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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.

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Address all communications to

*THE STREET RAILWAY JOURNAL,
114 Liberty Street, New York.*

Noise Reduction on the Boston Elevated

It is gratifying to note that considerable success is attending the efforts of the Boston Elevated Railway Company to reduce the noise which is more or less inseparable from the operation of its trains. Although we are not aware that any apparatus has been devised that is capable of checking the estimate of 25 per cent reduction in two years which a Boston editor recently gave as the measure of diminution accomplished, there is no doubt that the management has obtained noteworthy results in dealing with this trying problem.

Few railway systems in America have given anything like the attention to the noise question which it has received, and is still getting, in Boston. Doubtless the attitude of abutting property owners has been a powerful stimulus to the company to employ every means at hand to lessen the sound of its elevated cars, but whatever the cause the results are a public benefit of no small value. The use of a leather link in the contact-shoe support has contributed materially to the reduction of noise, but perhaps the greatest success has been attained through the grinding of the car wheels to remove flat spots. The inspection of car equipments, air brakes, trucks and motors with the adjustment of loose parts in view is another factor

which is being carefully applied toward the problem's solution. For some time records of the exact speed of the trains at every point on the elevated division have been in the company's possession, these figures being obtained from the readings of a magnetogenerator, calibrated in terms of speed and belted to a drum mounted on the car axle. No item of information bearing upon the noise question has been knowingly slighted.

"Jim Crow" Legislation Unpopular in the South

The enactment of the "Jim Crow" laws in several Southern States was a mistake, and the impracticability of enforcing these measures was pointed out at the time, as they imposed restrictions and unnecessary expense upon the operating companies without affording relief to the community; in fact, instead of regulating the evil complained of, they aggravated the annoyance and discomfort of the traveling public. Now, that the Supreme Court of Tennessee has declared the law invalid because of a technical defect, it is evident that public sentiment will not favor any attempt to re-enact the measure. Commenting editorially upon the decision the Memphis "Scimitar" says: "Whatever the reason, the decision will be welcomed in Memphis, where it is realized that the people who ride in street cars would be put to serious inconvenience and annoyance if such a law were in force." The "Commercial Appeal" says that the law was conceived under circumstances "which had best not be related at this time," that it was "almost surreptitiously hurried through the Senate of the last General Assembly," and rejoices that it is now declared "invalid, illogical, unjust and unconstitutional." It seems to be the general sentiment wherever an attempt has been made to comply with the law that it is impractical and incapable of enforcement. These expressions do not mean that there is any change in public sentiment in the South on the general subject of the distinctions that must be observed with relation to the color line. It is pointed out that it is one thing to be forced to travel for hours or days with negroes on railway trains and quite another to ride with them for a few minutes on a street car. The railroads find no difficulty in complying with the "Jim Crow" law, but, as was proved in New Orleans and Memphis with the street railroads, it is almost an impossibility. The decision will be welcome relief to the operating companies, and it is to be hoped that this is the end of Jim Crow legislation, so far as street railways are concerned.

The Life of Franchises

The subject of the proper length of franchises is one which is now agitating municipal councils and street railway companies in several of the Western cities. Franchises for the use of streets, which were granted a number of years ago, are now expiring in certain cities, and the conditions upon which they will be extended and the life to be given their renewal are subjects of serious discussion. To most Eastern railway managers the discussion on this topic seems somewhat incomprehensible, as does the claim of a recent writer on railway finances that a sinking fund should be established by every street railway company to cover the loss caused by the lapse of its franchise when

the period for which it has been granted has expired. Most of the street railway franchises in the Atlantic States, outside of Massachusetts, are of the so-called perpetual kind, although not all of them, while those in Massachusetts are revokable if the railway company does not supply the service to which the municipal authorities and the railroad commissioners consider the public is entitled.

Theoretically both the perpetual franchises and the revokable franchises are unsatisfactory when viewed from the standpoints of both company and public. Theoretically the perpetual franchise offers no protection to the city, because the railway company, being secure in its use of the streets, can pay for this privilege an inadequate compensation and can furnish an inadequate service. On the other hand, the revocable franchise seems to offer no protection to the railway company. It would appear *prima facie* a most unbusiness like proposition for a street railway company to make a large investment in irremovable property like track and power stations on the basis of a franchise which can be revoked at a moment's notice.

As we have said, neither of these plans seems theoretically desirable. Practically neither of them has the serious objections which theory would indicate. Companies with perpetual franchises in New York and other Eastern States have found that although the franchise is perpetual in name its title does not prevent either a rigorous supervision of all details of operation by the State railroad commissioners or an enforced increase in the compensation paid for the use of the streets to the State or municipal authorities. Whether or not the State, as a final resort, has the power to declare such a franchise void or not is of little moment if it can, through its commissioners, compel the operation of additional cars if they should consider the public needs require an additional service, can specify the speed and compel use of safety appliances, or through legislative enactment can regulate the fares or increase the returns paid to the city and State for the use of the streets. On the other hand the revocable franchise, as in force in Massachusetts, possesses little danger to the railway companies, provided the power is never invoked except in extreme cases, where the welfare of the public is absolutely at stake. Massachusetts is famous, however, for the high intelligence of its administrative officers, and we doubt whether the plan followed in that State could be satisfactorily enforced elsewhere, but the New York plan of perpetual franchises, which is theoretically the other extreme, is practically on the same basis and is equally satisfactory from the public point of view.

We do not mean to say that such arbitrary power vested in legislatures or State boards always has or always will give absolute satisfactory results, even in the States mentioned. There has been and will be abuse of this power, but the courts are always the final resort, and can be appealed to in case of any serious injustice. Any plan of this kind involving constant inspection and occasional interference with the railway company by the authorities may not be the most perfect form of government, but we believe that on the whole the "perpetual" form of franchise will be found to be much more satisfactory to the public than where, as in many of the Western States, the franchise is granted for a predetermined set of years. It may be taken for granted that even with a limited franchise the court would not sustain an effort on the part of the city authorities to transfer the franchise at the end of the term under such conditions as to amount to practical confiscation of the property of the operating company. But even if this is so, the fact that the franchise is nominally limited to a short term introduces into the minds of capitalists an element of uncer-

tainty as to the future of the property which cannot but be detrimental to the service, especially during the few years preceding the termination of the franchise in question.

Needless Franchise Restrictions

The Rapid Transit Commission of New York, at the dictation of Mayor Low, has caused to be inserted in the franchise of the Hudson & Manhattan Railroad Company a number of provisions that might hamper the projectors of an enterprise less favorably situated, although it is said that the conditions under which the proposed North River tunnel is to be built will enable the company to accept the ordinance in the amended form, and that the restrictions will not affect this particular enterprise. Aside from the present case, and in view of the fact that the Mayor announced his intention of insisting upon similar provisions in all franchises for public service corporations hereafter, the effect of such a policy must be viewed with apprehension by those who are dependent upon similar enterprises for the development of their business, as, for instance, owners of real estate and merchants in outlying districts. Any movement tending to hamper or obstruct the completion and extension of transportation facilities is a serious menace to this class of investors, and the policy of imposing severe restrictions and oppressive regulations must result in the abandonment of many projects from which the entire community would reap substantial benefit.

Mayor Low insists that all transportation franchises hereafter shall contain a clause giving the city closer supervision over the operation of the plant, enabling the city, through its officers, to regulate the service and determine how the needs of the several sections may best be served. These are practical operating problems, and neither Mayor Low nor his advisers can consistently claim to be possessed of sufficient knowledge to enable them to speak intelligently, not to say authoritatively, upon the subject. The only redress left to the companies is through an appeal to the courts to relieve them of the oppression which corrupt or incompetent city officials might attempt to inflict. The history of New York's municipal government does not inspire confidence, and the chapter that is being furnished by the present administration is not a record of brilliant achievements or a consistent, well-defined policy; therefore, those who have given this subject earnest consideration are justified in withholding approval from the proposal to intrust such important matters to politicians and pedants.

Interurban Service

The Institute papers on electric railway subjects have been presented in whole or substance in these columns. That by Mr. Armstrong on high-speed electric railway problems, which was printed in our issue of July 4, is one of the most suggestive and useful contributions to technical literature that we have seen for many a day. It deals very directly, in particular, with one of the most troublesome questions that confronts the engineer—the effect of stops on schedule speeds and the requirements for motor capacity. By drawing up curves, based on a standard motor for interurban work and showing output per ton-mile and schedule speed, as related to the stops per mile, Mr. Armstrong makes it at once possible to ascertain the requirements for any given schedule and to assign the limits of possible speed and number of stops at least approximately. The only criticism that we should make on his results are that they are based on a set of coasting experiments, which we think assigned an excessive value to the resistances, but this has at least the merit of being an error of conservatism likely to lead

to safe values for the other quantities. Three sets of curves are given, for one car, two cars and trains of eight or more cars respectively, so that comparisons can be quickly made to determine the most suitable service under given conditions. Perhaps the most striking feature of the paper is displayed in the relations of these curves, showing, as they do, in the most striking manner the immense saving in the energy required at high speeds, due to operating even short trains in place of single cars. The operation of single cars has been rather a fetish in electric railroading, but with the expansion of inter-urban service has come a half-unconscious recognition of ordinary railway precedents, so that most of the roads which attempt what would be called high speed from the ordinary railway standpoint, do so with trains rather than single cars.

Another most instructive result which appears in Mr. Armstrong's curves is the violent way in which frequent stops make themselves felt when high speed is attempted. With single cars and a maximum of 60 m. p. h., one stop per mile brings the schedule speed down to a little less than half that figure, while two stops per mile reduces the schedule to little more than 20 m. p. h. It becomes then perfectly evident that in order to secure quick running time for suburban work the stops must be infrequent, and this is true even when the maximum speed is as great as 75 m. p. h., which, with one stop per mile, brings the schedule to 28 m. p. h. Hence, electric roads to compete with ordinary suburban roads must follow suburban practice and stop at as few stations as traffic permits. In other words, this condition implies a distinct class of suburban and interurban electric roads differing from other railroads only in motive power. We have many times alluded to the gradual evolution of such a class. Of its usefulness and of the general advantage of the electric motive power there is no manner of doubt, but such roads are in no sense ordinary tramways and must have the same sort of terminal facilities as other railways to gain the full advantage of their operating schedules. They belong to a complete rapid transit system, rather than to the class of surface tramways. Suburban roads of more modest speed are quite a different matter. A maximum speed of 30 m. p. h. allows a schedule of 22 m. p. h. with one stop per mile, and of 14 m. p. h. with three stops per mile, and equipments of this sort can readily be fitted to work over tramway track at tramway speeds in the urban part of the run, while the faster equipments involve many difficulties and some dangers in working at greatly reduced speeds, and do best when equipped with regular railway running gear and operating on regular railway track.

The duplex evolution of the interurban road, therefore, comes about very naturally, and is likely to continue, with fewer and fewer transition types as time goes on. The railway type will steadily tend to running trains, and the tramway type will adhere to single cars. Another convenient use of Mr. Armstrong's curves lies in predetermining schedules on a long line. For instance, with a maximum speed of 45 m. p. h. and stops every 2 miles on the open part of the route, the schedule speed would be about 33 m. p. h., while with three stops per mile in the suburban districts the schedule would have to be cut to about 16 m. p. h. These figures do not vary greatly in operating a train, but the energy per ton-mile does vary immensely, and the relation of this energy to operating expense can be readily determined. Mr. Armstrong goes through a computation of this kind, and shows that for a schedule of 40 m. p. h., and stops every 4 miles, it would pay to run two-car trains, even at a considerably increased first cost in the sub-station equipment. His point as to the difference in traffic as between

a car every half-hour and two cars every hour, seems to us a little fine-drawn, since the capacity is the same, and a road which could not fill the cars under either condition would hardly be a paying proposition. The computation shows, however, the serious effect of sub-station costs in a most pointed fashion. The development of the larger electric traction seems to us to depend on the abolition of these costly sub-stations with rotaries, or at least upon a great reduction in sub-station expenses. Much of the substance of Mr. Armstrong's paper is not unfamiliar to electric railway engineers, but it is exceedingly well put, and will repay careful reading and preservation for reference. The exactitude of the absolute results, of course, depend on the original train resistance data, but the relative results are sound to a reasonable degree of approximation, and they are certainly in most convenient form.

Compensation for Franchises

One of the subjects upon which representatives of the Chicago City Railway Company and the city officials have been unable to agree is the amount of compensation to be paid for the new franchises and the form this compensation is to take. The Mayor and his adherents demand that the traction companies waive their claims under the ninety-nine-year franchise act, and make other concessions without any assurance whatever from the city even as to what may be expected in return. The companies, on the other hand, consistently maintain that these are matters for negotiation; that in relinquishing any rights or privileges they possess assurance must be had from the city of equivalent compensation in return. This attitude is in line with Judge Grosscup's opinion on the proper policy to be pursued by the receivers for the Union Traction Company, and it is manifestly so fair and logical that we believe it will be generally accepted by the conservative element of the community.

Already conflicting interests are at war over the form which the proposed compensation is to take. Property owners along the streets occupied by the railways have set up the claim that the license, tax or fee of whatever form exacted from the operating companies should be expended in paving and repairing the roadway along the route, but this is not popular with the great mass of patrons of the street cars who do not own real estate or at least have no investments which would be benefited by this plan. Some of the newspapers, recognizing this condition, have taken up the advocacy of a reduction of fare as an alternative, but this does not produce any enthusiasm, as there is no general demand of this kind on the part of the people. What the city really needs is improved service, which can only be procured at the expenditure of vast sums for modern equipment and construction throughout the entire city. It would seem, therefore, that the logical solution of the problem would be co-operation between the city and the owners of the railway lines, which would enable the management to place within reach of the community, with the least possible delay, a thoroughly modern service such as the city of Chicago is entitled to and which it must have if its industrial progress is to be encouraged and assisted. The companies have already shown that they stand ready to perform their part if the city will do likewise. The interests of the entire community would best be served by the adoption of a plan that would recognize the fundamental principle that the mission of street railways is to provide transportation facilities for the people, and that the men who build and operate these roads are entitled to a fair return upon their investment and adequate compensation for their services.

THE FIRST THIRD-RAIL ROAD IN SWITZERLAND

BY HENRI SOMACH

The first third-rail electric railway in Switzerland was put in operation recently and extends from Fribourg to Morat, near Neuchatel. It is 22.4 km in length and forms a part of the regular railroad system of Switzerland; in fact, the southern section of the line, 21.4 km (13.3 miles) in length, was until recently operated by steam. The change from steam to electricity was decided upon partly owing to the cheapness of electric power in Switzerland, but principally because the cost of operation by steam was very high, owing to the heavy grades encountered.

A profile of the line shows a large number of heavy grades for steam line. The difference in elevation between the termini, Fribourg and Anet, is only 195 m (640 ft.), but the maximum grade is 3 per cent, and there is one grade of 2 per cent for a length of 3.7 km (2.3 miles).

After deciding upon the adoption of electricity the question of direct-current or three-phase motors was carefully considered, and the former was finally adopted, in spite of the fact that an 8000-volt, three-phase station belonging to the canton of Fribourg was to furnish the power. The principal reasons which led to the selection of direct current were as follows:

(1) The direct-current system permits the utilization in the sub-stations of storage batteries to equalize the load and thus avoid sudden changes of load in the power station.

(2) These batteries also act as a reserve in the case of momentary interruption to the primary circuit.

(3) The automatic regulation of direct-current series motors is very desirable on grades where they reduce speed with an increase in load. On the other hand three-phase motors, which run at a constant speed, would have to be designed of sufficient capacity to maintain this speed on the steepest grade on the line, and this would require much larger motors than if direct current was used.

(4) A third rail contact is better for large currents than an overhead trolley; moreover, the use of the three-phase system introduces complications in the overhead work, especially at stations, switches and crossings.

The overhead system is used at both terminal and at certain



GRADE CROSSING WHERE THIRD RAIL IS CHANGED FROM ONE SIDE TO THE OTHER TO SECURE A SHORT BREAK

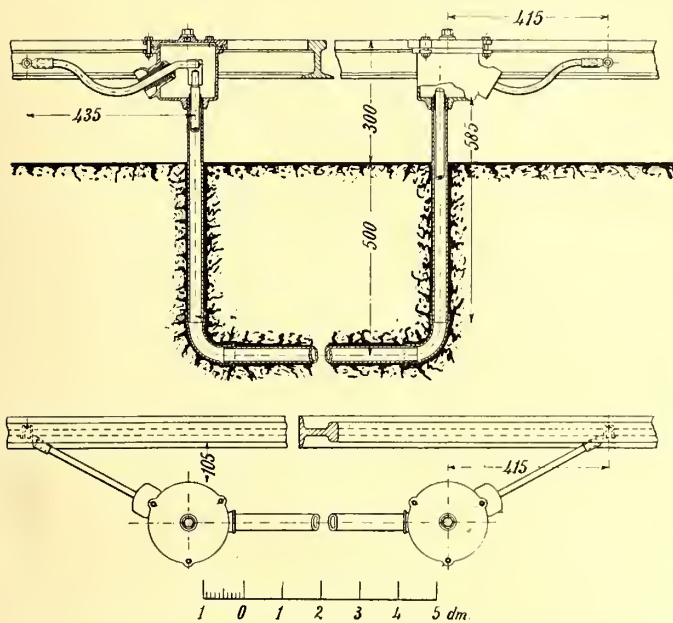
intermediate stations, and current is taken by a bow trolley. Elsewhere the third rail is used, protected by wooden guards at points where there would be danger of accidental contact with it.

The third rail itself is a T-rail, weighing 25 kg per meter (50 lbs. per yard), and is laid in lengths of 20 m (65.8 ft.).



ELECTRIC FREIGHT TRAIN IN STATION AT MORAT

The conductivity is 0.13 ohms per meter length and per square millimeter, and it is bonded with copper bonds of 100 sq. mm section (No. 0000). The rail is mounted on special insulators, as shown on page 116, composed of a casting, on which is an Ambroin insulator, which in turn carries a casting for holding the third rail. A disc of lineoleum is placed between the insu-



PLAN AND SECTION OF METHOD OF ELECTRICALLY CONNECTING THIRD RAIL AROUND BREAKS

lator and the upper casting to reduce the shock of the blows on the insulator. The insulators are carried on special ties placed between the regular ties and spaced 4 m (13 ft.) apart. The top of the third rail is 135 mm ($5\frac{3}{8}$ ins.) above the top of



SUB-STATION AND PASSENGER STATION AT PENSIER, SHOWING A POINT WHERE CHANGE IS MADE FROM THIRD RAIL TO OVERHEAD WIRE



INTERIOR OF MOTORMAN'S COMPARTMENT, SHOWING CONTROLLING APPARATUS



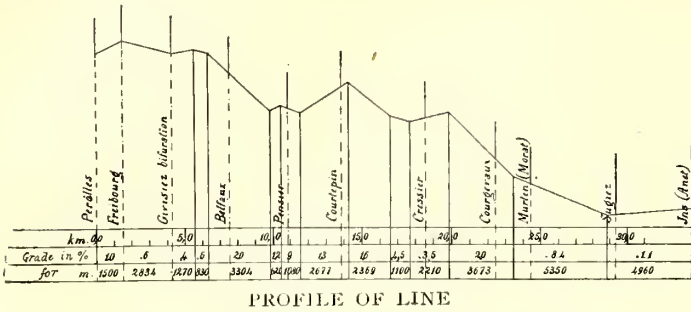
APPARATUS FOR SETTING THIRD RAIL IN POSITION

the track rail and 660 mm (26 ins.) from the gage line. Expansion joints are located every 100 m (305 ft.), where about 15 cm (6 ins.) have been left between the ends of the rails. As

ing is secured by operating the motor as generators through a resistance.

Each motor car is equipped with two Oerlikon motors of type TM-20 and of 150 hp each. They operate at 750 volts, with two series parallel controllers. The shoe is of malleable steel and has a somewhat novel suspension, as shown herewith. When operating with the bow the motorman cuts off the circuit from the shoe by means of a special switch, and when the bow trolley can be lowered by means of a small winch operated by the motor.

As has already been stated the road takes current from an 8000-volt, three-phase circuit. To transform this to direct current there are two sub-stations, one at Penser, 11 km from Fribourg, and the other at Morat, 24.5 km. The daily traffic consists of 10 trains, of 70 tons each, each way during 18 hours of the day. This requires the output for a sub-station to be that to operate only one train at a time. Each sub-station contains a storage battery set consisting of 400 cells, with a



PROFILE OF LINE

the third rail is held in the insulators by gravity only it is anchored to prevent it creeping by means of two steel wires 6 mm (1/4 in.) in diameter. These anchor wires are connected with the third rail and also to cross ties, and insulation from earth is secured by two strain insulators. The third rail is carried on one side or the other of the track, depending on local conditions.

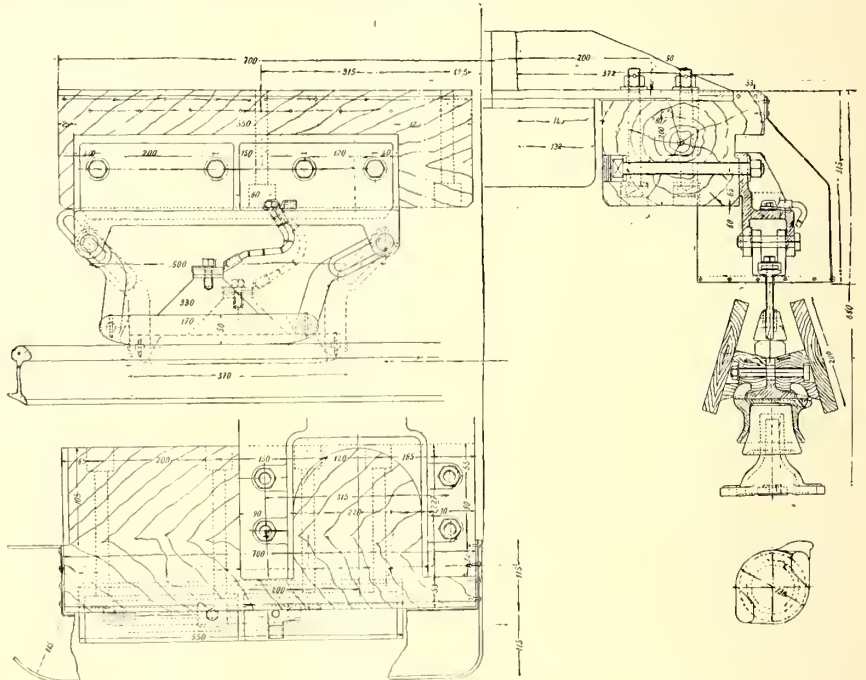
The motor cars are furnished with four shoes, two at each end, and the distance between the two shoes on each side is 14.5 m (47 1/2 ft.).

The usual composition of a train is one double-truck motor car, one six-wheel trail car and three four-wheel trail cars.

The speed of a train of 70 tons on a 3 per cent grade is 23 km (14 1/2 miles) an hour, and on a level is 35 km (22 miles) an hour. The dimensions of the motor cars are as follows:

- Length over all, 17.3 m (56 ft. 9 ins.).
- Length of body, 16.2 m (53 ft. 3 ins.).
- Total width, 3.035 m (11 ft. 3 ins.).
- Truck base, 11.5 m (37 ft. 9 ins.).
- Wheel base, 2.6 m (8 ft. 6 ins.).
- Weight of motor car, 33 tons (72,600 lbs.).

The motor cars seat forty-eight passengers, and have a baggage compartment and motorman's compartment. They are equipped with three brakes, viz., a Westinghouse air brake, a hand brake and an electric brake, also with an air whistle. The electric brak-

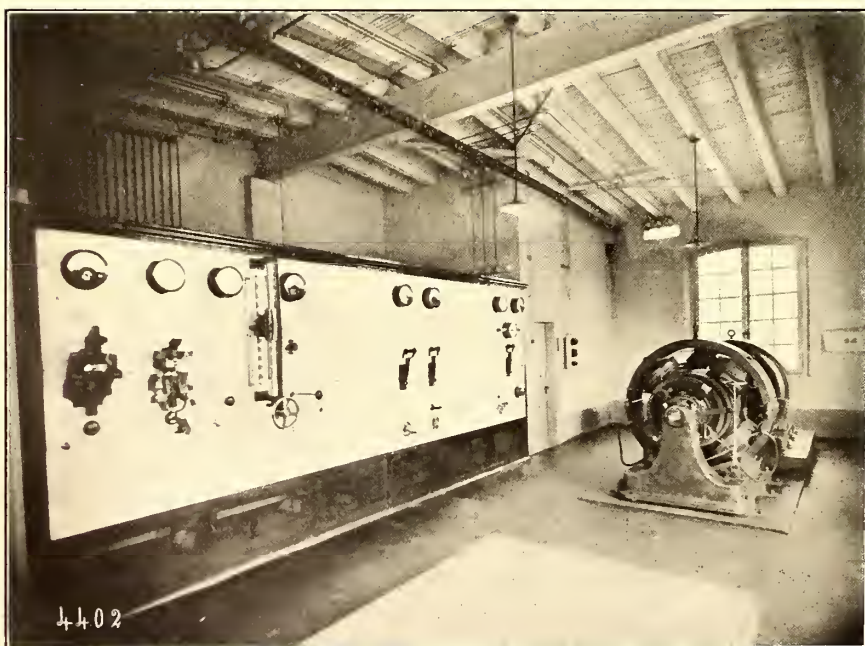


DETAILS OF THIRD RAIL AND CONTACT-SHOE

capacity of 207 amp.-hours. The power necessary to operate a train on the steepest grade is a maximum of 240 hp, and this power, as will be seen, is largely supplied by the battery.

The other electrical apparatus used in the sub-station consists of a synchronous motor, direct coupled to a direct-current generator of 100 kw, wound for 800 volts direct current, and running at 500 r. p. m.; also a direct-current exciter of 30 volts and 180 amps. The synchronous motors have a capacity of 135 kw, and are operated directly from the three-phase circuit at 8000 volts. The switch-board in each sub-station consists of six panels with two in reserve. As for the battery, it can be divided into two sections connected in parallel; after discharging the two halves are connected in series. In this way it is not necessary to use boosters.

The entire construction of the road, with the exception of the track and buildings, was carried out by the Oerlikon Machine Company of Oerlikon, near Zürich, Switzerland. The operation has been most satisfactory from a financial as well as from an electrical and mechanical standpoint.



INTERIOR OF MORAT SUB-STATION

OPERATION OF ELECTRIC CARS IN CRIPPLE CREEK DISTRICT

The electric railway operated by the Colorado Springs & Cripple Creek District Railway Company, in the Cripple Creek District of Colorado, has many interesting features which distinguish it from other electric roads. The main line of the Colorado Springs & Cripple Creek District Railway is a steam road, and is popularly known as the "Short Line." It runs from Colorado Springs up the mountains to Summit, which has an elevation of 10,000 ft. above sea level, and then descends to Cripple Creek and Victor, respectively 45.8 miles and 44.6 miles from Colorado Springs. This line is renowned for its grand scenery and bold engineering, and is exceedingly well patronized by tourists as well as by local passengers.

The electric part of the system operates entirely within what is familiarly spoken of as the Cripple Creek District, and reaches all the principal mines and camps of this famous gold-mining district. The road consists of two lines, known as the "High Line" and the "Low Line." Both have Victor and Cripple Creek as their terminal points, and at Cripple Creek the cars of the two lines pass around a loop in the center of the business district and use the same track to Victor Junction, a distance of 1.1 miles. In Victor, up to very recently, the terminal points of the two lines have been about four blocks apart, but franchise rights have lately been obtained to connect the lines, as shown on the accompanying map. This connection will now allow the company to run the cars over on one line and back on the other if desired. The map shows the routes of the two lines as altered recently. The sharp curves are necessitated by the variations in elevation and also on account of the situation of the mines which the road reaches.

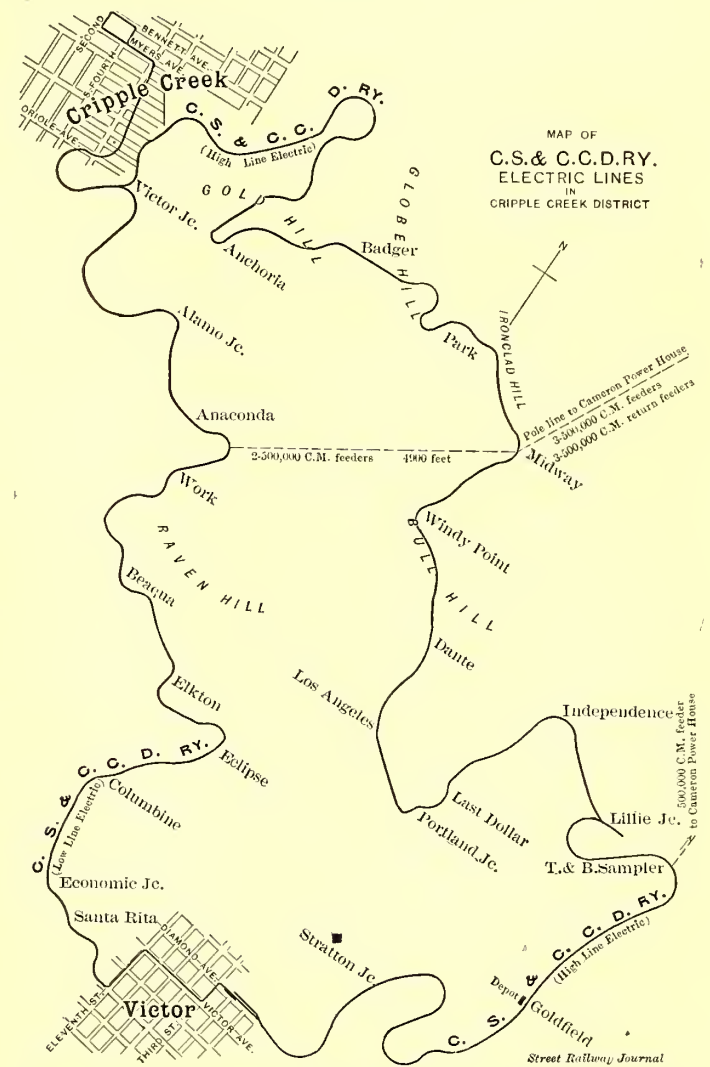
The Low Line is considerably shorter than the High Line, and as the grades are easier the cars are geared for 22.5 m. p. h., and the distance of 5.6 miles is regularly made in the schedule time of 27 minutes. On the High Line the cars are geared for only 12.6 miles an hour, on account of the heavy grades, for they reach 10 per cent in places, and the schedule time for the run of 9.9 miles between Victor and Cripple Creek is 55 minutes. The motor cars used on both lines are equipped with four General Electric 57 motors, rated at 52½ hp each.

The Low Line cars in making the run from Cripple Creek to Victor pass by Pointer, Anaconda, Beagua, Elkton, Eclipse, Columbine and Santa Rita, around Raven Hill and over Beacon Hill, from which elevation a magnificent view is obtained of several mining towns, the Saugre de Cristo range, Mt. Pisgah, Black Horse Hill, etc. On the High Line, Midway, Independence and Goldfield are passed, and Bull Hill is surmounted at an altitude of 10,500 ft. At Windy Point and Midway the cars pass just below Altman, the highest incorporated town in the world, over 11,000 ft. above the sea level.

The passengers on these cars are principally miners, who work in the various mines and live in Victor, Cripple Creek or Goldfield. As they work principally on 8-hour shifts they afford a substantial and regular traffic. As both lines are exceptional for their scenery and for the famous gold mining district through which they pass, they are well patronized by tourists. The morning train from Colorado Springs gives a wait of 2½ hours in the District, allowing visitors ample time to make the trip over both electric lines and return to Colorado Springs for dinner. A fare of 10 cents is charged on the Low Line and 20 cents on the High Line, and "circle tour" tickets are sold for 25 cents. There is a strong competition with two steam roads for passenger traffic between cities in the District, but the electric cars capture the bulk of the business.

Power for the operation of the electric divisions is supplied from two power houses. One of these is located at Lake Moraine, on Pike's Peak, and is equipped with a water-wheel, driving a 250-hp alternator. The current is transmitted a dis-

tance of 8 miles to the town of Cameron, where a steam plant is located. This latter plant is equipped with a 250-hp railway generator and transformers and rotary converter for the high-tension line. From Cameron a feeder line at 600 volts is carried to Midway, the nearest point on the High Line. The line consists of three 500,000-circ. mil cables. A 500,000-circ. mil feeder is also carried by a separate pole line to a point on the High Line, between Goldfield and Independence. The Low Line is fed by a line carried across country from Midway to Anaconda, a distance of 4900 ft. This line consists of two 500,000-circ. mil cables. From the two points on the High Line and from Anaconda on the Low Line the feeder lines are carried along on the trolley poles to the tapping-in points. The two roads are thus interconnected electrically, and from



Midway back to Cameron there are run three 500,000-circ. mil return cables, ground return not being depended upon.

On the Low Line there are operated thirty-six cars a day each way, beginning at 6:00 a. m. and running every 30 minutes until midnight. The High Line cars run on an hourly schedule from 5:15 a. m. to 3:10 a. m., with extra cars around 8:00 a. m. and 4 p. m., when the shifts of miners change. Twenty-four cars are operated each way during the 22 hours.

As parts of both tracks are used by the steam trains of the Colorado Springs & Cripple Creek District Railway for both passenger and freight service, all cars, electric as well as steam, are operated strictly under a despatching system from the Colorado Springs office. The despatching is done by telegraph, with registering stations at Cripple Creek depot, Bennett Avenue (Cripple Creek), Victor, Portland Junction, Vindicator Junction and High Line Junction. Between Cripple Creek Station and Victor Junction, a distance of 0.7 mile, both lines of electric cars and the steam passenger trains use the

SECOND ELECTRIC DIVISION.

Table with columns for stations (271-272) and time-tables for Westward, Eastward, and Victor to Cripple Creek. Includes a 'TIME-TABLE 6' section for the 7th and 8th districts.

TRANS RUN IN SECTIONS. These sections are to be run... SPECIAL RULES AND REGULATIONS. Applicable to Second Electric Division and Superseeding General Rules and Regulations, which are Inapplicable Therewith.

REGULATIONS. No. 55 will take siding on second electric division track when meeting No. 8 at Victor Junction. Second electric division trains will have the right of track over first district trains between Bennett Avenue and Cripple Creek station.

SAMPLE PAGE OF TIME-TABLE ISSUED FOR THE USE OF EMPLOYEES OF THE COLORADO SPRINGS & CRIPPLE CREEK DISTRICT RAILWAY COMPANY

THE OPERATION OF THE RATEAU STEAM TURBINE

In the STREET RAILWAY JOURNAL for April 18 an extended description was published of the Rateau turbine, as constructed at the Oerlikon Machine Works in Switzerland. The following discussion of the theory and operation of the machine has been especially prepared for this paper by Professor A. Rateau, of Paris.

Before giving any figures on efficiency it is desirable to define exactly the meaning of the term as used by Professor Rateau. It is too frequently the practice in tests of this kind to state the steam consumption per kilowatt-hour without giving the figures for the initial pressure of the steam and of the exhaust.

In his turbine tests Rateau determined the efficiency from the ratio of the real steam consumption to the theoretical con-

same track, and all cars are operated on a block system from Cripple Creek station, the operator at Victor Junction receiving his orders over a telephone line.

For the guidance of employees elaborate time-tables are published, one comprising only the Low Line electric cars and the other the High Line electric and the steam trains. A reproduction of one of these is given herewith. Following are some of the rules and instructions printed on these time-tables for governing electric cars:

No. 55 will take siding on second electric division track when meeting No. 8 at Victor Junction. Switch at High Line Junction will be left set, and locked for electric line.

Second electric division trains will have the right of track over first district trains between Bennett Avenue and Cripple Creek station.

All electric trains change numbers at High Line Junction. East-bound electric trains will not leave Victor until all overdue West-bound electric trains have arrived.

No train will exceed a speed of 10 miles per hour through city limits of Goldfield.

All electric trains will stop at Goldfield station, and will stop, on signal, at T. & B. Samples, Independence Avenue, and Twelfth Street, Goldfield, Stratton Junction and Hollywood.

All electric trains will stop at Independence, and will stop on signal at Last Dollar.

Regular trains will not exceed schedule time. Irregular trains will not exceed schedule time of regular trains.

Trains following each other must keep not less than five minutes apart.

Electric trains, before crossing steam line or entering thereon, shall be brought to a full stop with motor car not less than 30 ft., nor more than 60 ft. from the crossing, and will not proceed until the conductor has gone ahead to the crossing, and ascertained that no steam line trains are approaching from either direction, when he will signal the motorman to come ahead.

Conductors and motormen of electric trains will be held responsible for accidents with steam line trains at grade crossings.

Second electric division trains will look out for first district No. 55, using second electric division track at Victor Junction when meeting No. 8.

With these rules, which are strictly adhered to by all employees, the electric cars are run in between the steam trains without any friction, and since the opening of the electric division, over four years ago, no serious accidents have occurred. The immediate supervision of the electric trains is controlled by E. E. Hartman, with headquarters at Cripple Creek, while the general management of the cars is in the hands of F. C. Smith, general superintendent; C. W. King, trainmaster, and R. R. Norton, chief dispatcher, with offices at Colorado Springs.

MILFORD STREET RAILWAY SYSTEM

The street railway system centering in Milford, Mass., offers many points of interest, both from an engineering standpoint and on account of the peculiar situation in reference to the territory covered and the steam roads in that section. The former

return tubular, horizontal hand-fired boilers, aggregating 700 hp. The generating machinery aggregates 1150 kw in three units, as follows: A 600-kw Westinghouse generator, compound wound, direct-connected to a cross-compound, 1000-hp steam engine; a 325-kw General Electric unit, direct-connected to a 700-hp simple engine, and a 225-kw General Electric

direct-connected to a 500-hp simple engine.

The engines are condensing and take steam at 120 lbs. pressure. The station also operates for the Milford Electric Light Company 150 kw of alternating-current machinery. The 225-kw dynamo is connected up so that it may be used either as a railway generator or as a line booster.

The rolling stock of the system comprises forty passenger cars and several plows and freight cars. There are eleven four-motor equipments, the remainder being two-motor equipments. Some of the heaviest cars are 41 ft. long and weigh 20 tons each.

The longest line operated covers 16 miles, and runs to North Grafton. It was formerly a steam road and has a private right of way throughout. High speed is maintained, and an hourly service is operated under ordinary conditions. The farther end of this line is fed from a rotary located in the passenger station at Grafton Center. Alternating current is transmitted over three No. 6 aluminum wires at 10,000 volts pressure, from an inverted rotary at the station, taking current from the direct-current bus-bars. The other two long lines on the system are operated with storage batteries, furnished by the Electric Storage

Battery Company, and this feature of the installation will be discussed here, as the results obtained are significant.

The Milford & South Framingham line, the longest of these on which the storage battery is utilized, has 12 miles of track in all, with a long, steep hill about 3 miles from the South Framingham end. Formerly the power for the last 3 miles of



ENTRANCE TO LAKE NIPMUC PARK, ON LINE UTILIZING STORAGE BATTERY AS AUXILIARY

will be considered chiefly in this article, but to understand the problem fully a general statement of local conditions will be necessary.

The district served lies within the limits of a triangle formed by the cities of Boston, Providence and Worcester. There are five lines running out of Milford to the towns of Medway, South Framingham, Hopkinton, North Grafton and Uxbridge. The line from South Framingham, through Milford to Uxbridge, and the line from North Grafton, through Milford to Medway, form two diagonals which cross this triangle and give two connections between the Boston & Albany Railroad on the north, and the New York, New Haven & Hartford Railroad on the south. This fact has given rise to the phrase "Across the Triangle" as an advertising catch word. The Boston & Albany also has a branch line from South Framingham to Milford, and has been obliged to reduce its fares to street railway rates in order to retain any of its former business.

There are two parks on the system, one near Mendon, known as Nipmuc Park, on the Uxbridge line, which draws from Milford, Hopedale and Uxbridge, and the other known as Waushakum Park, near South Framingham, which draws from the latter town and the small villages lying between it and Milford.

The railway is operated by direct current, and has storage battery auxiliaries on two lines and a 10,000-volt alternating current transmission line fed by an inverted rotary at the power station on the third.

The power station is well situated in the center of the system, and is on a steam railway siding. It is equipped with five



POPULAR PARK RESORT

this branch was supplied at a fixed rental from a local power station belonging to another road in South Framingham, as it was impossible to keep up steady voltage at the end of the line when depending entirely upon the Milford station. The storage battery on this line is at Gouch's Corner, about 8¾ miles from the main power station. It enables the road to

operate the entire line from its own generating plant, thus cutting off the expenditure for rented power, and effecting a saving of about \$1,200 per year. The resistance of the circuit

improves the operation of the road will be readily understood from the following considerations: When the battery is discharging momentarily at its hour rate, 240 amps., the potential



MAIN POWER HOUSE

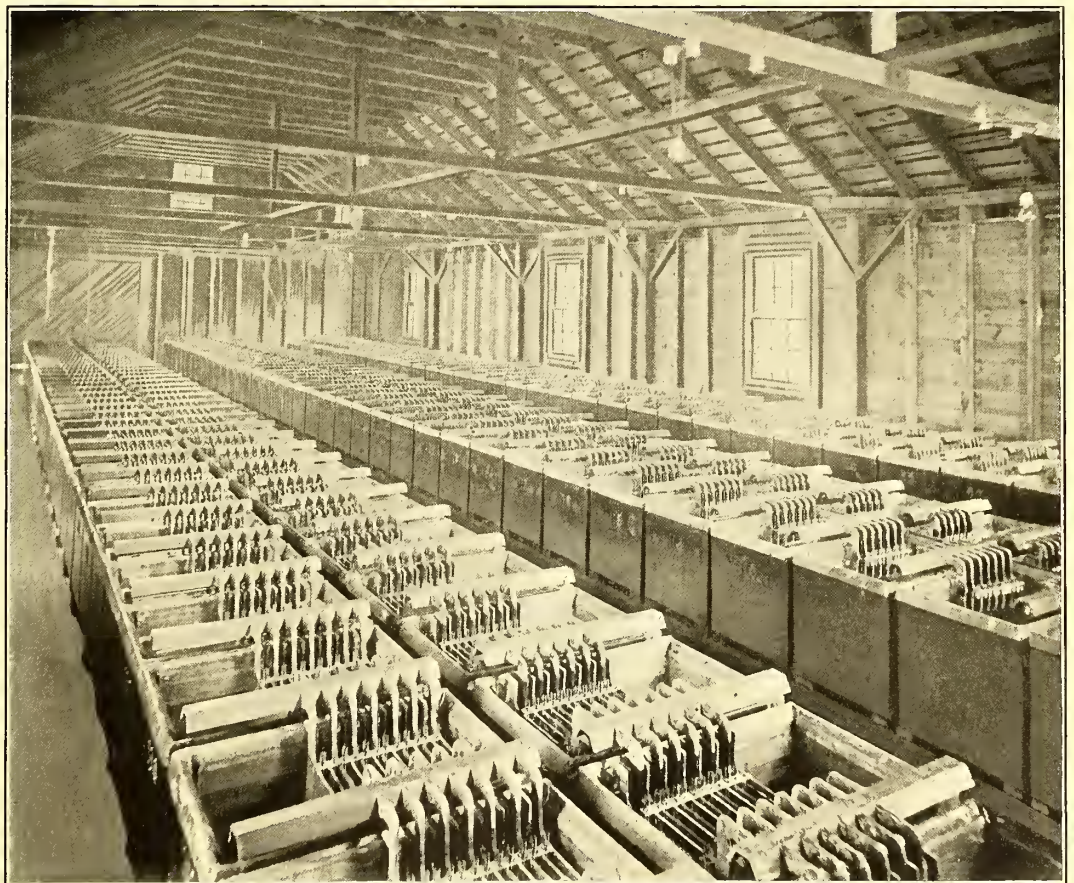


STORAGE-BATTERY HOUSE

between the power station and this battery is approximately 1 ohm, and the average load on the line is sufficient to cause an average drop of 50 volts to 75 volts. The number of cells installed in the battery, 240, balances an average voltage of approximately 500 at that point.

will drop about 40 volts below the average, reaching a minimum of 460. If the 240 amps. given by the battery had been supplied by the power house over the feeder and track resistance

Each cell consists of a hard wood tank lined with lead and mounted on four insulators, which in turn are carried on wooden stringers, resting on vitrified bricks. The tanks contain thirteen plates, of the size known as type F, measuring 11 ins. x 10½ ins., but are made large enough to receive nineteen plates, so that the battery can be increased 50 per cent in capacity by the simple addition of more plates in each cell, an operation which can be accomplished, if necessary, without taking the battery from service. The battery is rated for a discharge of 240 amps. at the hour rate. The house is of wood with a shingle roof, and is unfinished on the inside. In the front portion is a small space cut off and sheathed, to form a room for the switchboard which controls the battery. The switchboard is of marble and carries a circuit breaker, ammeter, voltmeter and single-pole, single-throw, quick-break knife switch. A recording voltmeter keeps a continuous record of the battery voltage.



INTERIOR OF A STORAGE-BATTERY HOUSE

The plant has been in operation two years, and in that time the momentary discharges have frequently reached and even exceeded the hour rating. The manner in which this auxiliary

of 1 ohm, it is evident that the drop would have been 240 volts greater, reaching a minimum of 220 volts. Without the battery it will therefore be seen the line voltage would fall to 220 volts, while with it the voltage is maintained at 460 under the same conditions of load demand. If the demand came from a car farther out on the line the voltage at the

car would, of course, be lower still, this being governed by the drop in the circuit between the battery and the car, yet without the battery it might be as low as 175 volts or 150 volts.

The second battery is located at Lake Nipmuc Park, near Mendon, on the Milford & Uxbridge branch, 6½ miles from the power station. This branch is very hilly and causes the load to fluctuate widely. This battery is a duplicate of the one at Whitney's Turnout, excepting that it has 234 cells. It has been in commission approximately the same length of time, and operates in the manner already described; the accompanying readings, taken May 7, 1903, show clearly the effect on the line voltage produced by having the battery connected or disconnected. The circuit resistance between the station and this battery is about three-fourths of an ohm.

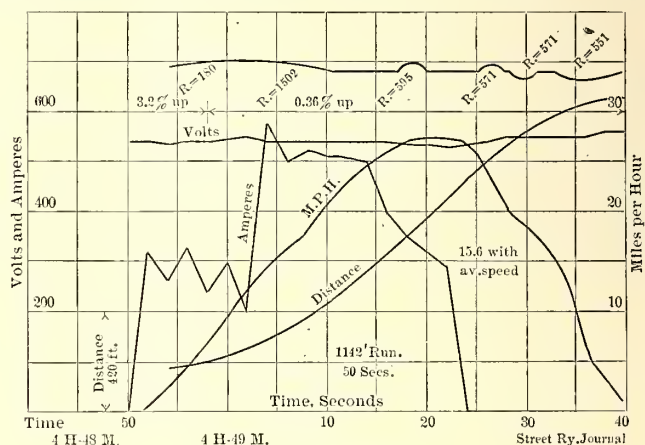
On very heavy days in summer when there is large travel to the parks the batteries are drawn upon as reserve, thus serving the double purpose of regulating the fluctuations of the line voltage, and to a certain extent relieving the power station of overload. This action is automatic since the extra load drops the average line voltage below the average battery voltage, resulting in a net battery discharge. Seven cars frequently start from one of the parks at the same time, and without the assistance of the battery it would be impossible to move them, owing to the low voltage that would ensue. The readings, heretofore referred to, were taken under conditions of ordinary service, and they show a variation of 295 volts with the battery off the line, the voltage ranging from 275 to 570, whereas, with the battery on the line the variation extended from 430 volts to 490 volts, or only 60 volts.

Since the installation of these two batteries two years ago nothing has been spent in renewals, and the attendance has been found to be extremely small, calling merely for the labor required in adding water to the cells to replace vaporization

to make. This compares favorably with the charge of \$14 per week for a regular attendant at the rotary sub-station on the Grafton line, and whatever may be further charged up to this work from the time of the station agent, who takes care of the rotary during one shift. The experience on the Milford system suggests great possibilities for the storage battery in this character of service, and will repay an examination into the financial as well as the engineering aspect of the cases.

AN ACCELERATION TEST

The study of speed, current and time diagrams in runs made by high-powered car equipments always brings out many interesting points in connection with train movements. In the

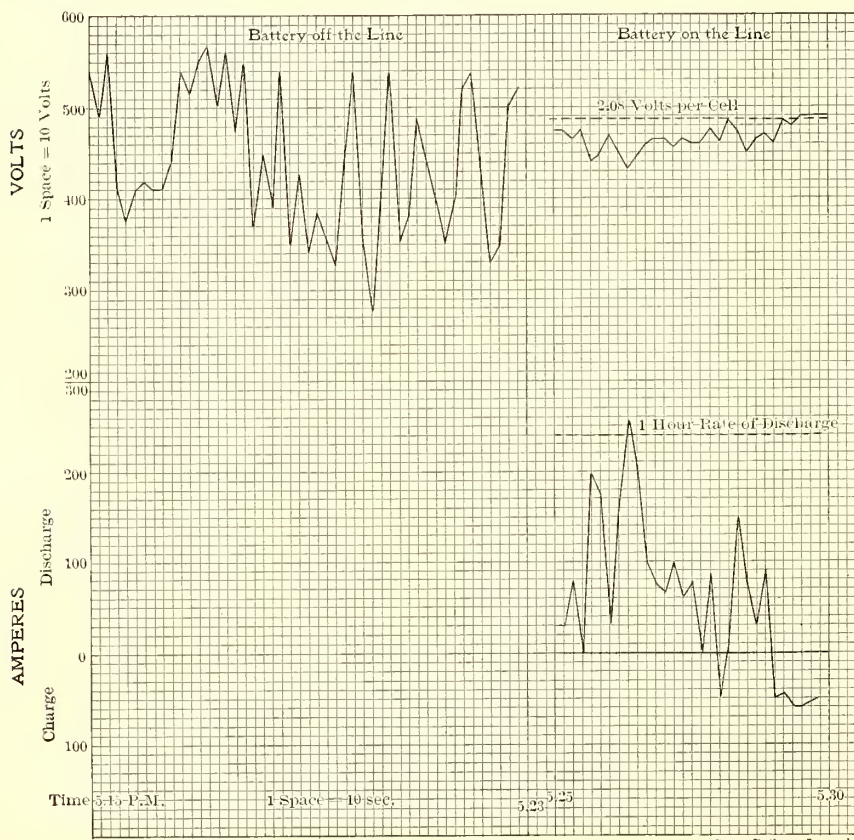


ACCELERATION DIAGRAM

accompanying diagram is exhibited the results of a test made on a 30-ton car to determine the energy consumption of the equipment in an acceleration run. The car was equipped with two General Electric-55 (160 hp) motors, gear ratio 50 to 21 or 2.38, and operated by the Sprague multiple-unit control. About 63 per cent of the weight was on the drivers. The weight of the car without passengers was 29.9 tons, and the passenger weight was 1.6 tons, total weight 31.5 tons. The run was made on a .36 per cent up-grade, and the current was kept on until close to the application of the brakes. The equipment thus covered the distance of 1005 ft. in practically the fastest time which it could make, 46 seconds from start to stop. Readings were taken every two seconds by a corps of observers stationed on the car, a clock being fitted with a suitably notched wheel for ringing a gong through an electric contact.

Analysis of the diagram shows a maximum current of 520 amps. at 537 volts or 280 kw, this being about 9 kw per ton. The maximum speed was 27.5 m. p. h., and the average speed 14.9. The ratio of average to maximum speed was 54.2 per cent, but the equipment was designed to give the car a maximum speed of from 40 m. p. h. to 45 m. p. h. on a level track with unobstructed running space. The current averaged 340 amps., and was applied 32 seconds, or about 70 per cent of the time, and the average voltage was 540, and the minimum about 537. The ratio of average to maximum current was about 66 per cent. The average power consumption of the car was 183.5 kw, or 246 hp, the ratio of

maximum to average being something over 1.5 to 1. The total kilowatt-hours were 1.63, and the kilowatt-hours per car-mile were 8.55, which brought the watt-hours per ton-mile to 272. The energy cost of runs, which contain little or no coasting, is decidedly apparent here.



EFFECT OF BATTERY OF 234 CELLS AT LAKE NIPMUC PARK, 6½ MILES FROM POWER PLANT

and in changing the charts of the Bristol recording voltmeter once a day. This work is attended to by a man who receives in return a pass on the road. In addition the chief engineer of the company charges 1½ hours of his time per week to the storage batteries for such superintendence as he is called upon

Considering the speed curve we note that the average rate of acceleration was 1.06 m. p. h. per second, calling for a total accelerating tractive effort of 3040 lbs., or 96.5 lbs. per ton. This rate could probably have been considerably increased if the throttle of the controlling apparatus had been set for a heavier current; 56.5 per cent of the time of the run was acceleration, and 32.6 per cent was occupied in braking. The rate of braking averaged about 1.67 m. p. h. per second, calling for a retarding force of 4800 lbs.

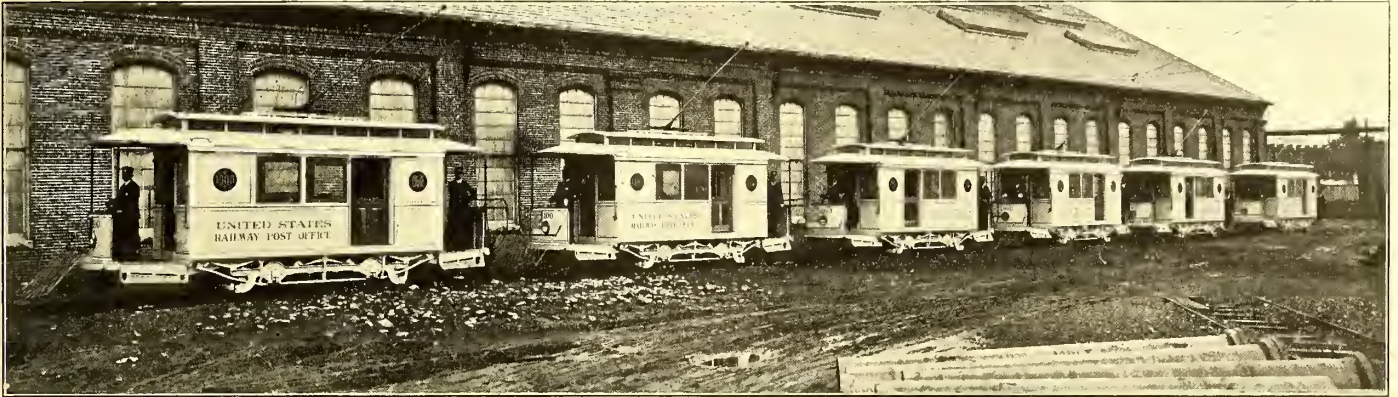
Perhaps the most interesting feature is the excessive energy consumption per car-mile, before noted, 8.55 kw-hours. It is

bumpers, 26 ft. 6 ins.; length over corner posts, 16 ft. 10¼ ins.; length of platform, 4 ft. 3 ins.; width over sills, 7 ft. 3 ins.

The cars are mounted on Lord Baltimore single trucks, and are equipped with No. 49 Westinghouse motors and K-10 controllers. The average weight of the cars complete is 18,691 lbs.

To enable the mail clerks to enter and leave the cars quickly the end doors are arranged slightly out of center in the opposite direction from the way they are regularly thrown to make the accelerator type of door for passenger service.

The interior furnishing of each car is arranged in accordance with plans submitted by the Post Office Department, and



SIX MAIL CARS JUST PUT IN SERVICE IN BALTIMORE

certain that any road which is obliged to operate heavy equipments in short accelerating runs which permit no coasting must look well into its power consumption if it wishes to reduce operating expenses.

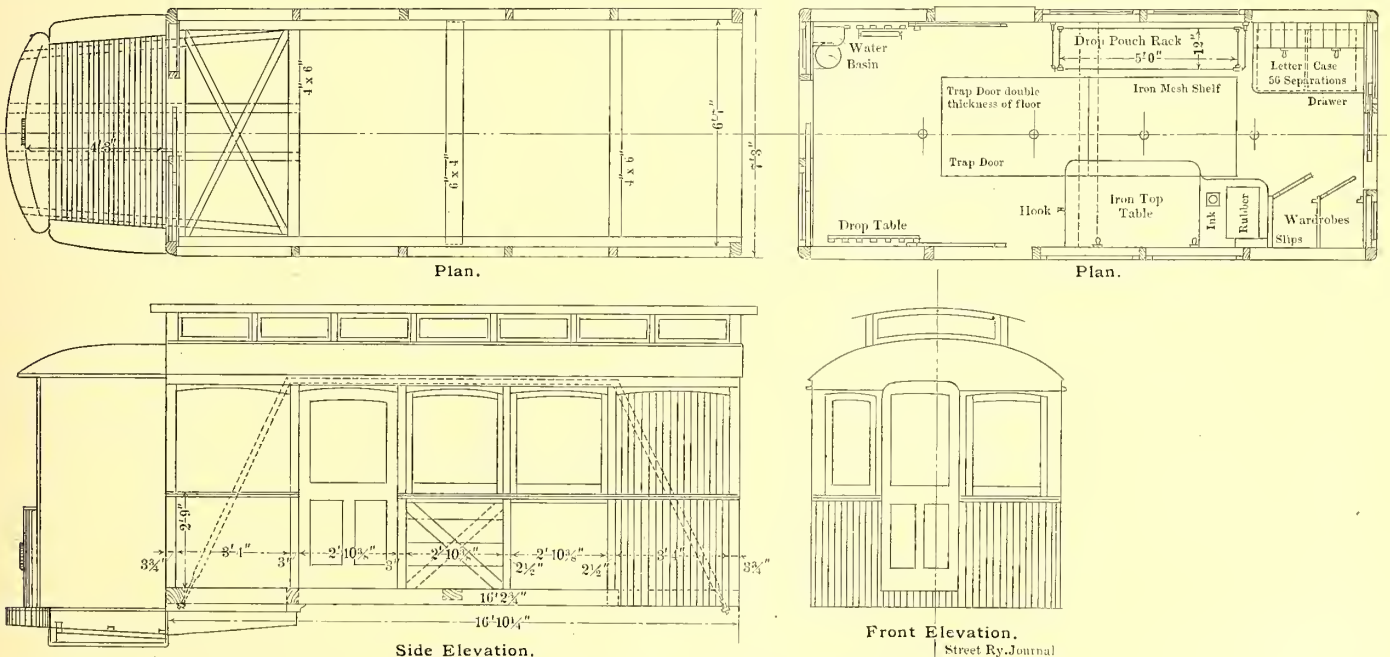
UNITED STATES MAIL CARS IN BALTIMORE

As the advantages of electric cars for mail transportation have become more evident to the postal authorities, the use of such cars has correspondingly increased. Among the street railway companies carrying mail is the United Railways &

consists of a letter case of fifty-six compartments, a drop rack for holding mail pouches, a sheet-iron covered table for cancelling mail, two wardrobes, a wash basin and a combination cooler and tank. There is also a drop table, used for cancelling parcels, etc.

All the mail cars are painted white, striped in blue. All numbers and lettering are in gold.

No side or hood signs are on the cars, but each car is equipped with a sheet-iron dash sign, giving the route to which it is assigned, with "Through Service" painted on one side, and "Local Service" on the other. The car displays the "Local Service" sign when collections are made from the street boxes,



SIDE AND END ELEVATIONS AND PLAN OF BALTIMORE MAIL CAR

Electric Company, of Baltimore, Md. This company has designed and built in its shops, under the supervision of Superintendent H. H. Adams, a number of special cars for this service. Six cars of this type are illustrated in Fig. 1, and in Fig. 2 the floor plan, side and end elevations are shown.

The principal dimensions of these cars are: Length over

and "Through Service" when it operates between suburban stations, in which latter service it has the right of way over passenger cars.

The information and illustrations for this article were furnished by Wm. A. House, second vice-president and general manager of the Baltimore United Railways & Electric Company.

VENTILATING RAILWAY MOTORS

An extensive series of tests are being made on the Camden & Suburban Railway Company's lines to determine the practicability of ventilating and cleaning railway motors while in operation in regular commercial service. The desirability of cleaning motors, and electrical apparatus generally, by forcing air through the motor casings has long been recognized in shop



FIG. 1.—CAMDEN CAR EQUIPPED WITH RAILWAY MOTOR VENTILATOR

practice, and the plan followed in these investigations really utilizes the same principles, only in this case it is not necessary to depend upon mechanical means for securing sufficient pressure to force the air through the motor casings. Natural draft is used, the air being admitted through a funnel or hood conveniently located on the outside of the car, either in front or above the roof, as may be desired. A pipe leads from this hood

apparatus. Figs. 1 and 2 illustrate the car now being used for the tests at Camden. It will be noticed that in this equipment the funnel or hood is located on the top of the car, but in other tests the funnel has been placed at other points, above the center of the car, for instance, and in some it has been set in the dashboard (Fig. 3) or secured just below the platform of the motorman's cab. This is a detail which may be determined by local conditions. Fig. 4 shows the truck of the Camden car upon which one of the exhausts is secured, and Fig. 5 is a plan of the piping under the car showing the connections between the motor casings and the pipe leading to the air collector. It

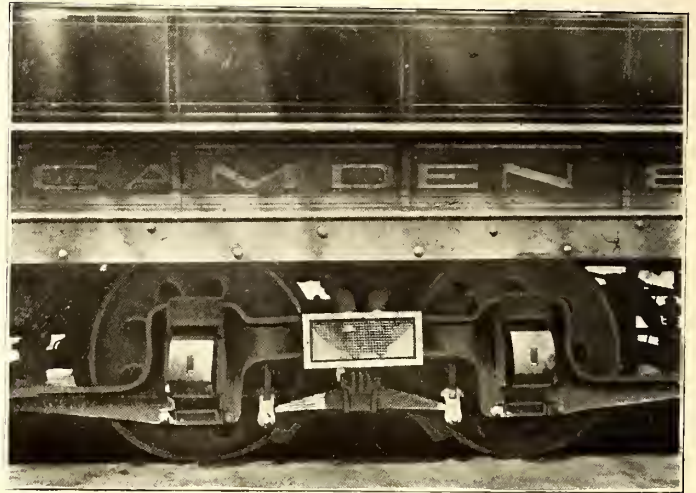


FIG. 4.—EXHAUST ON TRUCK

will be noticed that both of the motor casings are connected with the air supply, the main pipe going directly to the first motor, and a branch leading to the casing on the rear axle. In the top of each motor case is a vent, from which a pipe is extended to the outside line of the car body. The funnel-shaped hood at the end of this pipe, which serves as an exhaust, is fixed on the car truck in such a position that it will carry off the hot air from the motor casing, even though the supply of

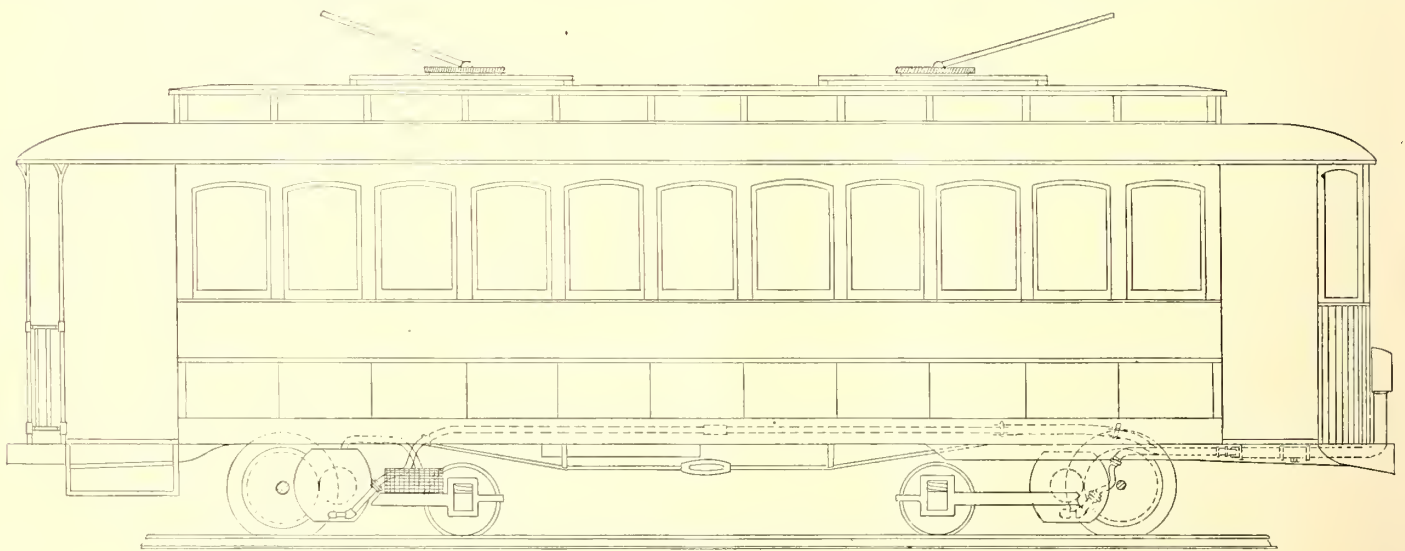


FIG. 3.—SIDE ELEVATION, SHOWING PIPING OF CAR WITH COLLECTOR IN FRONT OF VESTIBULE

to a point underneath the car flooring, where connection is made to the bottom of the motor casing by means of a flexible hose. An aperture is also made in the top of the motor casing to which another pipe is connected, which leads to a funnel-shaped exhaust covered with a wire mesh and secured on the truck at the side of the car. A very strong current of air is produced by this means when the car is in motion.

The accompanying cuts show a car equipped with this system of motor ventilation, as well as several details of the

air from the collector should be temporarily cut off. Of course, a much larger volume of air is passed through the motor case when the air collector is utilized, as it is intended to be. When thus admitted to the casing air is forced through the parts of the motor, effectually cooling and cleaning it at the same time, and thence out through the top and exhausted as already explained. Ample provision is made for eliminating all danger to the equipment from any moisture that may enter the air collector by inserting drips and valves in the piping through

high degree of heat is generated, and it is constantly increasing with the length of service until a point is reached where the insulation and bearings are affected, and unless some means is provided for reducing the temperature the equipment will soon be unfit for service.

An installation has been made on the cars of the Camden & Trenton Railway Company at Riverside, N. J., and tests are being made with highly satisfactory results. On this equipment the air collector is placed in front of the dashboard. An elaborate series of heat measurements are being made on this installation, and the results tabulated for reference.

SOME NOTES ON THE OPERATION OF RAILWAY MOTORS IN SERVICE

A paper was presented at the twentieth annual convention of the American Institute of Electrical Engineers, at Niagara Falls, N. Y., June 30, on this subject, by Clarence Renshaw, which will be briefly summarized here. The first part dealt with "The Equivalent Effect of Service Loads," and Part II was devoted to "Tests on an Electric Car in City Service." The author points out that a combination of the speed-time and input curves indicates in general the performance of an equipment of railway motors with reference to its external characteristics, and that judged from these curves only, a given equipment may be perfectly capable of performing a desired service satisfactorily, while in fact it may be entirely unsuited for the work. The three factors which limit the safe loads for a given motor are: First, its commutation; secondly, its mechanical strength, and, thirdly, the temperature rise of the windings. The capacity in regard to the first and second items is usually very much greater than that with reference to the third. As far as commutation and mechanical strength are concerned a railway motor, as a rule, could operate continuously with loads which would completely destroy the windings in a single day or less. It is usually the temperature rise which limits the capacity, and the general tendency is to choose equipments that are too small.

When new motors are first installed the effect of overloads will usually not be apparent at once, as the damage done by abnormal temperatures is, as a rule, not instantaneous but gradual. It is only when a motor has been overloaded sufficiently long to roast coils or make other repairs necessary that trouble is suspected.

The predetermination of the exact temperature rise of the different parts of a railway motor, operating at given loads and under any given service condition, is both difficult and complex. The problem, as a rule, is not, what will be the temperature of the field, or of the armature of such a motor under certain service conditions, but rather, will the temperature of the motor be such as to insure normal life and reasonable repairs? In other words, are the loads carried by the motor within its capacity? Mr. Renshaw presents statistics on "service loads," taken from actual tests on a car of the type ordinarily used in combined city and suburban service, and another car in high-speed interurban service. In each case the figures show a complete operating cycle, including the speed, line voltage and current consumption of the car, as well as the current used by each motor and the voltage at its terminals. The current used by each motor is not merely one-half of that used by the car, since, when the motors are in series, the car current and the motor current are identical.

In the case of the city car the load carried by each motor varies from a maximum input of 95 amps (or about four-thirds of the one-hour rating of the motor) to 23 amps. (or about one-third of this rating). The voltage at the terminals of each motor varies from 80 volts to the rated voltage of 500. Moreover, the load varies through this entire range in less than three-fourths of a minute. For the next one-fourth of a

minute, approximately, while the car is coasting and being stopped, the motors carry no load at all and this entire cycle is repeated a little less often than once every minute.

In interurban service the conditions presented are more uniform. The maximum current is 280 amps. per motor and the minimum 77½ amps. The motor voltage varies from 30 volts to 545 volts. For more than half of the entire cycle, however, the current and voltage are quite uniform. The length of the cycle in this case is 6 minutes and 20 seconds, which is pronounced considerably longer than the average cycle on most interurban roads.

The heat losses are next considered by the author, and their bearing on the problem discussed. Owing to the great mass of metal in its frame a motor has a considerable amount of heat-storage capacity. Instead of only a few hundred pounds of copper in the windings to be acted on the temperature of the frame must also be raised; when cooling the entire mass must cool off simultaneously. Owing to this action the temperature rise of the windings of the motor does not fluctuate in accordance with the instantaneous losses but rises at a fairly uniform rate depending on their average value.

In Part II the author takes up the results of a comprehensive series of tests on a car in exceptionally severe city service, showing the actual variation of the loads in all day service. In these tests, the temperature of the field coils of one of the motors was measured in addition to the average loads and the general relation between average load and temperature determined. Complete details in regard to schedule speed, passengers carried, number and duration of stops, etc., were taken also and the tests afford data on a number of minor subjects which have a bearing on the choice of motors for city service. The tests were made under the direction of the writer on a car of the Pittsburg Railways Company. The car was of the single-truck type, approximately 30 ft. long over all. The body was 20 ft. long and had longitudinal seats for twenty-eight people. The equipment consisted of two Westinghouse No. 62 motors with electric brakes of the disc type. The weight of the empty car complete with equipment but without load was approximately 12 tons. The motors were geared for a maximum speed on the level of approximately 26 m. p. h. with 500 volts. The car was run in regular service, carrying passengers. Three observers were needed to take the necessary data. Two of these were located on the front platform with the motorman, and the third on the rear platform with the conductor. The primary object of the tests was to study the temperature attained by the motors in all-day service, particularly the temperature of the field coils.

A small temperature coil consisting of 48 ft. of No. 27 annealed iron wire was calibrated in an oil bath, and an accurate comparison between its resistance and the temperature was obtained. This iron wire was then wound upon two thin wooden strips, and, during the process of winding a field coil for use on one of the motors, these two strips were placed in the interior of the coil, one on each side, about half-way between the center and the outside. Leads were brought out from this iron wire coil and measurements of its resistance, which could thus be taken, gave the temperature of the interior of the field coil. The field coil which had been prepared in this way was placed on one of the motors of the car and the leads from the temperature coil brought to a portable Wheatstone bridge on the front platform. By the use of this arrangement the temperature of the coils could be obtained at any time whether the car was running or standing still and whether the motors were using current or not. During the tests measurements were made every 4 minutes or 5 minutes.

In connection with the temperature of the field coil it was desired to note the root mean square current producing this temperature. In order to avoid the great amount of labor which would have been necessary to calculate this quantity

from the current for an entire day's run of 19 hours or 20 hours it was measured directly as follows:

A street car wattmeter was connected in the field circuit of the motor so that it would measure the watt-hours lost in the field. In adapting the wattmeter for this purpose the large resistance which is ordinarily inserted in series with the armature of the meter when it is used on a 500-volt circuit, was replaced by a smaller resistance suitable for the voltage drop across the field, with maximum current. The wattmeter was, of course, calibrated with this special resistance. When arranged in this way the wattmeter measured the product of I^2 , R and T , where I is the current, R the resistance of the field coils and T the total time. The resistance of the iron wire temperature coil at any time, by reference to the comparative test previously made, showed the resistance of the field coil, and the average value of this resistance between any two times could thus easily be found. The time was noted with a watch and hence T and R could be eliminated from the measurement made by the wattmeter, leaving I^2 , the square root of which was the quantity desired. In working up the test the root mean square current was calculated in this manner for each single trip between terminals and also for each round trip. Previous tests over the same road had showed the average motor voltage to be about 175 volts, and in the present tests this quantity was not measured. The average line voltage had been found to be about 450 volts.

The observer on the rear platform noted the number, duration and location of stops made by the car, the time of passing prominent points along the route and also the entrance or exit of each passenger.

Five different runs were made with the car equipped as described, three over the Hamilton Avenue line (42,000 ft. long, one way), and two over the Highland Avenue line (36,000 ft. long, one way). For the first 25,000 ft. these two lines coincide. On the Hamilton Avenue line the car was run singly. On the Highland Avenue line a trailer was hauled for one trip in the morning and one trip in the afternoon. In the case of the Hamilton Avenue line starting at a temperature of 25½ degs. C., or 13 degs. C. above the temperature of the air, the temperature of the inside of the field coil rose gradually until at the end of 8 hours it had reached a temperature of 74 degs. C. During the next 8 hours the temperature remained practically constant at this value (maximum rise, 64½ degs. C.). During the following 3 hours, which were late in the evening, the air temperature decreased and the temperature of the field coil decreased with it, reaching a temperature of 70 degs. C. at the end of the last regular trip. Measurements of the temperature were taken also at intervals of 10 minutes while the car was standing idle during the night. The cooling of the motor was interrupted for a short time by the application of current in order to move the car from the yard into the car house. After approximately 4 hours of idleness, at the end of which time the car was made ready to start out on the next day's service, the temperature had fallen from 70 degs. C. to 72 degs. C., the latter point being a little over 20 degs. above the temperature of the air, showing that ordinarily a motor never gets completely "cold." The tests extended over two days' continuous operation, and on the second day the results obtained were practically duplicates of the first.

On the run on Highland Avenue the temperature of the field coil at starting was 18 degs. C. or 5 degs. above the atmosphere. The addition of the trailer for its morning trip caused a much more rapid rise of the temperature than was the case in the run of the Hamilton Avenue car, and a temperature of 60 degs. C. was reached at the end of about three hours. After the removal of the trailer the rise in temperature was more gradual. Had it not been for the addition of the trailer for its evening trip the temperature of the field coil in this case would have remained constant at approximately 75 degs. C., giving a rise

approximately the same as in the other case. The addition of the trailer, however, caused a rapid rise to a temperature of 98½ degs. C. When the trailer was again removed and the motor run once more at its normal rate, the temperature fell off gradually to 74 degs. C., that is, a little less than its former temperature. It should be noted that the trailer was on for this afternoon trip only 1½ hours, while about three hours was required after its removal for the motors to cool off to the temperature at which they were before the addition of the trailer, and at which they would probably have remained had the trailer not been added. If the trailer had been left on for additional trips it is evident that the temperature would have reached a much higher value. As the car was not put in service for an early run on the day following this test the cooling continued for a longer time. It was noted that the field coil cooled from a temperature of 71½ degs. C. to a temperature of 25 degs. C. (which latter point was a little over 12 degs. C. above the atmosphere) in about 8 hours.

The two lines on which the tests were made naturally divide themselves into three sections. The first of these is a loop in the downtown or business portion of the city, about a mile in length, where the car is run very slowly and makes frequent stops. On this portion of the road there is great congestion due to the large number of cars, and the movement of any given car over this portion of the route is largely a succession of jerks. The second division is from the end of this loop—High Street to Atwood Street. This portion contains several long, heavy grades, the most important of which, 2½ per cent for 3500 ft. and 4 per cent for 3000 ft., are in the same direction. Comparatively few stops are made on this section. The third portion of the road is from Atwood Street to the outer terminus of the line. On this part of each line the grades are lighter and occur alternately up and down in shorter lengths. There are also few obstructions and a high speed is made. The time required on the first two portions of the road is about the same as that required on the third portion. In order to estimate the relative severity of the service on these different sections the root mean square current was calculated for a number of round trips over each. The average for these trips was 40.5 amps. for the first section, 41.8 amps. for the second section and 45.6 amps. for the third section. The results show that although the average root mean square current for the trips up the heavy grades was 50 amps., the average for the round trips over this section was not materially different from that on the remaining sections and was even less than that on the third section, where the track is most nearly level.

The length of the route over the Hamilton Avenue line is 8½ miles. The running time was in general about 95 minutes for the round trip, making a schedule speed of 10.7 m. p. h. On the Highland Avenue line the distance is 7.1-3 miles and the running time for the round trip was 76 minutes. The schedule speed on this line was thus 11½ m. p. h. In the down-town section of the city about 14 minutes is required to traverse a loop 5500 ft. in length. The schedule speed over this distance is thus approximately 4½ m. p. h. Over the second section of the road, between High Street and Atwood Street, the distance is 11,000 ft., and the schedule speed approximately 11 m. p. h. Over the third section the schedule speed on the Hamilton Avenue line was 11.6 m. p. h., and on the Highland Avenue line 12.35 m. p. h.

The average number of passenger stops per round trip on each route was calculated, and showed a value between four and five stops per mile. It is estimated that the practical stops required at curves and crossings, in addition to the stops for passengers, would make the total number of stops about six per mile. The length of stops varied from zero seconds, that is, a mere slow down, up to about 15 seconds. The average duration of stop for one run was 4 seconds.

The maximum and average passenger loads for each trip of

the respective all-day runs are carefully compiled. The net passenger load was calculated each time a passenger entered or left the car and these net loads were averaged. The average loads were thus figured without any reference to the distance which the passengers were carried. The net passenger load on each trip was plotted, with the distance as a basis, and the average loads were figured also from these curves with reference to the distance traveled as well as to the number of passengers. The results found in this way, however, differ only very slightly from those calculated on the other basis. Most of the passengers were carried over a considerable portion of the route. The car loads while passing over a very short distance, carries almost the entire load about six-tenths of the length of the route and then discharges it gradually. The car carried 457 people during the day on the outbound trips. The number carried on the inbound trips was 499, making a total of 956 in 18¼ hours, or fifty-two and one-half per hour. The average load, as calculated, was twenty-four passengers, or six-sevenths of the seating capacity of the car.

NOTES ON RAILWAY SHOP PRACTICE

Boston, July 18, 1903.

EDITORS STREET RAILWAY JOURNAL:

I have recently had occasion to inspect a number of electric railway shops and power stations in New England, and in the course of my travels naturally ran across a good many praiseworthy features of design as well as some pretty poor layouts. Perhaps some of your readers will be interested in several of the things which appealed to me.

In one large car repair shop the arrangements for handling motors and trucks struck me as admirable. The cars are run into the house from gauntleted tracks connecting with two or three main line spurs, and the machine shop is located on a floor beneath the track level, so that when the repair force desires to overhaul the motor and trucks it is an easy matter to do so. The car bodies are disconnected from the trucks and motor wiring, and then jacketed up over an electrically-driven hydraulic elevator, which quickly lowers the trucks and motors into the machine shop below. The machine shop floor is provided with tracks, and by flexible lead wires connected to the trolley circuit the trucks are self-propelled to any point in the shop where they are wanted. The speed is controlled by an old cast-grid resistance in series with the motors. There is a turntable set in the floor of this shop, which is moved by hand, and which is locked by simply placing an iron bar in each of the girder rails that leads from the turntable out to the main floor. This car house is also well equipped for pit work when it is required. The plan of dropping the trucks to a lower floor works out very well in practical everyday operation, and the elimination of extra work and delays due to cramped quarters is signally complete.

It is gratifying to note that electric railway managers are fast waking up to the importance of providing wholesome conveniences for their employees' sanitary comfort. Not long ago it was thought that proper washing facilities, clean toilet rooms and ventilated metal lockers were things of minor consequence, but observation shows that this attitude is rapidly changing. A great deal remains to be accomplished in this line, as we look over the general run of plants and car shops, but it is safe to say that in many of the larger and newer examples little else is required. Hot and cold water, clean towels, soap, and mirrors, which reflect the images of human beings instead of distorted simian countenances, are to be encountered much more frequently now than in the old horse railroad days, when a nail answered for a comb and all things were used in common felicity.

One of the large city car shops uses an ingenious tire expander in removing or replacing steel tires from and on its

rolling stock wheels. The contrivance is composed of two concentric circles of 1½-in. wrought iron pipe, compressed air at 45 lbs. pressure per square inch being supplied to one, and ordinary illuminating gas to the other. Thirty-seven burners project radially into the central space enclosed by the tubes, and when these are lighted a powerful heating effect is produced by the highly oxygenated flames. An old tire, varying in thickness from 1 in. to 1¼ ins., can be expanded off from the wheel in 5 minutes, and a new one expanded on in 8 minutes. The new ones are 3 ins. thick, which accounts for the difference.

While one would naturally expect motor-driven machinery in street railway repair shops, it was something of a surprise to me to find a road using modern types of shunt motors for this work, rather than the antediluvian patterns of street railway motors whose days beneath the cars had long since ended. Here was a 42-in. lathe driven by a 15-hp shunt motor with a speed range of 675 r. p. m. to 925 r. p. m.; there I found four grinders for tires driven by a single motor off a common line shaft, and as a crowning evidence of progress wattmeter records were being taken periodically on the different machines, partly as a check upon the work accomplished and in part for the information of the engineers of the road.

Compressed air hoists, good for raising 6 tons and holding it, electric traveling cranes, as well as hand-operated hoists, pneumatic forges and 600-lb. hammers, all indicated an up-to-date shop superintendent and foreman. In the best planned installations several small machines were usually driven from a common line shaft—such as grinders, shapers, screw cutting machines, etc., rather than from individual motors. In watching lathe work I was struck with the rapidity and depth of cut which the most improved tool steels permit, and the smoking pile of blue steel shavings forcibly illustrated the difference between old and modern methods. These shavings are barreled and sold by the operating company, as well as the worn tires.

On the other hand, in a power station of another road which I visited, I found the boiler room in an indescribably dirty condition, poorly lighted, badly ventilated, with feed pumps nearly strangled in filthy pools of water. In this plant, which is in a large and prosperous city of Massachusetts, the switchboard panels are of various degrees of antiquity; the switches in cases opened upwards, falling closed; the ammeter dials were not definitely calibrated for close readings; the wiring underneath the main floor was in literally fearful shape; the positive switch of a new generator was set out in the floor where the crane chain has already struck it and caused a short circuit, and to cap the esthetic climax the station yard was full enough of old junk to endow a ragman with a fortune.

In one car shop a gasolene torch blazed away the noon hour in quiet celebration, and at the same place the workmen filled their pipes and smoked in peaceful ignorance (?) of a prohibitive sign, which apparently was not in force out of working hours, although it is not recorded that the fire risk absented itself when the 12 o'clock whistle blew.

An interesting feature of a prominent car and repair shop's work was found in the card catalogue record of all the motor and equipment troubles daily occurring on the system. Starting with the reports of motormen and inspectors, the performance of a small amount of clerical work in the office resulted in the production of accurate records of all troubles, which papers are growing more valuable year by year to the operating company and to anyone else fortunate enough to see them. Tests on new devices and designs are also filed in the car shop office by card index or loose leaf book.

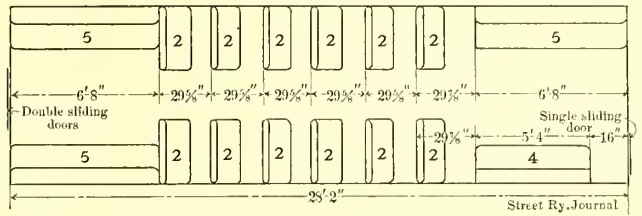
Thus it will be seen that much improvement has been made in late years and that the tendency is in the direction of systematic work, but there is still a great deal to be done.

ENGINEER.

NEW SEMI-CONVERTIBLE CARS FOR DETROIT

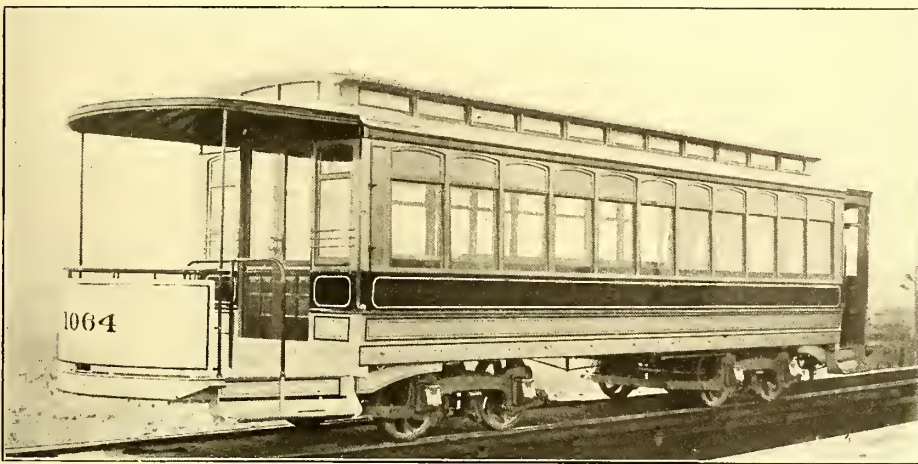
The Detroit United Railway is adding 100 new cars for city service which will mark the first introduction on a large scale of double-truck cars for city service in Detroit, and also the first introduction there of a city car which is good for both summer and winter use. Photographs of the interior and exterior of this car and also plans giving dimensions and seating arrangement are here reproduced. The seating arrangement is a combination of cross seats and side seats, the cross-seats being used in the middle of the car and the side seats at the ends, where a wide aisle is desirable. The front platform has a motorman's cab which is entirely shut off from the entrance. The motorman is, therefore, not in the least disturbed by the entrance and exit of passengers from the car by way of the front platform. In this respect it resembles many interurban cars. In the motorman's cab is a stove, arranged like a hot-air furnace, which discharges hot-air into the interior of the car through a register located at the left-hand

door, which seats four. The rear platform is of the usual Detroit type, 6½ ft. long, with a railing to prevent those standing on the rear platform from obstructing the passage into the car and for steadying the standing load on the platform. The trucks are 4½-ft. wheel base, known as the No. 47 truck of



PLAN OF SEATING ARRANGEMENT

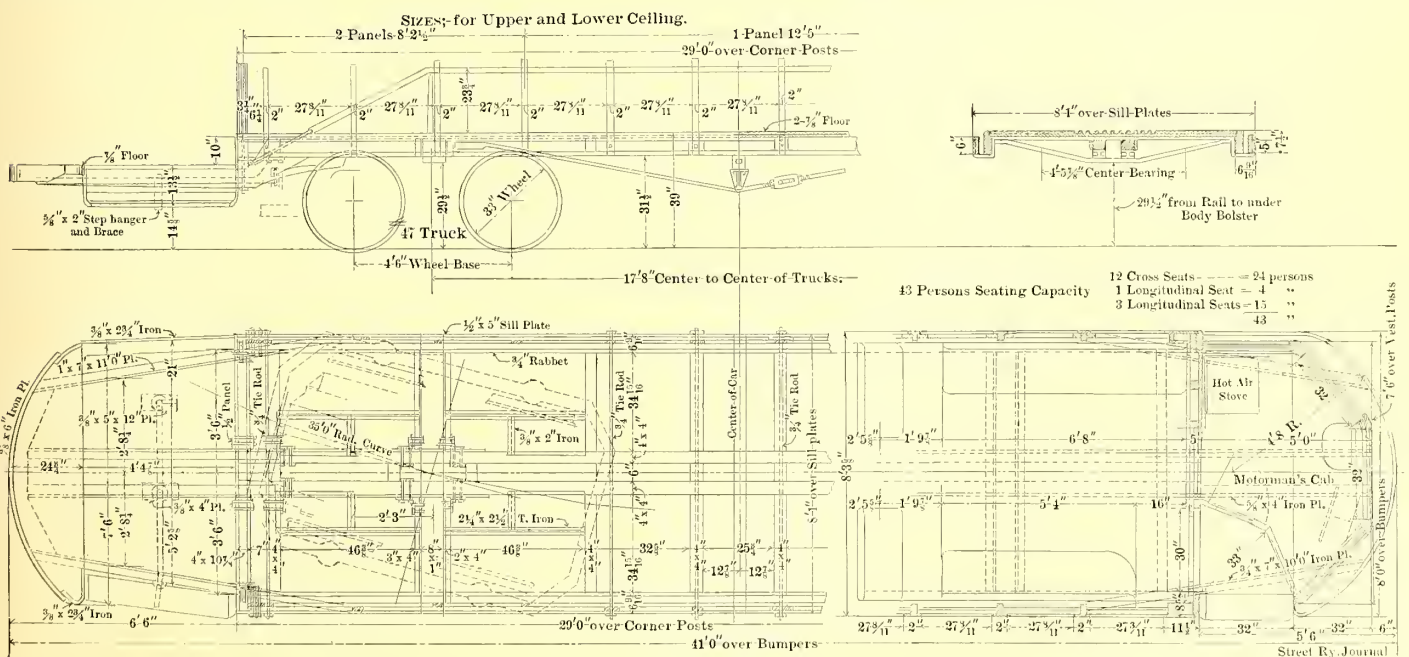
the St. Louis Car Company, and specially designed for city service requiring a short wheel-base truck. The car is 41 ft. over all and 29 ft. over the corner posts. The width is 8 ft. 1 in. over the sill plates. The floor is 39 ins. from the track.



EXTERIOR AND INTERIOR OF CAR

upper corner of the front end of the car, just above the mirror seen in the interior view of the car. The entrance to the rear

The step is 14⅝ ins. from the track and 13½ ins. below the platform; the platform is 10 ins. below the car floor. The



CROSS AND LONGITUDINAL SECTION AND PLAN OF FLOOR FRAMING

of the car is by double sliding doors and to the front of the car by a single sliding door. The side seats at each end of the car will seat five persons, as indicated, except the one next to the

finish is in oak and rattan seats. The seating capacity is forty-three persons.

The cars were built by the St. Louis Car Company.

SEMI-CONVERTIBLE CARS FOR ONEIDA

The American Car Company, of St. Louis, recently shipped twelve handsome semi-convertible cars (Brill patent) to the Oneida Railway Company, of Oneida, N. Y. The illustration shows one of three cars built with vestibules at both ends, while the remaining nine have open platforms at the rear. The cars



FIG. 1.—DOUBLE VESTIBULE, SEMI-CONVERTIBLE CAR FOR ONEIDA

include all the features of this well-known type, the $\frac{3}{8}$ -in. x 12-in. steel sill plate, the extra number of steel car lines, and windows which slide into roof pockets by means of metal grooves. The interiors are richly finished in dark mahogany, handsomely carved and inlaid, and ceilings of decorated birch. There are twenty double seats in each car, with walk-over backs. The seats are 36 ins. long. The monitor decks have a



FIG. 2.—INTERIOR OF SEMI-CONVERTIBLE CAR

clear width of 4 ft. 4 ins. Every other vent is arranged to be opened independently. The lower window sashes measure $25\frac{1}{2}$ ins. x $29\frac{5}{8}$ ins., and the upper $16\frac{1}{4}$ ins. x $29\frac{5}{8}$ ins. In the vestibules the sashes are made with one light each, and arranged to drop into pockets.

The length of cars over end panels is 28 ft.; over crown pieces and vestibules, 36 ft. $8\frac{1}{2}$ ins.; from panel over crown piece, 4 ft. $2\frac{1}{2}$ ins. Width over sills, 8 ft., and over posts at belt, 8 ft. $3\frac{1}{2}$ ins.; from center to center of posts, 2 ft. 8 ins. Side sills, of long-leaf yellow pine, are 4 ins. x $7\frac{3}{4}$ ins., plated on the inside. End sills are of white oak, $4\frac{3}{4}$ ins. x $6\frac{3}{4}$ ins. The corner posts are $3\frac{3}{4}$ ins., and the side posts, $3\frac{1}{4}$ ins. thick. The trucks are Brill 27-G, equipped with 40-hp motors. The wheel base is 4 ft.; the diameter of wheels, 33 ins., and of axles, 4 ins.

A NEW SYSTEM IN PENNSYLVANIA

Operations will be commenced Aug. 1 on the Washington & Canonsburg Electric Railway, 15 miles long, connecting Washington and Canonsburg. This line will eventually be the connecting link of a system extending from Pittsburg to Wheeling. The line passes through Oak Grove, Arden, Meadow Lands,

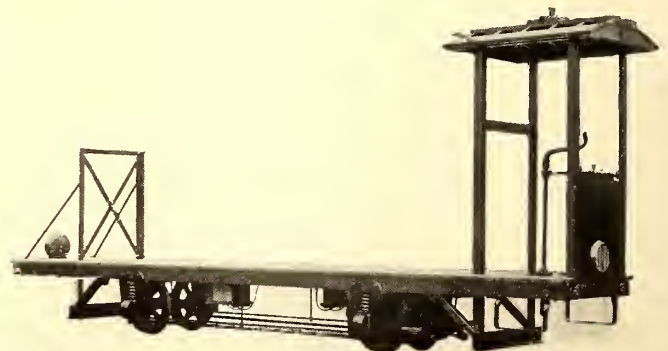
Houstonville and McGourren. It is one of the best constructed roads in the country. On the line are a number of steel bridges, and at Houstonville there is a steel viaduct 300 ft. long. The track is laid with 80-lb. rails, laid on oak ties. Instead of following the grade of the hills of Washington County the road has been made almost entirely level, this having been accomplished through the erection of trestles wherever a dip was encountered. This feature of the work cost in the neighborhood of \$200,000, and the road complete represents an outlay of about \$1,000,000. The power house is located at Meadowlands. It is a substantial brick structure, and the equipment consists of two 400-kw Crocker-Wheeler generators. These are connected direct with two 300-hp Russell engines.

The officials of the company are: Francis J. Torrance, president; Arthur Kennedy, vice-president; W. C. Hagan, secretary and treasurer. The general manager is Robert R. Reed, who has been associated with the Westinghouse Company for a number of years, representing that company in this country and abroad, and in more recent years active in street railway operations in New York city.

AN INTERESTING INDUSTRIAL LOCOMOTIVE

The accompanying cut shows a locomotive and lumber car, two of which have been shipped by the J. G. Brill Company to the Prairie Pebble Phosphate Company, of Mulberry, Fla., for whom they were ordered by the General Electric Company. The economy of operation of electric locomotives for industrial purposes has come to be very generally recognized, and in many places they are displacing steam locomotives. The fact that an ordinary day laborer of moderate intelligence can operate these machines with ease and accuracy is, of course, a great factor in their favor.

For the present these machines are intended for carrying wood, but at any time may be equipped with a second motor and draw-bars for hauling phosphate cars. They have a capacity of two cords of wood, cut in 4-ft. lengths. The length over end sills is 23 ft., and width over sills, 4 ft. The canopy at the forward end is supported by posts, which are 6 ft. 6 ins. high with a space between, 3 ft. x 3 ft. 4 ins. At the rear a strong upright frame is formed by angle-iron posts set through the floor and secured with heavy irons above and below. The locomotives are mounted on gear trucks of the builders' make,



INDUSTRIAL LOCOMOTIVE FOR HAULING AND CARRYING MATERIAL

with wheel base of 10 ft. The wheels are 22 ins. in diameter, and the axles 3 ins. The track gage is 24 ins. A 250-watt motor is used with each locomotive. Total weight of locomotive is 6080 lbs.

LEGAL NOTES.

CHARTERS, FRANCHISES AND ORDINANCES.

ALABAMA.—Street Railways—Nuisance—Injunction—Special Damages.

1. Where a street railway, having a right, by consent of the city, to construct its lines in a certain street, undertakes to lay its tracks in a portion of the street not designated in its charter, an abutting property owner, not suffering any injury, cannot complain.

2. Owners of property abutting on a street, in which it is proposed to lay an electric railway, are not entitled to restrain its construction because of threatened dangers in the ingress and egress to and from their premises, obstruction of the street, noise, dust, and vibration; but if they suffer damages from the operation or construction of the road, they have a remedy at law therefor.

3. In order to entitle owners of property abutting on the street in which it is proposed to lay an electric railway to restrain the construction of the same, it is incumbent on them to show a nuisance in fact, and that they would suffer special injury, different from that sustained by the general public.—(Baker et al. vs. Selma Street & Suburban Ry. Co., 33 S. E. Rep., 685.)

ARKANSAS.—Highways—Construction of Street Car Line—Additional Servitude—Jurisdiction of County Court—Abutting Owner—Contract—Construction by Conduit—Change in Railway System—Right to Damages.

1. Though a county court has general jurisdiction of matters pertaining to public roads, it is without authority to impose an additional servitude on a public highway by granting to a street car company the right to construct its system thereon.

2. A lost contract may properly be interpreted by the conduct of the parties thereunder.

3. By petitioning the county court to permit the extension of a street railway system along a highway beyond the corporate limits of a city, an abutting owner assumed a contractual relation with the company, binding her to permit the erection and operation of its system, which, as then contemplated, was one for horse car service. Afterwards this was changed to an electric system; the situation of the tracks being altered, and poles and wires being erected. Held, that the abutting owner was not precluded by her contract from claiming damages from the change, even though, had the right of way originally been secured by legislative authority, the change would not have imposed an additional servitude on the owner.—(Humphreys vs. Ft. Smith Traction Light & Power Co., 71 S. W. Rep., 662.)

CONNECTICUT.—Street Railways—Paving Streets—Public Authorities—Control—Statutes—Construction—Repeal—Railroad Commissioners—Jurisdiction—Right of Appeal.

1. Pub. Acas 1893, c. 169, sec. 6 (Gen. St. 1902, sec. 3837), provides that every street railway company occupying a public highway shall keep a certain part of the highway in repair to the satisfaction of the authorities of the municipality. By an act of 1901, a prior act of 1895, which authorized an appeal from orders of the local authorities relating to street railway companies to the superior court, or any judge thereof, was repealed; and such act, while providing that most of the matters provided for by the act of 1893 should be within the exclusive jurisdiction of the railroad commissioners, declared that when the local authorities should render any decision with reference to a street railway company as to the highway, etc., the company might appeal to the railroad commissioners. Held, that the power given by the act of 1893 to the municipal authorities to order a street railway company to repair parts of the highway was not abrogated by the act of 1901.

2. The act of 1901 authorized the railroad company, on being denied by the city authorities the right to lay a particular kind of pavement, to appeal from such order to the railroad commissioners.—(City of Hartford vs. Hartford Street Ry. Co., 53 Atlantic Rep., 1010.)

ILLINOIS.—Municipal Improvements—Street Assessment—Superseding of Recommendation—Record Reciting Notice—Railroad Property—Assessment of Benefits—Use for Manufacturing—Fire Protection—Propositions of Law—Refusal to Consider.

1. An ordinance, passed on recommendation of the Board of Improvements, for the paving of four blocks of a street, is not invalidated because the Board had previously recommended paving two of the blocks, and the Council had deferred action on the ordinance introduced accordingly.

2. Under Laws 1897, p. 105, sec. 9, providing that the recommendation of the Board of Local Improvements for the passage of a paving ordinance shall be prima facie evidence of proper preliminary steps, a recital in the Board's record that notices of a public meeting had been mailed pursuant to section 7, requiring such notices to property owners, is sufficient, and the facts rela-

tive to the giving of notice to each property owner need not be recited.

3. The fact that leases of railroad property for business and manufacturing purposes may be canceled by the company on six months' notice does not establish that the property is only temporarily devoted to such purposes, so that a paving assessment must be based on benefits accruing to it as railroad property, merely.

4. The fact that the Attorney General may, under General Incorporation Act, c. 32, sec. 5, require a railroad company to sell realty devoted to ordinary business or manufacturing purposes, does not require benefits accruing to the property in view of its ultra vires employment to be excluded in making a paving assessment.

5. The benefit accruing to property from the greater facility with which fire protection can be afforded it is proper for consideration in making a paving assessment.

6. In view of the fact that Laws 1871-72, p. 345, providing for the submission of propositions of law to the court where a jury has been waived, was enacted before Laws 1877, p. 69, creating the Appellate Court, it is error to refuse to pass on such propositions on the theory that the statute applies only to cases which will go for review to the Appellate Court.

7. Where, by exceptions to rulings on the admissibility of testimony, the same questions are preserved for review as are intended to be presented by propositions of law which the court refuses to pass on, such refusal is harmless error.—(Chicago Union Traction Co. et al. vs. City of Chicago, 67 N. E. Rep., 383.)

ILLINOIS.—Street Railways—Transfers—Connecting Lines—Ownership—Legal Title—Beneficial Interest—Evidence—Municipal Regulation of Rates—Reasonableness—Presumption—Proof.

1. Under Revised Code Chicago, section 1723, providing that at any point where the line of a street railway joins, connects, crosses or comes within a distance of 200 feet of any other line owned or operated by the same company any passenger shall be entitled to a transfer entitling him to ride on the connecting line without additional charge, a street railway corporation is required to give transfers if it is the real beneficial owner of both the connecting lines, though the dry legal title to one of them may be in another corporation.

2. Revised Code Chicago, section 1725, provides that any street railway company refusing to give transfers as provided by section 1723 shall be liable to a penalty. Evidence in an action by the city to recover penalties for refusals to give such transfers considered, and held to show that defendant corporation was the real beneficial owner of the connecting lines, and required to give transfers, though the dry legal title to one of the lines was in another corporation.

3. The rate of fare prescribed by a city ordinance limiting the rate of fare to be charged by street railway companies is presumed to be reasonable until its unreasonableness is shown, and the burden of showing the rate to be unreasonable is on the companies.

4. The question of whether the rates prescribed by a city ordinance limiting the fare to be charged by street railway companies are so low as to constitute a deprivation of property without due process of law cannot be determined by a consideration of the earnings of a portion only of the lines of a street railway company, but only by estimating the earnings of the entire line as against the expenses of the entire line.

5. In an action by the city under Revised Code Chicago, section 1723, fixing the fare to be charged by street railway companies, evidence considered, and held insufficient to show that the rate of fare so fixed was so low as to result in a deprivation of property without due process of law.—(Chicago Union Traction Co. vs. City of Chicago, 65 N. E. Rep., 470.)

ILLINOIS.—Municipal Corporations—Street Railways—City Charter—Authority to Regulate Fare—Transfers—Impairing Obligation of Charter—Lease—Waiver—Estoppel—Ordinance—Scope—Application to Future Conditions.

1. The Legislature has power to regulate the charges of common carriers.

2. The Legislature may delegate its power to regulate the charges of common carriers to a municipal corporation.

3. If there is doubt as to whether a municipal charter confers on the municipality the right to regulate the charges of common carriers, that doubt must be resolved in favor of the existence of the power.

4. Under 1 Starr & C. Ann. St. (2d Ed.) pp. 689-715, art. 5, sec. 1 (City and Village Act April 10, 1872), adopted by the city of Chicago as its charter, as well as under former charters (Act Feb. 14, 1851, and Act Feb. 13, 1863), authorizing the city to regulate

and prescribe the compensation of hackmen, cabmen, omnibus drivers, and "all others pursuing a like occupation," the city had power to enact Revised Code Chicago, sections 1723, 1725, limiting the rate of fare to be charged by street railway companies, inasmuch as the phrase "others pursuing a like occupation," when construed ejusdem generis, includes street railway companies.

5. The city of Chicago, having power under its charter (1 Starr & C. Ann. St. [2d Ed.] pp. 689-715, art. 5, sec. 1) to limit the rate of fare to be charged by street railway companies, had also, as a necessary incident thereto, power to enact Revised Code Chicago, sections 1723, 1725, requiring street railway companies to furnish transfer tickets entitling passengers to ride on a connecting line of the same company without the payment of an additional fare.

6. Where city ordinances granted the right to operate street railway lines in the south and west divisions of the city, and provided that the rate of fare for any distance should not exceed 5 cents, the street railway company was not thereby authorized to charge a fare of 5 cents for a ride in one division, and another fare for a ride in the other division, but only to charge a single fare for a ride in both divisions.

7. By incorporating under a general incorporation act, a corporation accepts the provisions of such act as part of its charter.

8. Persons contracting with a corporation are presumed to act with full knowledge of its charter powers.

9. 1 Starr & C. Ann. St. (2d Ed.) p. 1066 (Incorporation Act, section 9), provides that, as to corporations organized under that act, the General Assembly should have power to prescribe such regulations as it shall deem advisable. A corporation was organized under this act to construct, own, purchase, acquire, and lease street railways in Chicago. The city charter of Chicago (1 Starr & C. Ann. St. [2d Ed.] pp. 689-715, art. 5, sec. 1) gave the city power to prescribe the rate of fare to be charged by street railway companies. The corporation so organized leased street railway lines from a number of other corporations, which possessed, by contract with the city, embodied in their charters, the right to charge a certain fare, which the city had no right to reduce without their consent. By the terms of the leases the lessee acquired the right to the sole possession, operation, and control of the leased lines. Held that, by leasing the roads with knowledge of the requirement of the lessee's charter that it should be subject to regulation by the General Assembly, the lessors consented to the operation of the leased lines under the provisions of the lessee's charter, and not those of their own, thereby waiving their charter right to charge the fare fixed therein, so that Revised Code Chicago, section 1723, in effect requiring lessee to carry passengers for a smaller fare than lessors were by their charters entitled to charge, did not impair the obligation of those charters as contracts.

10. As the operation of the leased lines by the lessee in accordance with the provisions of the lessors' charters, restricting the power of the city to regulate rates of fare, would be a violation of the requirement of its own charter that it should be subject to regulation by the General Assembly, and hence also by the city under the power delegated in its charter, the lessee was estopped from insisting on the right to operate the leased lines under the lessor's charters.

11. Revised Code Chicago, section 1723, providing that the rate of fare "to be charged" on any street railway for any distance within the city limits shall not exceed 5 cents, and that at any point where a line of street railway does now or shall hereafter join, connect with, cross, or come within a distance of 200 feet of another line belonging to the same owner, any passenger shall be entitled to a transfer, etc., applies not only to companies existing at the time the section was enacted, but to those coming into existence thereafter.

12. In the absence of any showing as to earnings or profits of a street railway company, the court cannot pass on the question as to whether an ordinance regulating the rates of fare to be charged by such companies amounts to a deprivation of property without due process of law.—(Chicago Union Traction Co. vs. City of Chicago (three cases), 65 N. E. Rep., 451.)

ILLINOIS.—Contracts—Construction—Public Policy—Contract to Procure Property Holders' Consents to Construction of Elevated Road—Pleading—Assumpsit—Common Counts.

1. In assumpsit to recover an extra compensation for services rendered in procuring the consents of property holders to the erection of an elevated railroad, evidence held to support a finding that plaintiff's right to extra compensation was conditioned merely on procuring the consents, and not on securing them without compensation.

2. Where a requested instruction stated a correct proposition of law as applied to certain alleged facts, but the court found that the facts did not exist, the refusal of the instruction was not error.

3. Plaintiff contracted to aid in procuring the consents of adjacent property holders to the erection of an elevated railroad loop

—such consents being necessary to obtain the passage of an ordinance authorizing the loop; and it was stipulated that he should receive a bonus "in case the company was successful, and his efforts helped in securing the legal amount of frontage." One side of the loop was completed when the contract was made, and ordinances authorizing the construction of the other sides were obtained at different times and in conjunction with various other companies. Held, that the contract could not be construed to make plaintiff's right to receive the bonus conditional on the passage of an ordinance granting the right to build the entire loop, but that he was entitled to the bonus on completion of the loop, though no one ordinance authorized the construction of all of it.

4. A contract to use personal influence to obtain the consents of property holders necessary to enable a City Council to pass an ordinance authorizing the construction of an elevated railroad is not opposed to public policy.

5. In an action on a contract fully executed, so that nothing remains to be done except the payment of money, it is not necessary to declare specially, but a recovery may be had under the common counts in assumpsit.

6. The Appellate Court's finding of fact is conclusive on the Supreme Court.—(Union El. R. Co. vs. Nixon, 65 N. E. Rep., 314.)

ILLINOIS.—Street Railways—City Ordinance—Cleaning Between Tracks—Police Power—Public Burden—Impairment of Contract.

1. A city ordinance required a street railway company to clean, between its rails, all streets occupied by the company, and imposed a penalty for violation of the ordinance. On a prosecution for violation of the ordinance it appeared that, owing to the presence of the tracks, the street, instead of sloping from the center, had a flat crown 16 ft. in width, and that the rails retained dirt in the center of the street, and that, owing to such conditions, it was more difficult and expensive to clean the street. Held, that the ordinance was not void as casting a public burden on the street railway company.

2. The ordinance was not an unreasonable exercise of the police power.

3. An ordinance requiring a street railway company to clean, between its tracks, streets occupied by it, does not violate the rule as to equality and uniformity of legislation.

4. An ordinance requiring a street railway company to clean, between its tracks, streets occupied by it, is not invalid as impairing the obligation of a contract created by the ordinance authorizing the occupation of the streets, since a city cannot, by ordinance, deprive itself of its rightful police power.—(City of Chicago vs. Chicago Union Traction Co., 65 N. E. Rep., 243.)

INDIANA.—Cities—Police Power—Extent—Ordinances—Nuisance—Elevation of Railroad Crossings.

1. The question raised by a demurrer to an alternate writ of mandamus is not whether the relator is, under the facts, entitled to some relief, but whether he is entitled to the specific relief prayed for.

2. Under Burns' Rev. St., sec. 3794 (Indianapolis City Charter, sec. 23), providing that the Common Council shall have power to declare what shall constitute a nuisance, require its abatement, secure the safety of citizens in the running of trains in and through the city, require corporations operating railroads to construct street crossings and viaducts and provide protection against injury to persons from the operation of railroads, require railroad companies to change the location, grade, and crossings of their roads, and to raise or lower their tracks to conform to any grade which may be established, etc., the city has no power to pass an ordinance requiring all railroads operating within the corporate limits to construct elevated tracks over all crossings within a prescribed district, without regard to the conditions or circumstances of any particular crossing.—(State ex rel. City of Indianapolis vs. Indianapolis Union Ry. Co., 66 N. E. Rep., 163.)

INDIANA.—Eminent Domain—Railroads and Electric Railways—Crossings—Proceedings—Injunction—Pleadings—Effect of Appeal—Railroad Law—Application.

1. Burns' Rev. St. 1901, sec. 5468a, cl. 5, gives interurban street railway companies authority to cross any railroad tracks, and requires that, in case the compensation for crossing cannot be settled, the same must be determined by commissioners appointed as under the statute in respect to the taking of lands. This statute (section 5468e) requires the corporation taking the land to file in court "a description of the rights and interests intended to be appropriated." Held, that a complaint for an injunction by a street railway, stating that it was authorized to cross a certain railroad track, and, being unable to agree on compensation, it had filed an instrument of appropriation, that commissioners had fixed the amount, etc., but that said railroad interfered with its rights to cross, was sufficient without setting out the instrument of appropriation or averring that it stated the jurisdictional facts.

2. Burns' Rev. St. 1901, sec. 5468e, in respect to the taking of lands, made applicable to street railways crossing railroads by sec. 5468a, directs that on failure to agree on compensation the court may on application appoint appraisers, and, on the return of their assessment of damages, the amount assessed must be paid to the clerk or tendered to the party in whose favor it is made. The award may be reviewed on exceptions by either party, but it is expressly enacted that notwithstanding such appeal the appropriating company may take possession of the property. Held, that a railroad company that had filed exceptions to proceedings by a street railway to acquire a crossing, and had taken an appeal, had no right to interfere with the street railway and prevent it constructing the crossing.

3. The general railroad law, Burns' Rev. St. sec. 5158a, requiring the question as to whether it is practicable to avoid a grade crossing at the intersection of two railroads, and, if not, the mode of such crossing, to be submitted to the Circuit Court, does not apply to a street or interurban electric railway crossing a railroad, they being governed by Burns' Rev. St. 1901, sec. 5468e, requiring the manner of such crossing to be determined by commissioners in the proceedings to acquire the right of crossing.

4. In proceedings by an interurban electric railway, under the Street Interurban Railway Act of 1901 (Laws 1901, p. 461, c. 207), to acquire a right of crossing a railroad, the report of the commissioners that it should be a grade crossing; that the same shall be a frog crossing constructed of the same weight and kind of rails as are in the tracks of the railroad, and to be of a pattern in general use, and requiring a derailing device so constructed that the electric cars could not be run over the railroad tracks except by connecting the tracks of the electric cars by a lever from the side on which the car was approaching—was sufficiently certain. The provisions of Burns' Rev. St. 1901, sec. 5158b et seq., relate exclusively to interlocking devices to avoid the necessity for stopping trains before passing over the tracks of intersecting railroads, and have nothing to do with condemnation proceedings under the Street and Interurban Railroad Act.

5. The commissioners were not authorized to determine by which of the corporations the expense of establishing the crossing should be paid; the statute fixes that liability upon the company owning the road last constructed, unless otherwise agreed on.—*Wabash Ry. Co. vs. Ft. Wayne & S. W. Traction Co.*, 67 N. E. Rep., 674.)

IOWA.—Highways—Dedication—Street Car Tracks—Municipal Control—Reasonable Exercise—Prior Ordinances—Violation of Contract—Colorable Performance—Statutory Enactment—Franchise—Effect of Purchase.

1. In 1874 property owners along a 66-ft. road dedicated additional land so as to make it 120 ft. in width, and it was afterwards so generally regarded. In 1879 a corporation obtained from the abutting property owners consent that a "street" railway might be built "on and upon said boulevard," and the railway was built along one side of the enlarged street. As a defense to an action by the county to enjoin the company from such use of the road, the company successfully relied on a statute authorizing the construction of such railway on "highways" over 100 ft. in width. The county also refused to accept the dedication of the property owners. Held, that the company's right of way was not derived by grant from the property owners as over private property, since dedication and acceptance of the additional strip by the public was inferable from such circumstances, regardless of the absence of a formal acceptance by the county.

2. An ordinance was passed authorizing a street railway company to lay its tracks on a certain grade and in a certain manner. Six years later, when the repeal of the ordinance was being discussed, the company made its first move under the ordinance. Held, that such action was colorable only, and would not deprive the city of its right of repeal.

3. An ordinance ordered a street railway company to move its tracks from the side of the street to a rock-ballasted, curbed strip 20 ft. wide in the middle of the street, elevated several inches above the 25-ft. driveways on either side. Six years later the city passed a repealing ordinance again ordering the removal to the middle, but also ordering the paving and lowering of the tracks to grade. Held, that the second ordinance was not invalid as a violation of a contract or vested rights, since a city cannot be divested by ordinance or contract of its legislative power to make changes in its streets in the exercise of a reasonable discretion.

4. The burden is not cast upon a city to show that its exercise of legislative power is reasonable.

5. Under the authority of a statute providing that street railway companies might extend their lines into the county over highways 100 ft. or more in width, a company constructed its line out upon such a highway. The highway afterwards became a city street. Held, that the use of the road, as granted by the statute, was subject to the governmental control of the highway, and that hence

the company could be compelled by ordinance of the city to move its tracks, the same as any other street railway.

6. A motor line operating a street railway on a certain street purchased the franchise of an electric street railway company calling for an electric line along the same street, and also providing regulations for the construction and maintenance of the tracks. The motor line changed its power to electricity, but continued to occupy the same tracks. Held, that the regulations of the charter applied to the old motor tracks.

7. An ordinance ordered the removal of street car tracks from the side of a street to a strip in the middle 20 ft. wide, to be curbed and rock-ballasted, and elevated several inches above the adjoining 25-ft. driveways. Afterwards a repealing ordinance was passed ordering the tracks to be moved to the middle of the street, but to be constructed at grade, and the ground so occupied to be paved in accordance with the rest of the street. The company was operating under a charter requiring that the car tracks be paved and constructed at grade so as to afford no unnecessary obstruction to travel. Held, that both on general principles and under the charter the repealing ordinance constituted a reasonable exercise of the city's legislative control of its streets. Code, sections 753, 767.—(*Snuffer vs. Cedar Rapids & M. City Ry. Co.*, 92 N. W. Rep., 79.)

IOWA.—Taxation—Street Railway—Mode of Assessment—Appeal from Board of Review—Transcript—Appeal Bond—Failure to File—Effect.

1. Failure to file a transcript of the proceedings of a Board of Review until during the trial of an appeal therefrom does not oust the District Court's jurisdiction of the appeal, jurisdiction being obtained by service of the notice prescribed by Code, sec. 1373.

2. Under Code, sec. 1373, providing that appeal from a Board of Review may be taken by a written notice served on its chairman, an appeal bond is not required.

3. Code, sec. 1343, governing the assessment of street railways, provides that "the lands, buildings, machinery, poles, wires, overhead construction, tracks, conduits and fixtures" shall be assessed in the district where situated, but, where situated partly within and partly without the limits of a town, "such portions of the plant" shall be assessed separately, etc. Held, that while a street railway franchise was not assessable under this section, the portion of the system within a town was, nevertheless, to be assessed as a fractional part of an organized and money-earning whole with allowances for its state of repair, and was not to be resolved for assessment purposes into its component materials, such as rails, spikes, ties, poles, cross-bars, labor of construction, etc.—(*City Council of Marion vs. Cedar Rapids & M. C. Ry. Co.*, 94 N. W. Rep., 501.)

KENTUCKY.—Municipal Corporations—Assessments—Street Improvements—Assessment According to Surface Areas.

1. A city contracted with plaintiff for the improvement of a street, and assessed the cost thereof on abutting property, according to statute, in proportion to superficial areas. Owing to the intersection at an acute angle of another street with that improved, the assessed area of the property across the street from the intersection was 96,250 feet, and that in the intersecting angle was only 11,305 feet. Held, that the assessment, being at the same rate per square foot on each side of the street, was valid.

2. The property across the intersecting street having been previously assessed, and being across a principal street, could not be re-assessed.—(*Louisville Ry. Co. vs. Southwestern Alcatraz Asphalt & Construction Co.*, et al., 74 S. W. Rep., 237.)

MASSACHUSETTS.—Street Railways—Reservation of Space for Tracks—Additional Servitude.

1. St. 1895, p. 109, c. 121, forbidding the granting of any location for the track of any street railway in a certain locality, except in ways in which special space for the use of street railways shall have been reserved prior to the location of the tracks, and except within the limits of such reserved space, and authorizing the Selectmen of the town to lay out such space, is not unconstitutional on the ground that it authorizes the imposition of an additional servitude without compensation.—(*Eustis vs. Milton Street Ry. Co.* *Hollingsworth vs. Same.* *Whitney vs. Same.* *Kennedy vs. Same.*, 67 N. E. Rep., 663.)

MASSACHUSETTS.—Eminent Domain—Elevated Railroads—Statutes—Construction—Abutting Property—Damages—Noise—Concurring Causes—Measure of Damages.

1. St. 1894, p. 764, c. 548, sec. 8, provides that the location of a railway in any public way shall be deemed an additional servitude, and entitle persons having an estate in such way, or any abutting premises, and who are damaged by reason thereof, to recover compensation in the manner provided; and sec. 9 declares that in such a proceeding the findings shall be on the following question: "Has the petitioner's estate been damaged more than it has been benefited by reason of the location or operation of such railway; and,

if so, how much?" Held, that the word "damage," as so used, should be construed to mean special, and not general damage.

2. Where it was found that noise incident to the operation of an elevated street railway was such as to constitute a private nuisance, if it were not authorized, such noise constituted special and peculiar damage to abutting property, for which the owner was entitled to compensation, as authorized by St. 1894, pp. 764, 765, c. 548, sec. 8, 9.

3. Where, in an action for the assessment of damages to abutting property by an elevated street railway, there were other causes of damage connected with the operation of the railway, which, concurrently with noise, produced the damage, it was not necessary, in assessing the damages, to separate the effect produced by the noise alone from the effect of other concurring causes.

4. Where, in a proceeding to assess damages arising from the maintenance of an elevated street railroad, plaintiff owned the fee in a part of the street on which part of the structure was erected, the fact that plaintiff's deed to his abutting property limited his occupation and use to a strip 10 feet in width along the line of the street did not limit plaintiff to a recovery for noise from the operation of the railroad to the difference between the depreciation in value of his property which would be caused by the noise if it existed just beyond its confines and the depreciation caused by the noise in its present location.—(Baker et al. vs. Boston Elevated Ry. Co., 66 N. E. Rep., 711.)

MICHIGAN.—Eminent Domain—Railroads—Condemnation—Jurisdiction—Instructions—Appeal—Review.

1. The court, on appeal, will not review the decision of the trial judge and the jury making the award in proceedings by a railway company for the condemnation of land that the proposed railroad is a public necessity.

2. Where the court in condemnation proceedings by a railway company decided on the issue whether, before the commencement of the proceedings, the company had made a bona fide effort to acquire the land by offering a fair price therefor, that on the evidence offered it was a case for the jury, but that the landowner might later offer additional evidence to perfect his record, the refusal of another judge hearing the case to hear the additional testimony did not oust the court of its jurisdiction to impanel the jury, since the decision of the court that it was a proper case for the jury was a decision that the company had made a bona fide effort to acquire the land necessary as a condition precedent for the impaneling of a jury.

3. Where, in proceedings to condemn land for a railway right of way, the jury viewed the land, and the evidence as to its value was conflicting the court on appeal will not review the action of the jury.

4. An instruction in proceedings to condemn land that railroads are public necessities, and that the taking of land for railroads is taking land for a public use, was not objectionable as removing the question from the jury of the necessity of taking the land for a public use, where other instructions specifically stated that it was for the jury to determine whether it was necessary to take the land for a public use.

5. An instruction in proceedings to condemn land that the jury should pay the land owner what the land was worth was not erroneous as excluding damages for anything on or under the land, as well as the damages resulting to the other land, where other instructions specifically stated that the value of land was what it was worth taking into consideration any injury that might be sustained to the land remaining.

6. Comp. Laws 1897, sec. 6248, providing that within twenty days after the confirmation of the report of the commissioners or jury in proceedings by a railroad company to condemn a right of way either party may appeal from "the appraisal or report of the commissioners or jury," does not authorize an appeal from the allowance of attorney's fee to the owner of the land condemned under the express authority of sec. 6240.—(Detroit & T. Short Line Ry. Co. vs. Hall et al., 94 N. W. Rep., 1065.)

MICHIGAN.—Street Railways—Right of Way—Encroachment on Toll Road—Contract—Adequate Remedy at Law.

1. A contract between a toll road company and an electric railway company operating a single track along one side of the toll road provided that as the railway company desired to construct a second track upon its own adjacent right of way, and desired, when necessary, "to encroach upon" the toll road, therefore such encroachment should be permitted, and, "if at any place it should be necessary to encroach upon the roadbed, the railway company would extend the roadbed, etc." Held, that the purpose of the contract was to enable the railway company to double-track its road, and that necessary encroachment on the roadbed was therein contemplated.

2. A toll road company has an adequate remedy at law for an unnecessary encroachment on the highway by an electric railway

company which has a contract authorizing necessary encroachments.—(Detroit & B. Plank Road Co. vs. Oakland Ry. Co., 92 N. W. Rep., 346.)

NEW HAMPSHIRE.—Street Railways—Routes—Establishment—Rights in Street—Obstruction—Special Charter Provisions—Repeal.

1. A street railway company's charter required that its route over the streets of the city should be determined by the Selectmen thereof in like manner as highways are laid out. Pub. St. 1901, c. 45, providing for the establishment of highways, sec. 4, requires that the Selectmen shall make their decisions in writing, and cause the petition and their decision to be filed in the Town Clerk's office and recorded at length on the town records, and declares that their decision shall be of no effect until such section is complied with. Held, that where the Selectmen voted a general location to such street railway company in accordance with a plan, but the hearing of the petition for the laying out of the railway was continued from time to time while the road was being built, such general location, without record thereof, conferred no authority on the company to occupy the streets.

2. Laws 1889, p. 161, c. 178, sec. 2, granting a special charter to a street railway company, and requiring that its route should be laid out and selected by the Selectmen of a town in like manner as highways are laid out, was not repealed by Laws 1895, p. 367, c. 27, providing for the organization of street railway corporations by general law, and declaring that previous charters granted were altered or amended so far as they were inconsistent with such general law.—(Lenox vs. Dover, S. & R. Street Ry. et al., 54 Atlantic Rep., 1022.)

NEW HAMPSHIRE.—Rural Electric Railway Company.—Charter—Power to Construct Branch Line.

1. Under Laws 1899, chapter 153, section 1, incorporating an electric railway company, and empowering it to construct a railway, with necessary sidings and sidetracks, from a certain point in one town, over and on such highways, bridges, and public and private lands as may be necessary for the public accommodation, in that and three other towns, to some convenient point in the State line, and by section 2 providing that said railway shall be laid out by the Selectmen of said towns as highways are laid out, construction of a rural railway, only, between the termini mentioned, is authorized, and a branch line in one of the towns, for the accommodation of its inhabitants, cannot be constructed; the words "public accommodation" referring to the general public, whose convenience required the road extending through the several towns.—(Attorney-General ex rel. Boston & M. R. R. vs. Derry & P. Electric Ry. Co., 53 Atlantic Rep., 443.)

NEW JERSEY.—Street Railways—Right to Use Streets—Consent of Governing Body of County and Township.

1. Traction Act 1893, section 1 (3 Gen. St. p. 3235), requires a street railway corporation, before using any street or highway, to obtain the consent of the governing body "of the township or county" within which the street or highway used is located; Acts 1894 (3 Gen. St. p. 3247) provides that, in addition to the restrictions prescribed by law, no street railway shall be constructed in any street in any municipality, town, township, village, or borough, without the consent of its governing body; and Act 1896 (P. L. 1896, p. 329) requires the consent of the governing bodies of cities, towns, and villages, and declares that if any board or public authority other than the governing body of such municipality, town, or village shall have control of any of the streets or highways over which the tracks are to be located, the consent of such other body or public authority shall also be obtained. Held, that though, under the act of 1893, the consent of the governing body "of the township or county" only need be obtained, the subsequent acts required the consent of both county and township or other municipality within the territory in which the railway lines were proposed to be built.—(Woodbridge Tp. vs. Raritan Traction Co., 53 Atlantic Rep., 175.)

NEW JERSEY.—Corporations—Powers—Owning Stock—Exchange of Property—Valuation—Injunction.

1. Under Corporation Act, sections 6, 7, making it lawful to form a company to construct and operate railroads, and to hold, purchase, and convey real and personal property out of the State, a New Jersey corporation, with a charter stating its objects to be to own and operate, outside the State, railway properties of all kinds, and to sell and lease the same, and to acquire, by purchase or otherwise, the stock, etc., of other corporations, and sell and dispose of such stock, and providing that "with the consent in writing * * * of the holders of a majority of the stock * * * the directors shall have power to sell or otherwise dispose of the whole property of the corporation," may, on obtaining such consent, exchange its entire property for stock of the purchasing corporation.

2. Such an exchange is not controlled by section 54 of the cor-

poration act, declaring that on the dissolution of a corporation the directors are trustees for the settlement of its affairs, and may sell all or any part of its property for cash, or partly on credit, or take mortgages and bonds for part of the purchase price, though it is intended to divide the stock so received pro rata among the old stockholders and dissolve the corporation.

3. The fact that there is a mortgage on all the property of such corporation, together with "all stocks, bonds, etc., now owned or hereafter acquired" by it, and that the stock, when acquired, will be subject to such mortgage, and cannot be distributed to the stockholders, as contemplated, is not ground for enjoining the exchange.

4. Under 1 Hill's Ann. St. & Codes Wash., secs. 1497, 1500, authorizing corporations to be formed to build and operate railroads, and to purchase, sell, etc., real and personal property, and section 1524, authorizing corporations of other States to "acquire and dispose of all real and personal property convenient to carry into effect its objects," etc., an exchange by a New Jersey corporation, owning a street railway in Washington, of its property for stock in a corporation of the latter State, is valid.

5. Const. Wash., art. 12, sec. 6, declaring that all fictitious increase of stock by a corporation shall be void, does not forbid the issuance of stock in payment for property purchased.

6. Where a corporation issues stock in payment for property purchased, the valuation placed by it on the property and stock, in the absence of fraud, is binding and conclusive, as between the parties, but not on the courts or subsequent creditors.

7. Under Corporation Act 1896, section 51, empowering corporations to purchase the securities of other corporations, and 1 Hill's Ann. St. & Codes Wash., sec. 1506, declaring shares of corporate stock to be personal estate, in the absence of any statute or decision of the Washington courts declaring a contrary public policy in that State a New Jersey court will presume that, in accordance with the rules of comity, a New Jersey corporation may own and vote on shares of stock in a Washington corporation.—(Coler vs. Tacoma Ry. & Power Co. et al., 53 Atlantic Rep., 680.)

NEW JERSEY.—Street Railroads—Establishment—Municipal Consent—Consent of Abutting Owners—Execution—Seal—Acknowledgement—Statutes—Repeal—Construction—Extensions—Maps—Description—Variance—Judgments—Estoppel.

1. P. L. 1896, p. 329, provides that no street railroads shall be constructed except on consent of the governing body of the municipality on the written consent of one-half of the abutting owners filed with the clerk of such governing body. Held, that since the filing of the requisite consent by the property owners was a condition precedent to the passage of an ordinance granting authority to construct a railroad, it would be presumed, in the absence of a contrary showing, in a subsequent proceeding, that the township committee before authorizing such construction determined that the consent of such owners had been filed.

2. Under P. L. 1896, p. 329, declaring that no ordinance for the construction of a street railway shall be passed until consent in writing of abutting owners, executed and acknowledged as are deeds, entitled to be recorded, has been filed with the clerk of the governing body of the municipality, consents filed, but not sealed, were sufficient to confer jurisdiction on a township committee to authorize the construction of a road.

3. Where consents of abutting property owners to the construction of a street railway were sealed, an acknowledgment thereto that the grantors signed and delivered the same as their voluntary act and deed was not objectionable for failure to recite that the grantors sealed the same, the sealing being implied from the acknowledgment that the instrument was the signer's deed.

4. P. L. 1894, p. 374, providing that no street railway shall be constructed upon any street or highway in a municipality, except on consent of its governing body and on consent of a certain proportion of the owners of abutting property on streets to be used, was superseded by P. L. 1896, p. 329, covering the same subject.

5. P. L. 1896, p. 329, provides that no street railway shall be constructed in any city, town, township, village, or borough except on consent of the governing body of such municipality, etc., and that such consent shall not be granted except on filing with the clerk of such governing body of the consent of a certain proportion of abutting owners. Section 2 authorizes the change of motive power, and is followed by a proviso that if any board, body, or public authority other than the governing body of such municipality, etc., shall have control of the streets or highways over which the proposed road is to be constructed, the consent of such board or public authority shall also be required, which shall be granted only on notice. Held, that the consent of abutters was only required to be once given and filed before the municipal authorities mentioned in the first section grant permission, and the act did not require the filing of the same consents as a condition

to the railroad's obtaining the additional consent of the board of chosen frecholders of the county under such proviso.

6. Under a statute providing that before the beginning or construction of any extension to a street railway the corporation shall file in the office of the Secretary of State a description of the route of such extension, showing the termini, with a map exhibiting the same, with the courses and distances thereof, the fact that the map of an extension marked a distance running 1,462 ft., more or less, while the description filed omitted the words "more or less," was immaterial, since such words might be rejected as surplusage.

7. A decree in a proceeding by certiorari to determine the validity of an ordinance granting a street railway company the right to lay its road on the highway within a township, determining that such ordinance was valid, did not estop the contestant in a subsequent new proceeding to contest the validity of the ordinance for reasons not advanced or considered in the prior suits.—(Mercer County Traction Co. vs. United New Jersey Ry. & Canal Co., 54 Atlantic Rep., 819.)

NEW YORK.—Street Railways—Construction—Consent—Partial Compliance.

1. Where a railway company proceeded under the Railroad Law, sections 91, 92, to obtain the consent of the Commissioners of Highways of a town to construct its track over and along about 5 miles of a certain highway, and filed the written consent of the owners of more than two-thirds of the value of the property along the proposed route, the company could not abandon all but about 3100 feet of the route, and construct their track for only that distance on such highway, by virtue of the consents obtained.—(Collins et al. vs. Commissioners of Highways vs. Amsterdam St. R. Co. et al., 78 N. Y. Supp., 470.)

NEW YORK.—Deed—Highway as Boundary—Title to Fee of Road—Evidence—Railway in Highway—Rights of Abutter.

1. A deed of land described as on the easterly side of the highway, beginning at a locust stake driven in the ground, thence along said highway a certain distance, thence by courses and distances, and returning a specified number of feet to the highway aforesaid to the point of beginning, and likewise a deed of land described as on the north side of the highway, beginning at a locust stake, and running along the northerly side of the highway a certain distance, and thence by courses and distances, returning a certain number of feet to the place of beginning, excludes the highway from the land granted.

2. It is evidence that a deed of land bounded on a highway and described by courses and distances excludes the highway, that it contains the amount it purports to convey without including the highway.

3. An abutter on a highway, owning no part of the fee thereof, cannot complain of the construction of a railway therein under lawful authority.—(Kennedy vs. Mineola, H. & F. Traction Co., 78 N. Y. Supp., 937.)

NEW YORK.—Street Railways—Merger—Effect—Subsequent Liabilities—License Tax on Cars—Actions—Pleading—Joinder of Causes.

1. Where a street railway company was merged into another corporation, which assumed all the obligations of the corporation merged, such corporation, while existing as a corporation, so far as existing creditors at the time of the merger were affected, became extinct as to all future transactions, and could thereafter create no new obligations, or be liable for the acts of the corporation into which it was merged.

2. Prior to the incorporation of the Sixth Avenue Railroad Company, its incorporators contracted with the city of New York to pay an annual license fee to the city for each passenger car to be "used on its road." The corporation was afterwards organized under an act authorizing it to construct its line as designated in the respective grants, licenses, resolutions, or contracts with the city; and thereafter a city ordinance was passed declaring that each and every passenger railroad car running in the city below 125th Street should pay to the city the sum of \$50 annually for a license. Thereafter the Sixth Avenue Railroad Company leased its lines to the Houston, West Street & Pavonia Ferry Company, which latter company was subsequently merged into the Metropolitan Street Railway Company, after which neither the Sixth Avenue nor the Houston Company operated any cars previously operated by the Sixth Avenue Company. Held, that since, under the contract of the Sixth Avenue Company with the city, it was liable to pay only for cars it "used on its road," which liability terminated, as to it, on its lease to the Houston Company, and as to the latter on its merger in the Metropolitan Company, a complaint against the three companies, alleging such facts, to recover license fees for cars run on the road, stated a cause of action against the Metropolitan Company only, and was therefore not demurrable for misjoinder of causes.—(City of New York vs. Sixth Ave. R. Co. et al., 79 N. Y. Supp., 319.)

NEW YORK.—Street Railways—License Fee—Lease of Road—Liability of Lessee.

1. Where the incorporators of a street railway company contracted with the city that the company would pay a certain license fee for each car operated, and subsequently the company leased its lines to another company, which took the property, etc., "subject to all debts and liabilities of the first company," the lessee was not liable for license fees accruing and payable by the lessor prior to the lease.—(City of New York vs. Third Ave. R. Co. et al., 79 N. Y. Supp., 431.)

NEW YORK.—Street Railroads—Rights in Streets—Rival Roads—Injunction—Discretion—Appeal—Defenses.

1. Plaintiff and defendant were rival street railroads, each having secured the necessary certificate to enable it to construct its road; plaintiff having perfected its proceedings prior to defendant. Both roads desired to construct their lines on a certain street of a village, which lay in proximity to a State canal, which street was insufficient to accommodate the lines of both companies. Plaintiff had not acquired the consent of the Superintendent of Public Works or of the board of trustees of the village to the location of its line on such street. Held, that an order vacating a temporary injunction restraining defendant from laying its road on such street during the pendency of an action to determine which company was entitled to the use of the street was not such an abuse of discretion as to require reversal on appeal.

2. Where a street railway company seeks to enjoin another company from using a certain street for its line, it cannot object to a defense that, because of its failure to procure the consent of the Superintendent of Public Works and of the village trustees, it is not entitled to use the street, on the ground that such defense can be urged only by the public officials.—(Rochester & E. R. Ry. Co. vs. Monroe County Electric Belt Line Co., 78 N. Y. Supp., 998.)

NEW YORK.—Street Railways—Municipal Regulation—License Fees—Ordinances—Validity.

1. A city ordinance providing that every passenger car running in the city of New York below 125th Street shall pay to the city the sum of \$50 annually for a license, and prohibiting the running of cars without payment of the license fee, was not a police regulation, but was a mere imposition of a duty for the purpose of revenue, and was invalid in so far as it affected a street railway company, the franchise of which authorized the company to operate its cars without any other condition than payment of a certain percentage of its receipts.—(City of New York vs. Twenty-Third St. Ry. Co. et al., 79 N. Y. Supp., 323.)

NEW YORK.—Highways—Abutting Owner's Rights—Title to Center of Street—Railroads—Streets—Right of Way—Abutting Owner's Rights—Injunction.

1. The fact that the original patent to land bounded the premises on the west by a street did not preclude the patentee and his successors from claiming title to the center of such street, it being presumed that a grant by the State of land bordering on a highway conveys title to the center thereof.

2. An abutting owner, holding title to the center of a street, whose right has not been acquired by a railroad company, is entitled to enjoin such company from building or operating its railway line on such street.

3. An injunction will not be refused an abutting owner seeking to restrain a railroad from constructing its line in the street, where the company has not acquired such abutting owner's rights, on the ground that the company has proceeded to construct its line through the street, and has expended considerable money in such undertaking.—(Paige vs. Schenectady Ry. Co., 79 N. Y. Supp., 266.)

NEW YORK.—Railroads—Extension—Powers.

1. Laws 1890, chapter 565, provides that every railroad corporation, except elevated roads, may alter any part of its route, or locate it or any part thereof in a county adjoining any county named in its certificate of incorporation, if the directors believe that the line can be improved thereby, on making and filing a survey and map of such change. Held not to permit a railroad to select a new terminus in an adjoining county, 7 miles from its original terminus, and extend its line thereto, where such change is only made for the purpose of increasing the business of the road, and not for the purpose of benefiting the line originally located by the articles of association.—(Greenwich & J. Ry. Co. vs. Greenwich & S. Electric R. R. et al., 65 N. E. Rep., 278.)

NEW YORK.—Elevated Railroad—Construction—Persons Entitled to Damages—Lessees—Renewal Lease—Consent of Lessor—Effect—Reduction of Rent—Breach of Covenant of Lease—Recovery of Damages—Release.

1. A city leased property for twenty-one years, with covenant of renewal. On the expiration of the lease, which by several assignments had come to plaintiffs, a renewal was executed to her

for another twenty-one years. Pending the original term, an elevated railroad had been constructed in front of the property. Held, that plaintiff could recover for the damage to her leasehold therefrom, her title under the renewal lease relating back to the original term, and therefore occurring before the construction of the road.

2. A city which had leased premises to a third party could not thereafter, by consenting to the construction of an elevated railroad in front of the property, deprive the lessee of the right to recover any damage to the leasehold.

3. Where property was leased for a specified term, with covenant of renewal on terms to be agreed on by the parties, and the lessee had erected a building on the premises, the fact that the rent for the renewal term was paid with reference to the presence of an elevated railroad in front of the premises, which had been erected during the original term, did not preclude the lessee from recovering for damages to the leasehold.

4. The fact that lessees assigned their lease in violation of a covenant against assignments did not preclude the assignee from recovering against third persons for erecting an elevated road in front of the premises, when notwithstanding the assignment the lessors continued to collect the rents, and afterwards executed a renewal to the assignee.

5. Where a lessee recovers damages due to the erection of an elevated railroad in front of his property the company is entitled to a release from him, and conveyance of the easement, not merely during the existing term, but during future renewals stipulated for in the lease.—(Storms et al. vs. Manhattan Ry. Co. et al., 79 N. Y. Supp., 60.)

PENNSYLVANIA.—Joint Tort Feasors—Action—Dismissal as to One.

1. Plaintiff sued two railway companies and a construction company to recover damages for the construction of a street railway on a highway on which his land abutted, without his consent, alleging injuries to his crops and fences, and injuries from the reckless manner of operating the cars. It appeared that one of the street railway companies had leased its franchises and property to the other, which was alone responsible for the negligent operation of the road; that the construction company alone was responsible for the destruction of the crops and fences, and that the construction company and the other street railway company were liable for the construction of the road without plaintiff's consent. Held, that a nonsuit could be entered as to the defendant not connected with the joint tort, or a verdict directed for him, and the case submitted to the jury, as to the other two.—(Minnich vs. Lancaster & L. Electric Ry. Co. et al., 53 Atlantic Rep., 501.)

PENNSYLVANIA.—Foreign Corporations—Failure to Register—Right of Action.

1. Act April 22, 1874 (P. L. 108), prohibiting foreign corporations from doing business in the State without complying with its provisions, was passed in order to bring such corporations within the reach of legal process; and, where such a corporation does not register as provided by such act before entering into a contract sought to be enforced in the courts, it has no right of action therefor.

2. Where a foreign corporation constructs an electric railway in the State for six months, employing nearly all of its capital therein, and files no statement with the Secretary of the Commonwealth as required by Act April 22, 1874 (P. L. 108), until two months after the completion of the work, it cannot sue to recover for labor and materials furnished by it during the progress of the work.—(Delaware River Quarry & Construction Co. vs. Bethlehem & N. Pass. Ry. Co. et al., 53 Atlantic Rep., 533.)

PENNSYLVANIA.—Appeal—Final Order—Street Railways—Appointment of Viewers—Constitutional Law—Public Use.

1. An appeal will lie from an order of court on a petition of a street railway company appointing viewers to assess damages, and approving bonds of the petitioner, seeking to complete its circuit by the use of tracks of another railway company, though no assessment of damages has been made.

2. Act May 14, 1889 (P. L. 216, section 14), as amended by Act May 21, 1895 (P. L. 93), giving a street railway a right to use 2500 feet of the tracks of another street railway company on payment of damages, is unconstitutional, as an exercise of the right of eminent domain; the object being not the benefit of the general public, but to aid a new corporation in taking possession of the franchise of the property of the old one for its own benefit.

3. A street railway company organized under the act of May 14, 1889 (P. L. 211), is not estopped to deny the constitutionality of section 14 of the act, as amended by the act of May 21, 1895 (P. L. 93), giving a street railway company the right to use the tracks of another, inasmuch as such section may be eliminated from the act, leaving all other provisions to stand in full force.—(Petition of Philadelphia M. & S. St. Ry. Co., 53 Atlantic Rep., 191.)

FINANCIAL INTELLIGENCE

WALL STREET, July 22, 1903.

The Money Market

There were no important developments in the money market this week. The demand for funds for all periods continued light, owing to the continued liquidation in the stock markets, and to the fact that many of the larger commission houses have already secured enough funds to carry them into the new year. Local institutions, however, were not disposed to offer with any degree of freedom. Despite the continued influx of currency from the interior, and the gain made in other quarters last week, the banks lost to the sub-treasury \$3,703,000, but since last Friday they have gained nearly \$1,500,000 as a result of pension payments and the receipts of new gold from the Klondike. Call money ruled comparatively easy, transactions being made at between 2 per cent and 3 per cent, but time loans ruled firm, at about last week's level of rates. Sixty and ninety-day funds were offered in moderate amounts at $4\frac{3}{4}$ per cent by foreign houses, but the amount of business reported was extremely small. For the longer periods, especially for six months' contracts, a fair demand existed throughout, but nothing was obtainable under 6 per cent, except where all dividend-paying railroad shares were offered in collateral. At the close indications are that the rate will continue to hold firm at near the present level. The time is approaching when the local institutions will be called upon to supply funds for moving the crops, and preparations are now making to meet these demands. On the other hand, money continues to come from the interior in fair amounts, and although rates of exchange on New York are somewhat lower than a week ago, sufficient premiums yet remain to insure a continuance of the movement in this direction, at least for the present. A favorable feature is the market weakness in sterling exchange rates, which eliminate all possibilities of gold exports to Europe. The weakness in this department is due principally to the offerings of bills against London's purchases of stocks and bonds in the local market. Loan bills are also offered in fair amounts. There were no material changes in the discount rates at any of the leading European centres. The open market rate at London remains unchanged at $2\frac{3}{4}$ for short bills. At Berlin the rate declined $\frac{1}{8}$ to 3 per cent, while a similar decline was recorded at Paris, the rate there being $2\frac{5}{8}$ per cent. Amsterdam was unchanged at 3 per cent.

The Stock Market

From the lowest level for the list, as a whole, reached upon Wednesday there was a fairly steady advance until just before the close Saturday. The situation did not clear, but the wild rumors of the early part of the week were not followed by specific news developments, and traders took the ground that if facts did not appear in the crisis of that day, the bear contingent must have been the sole originators of the more disquieting tales. Attention was paid to railway earnings, crop news and favorable news of the general business situation. Saturday's bank statement showed gratifying increases in cash and surplus reserve, but operators for the decline argued that a season when a big decrease in the loan item was reasonably due, but did not appear, there must be some large interests involved in the market which had to be carried over. Such suspected accounts were gunned for, and successfully. On Monday one loan of about \$3,000,000, with Steel shares the largest part of the collateral, became due, and could not be renewed. The stocks were thrown over, with the result that new low records at 22 and 70 for the common and preferred were made. A weak account in Rock Island had been uncovered, said to be of 30,000 shares in St. Louis, but this was closed out when the stock reached 24. The resistance of the railway list on Monday to the influence of Steel was noted by the short interest, as well as some quiet buying throughout the list by several leading banking houses. The result was a decided rally on short covering, and some further good investment purchases on the following day. No sign of a weak spot appeared, as all the leading stocks advanced. In the afternoon the completion of buying orders and the \$9,000,000 building firm failure in Boston gave the bear contingent another opportunity to strike at the market, and part of the advance was lost.

Local tractions were comparatively inactive, except for Brooklyn Rapid Transit. Metropolitan Street Railway fell as low as

$115\frac{1}{2}$, and Manhattan to $131\frac{3}{8}$. No news developments affecting these properties appeared. Brooklyn Rapid Transit made a new low record at $45\frac{5}{8}$, and became almost the market feature one day. No facts as to the company's condition and operations came out. A prominent politician, with some friends, was reported to have been unable to renew a pool loan, protected in large part by this stock, and was obliged to liquidate the pool holdings.

Philadelphia

A declining market was experienced throughout the week, largely under the leadership of the steam railroad and industrial shares, which are dealt in on both the New York and Philadelphia markets. The local securities withstood the pressure very much better, although there was considerable long stock liquidated, especially in United Gas, which closed on July 21 at 82. American Railways, in spite of its favorable earnings, which show an increase of \$231,000 for the year, has fallen off $\frac{1}{2}$ point during the week, while the Philadelphia group, that is, Rapid Transit, Philadelphia Traction and Union Traction, show a loss for the first two of 1 point each, and $\frac{3}{4}$ of a point for the latter. Philadelphia Company is also down about $\frac{1}{2}$ point from last week to 40, in spite of the fact that its June statement showed a large increase in earnings. Other traction sales during the week include Consolidated Traction of New Jersey at 65, Railways Company General at $3\frac{1}{2}$, New Jersey Traction 5s at $104\frac{1}{2}$, Newark Passenger 5s at $113\frac{1}{2}$, and Electric People's Traction 4s at $99\frac{1}{4}$ to $98\frac{1}{2}$.

Chicago

The Chicago high-priced railway properties in common with the rest of the market, reflect the necessity of certain holders for ready cash, whereas the low-priced securities have held their own fairly well during the past week. City Railway scored a new low record in touching 180, which is 5 points below the price at which it was quoted on July 14. Union Traction, on the other hand, both common and preferred, are unchanged in price, at 4 and 30 respectively. South Side Elevated is down 2 points to 97, and Northwestern Elevated common $\frac{1}{2}$ point to $20\frac{1}{2}$. Lake Street Elevated reflects the general expectation that the proposed reorganization of the property will be successful, and is being quoted at $6\frac{3}{4}$, or $\frac{3}{4}$ of a point above the quotation of last week. Metropolitan West Side common is unchanged at 20, but the preferred is down 3 points to 63, on the rumor that the directors, who will meet the first week in August to consider the semi-annual dividend, will reduce it from $1\frac{1}{2}$ to 1 per cent.

Other Traction Securities

The Boston securities, in common with the general market, are lower than last week, the Elevated being down to 138 from 140, while Massachusetts Electric Companies common at $24\frac{1}{2}$, and preferred at $81\frac{3}{4}$, show decreases of $2\frac{1}{2}$ and $\frac{1}{4}$ points, respectively. West End common and preferred remain practically stationary, with very few transactions recorded. The Baltimore market has been without much life. While there was a little liquidation there was also almost an equal absence of buying indicated, so that most of the securities remained about stationary. The transactions included the United Railways & Electric common at 11, the income bonds at 63 and $62\frac{3}{4}$, and the 4s at 93 to $92\frac{5}{8}$. On the New York curb the tractions have been rather neglected, although Syracuse, on reports of increased earnings, has formed an exception to the general tendency of the market, and on July 22 was quoted as $29\frac{1}{2}$ for the common and 75 for the preferred. New Orleans common is down $\frac{3}{4}$ of a point, to $11\frac{1}{4}$, and the preferred shows a loss of $1\frac{3}{4}$ points, at a quotation of $40\frac{1}{4}$. Interborough Rapid Transit closed at $100\frac{1}{4}$, and Twin City Rapid Transit at $95\frac{1}{2}$. The Washington Railway & Electric preferred sold at $37\frac{3}{8}$, which is a low record price. St. Louis Transit was $19\frac{1}{4}$ bid, while the preferred was offered at 71.

Practically every traction issue on the Cincinnati Exchange showed a decline last week. Detroit United sold to extent of about 600 shares, and made a low mark of $69\frac{1}{2}$, declining from $72\frac{1}{2}$ at the opening, and closing the week at 70. Several small lots of Toledo Railways & Light sold at $23\frac{1}{2}$, and one lot went at $22\frac{3}{8}$. Cincinnati, Dayton & Toledo sold at 30, and a few small lots of Cincinnati Street sold at $133\frac{1}{2}$. On news of the receivership for the Miami & Erie Canal this issue dropped to $7\frac{1}{2}$, and then tumbled to $5\frac{1}{2}$ on a small sale; the issue has been selling around 20 recently. Cincinnati, Dayton & Toledo bonds were in

good demand at around 84. Columbus, Delaware & Marion bonds sold repeatedly at 101. At Cleveland there were few sales, but they were well scattered. Cleveland Electric advanced to 74 on one sale Lake Shore Electric preferred sold at 47½ and 48, new low marks. Western Ohio receipts dropped to the low mark of 17. Northern Ohio Traction & Light sold to the extent of 100 shares, and declined to 20, a drop of 1½ points from last sales.

Security Quotations

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

	Closing Bid	
	July 14	July 21
American Railways	45	44½
Aurora, Elgin & Chicago.....	a17½	17½
Boston Elevated	140	138
Brooklyn Rapid Transit	52¾	46½
Chicago City	185	180
Chicago Union Traction (common).....	4	4
Chicago Union Traction (preferred)	30	50
Cleveland Electric	74	74
Columbus (common)	104	101
Columbus (preferred)	102	103
Consolidated Traction of New Jersey	66	65
Consolidated Traction of New Jersey 5s.....	105	104
Detroit United	65	69¾
Elgin, Aurora & Southern	a48	b52
Lake Shore Electric	a14	b10½
Lake Street Elevated	5½	6¼
Manhattan Railway	132	131½
Massachusetts Elec Cos. (common).....	24½	22
Massachusetts Electric Cos. (preferred)	82	81¾
Metropolitan Elevated, Chicago (common).....	20	20
Metropolitan Elevated, Chicago (preferred)	66	63
Metropolitan Street	118¾	116½
New Orleans (common)	12	11¼
New Orleans Railways (preferred)	42	39½
North American	85	82
Northern Ohio Traction & Light.....	21	18
Northwestern Elevated, Chicago (common).....	21	20½
Philadelphia Rapid Transit	15	15
Philadelphia Traction	96	95
St. Louis Transit (common)	20½	19½
South Side Elevated (Chicago)	99	97
Syracuse Rapid Transit	25	b29½
Syracuse Rapid Transit (preferred).....	73	b75
Third Avenue	112	111½
Toledo Railway & Light	20	20
Twin City, Minneapolis (common)	96¾	95½
Union Traction (Philadelphia)	44¾	44
United Railways, St. Louis (preferred)	71	69½

a Asked. b Last sale. * Ex-dividend. † \$10 paid.

Iron and Steel

The weak feeling about the iron market, to which reference was made last week, continues to be the predominating factor. While there has been no great change in quotable prices, the purchases have been light and confined to immediate needs. The finished iron and steel market remains dull and easy. Quotations are as follows: Bessemer pig, \$18.75 to \$19; Bessemer steel, \$27 to \$27.50; steel rails, \$28; girder rails, \$33 to \$33.50.

Metals

Quotations of the leading metals follow: Copper, 13½ to 13¾ cents; tin, 27½ cents; lead, 4¾ cents; spelter, 5¾ cents.

THE ELECTRIC RAILWAY ALONG CHAUTAUQUA LAKE, NEW YORK

The Chautauqua Traction Company, of Jamestown, N. Y., anticipating a favorable decision from the Railroad Commissioners on its application for permission to build its proposed line, some time ago purchased the entire equipment for the road, and the rails, ties, poles, etc., have been distributed along the proposed route in order that there shall be no delay in construction. Already a construction gang is at work on the proposed line from Jamestown to Lakewood, via Celoron, which will take the place of the present Lakewood line of the Jamestown Street Railway Company, which is closely identified with the new company, its principal executive officers being the same. Just how long it will take to complete the line it is impossible to say at this time, but the promoters expect to operate cars between Jamestown and the Chautauqua assembly grounds before the close of the present season. The power house in Jamestown is being erected with as much haste as is consistent with good work, and rolling stock and power equipment of the road have already been shipped by the manufacturers. The road will follow the contour of Chautauqua

Lake closely from Lakewood to Mayville, passing along what is known as "the Lake road." It will not enter the Chautauqua grounds, but will establish a station in accordance with the wish of the institution, probably opposite the Vincent Avenue gate. The road will offer a quicker and more convenient route to Chautauqua for tourists from both Mayville and Jamestown. It will mark an era in the development of that portion of the country which lies along and to the southward of Chautauqua Lake.

ELECTRIC RAILWAY PROGRESS IN COPENHAGEN

In the trade report of Denmark for 1902 there are some interesting particulars bearing on Copenhagen's tramway system, which is very complete and extensive. The power is delivered from the overhead trolley system, storage batteries have been entirely done away with, and horse traction is being gradually abolished. One can travel any distance from one to five or six miles for 1d. (2 cents), and transfer tickets enabling passengers to change cars are supplied free.

The working expenses are about 7¼d. (14.5 cents) per mile. The tramways belong to a company which has a forty years' lease from 1808 from the municipality, and the municipality has the right to buy the various lines in 1908. The company has a capital of 889,000l. (\$4,225,000), and employs 793 conductors and drivers, with about 127 hands in the various sheds, track cleaners, &c., besides day laborers.

The motor cars number about 184, and there are besides seventy-five trailers, twenty-six horse cars, and seventeen omnibuses. The length of the tracks, double lines, is 33,500 km and 11,700-km single lines, and the total length of the various routes where cars run by electric power is 45,810 km. The length of routes where horse-power is used is 10,255 km. In a very short time horse-power will be done away with, and every car will be electric.

ELECTRIC RAILWAY FROM MONDARIZ TO VIGO VIA PORRINO, SPAIN

The concession for the first section of this important railway between Mondariz and Porrino is on the point of being granted by the Ministry of Public Works, and that for the second section between Porrino and the port of Vigo after crossing the latter town, is being applied for.

The line runs over the provincial road from Mondariz to Peunteareas, and over the excellent road from Villacastin to Vigo. The entire length of the line is 36 km (23 miles), whereof 20.5 km (12.5 miles) arc of the second section.

Electric power is derived from two waterfalls, named Crusion and Trangusclo, on the River Tea, between Mondariz and Peunteareas, and from another named Barral on the River Mino, near Ribadavia, about 25 km (15.5 miles) from the center of the line, where the sub-station will be erected. The minimum power of the two falls on the Tea is 268 hp at the axis of the turbines, and that of the Mino 1375 hp; total, 1643 hp. As the traffic of the line will only require a force of 375 hp, the remainder will be transmitted to Vigo, where about 1000 hp, at least, will be employed in the industries of that town.

NEW PUBLICATIONS

Duncan's Manual of Tramways, Omnibuses and Electric Railways. Published by T. S. Whitney & Sons, Ltd., 7a South Place, E. C., London. Price, 5 shillings.

The 1903 edition of this well-known reference book has just been issued. It is a complete manual of the tramways, omnibuses and electric railways of the United Kingdom, and also of the foreign and colonial companies listed on the London Stock Exchange. The capitalization, earnings, dividends, names of officers, and numerous other details are given respecting the companies listed. A feature of this book is a directory of directors, officials, engineers, auditors, etc., connected with tramway companies.

Hamburg and Its Street Railway System, by Gustav Schimpff. 48 pages, with four large plates illustrated. Published by Julius Springer, Berlin.

This is a reprint of an article which appeared in Mitteilungen des Vereins Deutscher Strassenbahn-und Kleinbahn-Verwaltungen, a supplement to the Zeitschrift für Kleinbahnen, and is a very thorough discussion of the street railway traffic conditions in Hamburg and its suburbs. Tables are included showing the population and its distribution of traffic per car mile and mile of track, classification of fares, distribution of traffic in different hours of the day, earnings, expenses, etc. The plates include maps of different parts of the city, and also an ingenious diagrammatic map in which the traffic on all of the different lines is indicated on a scale of 1 mm. to 25,000 seats per day.

UNIQUE TESTIMONIAL

The Sanderson & Porter Company, of New York, recently received a very unique communication from the town of Killingly, Conn., advising it that the Board of Selectmen had adopted a formal vote "of its entire approval and warm commendation of the shape in which the Worcester & Connecticut Eastern Railway Company has left the highways through which its tracks run, from Railroad Square in the Borough of Danielson, and thence southerly, through the town of Killingly, and also from Elmville Junction, easterly, to the Jacques Station at East Killingly; for which excellent condition of said highways this Board feels that great credit is due, not only to the Worcester & Connecticut Eastern Railway Company as a corporation, but to the contractors, the Sanderson & Porter Company, and in particular to their chief engineer, C. H. Nichols." Needless to say, this testimonial is highly prized by the recipients.

ABUSE OF TRANSFERS IN CLEVELAND

Officials of the Cleveland Electric Railway Company are not satisfied with the results being obtained from the recent adoption of universal transfers, and particularly the concession by which transfers are given on transfers to and from the Wilson Avenue cross-town line. It has been the aim of the company to make it possible for a person to ride from a given point to any other given point in the city for one fare, and it was the idea to make it possible for a workingman to travel on any east and west line, transfer to the cross-town line and then continue on any other east and west line to his shop, direct, all for one fare. It seems, however, that instead of appreciating the advantages of universal transfers and six tickets for a quarter, many people are spending their time encircling the city and riding an unlimited time for a single fare. It is claimed that on a recent Sunday the travel on the system was the heaviest ever experienced, but that the receipts fell below those of last year. The reduction in fare to six tickets for a quarter came a long way from making up for the discrepancy, proving that many people were taking an unfair advantage of the universal transfer system. The company is planning to obviate the difficulty. One plan which is being considered is that of giving a passenger the privilege of taking two transfers. The first would be punched once, and the second would bear two punch marks. A passenger holding a transfer with the double punch mark would not be entitled to another transfer. It is also planned to change the routes of a number of lines so that more through city routes will be provided, which will greatly reduce the necessity for so much transferring. To provide for these new lines the company will lay a large amount of new special work and will provide complete curves wherever one line crosses another.

FRANCHISE LIMITATIONS IN NEW YORK

A new policy has been introduced by the present city administration of New York on the question of permitting corporations to transfer franchises. During the consideration by the Rapid Transit Commission of the proposed franchise to the Hudson & Manhattan Railroad Company for a tunnel under the North River, connecting Jersey City with Manhattan at Cortlandt Street, Mayor Low opposed permitting the sale of the property by the company, when the franchise is granted, except with the approval of the Board of Estimate and the Board of Aldermen, as well as of the Rapid Transit Commissioners. An amendment to the franchise was decided upon, and several other suggestions were adopted.

Clauses of the contract were amended so that the trolley system in the tunnel cannot be extended without the consent of the Board of Aldermen, and so that the railroad shall be diligently and skillfully operated with due regard to the convenience of the traveling public. The Mayor also secured the insertion of a clause giving the Rapid Transit Commissioners the absolute right to order, from time to time, such an increase of service and such an improvement of accommodations as it, in its judgment, may deem proper.

Appeals from such decisions on the part of the board may be taken by the tunnel company to the Appellate Division of the Supreme Court in the First Department, the decision of this tribunal to be binding on both parties, but on any such appeal the burden of proof must rest with the tunnel company if the reasonableness of the demand of the board is brought into question.

It was determined to amend the proposed contract so as to include all these items, and then to bring the amended contract before the next meeting, so that it can be approved at that time.

BIDS FOR THREE-CENT LINES IN CLEVELAND

Bids have been opened by the City Council of Cleveland for the privileges of building 3-cent fare lines over routes recently established by the city. One proposal was submitted by attorneys for the promoters for the proposed interurban line from Cleveland to Akron. The route is known as the Seneca Street route, and is considered the most desirable of the routes established by the Council. The People's Railway Company, which is alleged to be headed by John B. Hoefgen, created a surprise by bidding for only one of the eleven routes laid out. Mayor Johnson claims that he is well satisfied with this arrangement, since there will undoubtedly be litigation before the matter is settled. If the 3-cent fare company finally wins out, it will only be necessary to grant extensions of the original grant. The Cleveland Electric Railway presented a formal protest against the granting of the Rhodes Avenue franchise to the People's Railway Company, claiming that the 3-cent fare clause with the demand for universal transfers made it impossible for the old company to bid for the right. At the same time the Cleveland Electric Railway Company has applied for an extension of its present franchise on Rhodes Avenue. The company has a short piece of single track on this street, and now applies for the right to double the track and extend the line. If the grant can be obtained, it will cover the ground for which the People's Railway Company has entered a proposal.

AMERICAN BLOWER COMPANY'S NEW OFFICE BUILDING

The American Blower Company has recently erected an office building adjacent to its factory in Detroit, sparing no expense to make it a model of convenience and taste. The first floor is occupied by the commercial departments, and the second floor by the engineering and drafting departments. The blue print and dark room is on the roof to secure the best light for sun printing. The basement is used for storing catalogues, letters, files, etc. The building is equipped with electric lights, annunciator bells, dumb waiter, an outside telephone system and an independent interior telephone system.

As the manufacture of heating and ventilating apparatus forms a large part of the American Blower Company's business, this part of the equipment naturally received considerable attention, and the system installed follows the latest and best practice. The apparatus is located at one side of the basement. Fresh air enters the building through one of the basement windows, and by a fan is drawn over a tempering coil which heats it to about 70 deg. The fresh air is then drawn into the fan and forced over the heater, where it is heated to about 140 deg. Beyond the heater is located a reservoir for the heated air, known as the "plenum chamber," from which the air is conveyed to the offices by galvanized iron ducts. A "by-pass" under the main heater permits part of the air to pass under it and into lower section of the plenum chamber, the hotter air from the main heater passing into the upper part of this chamber. Each pipe leading to the offices has a connection to each of these sections of the plenum chamber. In each main where the pipe divides into these two sections, there is located a set of mixing dampers, automatically controlled by diaphragm valves,—a part of the Johnson Service Company's system of heat regulation, which is employed throughout the building. By this system a constant flow of pure air at the proper temperature is automatically maintained at all times. The fan is operated by one of the American Blower Company's vertical engines. Direct coupled to this engine is an exhaust fan which draws the vitiated air out of the building.

The heating system is extremely economical in operation. The heating coils utilize the exhaust from the factory engine, and as the fan engine exhaust is also turned into the heater coil, the cost of operating the system is practically nothing.

Taken as a whole, this building with its equipment is by many said to be the most complete of its kind in this country.

CHICAGO FRANCHISE MATTERS

An ordinance providing for an extension of the franchises of the Chicago City Railway Company has been drawn up by a Council committee, and in the clause specifying the amount of compensation to be paid the city there is left a blank. This is the ordinance over which the attorneys for the city and the attorneys and officers of the Chicago City Railway Company have been working for a number of weeks, and action will not be taken by the Council until after the summer vacation of that body.

Judge Grossepup has appointed John S. Miller, a prominent Chicago attorney, as his representative to negotiate with the city for

a renewal of the Union Traction franchises. The selection is regarded as an excellent one. Mayor Harrison has written a letter to Judge Grosscup relative to the instructions of the judge to the receivers of the Chicago Union Traction Company, dated July 10. The Mayor says that the city desires "a just and prompt settlement of the street railway problem by means of unacrimonious negotiations," and he adds:

"It is assumed that a purpose of the receivership is to bring order out of chaos by such reorganization as will result in a responsible corporation controlling the entire situation in Union Traction territory, with which the city may safely deal. The city will make a grant, on just terms, which shall be in lieu of all existing franchise rights and claims of the companies.

"In view of the character of the so-called 'ninety-nine year act,' and particularly of the new contention that said act placed the city for a century at the mercy of the street railway companies and reduced it to a position of mere subserviency to them, it will neither now nor after litigation, whatever its result, make further grants to supplement that legislation. It has no policy of confiscation, but it insists that the companies must rely on their present rights or accept a new grant expressing all their rights. Their choice lies between stale claims and a modern grant. They may cling to an insufficient state, grant or accept an adequate municipal franchise."

The city sent notice July 17 to the Chicago Union Traction Company that no permits for any repair work in streets would be issued after July 30, and all previous permits withdrawn on that date. The city attorneys explained that this was a legal move considered necessary in view of the fact that the city maintains that the franchises on certain streets expire July 30, hence the city could not formally admit that the company had any right on the streets after that date. It was explained that a special order of the Council would probably be passed allowing the company to operate sixty days longer. No notification was sent to the Chicago City Railway Company because that company is already negotiating for franchise extensions.

Immediately following the notification sent by the city to the Chicago Union Traction Company Judge Grosscup was notified by the receivers that their rights were being interfered with, and the judge issued temporary injunctions, forbidding the city from interfering with or repealing any of the rights of the company for its existing street railways. The hearing is set for July 27.

A truce was called in the traction war at the City Council meeting Tuesday evening, when it was agreed to suspend hostilities until Nov. 30. It is said that the first step in the battle will be to contest the right of jurisdiction of Judge Grosscup and the Federal Courts to render permanent his recent injunction. In the case of the City Railway Company a temporary ordinance was issued by the city, the terms of which had been agreed upon and accepted by the company prior to its introduction at the Council meeting. A resolution was passed in the case of the Union Traction Company by which the hearing on the temporary injunction issued against the city by Judge Grosscup, which had been set for July 27, should by agreement be postponed to Nov. 30 next. At the same time, by implication, it was agreed that permits for repairing should be issued by the city after July 30 until Nov. 30.

PROPOSED PLAN OF REORGANIZATION OF CHICAGO UNION TRACTION COMPANY

Although no official announcement has been made, it is understood among those interested in the affairs of the Chicago street railways, particularly in financial circles, that the terms of the plan of reorganization have been decided upon, and that they have already received the approval of the protective committees of the North and West Side companies and the reorganization committee of the Chicago Union Traction Company. It will be necessary to execute new leases between the Union Traction Company and the North Chicago and West Chicago street railway companies, owing partly to the confusion existing at present over the ownership of the several franchises and leases belonging to the subsidiary companies of the Union Traction Company. It appears that the Union Traction Company holds the assignments of franchises under the ninety-nine-year act and many ordinances of the City Council, and the North and West Chicago companies have only a few of the more unimportant franchises left to them. It is understood that the ownership of all the franchises is being vested in the North and West Chicago companies under the new leases, and that, furthermore, the new franchises or agreements that may be granted by the city will be secured to the North and West Chicago stockholders.

The plan, as outlined and generally understood among those interested in the subject, provides for raising the money and improvements by a bond issue to be floated by the Union Traction

Company, and it is agreed that the interest on these bonds will take precedence over the dividends on the stock of the North Chicago and West Chicago companies. It is understood that the guaranteed dividends on the North and West Chicago companies are to be changed to cumulative dividends, and no forfeiture attached to the failure of the Union Traction Company to pay them in full. However, all arrears of dividends will be accumulated and paid when the earnings of the company are sufficiently large to furnish the money. This plan eliminates the present ruinous penalties attaching to the failure of the Union Traction Company to pay the dividends on its underlying companies. All surplus earnings above the fixed charges and guaranteed dividends are to be applicable to the Union Traction Company's stock, provided all arrears of dividends on the North and West Side stocks have been made up. This establishes simply an equity for the Union Traction Company's stockholders, who must wait several years before getting returns on their investments.

ELECTRIC RAILWAY AT LINARES, SPAIN.

The contractor for the new electric railway at Linares, province of Jaen, is the "Industria Electrica" of Barcelona. This company will furnish all the material for the road with the exception of the rails, which come from Paris. The work on the road is progressing finely. The roadbed of the entire 14 km (5¼ miles) has all been laid, and the construction work is more than half completed. Although a Barcelona company is the contractor the entire line has been sub-contracted to Linares people. The engineer is Emilio Soriano, Linares.

STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED JULY 14, 1903

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

733,496. Trolley for Electric Lines; Kennedy Lyons, New Rumley, Ohio. App. filed March 5, 1903. Relates to spring guards for holding the trolley wheel in contact with the wire.

733,524. Trolley Pole Guide; Hazekiah O. Woodbury, Beverly, Mass. App. filed Oct. 13, 1902. A pair of flaring arms, mounted one on each side of the trolley wheel, are adapted to be thrown upward to act as a finder for the trolley.

733,619. Trolley Circuit Breaker; Charles P. Breese, Norfolk, Va. App. filed April 1, 1903. To maintain continuity in the supply of electric current to the trolley wheel during the change from one section to the adjacent section, the conductor of one section overlaps the conductor of the adjacent section, so that a wheel in passing will always be in contact with at least one of the conductors.

733,653. Nozzle Appliance for Cleaning Railways; Frederick A. Jones, Perth, Western Australia, Australia. App. filed July 17, 1902. Consists of a traveling tank and a nozzle leading therefrom, through which water, under pressure, is directed against the rails.

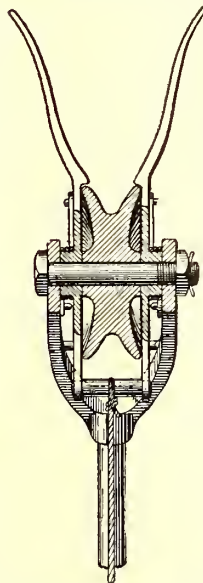
733,727. Trolley Head; Frederick V. Marsh, Haverhill, Mass. App. filed Aug. 22, 1902. The trolley wheel shaft is screwed into the end of the harp, the latter being in two pieces, so that by releasing one of said pieces from the trolley pole and swinging it around, it is unscrewed from the shaft and the wheel released.

733,866. Hand Strap; Joseph H. Myers, New York, N. Y. App. filed April 28, 1903. Comprises a main loop and two loops diverging therefrom and connecting with the first named loop by shank portions of such stiffness that the divergence of the loops is maintained without supplemental stays.

733,867. Hand Strap; Joseph H. Myers, New York, N. Y. App. filed April 28, 1903. Comprises a strap having its central portion rolled upon itself and folded to form a loop for the hand, the portions of the strap leading from the rolled portion being wider than the latter and diverging, their upper ends provided with loops adapted to receive the suspending rod, and a slidable loop embracing the rolled folded portion of the strap.

733,900. Electric Brake System; Frank E. Case, Schenectady, N. Y. App. filed Feb. 19, 1900. See following patent.

733,901. Method of Braking Moving Loads; Frank E. Case, Schenectady, N. Y. App. filed Feb. 19, 1900. The method of



PATENT NO. 733,524

braking a moving load which consists in so connecting the electrical circuits of a dynamo electric machine that it will operate to retard the movement of said load when connected thereto, and gradually clutching said dynamo electric machine to said load.

PERSONAL MENTION

MR. J. B. MARVIN, who has been general manager of the City Electric Railway & Electric Light Company, of Rome, Ga., for the past eight years, has resigned his position and will be succeeded by Mr. C. N. Fuller, of New York.

MR. E. O. REED, for some time secretary and auditor of the Toledo Railways & Light Company, of Toledo, Ohio, has resigned from that company to go into the manufacturing business. Mr. Reed was for many years assistant auditor of the Clover Leaf Railroad.

MR. H. H. VREELAND, president of the Interurban Street Railway Company, of New York, who is now in London, has been invited to be the guest of honor at a complimentary dinner to be extended to him by the Tramways & Light Railways Association of Great Britain.

MR. J. W. TOMPKINS has been appointed master mechanic and constructing engineer of the Indiana Union Traction Company's system at Ft. Wayne, Lafayette and Logansport. Mr. Tompkins has been superintendent of the Ft. Wayne Traction Company's line for a number of years.

MR. M. R. McADOO, of New York, has been appointed to the position of general manager of the Mexico Electric Tramways, Ltd., of Mexico. It is the intention of the company to equip the remaining horse car lines with electricity and to apply for concessions covering about 100 miles of additional streets.

MR. MICHAEL J. KEHOE has been appointed chief engineer and electrician of the Indiana Union Traction Company's lines at Ft. Wayne, Lafayette and Logansport, both the city and interurban lines coming under his jurisdiction. Mr. Kehoe has been chief electrical engineer of the Ft. Wayne Traction Company for four years.

MR. HENRY J. PIERCE, president of the Netherlands Tramway Corporation, has just returned to Buffalo from a visit in Holland. Mr. Pierce's company controls the lines in the city of Harlem as well as some interurban roads extending from that city to Bloemendaal and Vondvoort. The company has also built a line from Haarlem to Amsterdam.

MR. E. S. DIMMOCK, general manager of the Bay Cities Consolidated Railway Company, of Bay City, Mich., will sever his connection with that company on August 1, and will enter the service of Stone & Webster, of Boston. The Bay Cities Consolidated Railway was placed in the hands of receivers on August 1, 1899, at which time Mr. Dimmock was appointed general manager for the receivers. During the four years which have elapsed, Mr. Dimmock has brought the system up to a high state of efficiency, the track has been reconstructed throughout, and a new power station and car house have been built. The company has also established a summer resort known as Wenona Beach, which is one of the finest summer resorts in Michigan.

MR. ELIPHALET W. BLISS, of Brooklyn, died at his summer home, Owl's Head, on Tuesday, July 21. He had been ill with acute indigestion for a week, but announced his intention of making a long-contemplated trip to Germany, and called his wife in consultation about the arrangements for their journey. While talking with her he was stricken, and before Mrs. Bliss could reach his side he was dead. Mr. Bliss was one of the best-known business men of Brooklyn. He was the head of the E. W. Bliss Company and the United States Projectile Company, and was an inventor and manufacturer of presses and dies and a manufacturer of special machinery for working sheet metals. He had done much toward developing the open hearth cast-steel machine, cut gears and pressed high carbon steel pinions, which brought him directly in touch with the electric railway field.

MR. WALTER L. ADAMS has resigned as superintendent and purchasing agent of the Montville Street Railway Company and the Norwich Street Railway Company of Norwich, Conn. Mr. Adams has been superintendent and purchasing agent of the Norwich company since 1896. He came from Newburyport, Mass., in 1892, where he was engaged in street railroading. He was employed by the road for four years and was promoted to the superintendency at the resignation of Mr. E. P. Shaw, Jr. At the organization of the Montville Street Railway Company in 1900, he was made superintendent of the company and has held that position since. During Mr. Adams' term as manager many changes and improvements have been made in the road, both as regards operation and equipment. The line has been extended from Taftville to Baltic, two extensions have been made to the West Side line, and the extension of the Yantic road to Fitchville is ready to be put through.

MR. FRANK B. MUSSER, the newly elected president of the Central Pennsylvania Traction Company, of Harrisburg, Pa., which has taken over the Harrisburg Traction Company, was born in Columbia, Lancaster County, Pa., Feb. 19, 1864. Mr. Musser spent his youth in his native town, receiving his primary education in the public schools. He began his business life in the service of the Philadelphia & Reading Railroad Company as telegraph operator, and remained in the employ of the company in various capacities for nine years. After severing his connection with the Reading Railroad Company he entered the service of the Columbia Electric Light Company, serving as superintendent for three years. In March, 1889, he was appointed general superintendent of the East Harrisburg Passenger Railway Company. By fourteen years of successful management Mr. Musser has demonstrated his general business ability and fitness for his new position.

MR. G. W. CHANCE, general manager of the Trans-St. Mary's Traction Company, has just resigned from that company to open an office as consulting electrical engineer in the Drexel Building in Philadelphia. Mr. Chance has had a long experience in railway service since his graduation from the University of Pennsylvania, where he took a civil engineering course, and also a special course in electricity. His first railway work was with the Norfolk & Western Railway, but he soon left that company to accept the position of assistant chief engineer with the Lake Erie & Western Railway, and then that of assistant superintendent of William Wharton, Jr., & Company, of Philadelphia. He later returned to active railroad



G. W. CHANCE

work as assistant engineer of the Chicago & Northwestern Railway, and afterwards was appointed general manager of the Tagona Water & Light Company. Several years ago Mr. Chance was offered and accepted the management of the International Transit Company and the Trans-St. Mary's Traction Company, the Terminal Railway Company and the Power & Light Company, four associated companies at Sault Ste. Marie, Mich. The street railway system at this point was fully described in the STREET RAILWAY JOURNAL for July 4, 1903, and was constructed under Mr. Chance's supervision, and has been operated by him up to the present time. His long experience in electric railway construction and operation, as well as in steam railway engineering, makes him particularly fitted for general consulting engineering practice.

MR. LUTHER STIERINGER, who had achieved prominence in many different parts of the field of incandescent electric lighting, died on Friday, July 17, at Pasadena, Cal., from consumption complicated with Bright's disease. Mr. Stieringer first showed signs of breakdown in the fall of 1900, and despite the fact that he soon sought seclusion and retirement in the far West, his health was bettered only temporarily. Mr. Stieringer's boyhood was passed in New Jersey, where he attended the public schools. After leaving school he served a short apprenticeship as a gasfitter in New York City. He had a keen, inquiring mind, and was always an omnivorous reader, so that he was soon a master of his profession. He joined Mr. Edison at a very early stage of the electrical art at Menlo Park. His first work there was the adaptation of incandescent lamps and their connections to existing gas fixtures, while his subsequent work lay largely in the exploitation of the incandescent lamp. He was a pioneer in the electric illuminating art, and successfully introduced many fundamental inventions of his own, of which three systems of interior wiring are now in universal use. The illumination for the Louisville Exposition of 1883 was planned and installed by him, this being the first exposition entirely lighted by incandescent light. The 1893 Chicago Columbian World's Fair illumination and electric fountains, as well as other prominent expositions since, including the Omaha Exposition of 1898, and the recent Pan-American, were designed and installed by him, he also holding the position of consulting electric engineer in most of them. Medals and diplomas were awarded to him for many of these illuminations. He first introduced the outlining and accentuation of the buildings on a large scale with incandescent lamps at the Chicago Fair of 1893. The further development reached its climax at the Omaha Grand Court and surrounding buildings, the lighting being effected by small incandescent lamps. Mr. Stieringer may justly claim to have, by persistent effort, introduced and demonstrated the value of a small unit of light as exemplified on a large scale at the recent Pan-American. Just before his death he was awarded the John Scott medal by the Franklin Institute for his work.

NEWS OF THE WEEK

CONSTRUCTION NOTES

BIRMINGHAM, ALA.—Work has begun on changing the Powderly-Bessemer line of the Birmingham Railway, Light & Power Company from steam to electricity. This line is 7 miles long, and one of the oldest in the county. It was formerly the old Birmingham, Powderly & Bessemer Railway, and hauled thousands of people before the Birmingham-Powderly end was made an electric line. This new work will require heavy rail and ballast, and will be the last of the change from steam to electricity. Every line in the county will be run by electricity when the conversion of this line is completed. The company is now laying the track south of the railroads with 70-lb. rails slag ballasted.

FLORENCE, ALA.—The contract for the grading of the electric railway to be constructed between Florence, Sheffield and Tuscumbia has been awarded to T. M. Crow, civil engineer and contractor, of Florence, and a large force has been put to work. According to the terms of the contract, the work must be completed by December.

MOBILE, ALA.—The Mobile Light & Railroad Company has moved into its new offices. The building that it now occupies is a reconstructed hotel property, and has been fitted up especially to meet the demands of the company. On the west side front of the first floor is to be the general office. The east side of the ground floor will be used as a general supply room for the trolley and lighting departments, with a special room for the display of electrical devices. There are larger storerooms at the rear. In the hall, under the stairway on the first floor, is a series of closets to be used by the employees for storing their clothes during the day and leaving their working garments at night. The second floor is devoted solely to offices, except in the annex, where will be storerooms and testing places for lighting and power devices, arc and incandescent lamps, etc. On the west side front is the office of the president. The superintendent of the lighting department has a room at the rear of the president's, and back of this are the chief inspector's apartments. On the east side front is the office of the general superintendent. Back of this office are a number of storerooms. The entire top floor is devoted to the benevolent association composed of employees of the company. The large room on the west side is the gymnasium, which will also be used as a meeting room. The east side front is a library and reading room, supplied with daily papers, magazines, and many of the best works of fiction, as well as standard books on educational subjects. The fittings here are first-class, with appointments that appeal to the men and will be inducive of their spending their spare time here. Back of the reading room is the lavatory, where there are also hot and cold baths, showers, etc., and every convenience. The entire building will be heated by steam and lighted with electricity.

LOS ANGELES, CAL.—On Aug. 1 the Los Angeles shops of the Huntington-Hellman syndicate will be running with 700 operatives, and it is expected that by Jan. 1 about 1000 men will be employed. Besides overhauling the regular rolling stock of the syndicate's properties, the plans are to rush the construction of new cars for city and for interurban service. At the first of the year the capacity of the plant is expected to be four city and two interurban cars a month.

POMONA, CAL.—The City Trustees have accepted the bid of the Pacific Electric Railway Company for a franchise for an electric railway system in Pomona.

SAN JOSE, CAL.—The San Jose & Interurban Railway Company, recently financed by the Germania Trust Company, of St. Louis, to the extent of \$500,000, has ordered its equipment in St. Louis. The American Car Company has an order from the company for thirty cars, each of which will cost \$3,000. They will be large cars, something after the pattern of the new cars of the St. Louis & Suburban Company, of St. Louis.

APALACHICOLA, FLA.—The City Council has granted a franchise to citizens of Apalachicola for a street railway.

JACKSONVILLE, FLA.—The Jacksonville Electric Company has been granted permission to build a 1-mile extension.

BELLEVILLE, ILL. Articles of incorporation have been filed at Belleville by the Southern Illinois Electric Railroad Company, capitalized at \$50,000. The principal office of the company will be at Mount Vernon, Ill. The incorporators are: J. R. Pierce, G. F. M. Ward, Sam Casey, Louis G. Pavey, Samuel T. Maxey and A. N. Johnson. The company proposes to operate an electric railway from East St. Louis through the counties of St. Clair, Clinton, Washington, Marion, Jefferson, Hamilton and White, to a point on the Wabash River, near Maunie.

MONMOUTH, ILL.—The Western Illinois Traction Company has been granted a franchise by the City Council.

OTTAWA, ILL.—All the property of the Ottawa Railway, Light & Power Company has been sold to Rollins & Sons, the Boston bankers, who hold all the outstanding bonds of the company. The bid made was \$160,000, and for that amount the road was sold. It is understood that the purchasers will at once proceed to make many improvements in the road.

ROCKFORD, ILL.—The Interstate Electric Railway Company, of Rockford, has been incorporated, with a capital of \$50,000. The railway is to be constructed from Rockford northwesterly to a point on the Illinois State line northwest of Durand, Winnebago County, Illinois. The incorporators and first board of directors are: N. F. Thompson, M. A. Beal, E. H. Keeler, H. N. Starr, R. G. McEvoy, all of Rockford.

ARDMORE, I. T.—The Ardmore Coal & Power Company has applied to the City Council for a franchise to construct an electric railway here. The application has been referred to the ordinance committee.

ANDERSON, IND.—The Union Traction Company has begun work at Newcastle and Middletown on its line to be built between Anderson and Newcastle.

BLUFFTON, IND.—The Muncie, Hartford & Fort Wayne Interurban Railroad Company has bought ground to be used as a location for the power plant and car houses at Bluffton, which will be one of the division points.

CARLISLE, IND.—The Western Indiana Traction Company has been granted a fifty-year franchise for the use of certain streets through Carlisle. The granting of this franchise completes the route of the traction company all the way from Vincennes to Sullivan, franchises having already been secured in all of the other cities and towns through which the proposed road will pass. The company is now ready to begin the survey for the road. This work will be in charge of Civil Engineer R. L. Bailey, of Sullivan, who will commence the work at once.

COLUMBUS, IND.—Work on the extension of the Indianapolis, Columbus & Southern Traction Company's road is almost completed, and it is expected that the line will be opened by Aug. 15.

DANVILLE, IND.—The Town Council has granted the Plainfield Electric Railway Company a franchise right to enter this city as far as the public square, on Wayne and Marion Streets. Work of grading the extension has begun, and when completed this city will have trolley connection with Indianapolis by way of Plainfield. Albert Lieber is president.

JEFFERSONVILLE, IND.—The Commissioners of Clark County have granted to the Ohio Valley Electric Company a franchise to construct an electric railway through the county from Jeffersonville to Marysville. The promoters say the line will be built at once.

INDIANAPOLIS, IND.—The Indianapolis & Northwestern Traction Company has connected its interurban track with the street railway tracks at Thirty-Fourth Street. The line connects with Lebanon, Frankfort, Lafayette and Crawfordsville. The track is now practically complete as far as Lebanon and 16 miles of track have been laid between Lebanon and Frankfort. The machinery is now being placed in the power house at Lebanon, and it is expected that cars will be running between Indianapolis and Lebanon by Oct. 1.

INDIANAPOLIS, IND.—It is reported that the Southern Indiana Traction Company, recently incorporated, with \$3,000,000 capital stock, to build 200 miles of electric railway in Southern Indiana, has been financed by New York and Chicago firms, and that the stock will soon be put on the market.

INDIANAPOLIS, IND.—The grading on the Indianapolis & Cincinnati Traction line between Indianapolis and Rushville is going on rapidly. As soon as the road is completed to Rushville cars will be run between that city and Indianapolis. The contracts for the building of the power house at Rushville are now being let.

INDIANAPOLIS, IND.—A portion of the contracts to erect the new nine-story traction company station in this city have been let, the contract for the structural iron work going to the Noelke-Richards Iron Works, of this city. The firm has already gone to work on the new steel for the building. The work of razing the old building from the site has commenced.

INDIANAPOLIS, IND.—The Clark County Commissioners have granted to former Senator Joseph H. Shea a franchise for an electric railway from Jeffersonville to Columbus. He is said to be representing the Union Traction Company.

INDIANAPOLIS, IND.—The Indianapolis & Southwestern Electric Railway, the new Martinsville line by the way of Waverly, is to be constructed by the Interurban Railway Construction Company, of Indianapolis, which has been incorporated, with \$10,000 capital stock. F. E. Bakeman, W. S. Taylor, Mrs. Jean Brudi, W. G. Wagenhals and O. M. Murphy are the directors.

INDIANAPOLIS, IND.—Work on the Indianapolis, Danville & Rockville Traction Company's line, which will reach the Parke County coal fields, will begin this month, according to the announcement of President Fauvre, of the Indianapolis & Eastern, of which the new road will be an extension. The Danville Construction Company, which is to build the road, has been incorporated with \$100,000 capital. F. M. Fauvre, John W. Chipman, Medford B. Wilson, Ansel Fatout and C. E. Morgan are directors. The distance between Indianapolis and Danville is 20 miles. The line will follow the Rockville Road, which is due west of the city.

MICHIGAN CITY, IND.—The Chicago & Indiana Air Line Railway Company, which proposes to build an interurban line from South Bend to Michigan City and from Michigan City to Chicago, has formally accepted the franchise granted it by the South Bend Common Council by filing a \$10,000 bond indemnifying the city against any loss by reason of negligence during the construction of its line, and also depositing the \$1,000 forfeit provided in the measure if the system is not ready for operation in two years. The company is now working on the Chicago end of its line. Most of the grading in St. Joseph County is completed, while in Michigan City nothing has been done other than to lay out the route. The company intends to operate a rapid transit line from South Bend to Chicago via Michigan City. It expects later to connect with Toledo and other Eastern points. Judge Carlos M. Stone, of Cleveland, Ohio, one of the backers of the company, says the company will have several miles of track laid within the city limits of Chicago inside of one hundred days, and that work on the western terminus of the line will be pushed as rapidly as possible.