so that two glass tops can be slipped in, and these are held in place by buttons mounted on the end of the casting. On the outside of the casting are bolted two hooks, which serve to prevent the trolley cord from swaying from side to side; in short, the whole lamp guard acts as a trolley cord protector and prevents the trolley cord from sawing into the hood. The outside of the lamp guard is painted the same color as the roof, and at day or night it is hardly distinguishable, and it is sometimes puzzling on noting the brilliantly illuminated sign to discover where the light comes from. The fact that the whole structure is rugged and cheap, and can be applied to illuminate existing signs, and answers the purpose of a cord guard as well, makes it a very satisfactory solution of the illuminated sign problem.

The sign is well illustrated in the accompanying figure, which shows the roof of two cars. In the foreground may be seen the open front of the lamp guard, showing the two lamps in place. Beyond may be seen the roof of a second car, showing the exterior of the lamp guard, the hooks for retaining the trolley cord and the sign to be illuminated just above. The lower hook guard on this particular car is a relic of former times, and is not now necessary. This method of illuminating signs has not yet been placed upon the market, and is manufactured by the Worcester Consolidated Street Railway Company for its own use.

### INTERURBAN CARS FOR THE AUBURN & SYRACUSE RAILROAD

Two handsome interurban coaches have lately been delivered to the Auburn & Syracuse Railroad Company by the G. C. Kuhlman Car Company, of Cleveland, Ohio. The cars have been placed on the high-speed line, which is a part of the system operated by the company, extending between Syracuse and



HIGH-SPEED INTERURBAN CAR FOR THE AUBURN & SYRACUSE ELECTRIC RAILROAD

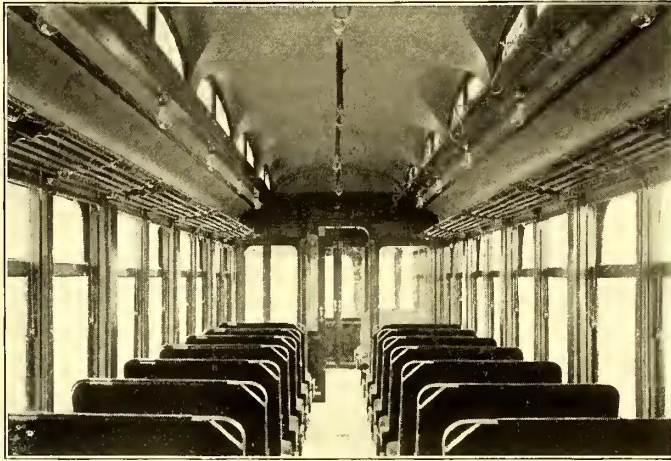
through the efforts of J. H. McMullin, superintendent of car shops, has adopted a solution of the problem which seems to present features which are desirable in street railway work, namely, simplicity, durability and cheapness.

The principle of the device is the illumination of the sign by reflected light. The ordinary poly-sided wooden sign is used, and is illuminated by the light thrown from properly

Auburn by way of Skaneateles and Marcellus, a distance of 25 miles, through one of the most beautiful sections of New York State. This is in the famous lake country, through many parts of which a number of interurban roads are being constructed. The cities are prosperous and the country thickly populated, fruit growing being the chief industry. In summer the traffic is largely increased by people from the cities of all

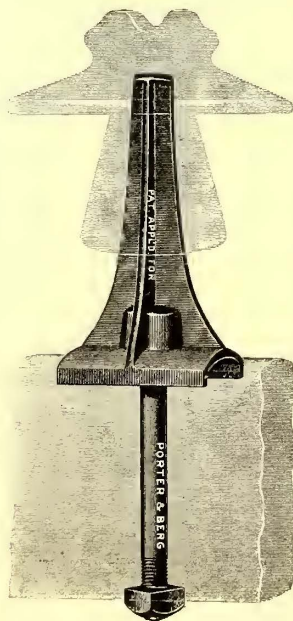
parts of the State, who are attracted by the fine hotels on the shores of the numerous lakes. The railway company owns Lakeside Park at the head of Lake Skaneateles, which has come to be a popular resort of the people of Syracuse and Auburn.

The cars are divided into two compartments, with a total



INTERIOR OF AUBURN & SYRACUSE CAR

seating capacity of fifty-six. Semi-empire ceilings, tinted light green and tastefully decorated with gold, contrast pleasantly with the rich, dark Mexican mahogany woodwork. The window lights are composed of heavy polished plate glass, and the ventilator sashes have cathedral glass. The bronze trim throughout is of generous proportion, and includes parcel racks. The cars measure 39 ft. 10 ins. over the end panels, and 49 ft. 10 ins. over the bumpers. The width over sills is 8 ft. 2 ins. Four under trusses are included in the bottom framing; the side sills are  $4\frac{3}{4}$  ins. x  $7\frac{3}{4}$  ins., with sill plates on the outside, 6 ins. x  $\frac{5}{8}$  in. The size of the end sills is  $5\frac{3}{4}$  ins. x  $7\frac{3}{4}$



HIGH-TENSION TRUSS-PIN

ins. The size of the corner posts is 4 ins. x 6 ins., and the thickness of the side posts is  $2\frac{1}{2}$  ins. The angle-iron bumpers, ratchet brake handles, platform and conductor gongs are of Brill manufacture.

◆◆◆  
**A NEW TRUSS PIN**

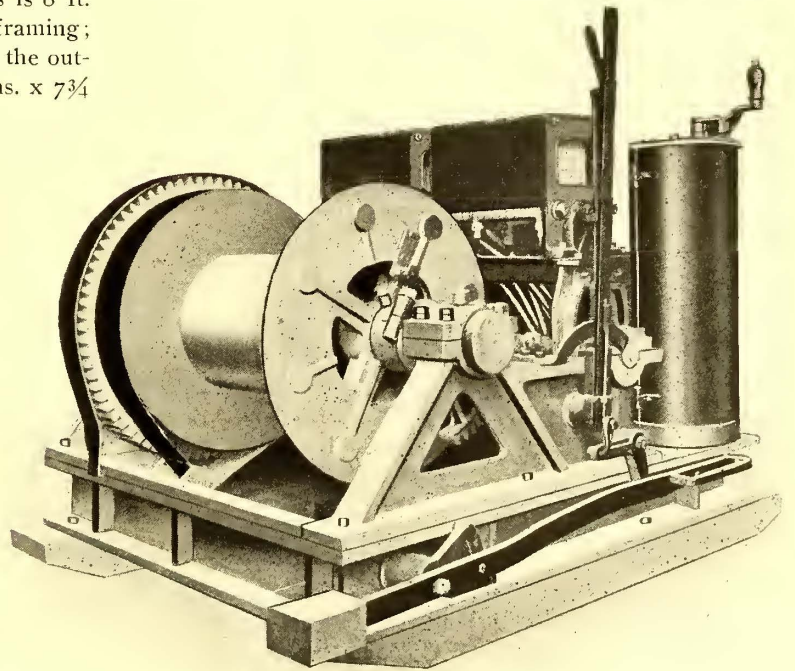
It is becoming quite usual for engineers designing high-tension lines to draw their specifications with the view of depending entirely upon the insulator for insulation, and the mechan-

ical supporting devices, cross-arms, pins, etc., for strength and durability. In such installations the truss pin illustrated herewith is especially recommended by its makers, Porter & Berg, of Chicago, who report that this type of construction is being used with great success on several of the largest high-tension lines in the country. It has abundant strength, due to its form, and being made of malleable iron, is not subject to burning from leakage currents so often complained of in wood pins.

The insulator is fastened on the pin by cement, thus making the combination of pin and insulator practically one piece and giving the pin an absolutely uniform support, free from irregular strains on the thread and consequent breakage of the insulators. The base of the truss pin is of proper width to fit over the top of the cross-arm, and the flanges reach over the edge of the arm to prevent any tendency of the pin to turn in place. The flanged base also acts as a water shed and prevents rain from entering the cross-arm through the pin hole, thus giving it a longer life. The iron bolt which fastens the truss pin to the arm requires a much smaller hole, and the cross-arm is not weakened by large holes as is the case where wooden pins are used. It is claimed that this truss pin is absolutely indestructible and will outlast the life of any high-tension installation.

◆◆◆  
**ELECTRIC HOISTS FOR CONSTRUCTION AND SUPPLY CARS**

Electric hoists are becoming more and more a necessity, both for handling material in construction work and for regular supplies on electric railway systems where supply cars make tours of the system, for delivering and receiving material. Not a few electric railway companies have equipped their supply and construction cars with electric hoists, these being frequently

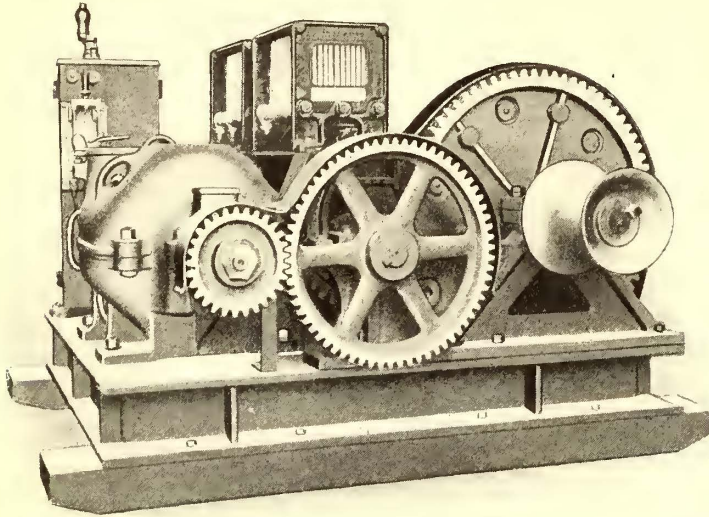


ELECTRIC HOIST, WITH PLAIN RHEOSTAT CONTROLLER

home made and susceptible of considerable improvement, because the average electric railway has not had extensive experience in the manufacture of hoists, and hence the actual requirements are not always known in advance.

The accompanying illustrations show two views of a single-drum electric hoist built by the Thomas Elevator Company, of Chicago. This company has for a number of years made a business of building and operating both steam and electric hoists, and has had excellent opportunity to weed out all defects in its hoisting apparatus. Owing to numerous inquiries and orders

from electric railway companies, the company recently decided to place its electric hoists before transportation companies, in the belief that when it becomes known among electric railways that such hoists are on the market there will be a strong demand for them. The hoist illustrated is especially suited for the light class of work for which a hoist located on a construction or



SINGLE-DRUM ELECTRIC HOIST, SHOWING GEARING, MOTOR, ETC.

supply car is used. The motor is a G. E.-52, with the regular resistance used with a street railway motor equipment. A plain rheostat controller is employed, and since the motor is always operated in the same direction, no provisions for reversing are necessary. Acting on the winding drum is a band-brake operated by a foot-lever. The winding drum can be disconnected from the motor and gears so as to revolve freely and lower its load. The drum is connected to the gearing through a paper cone friction clutch. The drum is forced against the paper cone clutch by a cam arrangement, which is so designed as to be very durable.

This hoist can be used very effectively for pile driving. The hammer of the pile driver is connected permanently to the end of the winding-drum cable. The motor is operated continuously. To raise the hammer on the pile driver, the clutch is thrown in and the drum winds up the cable until the hammer is at the top of its stroke, when the operator releases the clutch, letting the pile-driver hammer fall. Just before the hammer strikes the pile the operator applies the brake on the drum, and after a little practice he is able to apply the clutch at the right instant to catch the pile-driver hammer on the rebound and to start the winding drum to pulling the hammer up again, making use of the rebound as a start.

It has also been suggested that hoists of this kind would be of use in repair shops, where all the repair tracks can be entered only by means of a transfer table, as in such shops it is difficult to get dead cars off of a transfer table into a shop with any degree of celerity or economy of labor. If a few tracks could be equipped with hoists of this type, dead cars could be easily handled. The outfit weighs complete about 3 tons.

### THE HARRISON SAFETY BOILER WORKS AT ST. LOUIS

The Harrison Safety Boiler Works, of Philadelphia, Pa., have prepared an extensive exhibit at the Louisiana Purchase Exposition of their Cochrane feed-water heaters, steam separators, oil separators and Sorge-Cochrane systems. Their headquarters are at the east entrance of the Gas, Steam and Fuel Building, and are in charge of D. M. Mason.

Among the Cochrane heaters, separators and Sorge-Cochrane

systems on exhibition are the following: Exhibitors' Power Plant—One 1200-hp Sorge-Cochrane system, three 6-in. Cochrane horizontal receiver separators; exhibit of Westinghouse-Church-Kerr Company—Two 4000-hp feed-water heaters and purifiers, and one 6-in. vertical steam separator; Intramural Power Plant—One 1750-hp Cochrane feed-water heater and purifier, one 10-in. and one 8-in. vertical receiver separator, one 8-in. horizontal receiver separator, one 40-in. horizontal vacuum oil separator, and one 300-hp Sorge-Cochrane system; Underwriter Fire-Pump Station Line—One 14-in. horizontal receiver separator; exhibit of P. DeC. Ball—One 600-hp feed-water heater and purifier, one 6-in. horizontal oil-ammonia separator.

### THE VALTELLINA RAILWAY ACCEPTED

On July 10 the Società Italiana per le Strade Ferrate Meridionali Rete Adriatica, the owning company of the well-known railway connecting Lecco, Colico, Sondrio and Chiavenna, and popularly called the Valtellina Railway, officially accepted the three-phase equipment in use as satisfactory. This line has been frequently described in the technical press, and was installed by Ganz & Company, of Budapest, at their own risk. The contract with the railway company provided that it should take over the electric installation only if the whole installation should prove a success and fulfil all the requirements of railway service for a period of two years. The guarantee commenced on Oct. 15, 1902, the date of starting the road, and would therefore have expired on Oct. 15, 1904. The Italian Railway Company, which, during the period which has elapsed, has had an opportunity of closely observing the working of the system, decided that it was not necessary to wait for the expiration of the entire period of guarantee. It consequently took over the plant July 10, and added it to the regular Rete Adriatica system.

### AMERICAN LOCOMOTIVE SANDER CO. AT WORLD'S FAIR

At the west end of track No. 17 in the Transportation Building is the exhibit of the American Locomotive Sander Company. The sander especially applicable to electric railway cars put on the market by this company is operated by air obtained

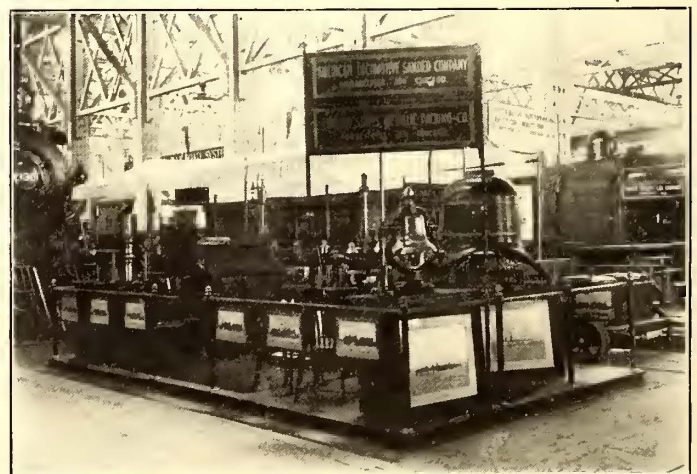


EXHIBIT OF THE AMERICAN LOCOMOTIVE SANDER COMPANY

from the main reservoir pipe of the brake system. From the sand boxes usually placed inside the car, a rubber hose leads to the rail, being so adjusted that no matter what the curvature of the track the sand is always thrown on the rail.

A feature of the motorman's valve for operating the sand is a warning port which draws the attention of the operator to the fact that the valve is open, thus saving much sand that would otherwise be wasted.

## LEGAL NOTES

## LIABILITY FOR NEGLIGENCE.

NEW JERSEY.—Street Railways—Collision with Wagon—Contributory Negligence.

1. When a person drives upon a trolley track and comes in collision with a car, in order to charge the trolley company with negligence he must show that the motorman, by the exercise of due care, could have avoided the injury to him.

2. If a person drives upon a trolley track without exercising reasonable observation to ascertain whether there is danger from an approaching car, he is guilty of contributory negligence.

(Syllabus by the Court.)—Solatinow vs. Jersey City, H. & P. Street Railway Company, 56 Atlantic Rep., 236.)

NEW YORK.—Personal Injuries—Permanency—Expert Evidence—Certainty.

Where, in an action for personal injuries, an expert witness had testified that he thought he could state with a fair degree of certainty where plaintiff's injuries would be permanent, and thereafter, in answer to another question, stated that he thought they would be more or less permanent; that, though there might be some little improvement, he thought she would suffer probably all the rest of her life; and defendant did not object to the second answer on the ground that the first had shown the witness not qualified to give an opinion, but merely moved to strike out as speculative, the second answer was sufficiently certain.—(Kelly vs. United Traction Company, 85 New York Supplement.)

NEW YORK.—Street Railways—Personal Injury—Crossings—Failure to Look.

A street car which plaintiff desired to board having started as he arrived at the corner, the conductor called to him to come on across the street; and while following in the rear of the car, and almost abreast of it, he was struck by a car running at a high rate of speed on an intersecting line. Plaintiff did not testify that he looked for the car on such intersecting line before stepping on the tracks, but stated that he could not see such car until it struck him, because his view was obstructed by the car he was following. Held, that it could not be said, as a matter of law, that he was guilty of contributory negligence, and that the question was for the jury.—(Binns vs. Brooklyn Heights Railway Company, 85 New York Suppl., and 119 New York State Rep., 874.)

NEW YORK.—Appeal from Non-Suit—Favorable Inferences—Street Railroads—Vehicle on Track—Negligence—Question for Jury—Contributory Negligence.

1. On appealing from a non-suit, plaintiff is entitled to the most favorable inferences deducible from the evidence, and all disputed facts are to be treated as established in his favor.

2. Plaintiff was driving along a car track, and a car came up behind him, signaling for him to get out of the way. A wagon was standing on the outside of the track, and he turned inwards across the parallel track, and, as he did so, discovered a car approaching from the opposite direction a half a block away, which struck him before he could turn back. Held, that the question of defendant's negligence should have been submitted to the jury.

3. The fact that plaintiff endeavored to get from in front of the first car, instead of continuing as he was, did not render him guilty of contributory negligence as a matter of law, but the question was for the jury.—(Pritchard vs. Brooklyn Heights Railroad Company, 85 New York Suppl., and 119 New York State Rep., 898.)

NEW YORK.—Street Railroads—Death of Passenger—Negligence—Question for Jury.

In an action against a street railroad for the negligent killing of a passenger, evidence for plaintiff that a violent jerk and accompanying accelerated speed of the car threw decedent off while he was standing on the running board and holding on to the stanchions with both hands, and evidence for the defendant that he was seated in the body of the car, but under the influence of liquor, and voluntarily got up, and either jumped off the car or fell or was pushed off, require a submission of the case to the jury.—(Sheeron vs. Coney Island & Brooklyn Railway Company, 85 New York Suppl., 95.)

NEW YORK.—Carriers—Street Railroads—Injuries to Passengers—Dangerous Position—Assumption of Risk.

Where plaintiff elected to ride on the step of a crowded street car, and was thrown off by the oscillation or "greyhound motion" of the car as it was running at the usual rate of speed maintained on that portion of its route, and there was no evidence of any unusual or abnormal motion due to any unusual condition of the car, rails, roadbed, or management, plaintiff assumed the risk of an injury so occasioned.—(Moskowitz vs. Brooklyn Heights Railway Company, 85 New York Suppl., 960.)

NEW YORK.—Negligence—Joinder of Defendants—Obstructing Street—Personal Injuries—Judgment.

A joint judgment against a street railroad and a contractor doing work for it, requiring the tearing up of a city's streets, is proper, where, through negligence in placing a cord across the highway, it was rendered unsafe for travel, by reason whereof plaintiff was injured, whether the contractor be an independent one, or whether the servant of one or the other was the cause of the cord being there.—(Schiverea vs. Brooklyn Heights Railway Company et al, 85 New York Suppl., 902.)

NEW YORK.—Street Railroads—Injuries to Pedestrians—Negligence—Evidence.

Plaintiff's deceased, a child five years of age, as he was coming from school with a companion, broke away from his companion, and ran across the street in front of an approaching car, was struck by the car and killed. The companion testified that just as deceased got on the track he tripped and fell. The motorman had stopped at the preceding street crossing, and, though the car was going rapidly it was under control, and the speed was not excessive. There was no evidence that the motorman was not attending to his business, or that he did not stop the car as soon as possible after he had reason to suppose that deceased would attempt to cross in front of the car. One witness testified that deceased fell on the track when the car was only 3 ft. distant, and the motorman testified that as soon as he saw the boy start to run across the street he applied the brake, put on the reverse, and used the sand box, and succeeded in stopping the car within five or six feet after deceased was struck. Held, that the evidence was insufficient to establish negligence on the part of the motorman.—(Sciurba vs. Metropolitan Street Railway Company, 84 New York Suppl., 85.)

NEW YORK.—Street Railroads—Collision—Street Crossings—Negligence—Questions for Jury.

1. Where an avenue entering a street on which is a line of railway comprises a continuous line of traffic, with an avenue on the other side of the street, though their ends are not directly opposite, the location is a street crossing, at which the rights of the users of the streets and the railroad company are equal, irrespective of the direction from which the intersection is approached.

2. Where a street car approaches a street intersection at a greater speed than usual, and the motorman makes no attempt to stop it until within 25 ft. of plaintiff's conveyance, too late to avoid the accident, though the car was 70 ft. away when plaintiff started to turn across the track, the company's negligence is a question for the jury.—(Freeman vs. Brooklyn Heights Railway Company, 84 New York Suppl., 108.)

NEW YORK.—Street Railways—Crossing Accident—Contributory Negligence—Evidence—Question for Jury.

1. It is not negligence, as a matter of law, for one driving a wagon to attempt to cross street railway tracks when an approaching car is about a block distant.

2. Where, in an action against a street railway for injuries, plaintiff's evidence showed that a car was nearly a block away when he started to cross the tracks, and that he had got part of the wagon over the tracks when it was struck by the car, and that it was quite light at the time, and that he looked for the car immediately before he started, the cause should have been submitted to the jury.—(Carter vs. Interurban Street Railway Company, 84 New York Suppl., 134.)

NEW YORK.—Railroads—Engine Setting Fire—Negligence—Sufficiency of Evidence.

Evidence in an action for damages from a fire caused by sparks from defendant's engine, which burned an awning and some signs, held insufficient to show negligence in defendant.—(Polacsek vs. Manhattan Railway Company, 84 New York Suppl., 140)

NEW YORK.—Carriers—Street Railroads—Injuries to Passengers—Dangerous Position—Platform.

Plaintiff took passage on a street car which was so crowded that he was compelled to stand on the rear platform and hold on by the hand rail. The conductor accepted his fare while in this position, and without notice to plaintiff the car was driven around a curve in the track without slackening speed, in violation of a rule of the company requiring the speed to be reduced one-half in rounding curves, and plaintiff was violently thrown from the car and injured. Held, that such facts were sufficient to establish negligence on the part of the carrier entitling plaintiff to recover for his injuries.—(Gatens vs. Metropolitan Street Railway Company, 85 New York Suppl., 967.)

NEW YORK.—New Trial—When Granted—Verdict Against Evidence—Conflicting Evidence—Discretion of Court—Street Railways—Injuries to Persons Driving on Track—Contributory Negligence—Evidence—Sufficiency of.

1. A new trial can only be granted where the weight of evidence against the verdict is so great that the court can see that it must

have been the result of passion, prejudice, mistake, ignorance, or corruption.

2. Where the evidence, though conflicting on material points, supports the verdict, the court has no discretion, but must refuse a new trial, even though the conclusion of the jury is one which the court itself would not have reached on the same testimony.

3. In an action against a street railway for personal injuries resulting to plaintiff from being struck by a car while driving on defendant's tracks, evidence held sufficient to warrant jury in concluding that plaintiff was free from contributory negligence.—(Benjamin vs. Metropolitan Street Railway Company, 85 New York Suppl., 1052.)

NEW YORK.—Personal Injuries—Actions for—Negligence—Contributory Negligence—Street Railways—Injuries to Persons on Track—Failure to Signal—Materiality—Care Required in Operation of Road—Duty of Person Crossing Track—Reliance on Car's Slowing Up.

1. To warrant a recovery in an action for wrongful death, defendant's negligence and intestate's freedom from contributory negligence must be shown.

2. When defendant's rapidly approaching street car was within 8 ft. or 10 ft. of where plaintiff's intestate stood, it slowed up, and intestate, who had seen it approaching, proceeded to cross the track, and was struck by the car, the speed of which had been again increased. Held contributory negligence on intestate's part, precluding recovery.

3. Intestate having seen the car, it was immaterial whether or not a signal of its approach was given.

4. While it is the duty of a street car motorman to have the car under reasonable control on approaching a street crossing, a pedestrian has no right to assume that, because a car has slowed up, it will stop, or its speed be so controlled as to give him time to cross the track in safety.—(Thompson vs. Metropolitan Street Railway Company, 85 New York Suppl., 181.)

NEW YORK.—Street Railroads—Injury to Pedestrians—Contributory Negligence—Evidence.

In an action against a street railroad for injuries to a pedestrian, where the uncontradicted testimony was that plaintiff saw the car approaching at the distance of a block and a half or two blocks at the time he left the crossing, and that it was daylight and there was nothing to prevent his seeing it from that time to the time he was injured, and there was nothing to show that he exercised any care whatever after he left the corner, or that he looked to see where the car was, but walked heedlessly onto the tracks, a verdict for him will not be allowed to stand.—(Lynch vs. Third Avenue Railroad Company, 85 New York Suppl., 180.)

NEW YORK.—Injury to Railroad Employee—Employers' Liability Act—Negligence of Superintendent—Evidence—Sufficiency—Contributory Negligence—Burden of Proof.

1. In an action for negligent death of an employee, where there was no evidence that the location at which deceased was working was defective, that any appliances were out of order, or that any precaution was omitted by defendant that was possible to protect deceased in the performance of his work, no liability was shown under the employers' liability act (laws 1902, p. 1748, chap. 600, sec. 1, subd. 1), giving an action for injury to an employee caused by reason of a defect arising from the employer's negligence in the ways, works, or machinery connected with the employers business.

2. In an action against a railroad for death of a servant engaged in coupling cars, evidence examined, and held insufficient to show that injury resulted from the negligence of one engaged in superintendence, or one acting as superintendent, within the meaning of the employers' liability act (laws 1902, p. 1748, chap. 600, sec. 1, subd. 2), giving an action in such case.

3. In an action against a railroad for death of a servant engaged in coupling cars, evidence examined, and held insufficient to show that the servant was himself in the exercise of due care, within the employers' liability act (laws 1902, p. 1748, chap. 600, sec. 1, subd. 2), giving an action for servant's injuries resulting from the negligence of one intrusted with superintendence when the servant is in the exercise of due care and diligence.

4. Under the employers' liability act (laws 1902, p. 1748, chap. 600, sec. 1, subd. 2), giving an action for servant's injuries resulting from negligence of one intrusted with superintendence, when the servant is in the exercise of due care and diligence, it must be shown that the servant was in the exercise of such care, to authorize a recovery.—(McHugh vs. Manhattan Railway Company, 85 New York Suppl., 184.)

NEW YORK.—Street Railways—Negligence—Collision with Vehicle—Right to Cross Track—Instructions.

In an action against a street car company for personal injuries caused by a collision between plaintiff's wagon and a car, an instruction that plaintiff had the right to cross the track when he

saw a reasonable opportunity to do so, even though it required the motorman to slacken speed, and that the rights of drivers of vehicles and those of electric cars were reciprocal, so that the gripman is bound to see to his charge as diligently as the driver of a vehicle to his, was not objectionable as substituting the mental process of the driver for the judgment of the jury as to whether the attempt to cross was reasonable.—(Prince vs. Third Avenue Railroad Company, 84 New York Suppl., 542.)

NEW YORK.—Street Railway—Person on Track—Injury—Instruction—Right to be on Track.

In an action, by a person riding in a wagon, against a street railway company, for an injury occasioned by the collision of a car with the vehicle, it is error to instruct that a person on a highway has no right to be on a street railway track when a car comes up, and no right to make a car slow up, though the court adds that, "To put it more precisely, the law requires them to use reasonable prudence to be off when the car comes up," and that "he has a right to be there, but with that right goes the duty to be vigilant to be off before the car comes up."—(Venuta vs. New York, W. & C. Traction Company et al., 84 New York Suppl., 544.)

NEW YORK.—Street Railways—Collision with Team—Contributory Negligence.

The driver of a covered wagon stopped it when it was nearly dark, without a light, on a street car track, waiting for a train to pass, remaining, without any precautionary measures, for two or three minutes, till struck by a street car from the rear. Held, that he was guilty of contributory negligence.—(Watson vs. Interurban Street Railway Company, 84 New York Suppl., 556.)

NEW YORK.—Street Railways—Injury to Passengers—Decree of Court.

Where plaintiff, while a passenger on a street railway car, was injured by the shaft of a wagon puncturing the side of the car, it was error to instruct that the railroad company was bound to exercise the "highest degree of care" to insure safety of the plaintiff.—(Kelly vs. Metropolitan Street Railway Company, 85 New York Suppl., 842.)

NEW YORK.—Negligence—Actions—Pleading—Bill of Particulars.

In an action for personal injuries defendant is entitled to a bill of particulars as to the injuries which plaintiff alleged she believed were permanent, and as to the length of time during which she was confined to her home.—(84 New York Suppl., 505.)

NEW YORK.—Street Railways—Negligence—Collision with Wagon—Evidence—Sufficiency.

In an action against a street car company for personal injuries caused by a collision between defendant's car and plaintiff's wagon, it appeared that the wagon was being driven in front of the car, and turned out apparently to allow the car to pass, but when the car was about to do so for some reason turned toward the track so that it was struck. The driver turned to avoid an approaching vehicle, but it did not appear how far away this vehicle was. Held not sufficient to support a finding that defendant was negligent.—(Reichenberg vs. Interurban Street Railway Company, 84 New York Suppl., 524.)

NEW YORK.—Street Railways—Injury to Passenger Boarding Car—Negligence—Evidence.

A judgment for plaintiff is supported by evidence that she attempted to board defendant's street car while it was at a standstill, immediately on the alighting of a passenger, and that it started while she was stepping on it, though plaintiff approached the car after the signal to start had been given by the conductor, who was inside the car.—(McGill (two cases) vs. Central Cross-town Railroad Company, 84 New York Suppl., 477.)

NEW YORK.—New Trial—Power to Grant—Discretion of Trial Court—Review on Appeal.

The power to set aside a verdict on the ground that it is against the weight of the evidence, and to grant a new trial, rests in the sound discretion of the trial court, and its determination will not be reversed on appeal unless an abuse of discretion clearly appears.—(Lynch vs. Metropolitan Street Railway Company, 84 New York Suppl., 496.)

NEW YORK.—Street Railways—Collision with Team Crossing Track—Contributory Negligence.

A finding that plaintiff, injured by the wagon on which he was riding being struck by a street car, was not guilty of contributory negligence, is authorized, there being evidence that the car had stopped half a block away, when the wagon approached the track, by a diagonal path, to cross it, though plaintiff did not look for the car, the place not being one of obvious danger, and there being evidence that, if he had looked, the position of the car was such that danger in attempting to cross would not have been apparent.—(Westerman vs. Metropolitan Street Railway Company, 84 New York Suppl., 501.)

**NEW YORK.—Carrier—Invitation to Take Passage—Injury to Passenger—Contributory Negligence—Remark of Counsel.**

1. Where one signaled a motorman of a street car, who was looking toward him, and who then slowed up the car, there was enough to warrant the inference that the signal was seen, and the car slowed up to permit the taking of passage on it.

2. Where one stepped aboard a car when it had almost stopped, and was injured by its sudden starting, it cannot be said, as a matter of law, that he was guilty of contributory negligence.

3. On objection to counsel's remark that he would show that "attempts had been made, and witnesses spirited away," the court said: "Unless he proves it, I will instruct the jury to disregard the statements," and no exception was taken. Evidence of an attempt to bribe a witness to absent himself was introduced. The court's attention was not again called to the matter. Held, that the remark affords no warrant for reversal.—(Mulligan vs. Metropolitan Street Railway Company, 85 New York Suppl., 791.)

**NEW YORK.—Master and Servant—Street Railways—Personal Injuries—Contributory Negligence—Question for Jury—Appeal—Motion for New Trial.**

1. A railway conductor, who had been in the employment for three months, called the attention of the starter to the fact that the wheel had fallen out of the top of the trolley pole, and was instructed to proceed by allowing the fork on the end of the pole to rest against and slide along the wire, but to be careful in going over crossing or around curves. While proceeding on a straight piece of track the pole became entangled with a supporting wire and fell on the conductor. Held, that the question whether the conductor assumed the risk was properly submitted to the jury.

2. Where there is no appeal from an order denying a motion for new trial, the appellant cannot raise the question that the damages were excessive.—(Lynch vs. Brooklyn Heights Railway Company, 85 New York Suppl., 805.)

**NEW YORK.—Street Railways—Passengers Boarding Car after Signal to Start.**

An instruction that, if plaintiff tried to board defendant's street car after the conductor had given the signal to start, and just before the car started, defendant was not liable for the conductor's pushing plaintiff off, is properly refused, because ignoring the questions of plaintiff's knowledge, or means of knowledge, that a signal to start had been given, and of any negligence of plaintiff.—(Ferris vs. Interurban Street Railway Company, 85 New York Suppl., 806.)

**NEW YORK.—Street Railroads—Personal Injuries—Crossing Track at Night—Contributory Negligence—Question of Fact—Negligence—Question for Jury.**

1. It is not negligence per se for a person to attempt to cross the track of a street railroad at night 75 ft. in front of an approaching electric car.

2. Evidence in an action for injuries to pedestrian on street car track held sufficient to make out a prima facie case of negligence on the part of the street railroad.—(McDermott vs. Brooklyn Heights Railway Company, 85 New York Suppl., 807.)

**NEW YORK.—Carriers of Passengers—Negligence—Evidence—Notice of Defects—Effect of Railroad Law.)**

1. The railroad law (laws 1890, p. 1131, chap. 565, sec. 162, as amended by laws 1892, p. 1416, chap. 676) providing that no examination, request, or advice of the Board of Commissioners shall impair in any manner or degree the legal rights, duties, or liabilities of a railroad corporation, does not operate to render inadmissible, in an action for injuries to a passenger, a communication to an electric railroad from the Railroad Commissioner, made after inspection about a year before the accident, recommending the adoption of certain safeguards at the place of the accident.

Notice to a railroad of a defect from which injury to a passenger has resulted is competent and cogent evidence in an action for the injury, irrespective of the source of the notice.—(Baruth vs. Poughkeepsie City & W. F. Electric Railway Company, 85 New York Suppl., 822.)

**NEW YORK.—Street Railroads—Fire Apparatus—Collisions—Right of Way—Injuries—Actions—Instructions.**

1. Under Greater New York Charter, sec. 748, as amended by laws 1900, p. 256, chap. 155, giving fire apparatus when on duty, proceeding to a fire, the right of way in a public street over all other vehicles except those carrying the United States mail, the driver of a fire truck, going to a fire, had the right to assume on crossing a street railroad track that the motorman of a street car approaching, on discovering the truck, would so control his car as to give the truck the right of way.

2. In an action for damages to a fire truck in a collision with a street car as the truck was proceeding to a fire, an instruction that all that was required of the motorman of the car "at the time that

he apprehended danger" was to use ordinary care to bring his car to a stop was properly refused as misleading, since it limited the motorman's care "at the time he apprehended danger," though the danger was caused by his previous negligence, and did not require care on his part from the time he apprehended danger until the collision actually occurred.

3. Where, in an action for injuries to fire apparatus in a collision with a street car, plaintiff claimed negligence on the part of the motorman in approaching the street crossing at a high rate of speed, without having his car under control, and in failing to keep a proper lookout to discover the approach of the truck or signals thereof, an instruction that if at the time the motorman saw the danger he applied the reverse, acting in the belief that that was the best method of stopping the car, defendant could not be found guilty of negligence because the motorman did not apply the brake, was properly refused as misleading.

4. In an action for injuries to a fire truck in a collision with a street car, the court charged that the safety of property and the protection of life require the greatest practicable speed of vehicles of the Fire Department in responding to alarms, and that the laws and ordinances regulating the speed of vehicles in the street do not apply to vehicles of the Fire Department, but did apply to defendant's car; whereupon defendant requested an instruction that there was no statute limiting the rate of speed of defendant's cars, and that negligence could not be predicated on the mere fact that the car was running at a high rate of speed, and that the only duty resting on defendant was to exercise reasonable care in the operation of the car under all the circumstances. Held that the charge as modified by the request was proper.

5. The driver of a fire truck is bound to respond to an alarm of fire with the greatest practicable speed, and is only bound to drive with that care which a prudent person would exercise under like circumstances. Hatch, J., dissenting.—(City of New York vs. Metropolitan Street Railway Company, 85 New York Suppl., 694.)

**NEW YORK.—Street Railroads—Drivers of Vehicles—Injuries at Crossings—Contributory Negligence—Negligence of Railway Company.**

1. Where the driver of a vehicle approached a street railway crossing at right angles at a high rate of speed, and, before attempting to cross he saw the car by which he was struck coming, but made no effort to stop or avoid the car, thinking he had time to get across the track in front of the car, he was guilty of such contributory negligence as precluded recovery for his injuries.

2. When in an action for injuries to the driver of a wagon while attempting to cross a street car track in front of a car, there was no evidence that when plaintiff drove on the track the motorman could have stopped the car, or that it was then at such a distance from the wagon that it was possible to stop it, a verdict finding that defendant was negligent was not sustainable.—(Goldkranz vs. Metropolitan Street Railway Company, 85 New York Suppl., 667.)

**NEW YORK.—Negligence—Personal Injuries—Excessive Verdict.**

Where a physician with a practice of about \$6,000 a year had his leg from the knee down crushed and bruised, so that he was confined to his bed from May 31, 1900, to July 2, and to his house until July 12, and was compelled to use crutches until August, and for six weeks thereafter used a cane, and at the date of the trial, April 30, 1903, was obliged to wear a steel plate in his shoe, and was prevented from taking long walks, and there was evidence from which the jury could infer that his pecuniary loss was substantial for the two years that had intervened, a verdict for \$12,000 was excessive, and should be reduced to \$7,783.—(Herold vs. Metropolitan Street Railway Company, 85 New York Suppl., 660.)

**NEW YORK.—Appeal—Verdict—Conflicting Evidence—Conclusiveness—Carriers—Injuries to Passengers—Premature Start—Actions—Instructions.**

1. A verdict based on conflicting evidence is conclusive as to the facts on appeal.

2. In an action for injuries to a passenger alleged to have resulted by reason of a premature start, an instruction that, in order for plaintiff to recover, he must prove that the accident happened substantially as he alleged; that it happened through the negligence of defendant's servants operating the car, and without any contributory negligence on plaintiff's part—that is, that the car was standing still, and, before plaintiff had an opportunity to board it, it was started, and that it made no difference how short a time it was standing still, if plaintiff boarded car, and the conductor started it before plaintiff had a reasonable opportunity to get on the car, the defendant was liable—was not objectionable as withdrawing from the jury defendant's negligence as a question of fact, and as instructing that defendant was liable irrespective of plaintiff's freedom from contributory negligence, which had been submitted in another instruction.—(Doering vs. Metropolitan Street Railway Company, 85 New York Suppl., 400.)

NEW YORK.—Practice—Objections to Evidence—Grounds—Prayer for Instructions—Items—Proof.

1. In an action for personal injuries, evidence as to the nervous condition of plaintiff at the time of an examination made by a physician being admissible to show plaintiff's general condition, though inadmissible as a basis of recovery, because not shown to have resulted from the accident, and not being specified in the complaint or bill of particulars, defendant's objection thereto should have been taken, not to its admission, but by a request for appropriate instructions.

2. In an action for personal injuries to plaintiff's son, there could be no recovery for expenses alleged to have been incurred for the board, lodging and nursing of the son, where such expenses were not paid by plaintiff, nor their reasonable value shown.—(Fagan vs. Interurban Street Railway Company (two cases), 85 New York Suppl., 340.)

NEW YORK.—Street Railroads—Injuries to Drivers—Evidence—Contributory Negligence.

1. In an action against a street railway company for injuries to the driver of a cart while crossing a street in front of a car, evidence held to justify a verdict in favor of plaintiff.

2. Where a street car, at the time plaintiff attempted to drive across the track, was half a block away, and not closer than 25 ft. when plaintiff was actually on the track, and was going at a speed not to exceed 1½ miles per hour, and could have been stopped within 3 ft., plaintiff was not guilty of contributory negligence, as a matter of law, in attempting to cross in front of it.—(Bullman vs. Metropolitan Street Railway Company, 85 New York Suppl., 325.)

NEW YORK.—Street Railways—Negligence—Injury to One Near Track—Instructions—Prejudicial Error—Construing Instructions Together.

1. In an action against a street railway for the death of one killed owing to a car leaving the track at a point near where he was working, the court instructed that it was the duty of defendant to have the car rails, etc., so constructed that the car would stay on the tracks. Held, that the instruction was erroneous, as eliminating from the jury the question of the degree of care which defendant was required to exercise, and practically stating that the company was an insurer against accidental derailment.

2. Though the court had in earlier instructions stated that plaintiff could not recover merely because the accident happened, and followed the erroneous instruction by a statement that if, from all the testimony, the jury believed the car left the track without defendant's fault, and they were guilty of no negligence, plaintiff could not recover, the error could not be regarded as harmless, it appearing that at the close of the charge the court was asked by counsel if the court meant to instruct that it was the duty of the railroad to have its track so constructed that the cars would stay on the tracks, and the court having replied that such was the charge.—(Kelly vs. United Traction Company, 85 New York Suppl., 433.)

NEW YORK.—Street Railroads—Injuries to Pedestrians—Contributory Negligence—Negligence—Instructions.

1. Plaintiff, a woman 78 years of age, was struck by a street car while passing diagonally across the street at a street intersection. She testified that when she left the curb she saw the car approaching about a block away, and that when she was about half way across and before the two lines of tracks, she looked a second time, and saw the car half a block away, and continued a few steps, when she was struck by the fore part of the car, after the fender had safely passed her. Held, that such facts tended to show care on plaintiff's part, and that, if she misjudged the distance of the car from her, such fact would not of itself constitute contributory negligence.

2. Where, in an action for injuries to a pedestrian at a street intersection by collision with a street car, it was not disputed that the car was running at the rate of 7 miles or 8 miles an hour, though there was evidence that the car was under control, whether the operation of the car was negligent was for the jury.

3. Where, in an action for injuries to a pedestrian at a street intersection by collision with a street car, plaintiff testified that she looked twice while crossing the street, and at the first time saw the car a block away, and on the second occasion a half block away, an instruction authorizing the jury to say whether or not plaintiff miscalculated or misjudged the distance, or whether she failed to exercise ordinary care in making the usual and ordinary observation, and thus brought the accident on herself, was not objectionable, as not based on the evidence.—(Mauer vs. Brooklyn Heights Railroad Company, 84 New York Suppl., 76.)

NEW YORK.—Street Railway—Passenger Injured by Closing Door—Negligence.

Plaintiff boarded a crowded street car and stood on the platform till some passengers alighted, when the conductor directed

him to go inside, saying there was plenty of room. Thereupon he entered, and, the car being still crowded, he pushed his way in sidewise, using his left hand by placing it against the door jam to support himself, and before he had time to avail himself of other means of support, if any could be reached, the conductor went inside, and closed the sliding door on his hand. Held, that whether the conductor was negligent was a question of fact, a finding on which for plaintiff would not be disturbed on appeal.—(Egnstfeld vs. Central Crosstown Railway Company, 84 New York Suppl., 148.)

NEW YORK.—Street Railroads—Injuries to Workman on Track—Evidence—Sufficiency.

Plaintiff was attending blasting wires, passing them to the foreman, who was beneath the street level, and connecting them with the explosive. He had placed danger flags warning cars to go slowly. Previous to bending over he looked for approaching cars, and then dropped the wire into the tunnel to the foreman. He was struck by a car which came rapidly along without giving signal or warning before he had recovered the wires. Held sufficient to sustain a judgment for plaintiff.—(Hennessey vs. Forty-Second Street, M. & St. N. Ave. Railway Company, 84 New York Suppl., 158.)

NEW YORK.—Dangerous Streets—Notice to Pedestrian—Presumption of Safe Condition—Particular Defect—Notice—Question of Fact.

1. In the absence of an appearance of danger readily discernible by reasonable care, the existence of which is ordinarily a question of fact, pedestrians have the right to assume that sidewalks and crosswalks are safe.

Whether a rail extending over a crosswalk constitutes a sufficient notice of danger to a pedestrian to make it her duty to avoid it is a question of fact.—(Gribben vs. Metropolitan Street Railway Company, 84 New York Suppl., 196.)

NEW YORK.—Witnesses—Cross-Examination—Impeachment.

Where, in an action against a street railway company for injuries, a witness for plaintiff, who saw the accident, denied on cross-examination that he had refused to tell defendant's agent how the accident happened unless he received a certain sum of money, and then stated that defendant's agent had offered him the amount named, and that he had refused to take it, defendant was bound by this testimony, and could not afterward contradict it, it not having been reverted to in the examination in chief, and the witness not being shown to be an agent of plaintiff.—(Goldberg vs. Metropolitan Street Railway Company, 84 New York Suppl., 212.)

NEW YORK.—Trial—Examination of Plaintiff—Discretion of Trial Court.

Allowing plaintiff, as a witness in an action for personal injuries, to take a glass of water in both hands, in order to show a nervous affection causing him to spill the water through the trembling of his hands, and to use his handkerchief in the same manner, being under the sole control of the witness himself, is beyond the ordinary tests of examination, and tends to prejudice the jury, but, being within the discretion of the court, is not ground for reversal by the Court of Appeals.—(Clark vs. Brooklyn Heights Railroad Company, 69 Northeastern Rep., 647.)

NEW YORK.—Street Railways—Injuries to Passengers—Verdict Against Evidence—Setting Aside.

In an action against a street railway for personal injuries, where plaintiff, a passenger, is wholly uncorroborated, and is contradicted in all essential particulars by the overwhelming testimony of a number of disinterested witnesses, who give a consistent and not improbable version of the accident, a verdict for plaintiff must be set aside as against the weight of evidence.—(Manning vs. Metropolitan Street Railway Company, 85 New York Suppl., 1122.)

NEW YORK.—Street Railways—Collision with Vehicle—Fellow Servants—Imputed Negligence—Contributory Negligence.

1. Where the driver of a furniture van and his helper, who is injured in a collision with a street car, are not engaged in a common enterprise or joint adventure, but are merely fellow servants in the employ of the same master, but with distinct duties, the driver's negligence is not imputable to the helper, so as to prevent his recovery.

2. The failure of a person riding in the rear of a van, and who is injured through a collision with a street car, to jump off the vehicle on foreseeing the probability of a collision, is not contributory negligence as a matter of law, but the question is for the jury, dependent on whether, and when, a person of ordinary prudence would have jumped, and whether there was time enough left for the exercise of a deliberate judgment after the collision became imminent from the ascertained negligence of either the motorman or the driver of the vehicle, or both.—(Waters vs. Metropolitan Street Railway Company, 85 New York Suppl., 1120.)



NEW YORK.—Street Railways—Collision with Wagon—Evidence—Exclamation of Motorman—Harmless Error—Damages—Injury to Wagon—Reasonableness—Evidence—Sufficiency.

1. The statement of a motorman, after colliding with a delivery wagon, that he "could not help it," is not admissible against the railroad.

2. The statement of a motorman, after colliding with a delivery wagon, that he "could not help it" does not tend to show negligence, and its erroneous admission was not prejudicial error.

3. The sum expended by the owner of a delivery wagon for the hiring of another wagon while his own is being repaired is a proper element of damages for injury done to his wagon by colliding with a street car.

4. Testimony that plaintiff paid out \$84 for the use of a delivery wagon during the twenty-eight days that his own was being repaired, but that he thought that the usual rate was less than that, though he did not know what it was, did not warrant a finding that \$84 was a reasonable charge, so as to establish a basis for damages for injury to plaintiff's own wagon.—(Rogers et al. vs. Interurban Street Railway Company, 84 New York Suppl., 974.)

NEW YORK.—Carriers—Street Railroads—Personal Injuries—Instruction.

The complaint in a personal injury action alleged that the accident occurred in C Street at or near the intersection thereof with H Street. Plaintiff testified that at the time she attempted to get on the car by which she was injured it stood waiting for her on the north side of H street, but was contradicted in this testimony by two of her own witnesses. The court was requested to charge that, if the jury found that the car stopped at the north side of H Street only, they must find for defendant. Held, that the refusal to charge as requested was proper.—(Gold vs. Dry Dock, E. B. & B. R. Co., 84 New York Suppl., 1018.)

NEW YORK.—Street Railways—Negligence—Car Leaving Track—Evidence—Operation of Car—Measure of Care.

1. In an action against a street railway company for injuries, in which plaintiff claimed that defendant's car, by reason of excessive speed and mismanagement, and owing to uneven rails, jumped the track at the point of the accident, and ran into the wagon on which deceased was riding while the same was a safe distance from the track, evidence that cars had been derailed at other times and places on defendant's road, and under circumstances not shown to be similar to those existing at the time of the accident, was inadmissible.

2. In an action against a street railway company for death alleged to have been caused by defendant's negligence in the operation of its car on a track along the side of a highway, an instruction that, though the defendant had the right of way, it was not exclusive, and it was its duty to run its cars so that the safety of other travelers should be protected, was erroneous, the railway company being bound to exercise only reasonable care.—(Perras vs. United Traction Company, 84 New York Suppl., 992.)

NEW YORK.—Street Railroads—Personal Injuries—Loss of Clothing—Value—Evidence—Sufficiency.

In an action against a street railroad for personal injuries one of the items of damage claimed by plaintiff was the loss of a suit of clothes. The only evidence as to its value was the testimony of the plaintiff that he paid \$35 for it. The only evidence as to its condition after the accident was that it was "torn and dirtied." Held, insufficient to prove the value of the clothes immediately after the accident, or damages to them.—(Dunne vs. Interurban Street Railway Company, 86 New York Suppl., 260.)

NEW YORK.—Street Railroads—Accident at Street Crossing—Evidence—Question for Jury—Negligence—Contributory Negligence.

Where the testimony of a person injured by a street car, that he looked, and did not see its approach, before he started to cross the street in front of it, is impeached by uncontroverted physical facts, showing that the car was in plain sight, and that he therefore either did not look at all, or did not look with care, his credibility is not involved, so as to take the case to the jury.

2. Evidence in an action for personal injuries resulting from being struck by a street car examined, and held insufficient to show freedom from contributory negligence, and negligence on the part of defendant.—(McKinley vs. Metropolitan Street Railway Company, 86 New York Suppl., 461.)

NEW YORK.—Carriers—Injuries to Passengers—Time to Alight—Evidence.

Where plaintiff was injured while alighting from a street car, and her testimony that the car had stopped before she attempted to alight, and that she was injured by the premature starting of the car, was uncorroborated, and several disinterested witnesses testified that she attempted to alight before the car had stopped, and was thrown down in so doing, a verdict in favor of plaintiff was

contrary to the weight of evidence. Laughlin, J., dissenting.—(Andrews vs. Metropolitan Street Railway Company, 86 New York Suppl., 338.)

NEW YORK.—Street Railroads—Injury to Horse—Expert Evidence as to Value—Witnesses—Cross Examination.

1. A veterinary surgeon who examines a horse immediately after it is injured by a street car, and testifies that he could not tell from such examination whether it was in a sound and healthy condition before the injury, is competent to testify as to its prior value, though he did not see it before the accident.

2. In an action for injury to a horse by a street car, defendant's witness testified that he saw all that happened; and later, that the first thing he knew he heard the jingle of glass, and ran around and saw a horse, and the horse was a little tangled up. On cross-examination, plaintiff's attorney asked whether the witness had not seen the car strike the truck; where the wagon was, in reference to the switch, and whether he did not see the collision through the windows of the car. His answer showed that he adhered to his statement that the first he knew of the accident was hearing the glass jingle and seeing the horse tangled up. Held, that a written statement made by the witness prior to the trial, offered by plaintiff, and showing that he had seen the car strike the truck, was not objectionable in evidence as in rebuttal of new matter called out on the cross-examination.—(Perine vs. Interurban Street Railway Company, 86 New York Suppl., 479.)

NEW YORK.—Street Railroads—Collision with Truck—Imputed Negligence—Contributory Negligence—Question for Jury.

1. Negligence of a truck driver, for whom plaintiff was not responsible, and with whom he was riding when injured in a collision with a street car, could not be imputed to him, and would not defeat his recovery for negligence of the motorman.

2. Plaintiff, a boy of nine years, was on the seat of a truck with the driver, when they were struck by a car at a street intersection, and he was injured. He apparently neither said anything to the driver, nor drew his attention to the car, and made no attempt to jump from the seat. There was evidence, however, from which it might be fairly inferred that the truck reached the track in time to pass in safety if the motorman had had the car under control. Held, that his contributory negligence was a question for the jury.—(Robinson vs. Metropolitan Street Railway Company, 86 New York Suppl., 442.)

NEW YORK.—Personal Injury Case—Weight of Evidence.

Where plaintiff in an action against a street railway is the only witness sworn in her behalf, and defendant calls four witnesses, three of whom are disinterested, and the fourth a former employee, all of whom contradicted the plaintiff, and testified to her contributory negligence, a judgment for plaintiff is against the weight of evidence.—(O'Neil vs. Interurban Street Railway Company, 86 New York Suppl., 208.)

NEW YORK.—New Trial—Imposition of Costs—Review—Motion for New Trial—Granting Motion—Failure to Take New Trial—Appeal.

1. Where a verdict is set aside as against the weight of evidence, costs should be imposed as a condition of granting the new trial, even in a case of seeming hardship.

2. On appeal from a judgment the question as to the reasonableness of conditions imposed in an order granting appellant a new trial, of which he did not take advantage on the ground that the conditions were too onerous, is not reviewable.

3. A party who fails to take advantage of an order granting him a new trial has no ground for complaint on an appeal from the judgment.—(Carter vs. Interurban Street Railway Company, 86 New York Suppl., 206.)

NEW YORK.—Negligence—Death of Child—Case Required.

In an action for the wrongful death of a child there can be no recovery whether he was sui juris or non sui juris, if he did not exercise such care as was commensurate with his years and intelligence.—(Atchason vs. United Traction Company, 86 New York Suppl., 176.)

NEW YORK.—Street Railways—Crossings—Injuries to Vehicle—Question for Jury.

In an action against a street railway company for injuries to a vehicle occurring by a collision on the south track of defendant's road, witness for plaintiff testified that when the driver of the vehicle got his horse on the south track the car was still standing 50 ft. or 60 ft. away, but the driver did not testify that he looked when he crossed the southerly track, and the evidence, so far as he was concerned, showed that when he crossed the northerly track he saw defendant's car standing still at the distance stated. There was no evidence that the car was going rapidly before it struck the carriage, but there was evidence that plaintiff's driver was going very slowly. Held, that there was evidence for the jury to consider as to whether or not the driver was guilty of negligence in not looking again, and whether defendant was

guilty of negligence, and it was error to dismiss the complaint.—(Rosenstock vs. Metropolitan Street Railway Company, 86 New York Suppl., 104.)

NEW YORK.—Street Railways—Collision—Evidence—Contributory Negligence.

In an action against a street railway because of a collision between plaintiff's wagon and a car, the evidence for plaintiff showed that when about 40 ft. from the track the driver saw the car about a half block away, but drove on the track, not seeing the car again until it struck the wagon. The defendant's motorman testified that the plaintiff's horses went upon the track about 10 ft. ahead of his car, and a disinterested witness swore that the gong was sounded, that the car was going at a moderate rate of speed, and that the horses started to cross the track at a distance of only 8 ft. or 10 ft. ahead of the car. Held, that plaintiff was guilty of contributory negligence.—(Levy vs. Metropolitan Street Railway Company, 86 New York Suppl., 102.)

NEW YORK.—Street Railways—Negligence—Collision—Evidence—Sufficiency.

In an action against a street railway because of a collision between a car and plaintiff's vehicle a bystander testified to the rapid movement of the car. Two employees of plaintiff, who were in charge of the vehicle, which was a covered one with two windows about 12 ins. by 9 ins. in the back, testified that as they drove on the track in order to pass a truck they looked back through the windows and saw no car; that just as they passed the truck they turned off the track, but before the wagon cleared it, it was struck from behind by a car. Defendant offered no evidence. Held not error, on verdict for defendant, to deny plaintiff a new trial.—(Alexander vs. Metropolitan Street Railway Company, 86 New York Suppl., 212.)

NEW YORK.—New Trial—Grounds—Municipal Court Act.

An order setting aside a verdict, after reciting a motion on behalf of defendant for such relief, on exceptions taken at the trial and on the ground that the verdict was contrary to the evidence, contrary to law, and for excessive damages, stated the granting of the motion, and the judge in a memorandum, after citing authorities, said that the verdict was set aside as against the weight of the evidence. Held, that, although the memorandum stated as the reason of the court's action a ground not expressly specified in Municipal Court act (laws 1902, p. 1563, chap. 580), sec. 254, enumerating the grounds for such relief, yet the memorandum was no part of the record, and the order itself recited causes for the vacation of a verdict expressly enumerated in such section.—(Newbound vs. Interurban Street Railway, 86 New York Suppl., 68.)

NEW YORK.—Street Railways—Negligence—Injuries to Passengers—Evidence—Cross-Examination.

1. In an action against a street railway for injuries received by a passenger while alighting from a car, where plaintiff's contention that the car had come to a full stop before suddenly starting was practically uncorroborated, his only witness refusing to swear that the car had stopped, and defendant's claim that plaintiff endeavored to alight while the car was in motion was supported by the testimony of five witnesses, three of whom were disinterested, and whose testimony was strongly supported by the probabilities of the case, a verdict for plaintiff was clearly against the weight of evidence.

2. In an action against a street railway for injuries to a passenger alleged to have resulted from a car suddenly starting while he was alighting, defendant had a right to ask plaintiff, on cross-examination, whether he knew that before he could recover he must show that the car started while he was alighting.—(Kramer vs. Metropolitan Street Railway Company, 86 New York Suppl., 34.)

NEW YORK.—Carriers—Street Railway—Injury to Passenger in Alighting—Submission of Case to Jury—Appeal from Dismissal of Complaint—Scope of Review.

1. Evidence in an action by a street car passenger injured in attempting to alight held too uncertain and contradictory to warrant submitting the issues of negligence and freedom from contributory negligence to the jury.

2. On an appeal from the dismissal of a complaint at the end of plaintiff's case the Supreme Court is not limited to reviewing the ground assigned by the trial court for its action, but must examine the entire record.—(Baker vs. Interurban Street Railway Company, 86 New York Suppl., 10.)

NEW YORK.—Street Railroads—Personal Injuries—Loss of Clothing—Value—Evidence—Sufficiency.

Where one of the items in the bill of particulars in an action against a street railroad for personal injuries for which plaintiff claimed damages was the destruction of his clothing, evidence merely that plaintiff paid \$50 for it is insufficient to sustain a judgment for plaintiff including an assessment of damages at \$50

for the loss of the clothing.—(Connolly vs. Interurban Street Railway Company, 86 New York Suppl., 214.)

NEW YORK.—Passenger on Street Car—Action for Injuries—Evidence—Sufficiency—Instructions—Damages.

1. Evidence examined, and held sufficient to sustain a verdict against a street railroad company for injuring a passenger when attempting to get off a car.

2. In an action against a street railway company for injuries to a passenger, claimed to have been caused by starting the car after it had stopped and when she was about to get off, the court charged the jury, without objection, that the only question for them to determine was whether, in getting off the car, plaintiff, before she had an opportunity to alight, was thrown to the street by a jerk caused by defendant's employees. Thereafter, at the close of the whole charge, in response to a request by plaintiff to further charge, the court stated that he would modify his charge, and thereupon charged that if the jury found the car had stopped, and that plaintiff was preparing to alight, and the car gave a start or jerk before she had a reasonable opportunity to do so, unless the start or jerk was satisfactorily explained by defendant, it was guilty of negligence, and it was not incumbent on plaintiff to prove what caused the same. Held, that this could not be treated as a charge that, if the jury found that plaintiff's version of the case was true, defendant was liable as a matter of law.

3. A verdict for \$3,000 for seriously injuring a passenger on a street car, causing her confinement in a hospital for nearly six weeks, and leaving her with one leg permanently shortened, with a stiff joint, was not excessive.—(Bente vs. Metropolitan Street Railway Company, 86 New York Suppl., 86.)

NEW YORK.—Street Railroads—Personal Injuries—Trial—Jurors—Misconduct—Evidence—Harmless Error.

1. An affidavit on which is based an application to set aside a verdict, because of alleged misconduct of two jurors, to the effect that after verdict was rendered the jurors stated to officiant, who was a clerk in the office of plaintiff's attorney, that during the progress of the trial they had inspected a gate on one of the defendant's street cars, to ascertain whether the plaintiff's hand could have been injured in the manner testified to by him, and that such information influenced them in arriving at a verdict against plaintiff, is hearsay.

2. The misconduct of two jurors, in inspecting a gate on one of defendant's cars, to ascertain whether plaintiff's hand could have been injured in the manner testified to by him, is harmless, where the evidence indicates that the jury were justified in finding for defendant, and there is nothing to show that a different conclusion would have been reached had the inspection not been made.—(Gans vs. Metropolitan Street Railway Company, New York Suppl., 914.)

NEW YORK.—Imputed Negligence—Driver of Wagon—Co-Servant.

Where employees of the same master, riding on a wagon, were not engaged in a common enterprise, and the one injured in a collision had no control over the driver, and did not assume to influence him in a way leading to the accident, the court cannot say as a matter of law that there was an imputation of negligence.—(Ciuffi vs. Metropolitan Street Railway Company, 84 New York Suppl., 918.)

NEW YORK.—Street Railroads—Duty to Use Care in Running Car.

The duty of a street railroad company to use care in avoiding collisions extends not only to the duty of the motorman to see that the front end of the car may pass safely, but also requires the conductor or other person in charge of the car to watch for and avoid obstructions the car may meet at any time before it has entirely passed.—(Martin vs. Interurban Street Railway Company, 84 New York Suppl., 921.)

NEW YORK.—Witnesses—Credibility—Inconsistent Statement—Admissibility—Consideration by Jury for Improper Purpose—Motion to Strike Testimony Admissible for One Purpose—Refusal—Evidence—Collateral Matters—Confidential Relations—Physician and Patient—Extent of Privilege—Objections—Sufficiency to Raise Question—Persons Included—Druggist—Refusal of Patient to Waive Privilege—Effect—Right to Draw Inferences Therefrom—Requested Instructions—Erroneous Statement of Law—Effect—Refusal to Give.

1. In an action for personal injuries, defendant offered evidence tending to show that no accident occurred, and that the ailments complained of were due to syphilis, from which the plaintiff was suffering. A physician called by plaintiff testified as to the nature and extent of the injuries sustained by plaintiff by reason of the accident, together with the results which flowed therefrom. Held, that a certificate, signed by the physician, certifying that Anna D. had been sick from syphilis and under his treatment, was admiss-

ible, as bearing on the credibility of his testimony, though plaintiff's name was Annie D., and though the physician testified that the certificate did not refer to plaintiff, and that he knew that she had never had the disease.

2. Where a written statement signed by a witness was received in evidence as bearing on his credibility, the statement of the court, on denying a motion to strike the statement from the record, and for an instruction to the jury to disregard it, that he would leave it to the jury to say whether the witness made the statement, and whether it referred to anything connected with the case, and would let the jury draw the inferences from it under all the circumstances, did not authorize the jury to consider the statement for any purpose beyond its bearing on the credibility of the witness.

3. A motion to strike from the record a written statement was properly denied where the statement was properly admitted in evidence as bearing on the credibility of a witness.

4. In an action for personal injuries, defendant offered evidence tending to show that no accident occurred, and that the ailments complained of were due to syphilis, from which plaintiff was suffering. A physician called by plaintiff testified as to the nature and extent of the injuries, sustained by her by reason of the accident, he having treated her for such injuries, and admitted making a written statement to the effect that Anna D. had been sick from syphilis and under his treatment, but testified that the statement did not apply to plaintiff, whose name was Annie D.; that he did not know to whom it referred; that he could not remember the circumstances of making it, and that he knew that plaintiff had never had the disease. Held, that evidence as to what other patients did, or what persons called on him, or what records he kept, or as to whether persons suffering from such disease frequently gave fictitious names, was collateral and inadmissible.

5. The testimony of a physician, limited to the identification of plaintiff, to the fact that he had treated her, together with the place and length of time of such treatment, did not disclose, or have any tendency to disclose, any communication plaintiff made to the physician, or he to her, within Code Civ. Proc., sec. 834, prohibiting a physician from disclosing professional information acquired in attending a patient.

6. The objection to the question asked a physician which called for an answer as to whether certain prescriptions delivered by him to a patient were in his handwriting, that it was immaterial, irrelevant and incompetent, did not raise the objection that the question was in violation of Code Civ. Proc., sec. 834, prohibiting a physician from disclosing professional information acquired in attending a patient, and therefore this objection could not be made available on appeal.

7. Code Civ. Proc., sec. 834, prohibiting a physician from disclosing professional information acquired from a patient, does not extend to a druggist who fills physicians' prescriptions, nor does it preclude a patient receiving a prescription from divulging its contents, and therefore a druggist filling prescriptions for a physician's patient may testify to that fact, and identify the prescriptions so filled, which prescriptions may then be received in evidence.

8. The refusal of a patient to permit a physician to testify, notwithstanding Code Civ. Proc., sec. 834, prohibiting a physician from disclosing professional information acquired from a patient, authorizes the jury to draw inferences therefrom warranted by the evidence.

9. As the statute only prohibits a physician from disclosing confidential information acquired in attending on a patient where the relation of patient and physician is established, and when the information was necessary to enable him to act in that capacity, a requested instruction that, under the law, communications from a patient to a physician were privileged and could not be given in testimony except in a case of a waiver of the privilege, was properly refused, being too broad a statement of the law.—(Deutschmann vs. Third Avenue Railroad Company, 84 New York Suppl., 887.)

NEW YORK.—Imputed Negligence—Fellow Servants.

It cannot be said as matter of law that negligence of the driver of an insurance patrol wagon in colliding with a street car is not imputable to an employe of the insurance patrol riding to a fire on the wagon, on the seat with the driver, and ringing the bell.—(Adler vs. Metropolitan Street Railway Company, 84 New York Suppl., 877.)

NEW YORK.—Imputed Negligence—Fellow Servants.

Even if the negligence of the driver of an ice wagon, with which a street car collides, can be imputed to one riding on the wagon as a helper, he not having interfered in any manner with the driving, the question having been submitted to the jury as a question of fact, their finding in his favor should not be disturbed.

—(Murray vs. Metropolitan Street Railway Company, 84 New York Suppl., 876.)

NEW YORK.—Street Railways—Injury to Teams—Contributory Negligence—Failure to Look.

One driving a milk wagon at a jog trot, the horse being under perfect control, was guilty of contributory negligence in crossing a street car track, when he had seen the car standing some 30 ft. from where it struck his horse, without again looking before attempting to cross.—(Cosgrove vs. Interurban Street Railway Company, 84 New York Suppl., 885.)

NEW YORK.—Street Railroads—Injuries to Pedestrians—Negligence—Question for Jury—Extra Allowance—Objection—Appeal.

1. In an action for injuries to plaintiff by a street car as she was crossing the track at a regular street crossing, held, that the question of the motorman's negligence was for the jury.

2. Where defendant interposed no objection to plaintiff's motion for an extra allowance at the trial, the granting of such motion cannot be reviewed on appeal.—(Mulligan vs. Third Avenue Railroad Company, 84 New York Suppl., 366.)

NEW YORK.—Street Railroads—Passengers Alighting—Duty to Stop Car—Instructions.

An instruction that it was the duty of defendant to bring its car to a stop, and allow it to so remain for a length of time "sufficient" to allow plaintiff and her children to alight therefrom, was not erroneous, though the law only required the car to stop a reasonable time, where other instructions stated that only ordinary care was required.—(Day vs. Union Railway Company, of New York City, 84 New York Suppl., 560.)

NEW YORK.—Street Railways—Injury to Person Boarding Car—Contributory Negligence.

Plaintiff, in an action for injury received in attempting to board a street car, testified that the gate of the car was not fully opened for reception of passengers, that it was open a little bit, and that if he had seen the position it was in he never would have put his hand there to get hurt. Held, that there was evidence for the jury that he did not use reasonable care in attempting to board the car, under the circumstances.—(Ganz vs. Metropolitan Street Railway Company, 84 New York Suppl., 579.)

NEW YORK.—Street Railways—Negligence—Collision with Pedestrian—Evidence—Contributory Negligence—Speed of Car.

1. Plaintiff endeavored to push his cart across the street while defendant's street car was within a distance estimated by witnesses at from 15 ft. to the "width of 8 or 9 houses," and, observing the car, signaled the driver to slacken speed or stop, in spite of which the car proceeded, striking and injuring plaintiff. The driver admitted that he saw plaintiff and endeavored to stop the car, but also testified that he could stop within 20 ft., and it appeared that, though he applied the brake when 12 ft. or 15 ft. from plaintiff, it did not stop until 20 ft. beyond the point of collision. Held, that defendant was guilty of negligence.

2. In an action for injuries by collision with street car, evidence held to show plaintiff free from contributory negligence.

3. In an action against a street car company for personal injuries, caused by defendant's car striking plaintiff as he was crossing the street, evidence of bruises to the plaintiff's head was admissible as showing the violence of the collision, and thereby bearing on the speed of the car, although such injuries were not specified in the bill of particulars.—(Greenbaum vs. Interurban Street Railway Company, 84 New York Suppl., 588.)

NEW YORK.—Street Railroads—Collision—Contributory Negligence.

In an action for injuries sustained by a street car colliding with the rear end of plaintiff's wagon while he was driving along the track, evidence considered, and held to show contributory negligence precluding recovery.—(Geleta vs. Buffalo & N. F. Electric Railway, 84 New York Suppl., 629.)

NEW YORK.—Street Railways—Negligence—Question for Jury—Care Required of Street Railway—Contributory Negligence.

1. Where, in an action against a street railway for injuries sustained by one who, having alighted from a car, while it was still standing passed behind it, and was struck by a car coming from the opposite direction on the other track, plaintiff testified that he listened for a bell, but did not hear one, while defendant's evidence was that the bell was ringing, and that plaintiff ran into the car, the question of negligence on the part of defendant was for the jury.

2. A street railway is chargeable with notice that passengers, when they alight from cars, are liable to cross to the opposite side of the street, and over the adjoining track, and the obligation is imposed upon the railway to exercise reasonable care in the operation of its cars, having regard to such condition.

3. Where one who has alighted from a street car passes behind

the same, and, before stepping on to the other track, looks and listens to see if a car is approaching from an opposite direction, but does not see or hear one, he is not, as a matter of law, guilty of contributory negligence in going on the other track.—(Reed vs. Metropolitan Street Railway Company, 84 New York Suppl., 454.)

NEW YORK.—Appeal from Non-Suit—Favorable Inferences—Street Railway—Passenger—Attempt to Board Car—Injury—Case for Jury—Contributory Negligence—Question for Jury.

1. Where a non-suit is granted at the close of plaintiff's case, plaintiff on appeal is entitled to every fact that the jury could have found from her evidence, and to all the favorable inferences therefrom; and, if two inferences arise, one favorable and the other unfavorable, only the favorable one can be considered.

2. Evidence in a suit by a passenger against a street car company for injuries received while attempting to board a car held sufficient to take plaintiff's case to the jury on the issues of negligence and contributory negligence.

3. Contributory negligence is generally a question of fact, and it is only where it clearly appears from the circumstances, or is proved by uncontroverted evidence, that the court can determine the question.—(Benjamin vs. Metropolitan Street Railway Company, 84 New York Suppl., 458.)

NEW YORK.—Street Railroads—Injuries to Travelers at Crossings—Contributory Negligence.

A traveler who crossed street car tracks at a crossing in such close proximity to a southbound car that the motorman on the northbound car could not stop the car before injuring him, and who had opportunity to see the northbound car approaching, was precluded, by contributory negligence, from recovering for the injuries sustained.—(Schroder vs. Metropolitan Street Railway Company, 84 New York Suppl., 371.)

NEW YORK.—Street Railroads—Injuries at Crossings—Contributory Negligence—Instructions.

1. Plaintiff, a passenger on one of defendant's street cars, on alighting therefrom at a crossing, passed behind it to cross the other track, and while on the latter track she was struck by a car traveling at the rate of 15 miles an hour, and which traveled about 100 ft. before it was brought to a stop after the collision. Plaintiff testified that, as the car on which she had been a passenger proceeded, she looked both ways, and saw no car approaching, though there was nothing obstructing her view, and that she then attempted to cross defendant's tracks. Other witnesses in her behalf testified that when she started to cross the tracks the car that struck her was from 60 ft. to 100 ft. north of the crossing. Held sufficient to go to the jury on the question of her contributory negligence.

2. An instruction, in an action in which there was conflicting evidence, that there had been perjury in the case on one side or the other, asking on which side, and whether the jury, out of the conflicting testimony, some of it surely perjured, could feel that they knew to any reasonable degree of certainty what the truth was, and stating that if they did not their verdict should be for defendant, was erroneous, because preventing the jury from reconciling the conflicting testimony.

3. Where, in an action against a street railway company for injuries sustained by a traveler at a crossing, plaintiff testified that on alighting from a car at a crossing she looked in both directions, and saw no car approaching, and that while on the adjoining track she was struck by a car, and it was admitted that there was nothing to obstruct her view, an instruction whether, in such a situation, plaintiff could palm off on a jury the suggestion that she did not see the car, and whether it was to be tolerated that in an open field, with nothing in the way—an open street, in broad daylight—a man, woman, or child, sui juris, should be permitted to walk into a car so as to be hit thereby without the imputation of negligence on his part, where there was no acceleration in the speed of the car, was erroneous, as a virtual direction to the jury, to find a verdict for defendant.—(Beers vs. Metropolitan Street Railway Company, 84 New York Suppl., 785.)

NEW YORK.—Appeal—Negligence—Sufficiency of Evidence.

Judgment for plaintiff in an action for injury from the starting of a street car while she was alighting after it had been stopped on her signal will be reversed as against the weight of evidence, she having no witness, and four apparently disinterested witnesses, besides the conductor and motorman, testifying that, after plaintiff had asked the conductor to stop the car, she, disregarding his warning, alighted while it was in motion, and before it had stopped.—(Clancy vs. Yonkers Railroad Company, 84 New York Suppl., 780.)

NEW YORK.—Street Railways—Collision with Team—Action for Injuries—Evidence—Appeal—Prejudicial Error.

In an action against a street railroad for injuries from a collision with plaintiff's wagon, plaintiff testified that he was disabled for nine days, and then went to work; that while driving his horse

ran away, and he jumped (but there was no evidence that he was injured); that he worked the two following days. He then testified, under objection, as not having been shown to be the result of the accident, that he did no more work. The court charged that plaintiff could only recover for the "direct consequences" of the accident. Held, that defendant was not prejudiced by the admission of the testimony excepted to.—(Dunford vs. Interurban Street Railway Company, 84 New York Suppl., 865.)

NEW YORK.—Street Railroads—Collision—Questions for Jury—Measure of Care—Stopping Car—Error of Judgment.

1. A street car line passed over a narrow bridge. Plaintiff drove on the bridge about the time a car entered on the other end. His horse became frightened. The motorman did not slacken his speed until near the horse, which swerved across the track and was struck. Held, that whether the motorman exercised due care, and whether the car was stopped as quickly as it could have been after the danger of collision became apparent, were questions for the jury.

2. The measure of care to be exercised toward persons rightfully in a street by a street railroad company operating cars thereon is such reasonable care as an ordinarily prudent person would exercise under all the circumstances.

3. Where a motorman using ordinary prudence erred in a matter of judgment as to stopping the car in time, or as to the method of stopping it, it was not negligence for which plaintiff can recover in an action for injuries by collision.

4. A motorman is not required to take any precaution against frightening a horse on a highway, more than would be required by the driver of any other vehicle.—(Adsit et al. vs. Catskill Electric Railway Company, 84 New York Suppl., 393.)

NEW YORK.—Street Railroads—Injury to Pedestrian—Contributory Negligence.

1. Where plaintiff's decedent was killed by a street railway car, running at a high rate of speed, while crossing a track to catch a car waiting for him, the conductor of which called upon him to hurry if he wanted to get the car, the question whether decedent was guilty of contributory negligence in passing diagonally across the street, facing the approaching car, is a question for the jury; it presented a question of fact, rather than one of law.—(Stillings vs. Metropolitan Street Railway Company, 69 Northeastern Rep., 641.)

NEW YORK.—Carriers—Street Railroads—Injuries to Passengers—Damages—Evidence—Variance—Harmless Error—Trial—Motion to Strike—Presumption of Negligence.

1. Plaintiff was injured from fire communicated to her feet and dress while riding on defendant's street car by friction caused by a contact between a wheel of the car and an iron plate over the same, drawn together by the overcrowded condition of the car. Shortly thereafter plaintiff suffered from nervous prostration, and there was evidence that it was the result of the shock caused by the burns. Held, that a finding that plaintiff's nervous prostration was the result of the injury, and was not occasioned by mere freight, was not against the weight of evidence.

2. Where defendant railway company was organized by consolidation of the G. & S. and S. & M. Railway Companies, the fact that the complaint in an action for injuries to a passenger charged that the injuries occurred on the line operated by the S. & M. Railway Company, while the proof showed that it was in fact on the G. & S. Railway Company's line, did not constitute a prejudicial variance.

3. Where, in an action for injuries to a passenger on a street car, it was conclusively proved that the conductors of one of the constituent railways forming defendant consolidated company were on the cars, taking fares, error, if any, in permitting the introduction of reports by one of such amalgamated companies, tending to show that it was operating the road, was harmless.

4. Where a complaint in an action for injuries to a passenger on a street car charged negligence, in permitting the bearings on one of the wheels to become overheated, a variance between such allegation and the proof, which showed that the bearings were not overheated, but that the plate over the wheel was overheated by friction caused by the plate being pressed against the wheel, which proof was made by defendant's witnesses, was not material.

5. Where some of the evidence given by a witness was proper for the consideration of the jury, a motion to strike out all of this evidence was properly overruled.

6. Where a passenger on a street car was injured by the overheating of a plate over a wheel by friction caused by the overloading of the car, the heating of the plate raised a presumption of negligence on the part of the company.—(Powell vs. Hudson Valley Railway Company, 84 New York Suppl., 337.)

NEW YORK.—1. Street Railroads—Alighting from Car—Negligence—Questions for Jury.

A street car conductor, after being notified of plaintiff's desire to transfer, left the car just before reaching the place of transfer.

Plaintiff was familiar with the locality, and knew where the cars usually stopped for transfer. The car, on reaching the place, stopped, and plaintiff started to leave it; but, it having started, she remained standing until it stopped a second time. While attempting to alight, it was suddenly started without any warning, and she was thrown to the street. Plaintiff did not notify the motorman of her intention to alight. There was nothing to indicate that the car had stopped for any purpose other than the transfer of passengers. Held, to require the submission to the jury of the question whether plaintiff was negligent.—(Gillespie vs. Yonkers Railway Company, 83 New York Suppl., 1043.)

NEW YORK.—1. Personal Injury—Damages—Inadequate Verdict.

A verdict of \$171 for personal injury should be set aside as inadequate, the undisputed evidence showing permanent injury in strength and working power, loss of work for four months at \$60 a month, and incurrence of liability for medical attendance worth \$250.—(Hurley vs. Metropolitan Street Railway Company, 83 New York Suppl., 1082.)

OREGON.—Street Railroads—Vehicles—Injuries to Drivers—Minors—Care Required—Contributory Negligence—Instructions—Objections.

1. Where in an action for injuries to plaintiff's minor son, while driving a light express wagon, in a collision with a defendant's street car, all the instructions pertaining to defendant's negligence were unexceptional, and not objected to, defendant could not object to instructions on contributory negligence limiting plaintiff's duty to the care a reasonably prudent minor of his age would be expected to exercise, on the ground, that defendant had no knowledge that the driver of the wagon was a minor, and that its liability could not be made to depend on the driver's capacity from considerations of his age.

2. In an action for injuries to plaintiff's minor son, 15 years of age, caused by collision with a street car as he was driving a delivery wagon across the tracks, it could not be said, as a matter of law, that he had arrived at man's estate, in judgment, prudence and forethought, so as to be liable for the exercise of the same degree of care as an adult.

3. In an action for injuries to plaintiff's minor son in a collision between a delivery wagon which he was driving and a street car, the evidence as to his acts just prior to the collision was conflicting; defendant claiming that after the horse and all of the wagon except the hind wheels, had crossed the tracks, the driver suddenly stopped and turned the horse to the right, so that a collision occurred before the car could be stopped, while the driver testified that before attempting to cross he stopped, and looked and listened for a car, and, seeing none, started to cross the track at a slow walk, and that, before the hind wheels of the wagon got across, it was struck by a car approaching at a high rate of speed. Held, that it was proper for the court to submit the driver's contributory negligence to the jury under instructions limiting the degree of care required of him to such care as a minor of his age, capacity and understanding would usually exercise under the same circumstances.—(Dubiver vs. City & Suburban Railway Company, 74 Pacific Rep., 915.)

PENNSYLVANIA.—Carriers—Injury to Passenger—Negligence—Presumptions—Evidence.

1. Where a passenger on a street car is injured without fault of his own by a collision not due to any defect in the car on which he was riding, but by a broken appliance in the car that ran into it, there is a legal presumption of negligence to be rebutted by the carrier.

2. When a passenger on a street car, in a well-grounded fear that a collision was about to take place, which would result in serious injury, jumped from the car, the presumption of negligence on the part of the carrier arises because of the injuries received.

3. A street car company is not negligent, as a matter of law, because it runs two cars toward each other on the same track.

4. A carrier of passengers is required to exercise the highest degree of practical care which is consistent with the mode of transportation adopted.

5. A physician testifying in a personal injury case as to the permanent character of the injury, may be asked whether it will prevent plaintiff from performing her ordinary labor.—(Palmer et al., vs. Warren Street Railway Company, 96 Atlantic Rep., 49.)

PENNSYLVANIA.—Injury to Employee—Assumption of Risk.

1. Plaintiff sued to recover for the death of a motorman, caused by a collision between the decedent's car, running 12 miles an hour, and a work car which was standing at a curve in the road. Defendant's road had but a single track, and the movements of the work car could not be regulated by a fixed schedule, but there was no danger in its use that could not be avoided by reasonable care by the motorman. Deceased had been in the service of the company for several years, during all of which time the work car

had been in use. Held, that he assumed the risk resulting from the presence of the car on the track.—(Nelson vs. Oil City Street Railway Company, 56 Atlantic Rep., 934.)

PENNSYLVANIA.—Street Railroads—Injury to Child—Contributory Negligence of Motorman.

1. The measure of responsibility of a child for contributory negligence is the average capacity of others of the same age and experience, and his responsibility also depends on the character of the danger to which he is exposed; and the question is generally one for the jury, unless the facts are clearly settled, and there can be no reasonable doubt as to the inference to be drawn.

2. Evidence in an action for injuries to a boy seven years and eight months old, on a street car, considered, and held a question for the jury whether the motorman was negligent in permitting the boy to ride on the front platform.

3. In an action for injuries to a boy seven years and eight months old, it was proper to decline to submit the question of his contributory negligence to the jury, where he went on the front platform of a street car to tell the motorman where he wanted to get off, and either fell or jumped off the platform and was injured.—(Parker vs. Washington Electric Street Railway Company, 56 Atlantic Rep., 1001.)

PENNSYLVANIA.—Injury to Employee—Contributory Negligence.

1. Where a motorman, on reaching a street crossing with his car, failed to look for an approaching car, and a collision resulted, he was guilty of contributory negligence, preventing recovery.—(Bobb vs. Union Traction Company, 55 Atlantic Rep., 972.)

RHODE ISLAND.—Negligence—Leading Horse in Street—Injury by Animal—Liability of Owner.

1. The owner of a horse which, while being led in a street, inflicts an injury by kicking a passer-by, is not liable, in the absence of a showing of knowledge by him of vicious propensities or previous kicking.—(Eddy vs. Union Railway Company, 56 Atlantic Rep., 677.)

TENNESSEE.—Street Railroads—Injury—Negligence—Contributory Negligence—Evidence.

1. Evidence in an action for the negligence of defendant in so operating its street car as to frighten the horse on which plaintiff was riding and cause it to throw him. Held, sufficient to support a verdict for plaintiff.

2. Where it reasonably appears to a motorman in control of a street car that a horse has become unmanageable through fright, and is placing some one in danger, it is the motorman's duty to stop sounding his gong and stop his car, whether at the usual stopping point or not, to prevent an injury, and his failure to do so renders the company liable for resulting injury.

3. Whether a person riding a young and skittish horse, which showed fright on approaching a street car, was guilty of negligence in not turning at once off the street on which the car was running, was a question for the jury.—(Knoxville Traction Company vs. Mullins, 76 Southwestern Rep., 890.)

TEXAS.—Carriers—Injury to Passengers—Negligence—Instruction.

1. A charge that if the jury believe that plaintiff attempted to alight from a car after it had stopped, etc., is not objectionable as assuming the fact to be that the car had stopped when she attempted to alight.—(San Antonio Traction Company vs. Welter, 77 Southwestern Rep., 414.)

TEXAS.—Master and Servant—Injuries to Servant—Negligence—Assumption of Risk.

1. Where a servant, ordered to assist in handling a wooden beam with inadequate assistance, was ignorant, by reason of his inexperience, of the weight of the beam, and the number required to safely handle it, and the master was charged with a knowledge of the danger of the undertaking, the master was liable for the injuries received by the servant while assisting in handling the beam.

2. A servant ordered to take a certain number of men with him and go to a certain place and get a wooden beam, who knew of the weight of the beam and the number of men required to handle it with safety, assumed the risks arising from undertaking to handle it with inadequate force.—(San Antonio Traction Co. vs. De Rodriguez, 77 Southwestern Rep., 420.)

TEXAS.—Street Railways—Negligence—Instructions—Evidence—Prejudicial Error.

1. Where in an action against a street railway for injuries sustained by plaintiff owing to his horse having been frightened by a car which ran upon a bridge at an unlawful speed, there was no evidence, except the fright of the horse on the occasion of the accident, which tended to show that the horse was fractious, an instruction that if the plaintiff was driving a fractious horse he was guilty of negligence was prejudicial error.—(Romine vs. San Antonio Traction Company, 77 Southwestern Rep., 36.)

## LONDON LETTER

*(From Our Own Correspondent.)*

It is stated that the directors of the North-Eastern Railway Company, who have quite recently completed the electrification of several of the branch lines on the north bank of the River Tyne, have now decided to similarly equip their Newcastle and South Shields line, which traverses a thickly populated area on the south side of the river.

It is rumored also that the main line of the North-Eastern Railway is to be shortly electrified between Newcastle and Darlington, a distance of 38 miles. This section of line forms a part of the East Coast route to Scotland, and, in addition, carries the immense coal and freight traffic to and from the Durham coal fields, being composed of from three to eight sets of rails. The system to be adopted is the overhead wire—as against the “live” rail now used on Tyneside—and the necessary power is to be derived from a local private company.

The Bury Corporation tramway committee has reported that an agreement has been practically arrived at and terms arranged for the through running of both Salford and Bury tram cars over portions of the systems owned by both corporations. It was also reported that the award in the recent arbitration between the old Steam Tramway Company and the local authorities was ready and that the Town Clerk of Bury had been instructed to take it up for the authorities.

The new municipal electric tramway service at Northampton was recently inaugurated by the Mayoress, when a procession of electric cars containing members of the Town Council and others proceeded through the town amid rejoicings. The corporation purchased the system from a local company for £37,500, and converted it from a horse-drawn to an electric system at a cost of an additional £85,000. The new trams run on about 9 miles of permanent way. J. G. White & Company were the contractors for the permanent way, the International Engineering Company for the power plant, Dick, Kerr for the cars, the Brush Company for the overhead construction, and Siemens Brothers for the feeders.

Jan. 1 next is the date fixed by the chairman of the District Railway Company for the opening for electric traffic of “a considerable portion” of the line. A little later he hopes to see the whole of the company’s system wearing quite a new garb. With electric traction and zone fares, a new era of popularity should dawn for the District Railway, and there is not much doubt that the cost of the change will be small in comparison with the financial benefits to be gained from it, which should quickly accrue when the public find out the increased comfort and the absence of the stifling fumes which have been tolerated too long.

The Leeds Corporation tramways committee is considering a suggested agreement for the running of through cars between Leeds and the districts of Rothwell and Wakefield. Some time ago the Wakefield District Light Railway Company wrote to the Corporation asking that, in view of the construction of lines which covered a large area, some facilities should be granted to enable through running to take place to Leeds by its cars, and to its territory by the Corporation cars. To enable this to be carried out, the company explained that it had adopted standard-gage track, and that in other respects its equipment would be of an up-to-date character. The Leeds tramways committee had a conference with the directors of the company, at which the principle was laid down that the receipts earned in each district less working expenses should be paid by the operating or running body to the owning authority.

At two points in the construction of the underground shallow tramway from Holborn to The Strand the Greathead shield will be used to drive the tunnel. The shield work at The Strand end is not yet begun, but at the Holborn entrance it is being pushed steadily forward from the south side. The subway, except at stations, is 20 ft. wide, with a maximum height from invert to intrados of 16 ft., the arches having five rings of brickwork. The cast-iron tubes will be 15 ft. 10 ins. outside diameter; pipe subway, 12 ft. broad by 8 ft. high; vaults under pathways, 12 ft. long by 8 ft. high; sewers, 4 ft. 6 ins. by 2 ft. 8 ins., with blue brick invert, with branches every 30 ft. under the vaults. The wood paving of the road will be 6 ins. thick, and the footpath will be paved with 3-in. York flagging. There is a pipe subway running right along the Strand from the Gaiety to the Law Courts. The subway on the south side of Aldwych runs into this at the two ends and crosses under the new road at Catherine Street on the west, and near Houghton Street on the east. These two crossways join the subways which are formed on each side of Kingsway, and which turn right and left at the junction with Aldwych, and so form the subways on the north side of that street. The tramways will be laid down on the conduit system, but the tunnel will not be large enough to accommodate a car with seats on top, and, in consequence, all cars will have to be single-deck.

Therefore, passengers will have to change cars at Theobald’s Road, unless all the electric cars for the North London lines running to this point are made single-deckers, which does not appear likely. The extra cost of making the tunnel large enough to admit double-deck cars would have been very great, and the Council, which has already incurred a great deal of blame for equipping its lines with the more expensive conduit system instead of with the overhead trolley wire, did not feel able to undertake the tunnel of greater cost.

In view of the stage now reached by Leith Tramways provisional order, under which the Town Council proposes to acquire and reconstruct the present horse tramway system in the burgh, the tramways committee of Leith Town Council has appointed a sub-committee to make inquiries regarding all systems of traction. It is expected that the sub-committee will report to the tramways committee early in September.

At the recent half-yearly general meeting of the proprietors of the Great Eastern Railway, Lord Claud John Hamilton (chairman of the company) stated that they had as yet committed themselves to no schemes regarding the electrification of their lines, but they were now watching the development of that portion of the Lancashire & Yorkshire Railway between Liverpool and Southport, which was now worked by electrical traction, and they also thought it advisable to go to France and see there whether there was anything for them to learn in regard to the working of some of the French railways. Accordingly, in the month of May, accompanied by the general manager and other principal officials, he went to Paris, but they came back thoroughly satisfied that there was nothing in what they had seen, though a great deal of it was commendable, that would prove of use to the Great Eastern Railway. They were, therefore, continuing the policy of holding their hands until they found something they could recommend to the shareholders with full confidence.

The first section of the scheme of the Metropolitan Electric Tramways, Ltd., to intersect the northern suburbs of London has now been opened. It is some 5 miles in length and extends from Finsbury Park, along Seven Sisters Road, to Tottenham High Road. At Manor House it branches off to Wood Green. On both of these routes there has been very heavy traffic for many years. In this district last year the company’s passengers numbered 14,000,000. The fare from Finsbury Park to Wood Green terminus has been reduced from 3 halfpence to a penny. Altogether about 50 miles of electric tramways and light railways are to be constructed. As the result of an alliance between the Electric Tramways, Ltd., and the North Metropolitan Tramways Company, which leases from the London County Council the system within the county, junctions are effected at several points with the new lines, which are also fed by the Great Northern Railway and the Great Northern & City Tube at Finsbury Park. Work is now in progress on the Great North Road from Highgate Archway to North Finchley and on the Edgware Road from Cricklewood to Edgware. The station which supplies the lines in the Wood Green and Tottenham districts is at Brimsdown, about 3 miles east of Enfield. The Cambridge main line of the Great Eastern Railway is close at hand, and the Lea navigation, on the edge of which the station is placed, affords facilities for the carriage of coal, which is lifted straight from barges by an electric crane, as well as a plentiful supply of water for condensing purposes, etc. Steam is supplied by Babcock & Wilcox boilers, with automatic chain grate stokers fed by coal, which is lifted by an electrically driven conveyor to overhead bunkers and automatically weighed before it enters the furnaces. The chimney stack, 125 ft. high, is made of steel rings lined with fire-brick throughout. The generating plant now installed consists of two 1000-kw alternators, each driven by a Parsons turbine and delivering a three-phase current with a voltage of 10,000 and a frequency of 50. A third generator of the same capacity is being erected, and there is room for others in the present building, which has been designed so that it can conveniently be enlarged when necessary. The high-tension current generated here is conducted by duplicate sets of cables to sub-stations already erected or being erected at Edmon-ton, Wood Green, Finchley and Henden, where by rotary transformers it is converted down to continuous current at 550 volts for use on the tramways. Although established primarily for supplying the current required by the Metropolitan Electric Tramways, this power station is available for the supply of electrical energy for power purposes over a large area of Middlesex and Herts, including 24 miles of the Lea navigation, along which there is plenty of land for the erection of factories, which would enjoy the advantages of water transit. Local authorities within that area will also have the opportunity of buying power “in bulk” for their electric lighting at prices probably much lower than they could make it for themselves.

The report of the Barry Railway Company states that the directors have had before them the question of the electrification of the

line, and have sent a committee to inspect lines worked by electricity. After careful consideration, they have come to the conclusion that "under present conditions the application of electrical power to railways which deal with a heavy mineral traffic is impracticable." They have, however, let a contract for two-motor coaches, which they think can work economically on parts of the Barry line.

At a recent meeting of the Surrey County Council at Kingston the Kew-bridge joint committee reported that the London United Tramways, Ltd., had intimated that they intended to promote a bill in the next session of Parliament seeking powers to construct electric tramways over the new King Edward VII. bridge at Kew. The joint committee was of the opinion that the use of the overhead trolley system on the bridge and approaches should, if possible, be avoided. A resolution to this effect and stipulating that the tramway company should pay an annual rental of £2,000 for the use of the bridge was passed.

At the half-yearly meeting of the London, Tilbury & Southend Railway Company the chairman said, with regard to the question of electrical traction, the directors recognized that it would be necessary for the proper development of the traffic that this system of traction should be installed as an alternative means of working from the point where the Whitechapel and Bow Railway joined the Tilbury Railway at Campbell Road, Bow, to a point at or near Barking. Accordingly, steps were being taken with the object of adapting this portion of the railway for electrical traction, so that it might be ready for use at the time when the new mode of working was brought into operation on the Metropolitan and the District Railways. The company fully hoped to get the electrical system in operation as far as East Ham in the early part of next year—when the District Company would be ready for it.

When recently the Torquay tramways bill was read a third time in the House of Lords, Lord Clifford, of Chudleigh, moved to insert the following new clause: "If at any time it be proved that any injury or damage to any mains, pipes or apparatus of the Corporation or the Torquay Gas Company shall have resulted from the use of electric current on any of the tramways authorized by this bill, nothing in the bill shall relieve the company from liability to make compensation for such injury or damage." There were, he said, special circumstances in this case which led the committee before whom the bill went to believe that substantial justice would only be done by the insertion of this clause. The system adopted in this case (the Dolter system) had never before been tried in this country, and on that ground alone the Torquay Corporation were justified in asking for a guarantee against loss other than that required by the regulations of the Board of Trade, which were drawn up when this particular system of traction was not contemplated. Lord Balfour, of Burleigh, and other Lords, however, maintained that the insertion of the proposed clause would be disastrous to the precedents which had governed these questions for a number of years, and it was negatived without a division, and the bill was then passed.

The Huddersfield Corporation has just completed all arrangements for a most interesting experiment on its tramways. Some time ago the tramways committee was approached by Martin, Sons & Company, Ltd., manufacturers, of Wellington Mills, Lindley, with the object of securing a light railway service to carry coal from the Hillhouse Railway siding to the works of the company at Lindley. The negotiations proceeded, and the result was the entering into a seven years' agreement for the Corporation to carry all Messrs. Martin's coal, and the work of constructing the necessary permanent way to connect the two points was commenced. The tramways committee will restrict the hours of haulage to slack hours in the morning passenger traffic, and none will be carried in the afternoon. The committee have done wisely in entering into a definite agreement, as the income from the new service is thus secured. It is probable that other large consumers of coal will enter into arrangements with the Corporation for a similar service. The distance to be traversed by the trucks from the Hillhouse siding to Messrs. Martins' mill is about 3 miles. The trucks will be in charge of a motorman and a conductor. Leeds is proposing to obtain powers to enable it to follow the example of Huddersfield, whilst other towns are showing a keen interest in the experiment.

It is satisfactory to be able to record that after a most stubborn resistance the Newcastle Corporation has evidently seen the error of its ways and has now entered into an agreement with the Tyne-side Tramways Company whereby running powers over its lines are granted to the company with mutual benefit to corporation and company and much satisfaction to the people of the vicinity. It will be a lesson doubtless to other corporations that tramways are run for the interests of the people, and that Parliament will not tolerate any narrow-minded policy on the part of corporation officials, who, after all, are, what they seem to occasionally forget, public servants. The substance of the agreement is that the Corporation is to run a service of cars to Park Road, Wallsend, on both the high and low

routes, the Corporation to pay to the company four-fifths of a half-penny for each passenger carried in Wallsend, the amount to be reduced in respect to workmen and children. The Corporation is not to charge more than a half-penny per half mile, but no fares to be less than a penny. With regard to the Willington Quay and North Shields traffic, the company to run a car between Shields and Stanhope Street, or some point on the route west of the center of the city, and vice versa every sixteen minutes, the Corporation to retain the whole of the receipts taken on account of passengers carried in Newcastle, less twopence per car operating costs to be paid by the company. With regard to the Gosforth Park race traffic, the Corporation is to have the sole control of the line on those days, paying to the company seven-sevenths of the special through fare charged from the Central Station to Gosforth Park for every passenger carried. With regard to the Gosforth Park ordinary traffic, the Corporation is to run such service as the traffic may require. The cars used by the company in the city are to be as far as possible free from advertisements. A. C. S.

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## PARIS LETTER

(From Our Own Correspondent.)

The Midi Railway Company is about to build a new line uniting Villefranche to Bourg Madame, in the Eastern Pyrenees. The length of the line is 57 km, and there is a constant rise during the first 32 km amounting to 1050 meters above starting point. The grades, however, do not exceed 6 per cent. Over the next 25 km the line descends some 500 meters. It is proposed to apply electric traction, waterfalls being available in the district for generative purposes. Single-phase traction is proposed as an alternative to the usual direct-current 500 volts, and this may be installed in view of the small number of stops, some eighteen over the entire distance. In case single-phase traction is adopted, the voltage would probably be about 3000 volts, collected from an overhead trolley line. No tenders have yet been accepted, and the Midi Railway Company is open to receive offers for twelve equipments for use on this line.

The new extension of the Orleans Railway Company, the electrical equipments of which were described in last month's issue, has cost the railway company a sum of over \$5,000,000, of which about \$1,000,000 represent the cost of the generating machinery of the electric extension; \$700,000 has been spent on the acquisition of land and new stations, and tracks have cost about \$300,000.

The modern tendency in France and on the Continent is to adopt American practice regarding end exits from cars both for inter-urban and main railway lines. It is therefore causing some little surprise that the American is now going back on his practice, as witness the new car used on the Illinois Central, described in a recent issue of the STREET RAILWAY JOURNAL, which car has a number of lateral doors instead of the usual end exits.

The P. L. M. Railway Company has had in service since 1903 an interesting apparatus for the mechanical drilling of ties and also for the ballasting of the track. This consists of an electrogne group capable of running on the ordinary tracks, and also supplied with portable tracks allowing it to pull itself off the track at any stopping place, ready for operation. There is a small cable transmission and portable drill for boring the ties ready for the ties. The rate of work compares well with hand labor. It requires 9½ minutes for two drills to drill for and pose 200 ties complete over a length of single track 18 meters. Hand labor necessitates 4 minutes to merely withdraw 100 ties over the same length of track, allowing two men for the work. As regards the ballasting and cushioning of ties, the machine worked over some 7000 ties during 1903, and it is calculated that seven times the cost of the work would have to be expended for the same done by hand. The use of this apparatus is to be extended largely over the P. L. M. system.

With the approach of the completion of the Simplon Tunnel scheme, to be opened probably within the next eighteen months, attention is being directed to the necessity for boring a tunnel beneath Mount Blanc, connecting France and Italy. The scheme is by no means a new one, it having been mooted as long ago as 1875, and has been shelved by successive governments ever since. The tunnel would be a comparatively easy undertaking, and the length is only about 6 km, the cost being much less than that of the Simplon. It is thought that the opening of the Simplon will force the project into view, and there seems a good chance of the matter being taken up seriously.

Attention has now and then been directed to the large utilization of non-navigable streams, both in France and Italy, for the generation of power. Statistics recently issued show that in France alone there exists some 4600 small stations utilizing 4000 falls of non-navigable streams, giving some 500 hp. In addition, there are some 1500 stations using navigable rivers collecting 86,000 hp. The power of the former stations varies from the highest figure of 37,000

hp for 1050 works in one department downward, there being ten departments with an output of 10,000 hp and above.

The Association des Industriels de France announce an international competition for an instrument which will indicate the state of load of an electric conductor. Such an instrument is for the use of all those who have to work on or in proximity to electric cabling to allow them to discover in a practical manner that no risk is run by touching the wiring. The conditions are that the instrument must be strong, easily carried and handled and giving sure readings in all circumstances and at all states of the weather, etc. No accident must happen to the instrument when placed directly or indirectly in contact with one or several live conductors. The instrument must be available for direct or alternating currents, low or high pressure, overhead or underground conductors. The apparatus will remain the property of the inventor, who should take the necessary steps to protect the invention. The apparatus should be sent, together with description and drawings, to the president of the association, 3 Rue de Lutèce, Paris, before the end of this year, and the prizes will be distributed before June 1, 1905. The first prize will be f. 6,000.

The electrical situation in Italy, which, like the rest of Europe, has suffered a general depression, is now looking up, having attained the maximum of the crisis about the middle of 1903. Since that date the Allgemeine Elektrizitäts and Thomson-Houston concerns have amalgamated, as we have already announced. Now comes news of the amalgamation of the next important firms of Italian origin, viz.: the Electrical Company and the combination already two years old, of Gadda, Brioschi, Finzi & Company. The capital is f. 7,000,000. Beyond the firms above mentioned and the Siemens-Schuckert and Brown Boveri concerns, there are no important Italian electrical firms. The industry appears to be about to take a new lease of life, and several rather important schemes are in view. Among the principal which may be resumed is the application by the firm Turletti-Erba, of Milan, for a concession of 25 cu. m. per minute from the river Olio, in the district of Valcamonica, producing with a fall of 50 meters over 13,000 hp, to be applied for industrial uses, including in large part electric traction. The length of the canal is to be 6 km, with an extension to join another fall 3 km away, of 82 meters, so as to give a total force of 27,000 hp. The estimates for this work are 3,200,000 lire (\$640,000). Among the installations approaching completion is that of Corti & Company at Zogno, giving 6000 hp for industrial purposes in the Monza district. The general remarks above regarding Italy also apply in some measure to Spain.

A new company has been formed by two Belgian firms for the taking up of the abandoned concession for tramway and lighting of the town of Belgrade, in Servia. The power station on the Danube includes seven steam groups capable of giving 2000 hp output. The present horse tramways are at present being transformed.

### TRANSFER FRAUDS ON BOSTON & NORTHERN

As a result of an investigation by the State officers and the inspection department of the Boston & Northern Street Railway Company, four of the conductors are under arrest on the charge of larceny. For some time the officers of the company have noticed a shortage in their receipts, and the inspection department has been at work investigating the matter. It is said that the system had been worked out to a nicety by the ringleaders, but that some of the underlings had blundered. Perfected to a working basis, the system was worked in this way.

A conductor of the Boston & Northern, running between places which may be called A and B, had the privilege of giving transfers from the town line at the terminus of his road to the town line where the conductor of the connecting car would take up fares. The conductors gave transfers to passengers, but also, it is said, supplied each other with blocks of twenty-five and fifty. When the day's work was ended, according to the company's lawyer, they had all of these transfers rung up on the cash fare indicators of their cars.

Several months ago the officials of the Boston & Northern found that their conductors had a clever scheme of forging 8-cent checks. The men were allowed some leeway, and arrests and convictions came later. In most cases, however, the company was content with discharging the guilty men. The peculations at that time ran into the thousands, but the company thought that a few examples of stringent measures would be sufficient to check further dishonesty on the part of its employees. Since this transfer swapping case has come to light, the officials say that nothing short of prosecution for larceny and letting the law take its full course will satisfy them. They consider that their duty to the public demands such action on their part.

### NEW YORK, NEW HAVEN & HARTFORD IMPROVEMENTS— ELECTRICITY OUT OF NEW YORK

The most important announcement made in railroad circles in the East for some time is that just issued by the New York, New Haven & Hartford Railroad Company regarding plans it has worked out for expending \$8,000,000 for improved rapid transit in Bronx Borough, New York City and that part of Westchester County lying along the Sound. It is proposed to "six-track" the Harlem branch of the road, running from the Harlem River at Willis Avenue and 133d Street to New Rochelle. This work awaits only the formal approval of the State and city authorities. The directors of the road are now considering a further plan for a branch from West Farms along the Bronx Valley to Woodlawn, in the southern part of Mount Vernon. It is proposed to make a connection with the Interborough system at West Farms, and it is the plan eventually to give a through service from the Battery, N. Y., to New Rochelle and Mount Vernon.

The money for the improvements is to be raised by an issue of \$15,000,000 of bonds, the balance being devoted to the repayment to the New Haven of money advanced in the last thirty years on account of the Harlem River & Port Chester Railroad, the titular owner of the Harlem branch of the New Haven. The New Haven has been without bonded indebtedness, so that the announcement of the proposed bond issue will interest financial circles. The bonds have been underwritten at a premium.

Of the six tracks from the Harlem to New Rochelle, four will be electrically equipped with the third-rail system, and two will be left for the use of steam trains. Two of the electric tracks will be for express trains, running every fifteen minutes, and the other two for local trains, with the same headway. The two tracks to be used for steam will not only handle the freight, but will be the outlet for the New York Connecting Railway, running from the Harlem over Randall's and Ward's Islands to Astoria, where a connection with the Pennsylvania Railroad will be made. Trains from the South and West will then run over the Pennsylvania tracks through the tunnels under New York to Long Island City, thence over the Connecting Railway out over the Harlem branch through to Boston and the East.

The formal application to the Railroad Commissioners shows that the present estimate of the cost of the improvements is \$7,701,891, but it is expected that this will be exceeded. According to Chief Engineer C. M. Ingersoll's report, the cost of "six-tracking," eliminating grade crossings and constructing new stations, will amount to \$4,825,891. B. F. Simmons, of Boston, assistant chief of the electrical department of the road, estimates the cost of this branch of the work at \$2,876,000, distributed as follows:

Seventy cars equipped with electricity complete.....	\$750,000
Four third rails with top protections, and bonding surface rails with necessary marine cable at drawbridges.....	415,000
Feed wire, high-tension wires and pole line complete....	336,000
Two sub-stations (with electrical apparatus).....	280,000
Power house with all material.....	920,000
Car house .....	100,000
Sundries .....	75,000
Total .....	\$2,876,000

The cars will be of standard construction, of the latest design, similar to those to be used by the Interborough Rapid Transit Company, operating the elevated and the subway lines in New York; and it is expected that they will be run over the Interborough lines down town if the traffic proves large enough.

New Rochelle and the towns beyond, the promise is, shall have double service over the branch and main line, while Mount Vernon shall have the proposed branch to West Farms, giving direct connection with the lower city in addition to the main line service as at present.

In no case will street grades be changed more than 15 ins. Edward G. Buckland, attorney of the company, has arranged to see Mayor McClellan, on the latter's return from his vacation, about getting formal approval by the city authorities of the extensive improvements. As a result of its experience in the operation of electrically equipped lines in Connecticut, the New Haven road is prepared to go forward with the establishment of an extensive and complete auxiliary electrical system.

Some master mechanics are continually bothered by their lenient storekeepers, who give out supplies without receiving requisitions. A. H. Mann, master mechanic of the Evansville Electric Railway Company, has an effective check on any tendency to be lenient. A deaf storekeeper makes a written requisition absolutely necessary.



## OUTING OF THE OFFICERS OF THE NEW YORK CITY RAILWAY COMPANY

Five years ago President Herbert H. Vreeland, of the New York City Railway Company, invited the officers and heads of departments of the New York City Railway Company to spend a day at his country home at Brewster, N. Y., and partake of a clam-bake. The entertainment was such a success that Mr. Vreeland has extended a similar invitation to his home each succeeding year. This year's annual outing of the staff of the New York City Railway Company at Brewster occurred on Aug. 24, and 106 guests left in special cars attached to the 9:06 a. m. train, via the Harlem Railroad for Brewster. They were met at the station by Mr. Vreeland and transported in carriages to the Tonneta Outing Club, of which Mr. Vreeland is a member, and which is about 2 miles from the station. The clubhouse is situated on the side of Tonneta Lake, where the clam-bake was given at about 1 o'clock. During the interval the guests found plenty to do in fishing, rowing and other pastimes. The dinner, as on other occasions, was most appetizing, and included not only the luscious bivalves, but fish, lobsters, chickens and other viands.

After a short rest following the repast, the party was conveyed by carriages to Mr. Vreeland's attractive home, "Rest-A-While," where a reception was extended by Mrs. Vreeland, assisted by a number of ladies and attended also by a number of prominent residents of Brewster and vicinity. A very pleasant feature of the entertainment of the day was a musical programme provided during morning, afternoon and evening by the Metropolitan Street Railway Drum and Fife Corps, and by a quartette of singers. The party returned to New York about 9 o'clock by special train after a most enjoyable day.

In addition to the staff of the New York City Railway Company, a few other gentlemen were present, including Messrs. Henry Sanderson, of the New York Transportation Company; G. Tracy Rogers, of the Binghamton Railway Company; Hon. Frank M. Baker, of the New York State Railroad Commission; E. P. Bryan and Frank Hedley, of the Interborough Rapid Transit Company; Charles F. Smith, Ira A. McCormack and J. F. Deems, of the New York Central Railroad Company; W. G. Besler and W. McIntosh, of the Central Railroad of New Jersey; W. F. Potter, of the Long Island Railroad Company; D. M. Brady, of the Brady Brass Company; Edward A. Maher and Thomas W. Olcott, of the Union Railway Company.

## SALE OF THE LOUISIANA PURCHASE POWER PLANT

Westinghouse, Church, Kerr & Company, who installed the main service plant at the Louisiana Purchase Exposition, have announced that after the close of the Exposition the plant will be for sale, either complete or in part. Particulars of this plant have been published in these columns, but it can be said briefly that it consists of four 3500-hp Westinghouse vertical cross-compound steam engines, 38-in. and 75-in. x 54-in. stroke. The engines run at 85 r. p. m. and drive two 2000-kw a. c. Westinghouse and two 200-kw a. c. General Electric generators. The generators are three-phase, 6600-volt, 25-cycle, revolving-field type, and are located between the engine frames. The plant also contains three Westinghouse 80-kw exciters, direct-driven by Westinghouse compound engines; two Worthington jet condensers, two Worthington turbine pumps, three dry vacuum pumps, etc. The boiler plant consists of sixteen 400-hp Babcock & Wilcox boilers equipped with Roney stokers; two mechanical draft plants, each with a 14-ft. New York blower, direct connected to a 13-in. x 14-in. Chandler & Taylor engine; pumps, feed-water heaters, etc.

## ELECTRIC TRAMWAYS IN THE EAST

It is satisfactory to learn that, despite the backward condition which has existed up to this time in the East as regards electrical work, there is evidence of a growing interest in electric tramways and lighting. This is shown by a number of recent contracts closed by Dick, Kerr & Company, Ltd., for London. One of the latest is an order for an electric tramway plant and material for the Bangkok tramways, owned by the Siamese Tramways Company, Ltd. The contract includes power house equipment which consists of three 200-kw 500-volt d. c. generators of Dick-Kerr's standard type, coupled direct to a three Browett Lindley vertical compound engine, and the usual accessories, including surface condensers, pumps, etc. There are also forty single motor equipments of the company's standard 25-B type mounted on Brill 21-E trucks, and the whole of the rails, fish-plates, tie-bars for the line, which has a total length of 13½ miles.

Of the other contracts which Dick, Kerr & Company are carrying out, the Mandalay tramways have just recently been successfully opened by the Lieutenant-Governor of Burmah, Sir Hugh Barnes, K. C. S. I., K. C. V. O., and the system is now in operation. The total length of these tramways is 12 miles of single track laid to a gage of 3 ft. 6 ins. with rails of the girder type, weighing 85 lbs. per yd. The overhead equipment is on the span wire system, and is of a very neat and rigid design. The rolling stock consists of twenty-four single-deck, open, cross-bench cars, to accommodate forty-eight passengers, built by the Electric Railway & Tramway Carriage Works, Preston. The cars are mounted on Brill maximum traction trucks, each car being supplied with a complete electrical equipment consisting of two standard 25-B motors with DB-1 form "C" controllers. The power house equipment consists of three Dick-Kerr's d. c. compound-wound 200-kw 400 r. p. m. 500-550-volt generators, direct coupled to three Belliss compound engines; the switchboard is in accordance with the standard traction practice, and consists of four feeder panels, three generator panels, one testing panel and one panel for motor and lighting circuits.

The electric tramways of Hongkong are rapidly approaching completion by the same contractors. The total length of single track is 14½ miles, and is laid to a gage of 3 ft. 6 ins. with girder type rails weighing 86 lbs. per yd. The overhead line within the city is center pole construction, but outside the city boundary is equipped on the side pole system. The power house is as nearly as possible in the center of the system; the plant consists of two Dick-Kerr's standard d. c. 300-kw railway generators of the multipolar type, compound wound, running at a speed of 100 r. p. m., at 500 volts, direct coupled to the main shaft of two engines built by Yates & Thom; in addition to the two traction sets, two combined sets for arc and incandescent lighting of the depot have been installed. The switchboard consists of two generator panels, two feeder panels, three lighting panels, one main station panel and one b. o. t. panel. The boiler house contains two Babcock & Wilcox water-tube boilers and the usual accessories. Twenty-six single-deck cars are provided, ten being of the combined type with an enclosed portion in the center and an open platform with seats at either end, and having a seating capacity for thirty-two passengers; the remaining sixteen cars are of the open, cross-bench type to seat forty-eight passengers; the cars were built by the Electric Railway & Tramway Carriage Works, Ltd., Preston; each car is mounted on a Brill 21-E truck and is fitted with two of Dick-Kerr's 25-hp motors, and at either end of the car is a DB-1 form "C" controller. As this is the pioneer system of electric traction in China, it is to be hoped the venture will meet with well-deserved success and that electrically equipped lines will shortly be laid in other parts of the Celestial Empire.

Singapore tramways are in the hands of the same contractors and are making considerable progress. The power house contains eight Lancashire boilers with the usual accessories, including two fuel economizers and four feed pumps, three engines, two of Yates & Thom's horizontal cross-compound condensing type, coupled direct to two of Dick-Kerr's standard 500-kw, 100 r. p. m., 500-volt, compound generators. For lighting purposes a 200-kw plant has been installed, including a d. c. generator of 150-kw capacity, coupled direct to a Willans engine, also a 50-kw motor-driven generator working off a circuit of 550 volts. A suitable switchboard has been supplied and erected by the contractors. The overhead work has been carried out on the span wire system. The total length of single track is 27 miles, and is laid to a 1m gage, and the form of construction consists of laying girder type rails weighing 95 lbs. per yd. upon a continuous beam of concrete. The rolling stock consists of fifty cars, twenty single-deck, single-truck combination type, with a seating capacity of thirty-two persons, sixteen inside and sixteen outside, and thirty open, cross-bench type to seat forty persons; they are mounted on Brill 21-E trucks and equipped with 25-B motors and DB-1 form "C" controller. In addition there are thirty-three freight cars mounted on Brill 21-G trucks, each with a double motor equipment, the whole of the rolling stock being built by the Electric Railway & Tramway Carriage Works, Preston.

Lastly, that most successful tramway owned by the Calcutta Tramways Company is carrying out considerable extensions, and this work has been entrusted to the original contractors, Dick, Kerr & Company, Ltd. This includes an additional ten open type motor cars, in all respects the same as those supplied before, i. e., single-deck open type cars mounted on Brill 21-E trucks and equipped with two 25-A motors, each with a DE-1 form "C" controller.

The main station plant is being increased by one of Dick-Kerr's standard three-phase alternators, 500-kw, 25 cycles, 6000 volts, 94 r. p. m., direct coupled to a Yates & Thom horizontal cross-compound engine. There are two sub-stations being erected, in which will be placed one of Dick-Kerr's standard 300-kw rotary converters, with the necessary transformers and switch gear.

## CHICAGO TRACTION MATTERS

Judge Grosscup, in reply to a letter by Mayor Harrison, asking him to co-operate in the settlement of Chicago Union Traction Company franchise questions along the line of the proposed Chicago City Railway Company franchise ordinance, has replied as follows:

"Chicago, Aug. 23.—Dear Sir: I have yours of the 18th inst., calling attention to the fact that the substantial elements of the decree to be entered in the traction cases have been determined; that you believe from my public utterances that I desire a settlement fair at once to the city and to the property interests confided to the charge of my court; and transmitting a copy of the pending city railway ordinance, and asking that if that ordinance meets my views I intervene in such a way as may be proper to bring about the acceptance of a similar ordinance by the Union Traction Company and its underlying companies.

"The fiscal structure of the property interests embraced in what is known as the Union Traction lines is such that a settlement out of court of their franchise relations with the city—particularly the merging of all outstanding franchises in a new franchise—would be a task of great difficulty. On this account it has seemed to me all along that when a feasible basis for settlement was once arrived at the court's possession of the properties—drawing along with it jurisdiction over the questions that the proposed settlement is bound to raise—would be helpful to a quick and complete adjustment of all the matters involved. The court, so far as I represent it, is ready now to aid you to the extent of its power in bringing about such adjustment.

"Nothing can be done by the court, however, except on the basis that the franchise to be given will contain the legal equivalent for the franchises to be relinquished. An exact equivalent would be a regrant for the period found to be the average of all the outstanding grants, and on the terms substantially of the outstanding grants. To what extent the pending city railway ordinance meets this test, now that the boundaries of the grants are known, will be made the subject of immediate inquiry. Personally I hope that a basis for settlement, not only in principle but in detail, will be speedily found."

## PROGRAMME OF THE VIENNA CONVENTION

As there were several typographical errors in the list of papers to be presented at the Vienna Convention of the International Tramway & Light Railways Association as published in the issue of this paper for Aug. 6, and as several additional papers have been added to the programme, the complete list of papers is reprinted below:

1. "Renewal Accounts," by M. Haselmann, manager of the Société des Chemins de fer Vicinaux, of Aix-la-Chapelle.
2. "Transfer Tickets," by a committee consisting of Messrs. J. Grialou, manager of the Compagnie des Omnibus et Tramways, of Lyons; A. Janssen, secretary of the Société des Tramways Bruxellois, of Brussels; E. Lavalard, manager of the Compagnie Générale des Omnibus, of Paris; von Pirch, manager of the Tramways de Barmen-Elberfeld, and H. Vellguth, secretary of Verein Deutscher Strassen-und Kleinbahn Verwaltungen, of Berlin. (Mr. von Pirch is the reporter on this subject, assisted by Mr. Vellguth.)
3. "Advantages and Disadvantages of Different Types of Brakes for Electric Railways," by M. Scholtes, manager of the Nuremberg-Fürth Tramways.
4. "Protection of the Trolley Wire Against Accidental Contact with Telephone and Other Aerial Wires," by M. Petit, chief engineer of the Société Nationale des Chemins de fer Vicinaux, of Brussels.
5. "Advantages and Disadvantages of Trail Cars," by M. Pavie, general manager of the Compagnie Générale Française de Tramways, of Paris.
6. "Economy in the Consumption of Current by Cars," by M. Klitzing, manager of the Magdeburg Tramways.
7. "Advantages and Disadvantages of Electric Traction on Interurban Railways," by M. H. Lüthlen, Chief Commissioner of Inspection of the Austrian State Railways, of Vienna.
8. "Character of Current for Interurban Lines," by M. Pffor, chief engineer of the Union Elektrizitäts Gesellschaft, of Berlin.
9. "Track Construction for Interurban Steam Lines," by M. C. de Burlet, general manager of the Société Nationale des Chemins de fer Vicinaux, of Brussels.
10. "Legislation on Tramways and Interurban Roads in Different Countries in Europe," by R. H. Scotter, of London.
11. "Standard Form of Operating Report," by Messrs. H. Géron, manager of the Société des Tramways de Cologne (in liquidation), of Brussels; Haselmann, manager of the Société des Chemins de fer Vicinaux, of Aix-la-Chapelle; L. Janssen, manager of the So-

ciété Les Tramways Bruxellois; Kessels, manager de la Société Générale des Chemins de fer Economiques, Brussels; E. Lavalard, manager Compagnie Générale des Omnibus, Paris; E. A. Ziffer, president of the Bukowina Railway Company, Vienna.

12. "Control of Electrical Installations and Maintenance of Trolley Wires," by M. G. Pedriali, chief electrical engineer of the Société des Tramways Bruxellois, of Brussels.

13. "Use of Motor Cars and Locomotives on Railway and Tramway Lines," by M. E. A. Ziffer, president of the Bukowina Railway Company.

14. "Regulations for Testing Motor Capacity," by a committee consisting of Messrs. G. Kapp, secretary of the German Association of Electrical Engineers; G. Rasch, professor of the Polytechnic Institute at Aix-la-Chapelle; Blondel, professor of the School of Bridges and Highways, Paris; E. d'Hoop, technical director of the Société Les Tramways Bruxellois; Macloskie, chief engineer of the Union Elektrizitäts Gesellschaft; James Swinburne, president of the British Institution of Electrical Engineers, London; and Wyssling, professor of the Polytechnic Institute at Zurich. (Mr. Kapp is the reporter on this subject, assisted by Mr. Rasch.)

15. "Legislation in Germany in Favor of Employees (insurance against accident, disease, old age and disability), and Its Effect upon Tramway and Railway Enterprises; Comparison with Similar Insurance Laws in Different Parts of Europe," communication by Mr. Gorella, secretary of Corporation of German Tramways & Light Railways, Berlin.

16. "Precautionary Measures Taken to Overcome the Effect of Electric Tramways on the Measuring Instruments in Physical and Electro-Technical Observatories," communication by M. Bjerkegren, chief engineer of the Grosse Berlin Strassenbahn Gesellschaft.

## SERIOUS ACCIDENT ON ROCHESTER & EASTERN LINE

Fully thirty-five persons were injured Wednesday, Aug. 24, in a collision on the Rochester & Eastern Railway near Pittsford, N. Y., though no one was fatally hurt. About a dozen people suffered fractured limbs or were seriously bruised, and the remainder suffered minor injuries, most of which were caused by broken glass. A train of two cars bound from Canandaigua to Rochester ran into a single car running east. The train was late, and, according to the statement of the officers of the company, ran past the siding where it was to have met the car from Rochester. The trains met on a sharp curve. A lineman in the employ of the road was at work near the scene of the accident and saw the two trains approaching. He flagged the eastbound train and it had nearly stopped when struck by the other train, which was running at a good speed. All three of the cars were full of passengers.

## TWO LINES NOW BETWEEN DES MOINES AND ST. JOSEPH

Two electric railway companies are now planning the construction of lines between Des Moines and St. Joseph. Just as the fores of the St. Joseph, Albany & Des Moines lines are getting well organized and the surveyors are approaching Des Moines with splendid reports of a first-class route, with no grades to exceed 1 per cent, there comes from Kansas City the statement that the Interstate Railway Company has let the contracts for the first 400 miles north from Kansas City, and that all necessary arrangements have been made for financing the line from Kansas City to Duluth. Percival Steele, of Chicago, general counsel for the St. Joseph, Albany & Des Moines, has been in New York for the past week or so, making arrangements for the financing of the Mordaunt line between St. Joseph and Des Moines, and recent despatches indicate that he has been successful and that the work of construction will be commenced as soon as the survey is completed. The preliminary survey will be finished within a few days, and from that the locating survey can be made in short sections so that the construction work can be commenced at any time. The St. Joseph, Albany & Des Moines Company has no intention of building further north than Des Moines at this time, while the Interstate Railway Company intends to build a line through from Kansas City to Duluth. The Consolidated Trust Company was recently organized for the sole purpose of financing the Interstate Company, and it is stated that \$2,000,000 of French capital is invested in the scheme. On the other hand, it is reported that the Goulds are interested in the construction of the St. Joseph, Albany & Des Moines line, and that plenty of financial backing will be forthcoming for the enterprise. The Interstate Company plans the construction of an exclusive electric line, while the other company expect to use steam power for the freight traffic. As both companies are anxious for the territory between St. Joseph and Des Moines, there is a good chance for a race in construction work between those two cities.

## IMPROVEMENTS AT THE ST. LOUIS CAR COMPANY'S PLANT

A new addition to the erecting shops of the St. Louis Car Company will give much-needed room in this department. The new portion extends the full length of the original shops. An overhead trolley system has been recently installed in the machine and truck shops. The system is liberally supplied with branches and turn-outs, so that heavy work may be carried directly to all machines.

The company has almost completed the last of 450 cars built for the St. Louis Transit Company. These cars were ordered especially for use in handling the World's Fair visitors. At present the greater number of them are in service on the Olive Street, Market Street, Easton Avenue and other lines leading to the World's Fair entrances.

## WESTINGHOUSE TURBINE CONTRACTS

The Westinghouse interests have secured a number of contracts recently for steam turbines to be installed in various electric railway power stations throughout the country. The Parkersburg & Marietta Interurban Railway Company, of Parkersburg, W. Va., has added a 500-hp turbine. Two machines of 500-hp capacity each have been requisitioned for by the Philadelphia, Coatesville & Lancaster Railway Company.

Westinghouse gas engines have been ordered by the Warren & Jamestown Street Railway Company, of Warren, Pa.

## GRADING BEGINS ON SAN JUAN-PONCE ROAD

Advices from San Juan, Porto Rico, state that the Porto Rico Railway, Light & Power Company, the assignee of the franchise granted to the Vandergrift Construction Company, of Philadelphia, to construct and operate an electric railway between San Juan and Ponce—a distance of 70 odd miles—has started work on the grading from Rio Piedras towards Caguas, passing in the vicinity of Trujillo Alto. The Executive Council has amended this franchise, and the company is now permitted to pass through the town of Rio Piedras. The plans, etc., for the line from San Juan to a point located between Caguas and Rio Piedras have been approved by the Bureau of Public Works.

## RAILROAD ARRANGEMENTS FOR NEW YORK CONVENTION

The Trunk Line Association has announced that the usual special rates from points in New York State, of a fare and a third on the certificate plan, will be in force for the annual convention of the New York State Street Railway Association to be held in Utica, Sept. 13 and 14. Tickets may be had at any time after Sept. 9 and prior to Sept. 13, except from stations where it is possible to reach the place of meeting by noon of Sept. 13, in which case tickets will be sold for morning trains on that date.

A circular giving the programme of the convention will be issued within a few days. All roads not already members are urged to send delegates to the convention. A very interesting and valuable meeting is assured.

## STEEL CONTEST AT ST. LOUIS FAIR

A notable feature of Machinery Day at the Louisiana Purchase Exposition will be that of the high speed steel cutting contest, which is arousing much interest throughout the world, especially among the railroad and steel men. This test will take place at Block 9, Machinery Hall, commencing at 10 o'clock in the morning, Sept. 10. Nearly all of the high speed steel manufacturers of the world will be entered in this contest, and it promises to be very interesting. The contest will be decided by a party of three judges, one selected by the steel men, one by the railroad men and the third by the first two judges. The test will be made both in solid forged tools and in the Armstrong tool holders. The size of steel to be used in the solid forged tools will be 1½ ins. x 2¼ ins., and in the Armstrong tool holders 1 in. x 1 in. The test will be made on the new motor-driven high-speed steel lathe manufactured by the Putnam Machine Works, Fitchburg, Mass.

The material to be used will be steel forgings and cast steel columns. The cut will be ¾ in., 1½ ins. reduction, 3-16 in. feed, 100 ft. per minute, to be run as long as the tool will stand up. The amount of metal removed will be one of the points to decide the quality of the tools. The steel to be used in this test will be that which is regularly offered by the steel men on the market to-day. The tools will all be forged, tempered and ground at the Exposit-

tion grounds before a committee appointed for that purpose. No two representatives can represent the same brand of steel, and the steel men will give their test in rotation as they may draw their names, which will be placed in envelopes in a box for that purpose. Complete record of every test will be given to each contestant and shall be signed by each of the judges. Any further information, or copies of rules governing this test, can be had by applying to the chairman, Block 9, Machinery Hall.

## PERSONAL MENTION

MR. M. B. HERLEY, formerly general superintendent of the Chicago Union Traction Company, has become general traffic manager.

MR. GEORGE C. EWING has been appointed manager of the railway department in the Boston office of the Westinghouse Electric & Manufacturing Company. Mr. Ewing assumed his duties Sept. 1. The many friends of Mr. Ewing in New England and throughout the rest of the country will extend to him their best wishes in his new work.

MR. JOSEPH V. SULLIVAN has been appointed chief supervisor of the Chicago Union Traction Company, to fill the vacancy caused by the promotion of Mr. Robert R. Hertzog to the office of chief superintendent. Mr. Sullivan has been with the Chicago Union Traction Company about one year, having been general passenger agent. In his new position he will have charge of the employment of men and will continue his former duties of negotiating for special cars and special traffic. Mr. Sullivan was formerly a Chicago newspaper man.

MR. ROBERT R. HERTZOG has been made general superintendent of the Chicago Union Traction Company. Mr. Hertzog formerly was chief supervisor of the company, having charge of the employment of men and allied duties. Mr. Hertzog began his street railway career in the cashier's office of the West Chicago Street Railroad in July, 1891, and later became chief clerk to the superintendent of that road. When the road was consolidated and the Chicago Union Traction Company formed in 1900, he was made chief supervisor, which position he has held ever since. Mr. Hertzog in his new position has entire charge of conducting transportation. He is only forty years old.

MR. GEORGE W. KNOX, of Chicago, on Sept. 1 became general manager of the Green Bay Traction Company, of Green Bay, Wis. This is the company which is to take over and operate the Fox River Electric Railway & Power Company's property, consisting of 22 miles of city lines in Green Bay and the new interurban line between Green Bay and Kaukauna, which has just been completed by the Knox Construction Company, of which Mr. Knox is president. This does not mean that Mr. Knox is to give up his engineering practice with headquarters at Chicago, as the business of the Knox Engineering Company, of which he is the head, is too important to permit of his giving his entire time to the Green Bay property. The appointment of Mr. Knox as operating head of this company, however, indicates that the Knox Engineering Company is entering a new field, namely, that of operation, in addition to



GEORGE W. KNOX

the construction of electric railways, thus following along the lines which have been so successfully followed by several other large consulting engineering firms. Mr. Knox is a thorough operating man, although his activities since he resigned the position of electrical engineer of the Chicago City Railway Company in 1900 have been mainly in consulting and construction work. Mr. Knox has been in electric railway work practically since its beginning in 1887, being employed at various times by the old Sprague, Thomson-Houston and Edison companies. Associated with Mr. Knox is Mr. R. N. Heskett, who has been resident engineer during the construction of the Green Bay & Kaukauna Interurban. Mr. Heskett was at one time superintendent of the McCartney Electric Railway, of West Green Bay, before it was purchased by the present company. After its purchase he completed his education at Armour Institute of Technology in Chicago, from which he graduated in 1902. Mr. Knox has appointed as superintendent at Green Bay Mr. M. J. Kinch, formerly of the Grand Rapids, Holland & Lake Michigan Railway Company, and of the Rockford, Beloit & Janesville Railroad Company.

TABLE OF OPERATING STATISTICS

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

COMPANY	Period	Total Gross Earnings	Operating Expenses	Net Earnings	Deductions From Income	Net Income, Amount Avail-able for Dividends	COMPANY	Period	Total Gross Earnings	Operating Expenses	Net Earnings	Deductions From Income	Net Income, Amount Avail-able for Dividends	
<b>AKRON, O.</b> Northern Ohio Tr. & Light Co.....	1 m., July '04	95,881	47,373	48,508	22,826	25,682	<b>HAMILTON, O.</b> Cincinnati, Dayton & Toledo Traction Co.	1 m., July '04	*54,810	28,395	26,415	16,697	9,718	
	1 " " '03	95,766	47,970	47,795	22,806	24,989		1 " " '03	51,637	26,141	25,495	16,083	9,413	
	7 " " '04	492,967	275,634	217,333	158,528	58,807		7 " " '04	98,480	56,076	42,404	33,146	9,258	
	7 " " '03	484,748	264,763	214,984	155,830	59,153		7 " " '03	98,133	49,908	48,225	32,153	16,072	
<b>AURORA, ILL.</b> Elgin, Aurora & Southern Tr. Co.....	1 m., July '04	46,480	21,472	25,008	9,173	15,835	<b>HANCOCK, MICH.</b> Houghton County St. Ry. Co.....	1 m., June '04	16,937	10,242	6,694	3,381	3,313	
	1 " " '03	47,182	25,598	21,584	9,173	12,411		1 " " '03	16,417	9,566	6,851	2,929	3,922	
	7 " " '04	260,318	156,238	104,080	64,731	39,349		12 " " '04	149,037	131,348	57,689	37,310	20,379	
	7 " " '03	258,271	150,593	107,678	64,943	42,735		12 " " '03	182,576	121,202	61,374	33,200	28,174	
<b>BINGHAMTON, N. Y.</b> Binghamton Ry. Co..	1 m., July '04	29,120	12,495	16,625	-----	-----	<b>LIMA, O.</b> Western Ohio Ry Co.	6 m., June '04	103,000	53,000	50,000	-----	-----	
	1 " " '03	26,202	11,290	14,913	-----	-----		<b>LONG ISLAND CITY, N. Y.</b> New York & Queens Co. Ry. Co..	3 m., June '04	197,739	144,613	53,126	-----	-----
<b>BUFFALO, N. Y.</b> International Tr. Co..	1 m., June '04	355,472	223,597	131,875	102,553	29,322	3 " " '03		172,974	137,063	35,911	-----	-----	
	1 " " '03	323,098	176,935	146,163	130,527	15,636	<b>MILWAUKEE, WIS.</b> Milwaukee El. Ry. & Lt. Co.....		1 m., July '04	283,062	133,977	149,085	77,706	71,318
	3 " " '04	1,003,671	647,170	356,701	367,789	†11,088			1 " " '03	270,499	130,101	140,398	75,383	65,015
	3 " " '03	945,556	519,062	426,494	389,394	37,100		7 " " '04	1,821,735	935,360	886,375	521,211	365,104	
12 " " '04	4,074,977	2,428,262	1,646,715	1,565,061	81,654	7 " " '03		1,707,175	864,216	842,960	499,830	343,130		
12 " " '03	3,728,173	2,013,624	1,714,549	1,838,484	176,065	<b>MINNEAPOLIS, MINN.</b> Twin City Rapid Transit Co.....	1 m., July '04	385,769	179,679	206,090	74,925	131,165		
<b>CHICAGO, ILL.</b> Aurora, Elgin & Chicago Ry. Co.....	1 m., July '04	58,518	27,131	31,387	-----		-----	1 " " '03	364,471	164,037	200,433	60,937	139,496	
	7 " " '04	239,838	132,443	87,395	-----		-----	7 " " '04	2,445,030	1,165,553	1,279,477	510,366	769,111	
	<b>Chicago &amp; Milwaukee Elec. R. R. Co.....</b>	1 m., July '04	52,228	18,508	33,720		-----	-----	7 " " '03	2,283,125	1,086,410	1,196,715	426,256	770,459
		1 " " '03	29,529	8,523	21,007	-----	-----	<b>MONTREAL, QUE.</b> Montreal St. Ry. Co..	1 m., July '04	226,695	131,276	95,419	25,637	69,782
7 " " '04		215,478	91,095	124,383	-----	-----	1 " " '03		216,236	116,157	100,079	24,696	75,383	
7 " " '03		123,250	48,370	74,880	-----	-----	10 " " '04		1,933,612	1,281,213	707,399	201,008	506,392	
7 " " '03	123,250	48,370	74,880	-----	-----	10 " " '03	1,788,178		1,109,809	678,368	189,363	489,005		
<b>Metropolitan West Side Elevated R. R. Co.....</b>	1 m., July '04	158,320	-----	-----	-----	-----	<b>PEEKSKILL, N. Y.</b> Peekskill Lighting & R. R. Co.....	12 m., June '04	110,735	*66,327	44,408	-----	-----	
	1 " " '03	158,188	-----	-----	-----	-----		12 " " '03	106,118	*62,600	43,518	-----	-----	
	7 " " '04	1,221,648	-----	-----	-----	-----		<b>PHILADELPHIA, PA.</b> American Railways...	1 m., July '04	151,308	-----	-----	-----	-----
	7 " " '03	1,196,000	-----	-----	-----	-----			1 " " '03	144,466	-----	-----	-----	-----
<b>Northwestern Elevated R. R. Co.....</b>	1 m., July '04	94,264	-----	-----	-----	-----	<b>ROCHESTER, N. Y.</b> Rochester Ry. Co.....		1 m., July '04	139,548	68,826	70,721	26,811	43,910
	1 " " '03	92,059	-----	-----	-----	-----			1 " " '03	116,732	57,746	58,986	25,896	33,089
	7 " " '04	745,411	-----	-----	-----	-----		3 " " June '04	402,245	223,708	178,537	86,984	91,553	
	7 " " '03	718,513	-----	-----	-----	-----		3 " " '03	337,479	174,519	162,960	126,110	36,850	
<b>South Side Elevated R. R. Co.....</b>	1 m., July '04	108,348	-----	-----	-----	-----	<b>SAN FRANCISCO, CAL.</b> United Railroads of San Francisco.....	1 m., July '04	535,186	-----	-----	-----	-----	
	1 " " '03	118,184	-----	-----	-----	-----		1 " " '03	500,079	-----	-----	-----	-----	
	7 " " '04	907,087	-----	-----	-----	-----		<b>SAVANNAH, GA.</b> Savannah Electric Co.	1 m., June '04	49,511	26,471	23,040	10,407	12,634
	7 " " '03	904,878	-----	-----	-----	-----			1 " " '03	46,104	26,890	19,215	9,588	9,627
<b>CLEVELAND, O.</b> Cleveland & Southwestern Traction Co.....	1 m., July '04	50,542	26,663	23,879	-----	-----	12 " " '04		534,014	305,083	228,931	123,949	104,982	
	1 " " '03	43,692	22,539	21,153	-----	-----	12 " " '03		499,470	294,868	204,602	115,252	89,350	
	7 " " '04	255,295	171,130	84,156	-----	-----	<b>SEATTLE, WASH.</b> Seattle Electric Co.....	1 m., June '04	191,495	126,243	65,252	24,696	40,556	
	7 " " '03	240,538	143,419	97,119	-----	-----		1 " " '03	175,513	117,546	57,967	24,053	33,915	
<b>Lake Shore Electric Ry. Co.....</b>	1 m., July '04	59,595	36,223	23,372	20,404	2,968		12 " " '04	2,229,880	1,557,615	672,266	273,711	398,554	
	1 " " '03	56,822	33,439	23,383	20,370	3,012		12 " " '03	2,018,907	1,429,737	589,170	282,473	306,696	
	7 " " '04	271,003	-----	-----	-----	-----	<b>SYRACUSE, N. Y.</b> Syracuse R. T. Co.....	1 m., July '04	72,084	41,809	30,275	20,242	10,033	
	7 " " '03	259,903	-----	-----	-----	-----		12 " " June '04	839,373	490,426	348,946	243,460	105,486	
<b>DETROIT, MICH.</b> Detroit United Ry....	1 m., July '04	456,269	*246,951	209,318	89,816	119,502		12 " " '03	753,277	421,961	331,316	230,901	100,415	
	1 " " '03	455,432	*251,212	204,230	84,621	119,599		<b>TERRE HAUTE, IND.</b> Terre Haute Elec. Co.	1 m., June '04	47,654	30,748	16,907	9,579	7,328
	7 " " '04	2,541,590	*159,246†	949,123	623,261	325,862	1 " " '03		38,485	24,366	14,119	6,560	7,559	
	7 " " '03	2,489,622	*146,870†	1,020,921	575,386	445,505	12 " " '04		526,293	352,540	173,753	105,357	68,397	
7 " " '03	2,489,622	*146,870†	1,020,921	575,386	445,505	12 " " '03	410,346		279,888	130,458	78,059	52,399		
<b>DULUTH, MINN.</b> Duluth Street Ry. Co.	1 m., July '04	60,412	28,107	33,305	15,876	17,429	<b>FORT WORTH, TEX.</b> Northern Texas Traction Co.....	1 m., July '04	52,281	27,551	24,730	10,209	14,521	
	1 " " '03	60,777	29,642	34,135	16,544	17,591		1 " " '03	42,548	20,543	22,005	9,018	12,987	
	7 " " '04	355,804	201,639	154,165	107,888	46,777		7 " " '04	311,217	173,525	135,691	70,757	64,935	
	7 " " '03	353,523	195,595	157,928	115,423	42,505		7 " " '03	249,488	132,973	116,515	63,143	53,372	
<b>EATON, IND.</b> Muncie, Hartford & Ft. Wayne Ry. Co...	1 m., July '04	19,005	*7,623	11,381	4,000	7,381	<b>TOLEDO, O.</b> Toledo Rys. & Lt. Co..	1 m., July '04	158,377	*77,820	80,557	41,186	39,371	
	1 " " '03	14,346	*5,380	8,966	-----	-----		1 " " '03	153,224	*75,500	77,724	41,790	35,934	
7 " " '04	99,300	*49,803	49,497	30,000	19,497	7 " " '04		984,236	*534,794	449,452	291,535	157,917		
7 " " '03	99,300	*49,803	49,497	30,000	19,497	7 " " '03		925,402	*476,706	448,696	283,860	164,836		