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EDITORIAL NOTICE.

The news issues of the Street Railway Journal are devoted primarily to the publication of street railway news and current happenings related to street railway interests. All information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in its columns.
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Annual Meeting of the Pennsylvania Street Railway Association Postponed

The annual meeting of the Pennsylvania Street Railway Association has been postponed until Oct. 10 and 11, and will be held at the Neversink Mountain House, Reading, Pa.

New York Convention Postponed

The eighteenth annual convention of the New York State Street Railway Association, which was to have been held at Buffalo Sept. 11 and 12, has been postponed until Sept. 18 and 19, at the same city. The postponement is made because of lack of hotel accommodations for the week commencing Sept. 10, as a number of other conventions are scheduled for this city at that time.

Municipal Ownership Ordinance Drafted for St. Louis

The Board of Public Improvements has drafted an ordinance, to be presented in Council, which provides that the city operate by electricity the railway extending from the Baden station of the waterworks to the Chain of Rocks. The road, at present, although owned by the city, is operated as a branch of the Burlington Railroad, and is used exclusively to transport the necessary heavy freight between the two branches of the waterworks system. The ordinance also provides for placing regular passenger coaches on the line, and for their regular operation by the city in competition with the private city lines in the vicinity.

Transfer Privilege to be Curtailed in Washington

It has been announced that the Washington Traction & Electric Company will make a number of very important changes in its transfer system, to take effect Aug. 15. A new transfer schedule has been arranged, but the most important change is that which abolishes the double transfer. Hereafter a transfer will not be issued on a transfer, but only when a cash fare is paid.

Before the consolidation of the roads now comprising the Washington Traction & Electric Company, no transfers were exchanged except between the Metropolitan and Columbia railways, and in some cases it required three fares to go from one point in this city to another. The consolidation of the separate lines and the issuance of transfers on transfers made it easy for a passenger to start from and return to a given point on one cash fare. In order to prevent this "looping" the company later required the passenger to state, at the time of paying his fare, at what point and in what direction a transfer was desired. Failure to comply with this order forfeited the right to a transfer.

New Haven Company Establishes a Precedent

On Aug. 1 the Winchester Avenue Railroad Company, of New Haven, Conn., issued an edict which prohibits passengers from riding on the running board of a car or from standing between the seats of a car on its system. This is an entirely new departure in street railroading, and the outcome will be watched with great interest throughout the country. The conductor is given to understand that just as soon as all the seats in the car are filled he must refuse to take on even one more passenger until a seat is made vacant by a passenger getting off. It must be said, however, of the new ordinance that it is a little severe on the motorman. He is required to keep a sharp lookout and to know when there are no vacant seats. As soon as his car is full, he is to proceed until signalled by the conductor to stop, or in case of an emergency. If passengers be waiting for the car, he is to slow up, not stop, and request them to wait for the next car.

A Unique Accident

A motorman working on the Waukesha interurban line of the Milwaukee Electric Railway & Light Company, and who wore celluloid collars because they were inexpensive, was seriously injured a few days ago because of his efforts to reduce his laundry bills. On Aug. 5 he noticed that his car was wrong, and, leaning over to adjust the switch, he turned on the current. Suddenly there was a flash and a spark flew out from the controller box. The motorman's collar was a shining mark, and it was ablaze before he realized what had happened. Before he could tear it from his neck, a broad band had been burned around his throat, his hair and eyebrows had been singed, and his hands burned by

the melting celluloid, which clung to his fingers. It was necessary to take the man to the hospital. Largely, it is said, on account of this accident, President Roach, of the Union Traction Company, of Chicago, has issued an order prohibiting his men from wearing celluloid collars, and it is thought that motormen in other cities who have worn this material will hereafter discard it for the more easily soiled but less combustible linen.

An Interesting Opinion in a Bicyclist's Suit

A most interesting opinion has recently been written in the case of Bacon vs. Consolidated Traction Company by the judge of the Court of Common Pleas, Allegheny County, Ill. The facts were that the plaintiff, an inexperienced bicyclist, rode on to the tracks, when a car proceeding on a down grade was "right behind him," and started to ride a distance of about 160 ft. and then turn off from the tracks. Just as he was turning off, after having gone about 140 ft. without having looked back at the car, he was struck by the car with the result, as the judge says, that "he was whirled in the air and came down, doubtless on the ground." The judge dismissed the suit for damages brought against the car company, on the ground that the plaintiff "was guilty of negligence, gross negligence, absolute recklessness." The judge then went on to say: "I have long been impressed with the belief that the courts should take a firm hold of these cases, where men risk their own lives by just going before a car or traveling on a track before a car. If the plaintiff can be sustained in this action, the result of it is about this, that these bicyclers can get on to the track of a street railway, plod along on that track, and expect that the motorman of the car behind will stop to let them off rather than hit them, and if that is the law with these bicyclers, perhaps one-half the cars in the city will be delayed in their trips. Some of these young fellows and others run before the car and expect the car to stop while they get out of the way. They should get out of the way without that. They should keep out of the way, and not run the risk of an accident." Finally, and apparently in the interest of humanity, the judge concluded his opinion with these words: "It is almost a wonder that this man was not killed by that accident, and by sustaining his right to recovery here I think it would result in somebody else being killed; it should rather be a warning to these bicyclers to keep off the tracks when they know a car is coming and avoid those dangers."

Early Opening of the Stephenson Plant

Joseph C. Willetts and Adolph Wimpfheimer, purchasing committee of the newly incorporated John Stephenson Company, have taken title to the plant, equipment and material of the late John Stephenson Company, Ltd., at Bay Way, near Elizabeth, N. J. Peter M. Kling, the general manager, is in charge, and will soon have the works in active operation. The officers of the new company will shortly be chosen.

Outing of Metropolitan Street Railway Officials

On Aug. 11 President Vreeland, of the Metropolitan Street Railway Company, of New York, entertained all the heads of the departments on that road at a clambake and reception at his country home in Brewster, N. Y. This is the second of a series of such entertainments extended by Mr. Vreeland, the first having been given about a year ago, and typifies the cordial friendship existing between the president and personnel of this large company.

The guests left the Grand Central Station about 9 o'clock on special cars attached to the Pittsfield express. After their arrival at Brewster, they were taken by carriages to the clubhouse of the Tonetta Outing Club, of which Mr. Vreeland is a member. The Brewster cornet band gave a concert, after which the Rhode Island clambake was eaten, some fishing was enjoyed, and the party again entered the carriages and was driven to Rest-a-While, the Vreelands' country home. Here they were cordially received by Mrs. Vreeland, who was assisted in receiving them by a number of ladies living in Brewster. In a speech of welcome Mr. Vreeland spoke feelingly of the support the employees had always accorded him. Responses were made, and he was assured of the esteem and regard in which he was held. Luncheon was served on the lawn, under the personal supervision of Mrs. Vreeland, the lawn being brilliantly illuminated, and the party returned to New York by special train.

Among those present from the company were: D. B. Has-

brouck, vice-president; Charles E. Warren, secretary; H. S. Beattie, treasurer; directors, H. P. Whitney, Thomas F. Ryan, W. L. Elkins, Thomas Dolan, P. A. B. Widener and H. A. Robinson; also, F. S. Pearson, consulting engineer; M. G. Starrett, chief engineer; W. B. Reed, engineer maintenance of way; W. A. Pearson, electrical engineer; F. Greenwald, track master; Thomas Millen, general master mechanic; A. C. Tully, purchasing agent and general storekeeper; A. V. Porter, architect; D. C. Moorehead, general auditor; Frank Kane, chief of gripmen; George Brown, chief of switchmen; George Robinson, general car-house foreman; Oren Root, Jr., assistant general manager; James Parker, chief inspector, and a number of the division superintendents and general foremen.

Among others in attendance were: W. W. Wheatley, general superintendent, Brooklyn Rapid Transit Company; W. W. Snow, president, Ramapo Iron Works, Hillburn, N. Y.; D. M. Brady, president, Brady Brass Company, of executive committee, New York Railroad Club; Edward W. Maher, president, Union Railway system, New York; G. Tracy Rogers, president, Binghamton Street Railroad Company; John Beaver, treasurer, Third Avenue Railroad Company; J. H. Hustis, superintendent, New York & Harlem Railroad; H. A. Macdona, and J. H. McGraw, of the STREET RAILWAY JOURNAL.

Accident Instructions in Ithaca

H. S. Cooper, general manager of the Ithaca Street Railway Company, of Ithaca, N. Y., has recently issued to his conductors and motormen a comprehensive set of instructions as regards accidents. The instructions are in book form, and each copy is numbered. A list is kept of the copies issued, and each recipient is obliged to sign a receipt promising to return the book to the company when leaving its employ, or on request.

The pamphlet contains the telephone numbers and addresses of the different offices and officials of the company.

A special effort was made by the management to make the instructions full, explicit and *legal*, and for this reason they are given below as being possibly of help to other companies who issue instructions of this character.

INSTRUCTIONS

These "Instructions" are the exclusive property of the Ithaca Street Railway Company, and are issued solely to the employees of this company for their information and guidance while in the employ of the company. When employees to whom they are issued leave the service of the company, these instructions *must* be returned to the office of the company. All employees are forbidden to give, lend, sell or show these instructions to *anyone*, or to communicate any part of the contents to any person not regularly in the employ of the company. GENERAL MANAGER.

Every disturbance on, or occasioned by the cars, every collision or derailment, every accident to individuals or to animals, vehicles or property not belonging to the company, if such occurrence is caused by the cars, by their operation or by the act or operation of any employee of the road when engaged in duties for the company, *must* be reported to the office in some way.

Accidents to the car or its machinery, to track, bridges, or overhead line, derailments and collisions, loss of power, any and all of the foregoing which delay a car sufficiently to make it "lose its time" and which do *not* result in any injury to individuals or do *not* affect property belonging to outside parties, *must* be reported on the back of the car report in the form arranged for it.

Accidents which involve the *slightest* injury to any individual or the *slightest* chance of a *claim* for injury *must* be reported at once on the regular "Accident Report" of the company in the manner as prescribed further on. Accidents which involve any animals, vehicles or property *not* belonging to the company *must* be reported on the same form and in the same way. All disturbances on or occasioned by the cars, all ejections, no matter for what cause, *must* also be reported on this form.

In the matter of accidents to individuals, it *must never* be assumed that "no harm has been done," no matter what the individuals say themselves. The assumption *must* always be that "harm *has* been done" and the report *must* be as promptly and accurately filled, and names of witnesses, etc., taken with as great care as if actual and visible injury had been inflicted. Much loss has been occasioned to companies by the neglect of employees to properly report cases of accidents which seemed trivial at the time of occurrence but which developed into important and expensive cases. The invariable rule *must* be: *To report every accident to individuals with full and equal care.*

(1) Upon the occurrence of any accident the *first* duty is to render assistance to the person or persons involved in it. In case of bodily injury they must be taken or carried to the nearest hospital, doctor's office, drug store, store or dwelling and a doctor summoned at once. The instant that a doctor or other competent person (such as a nurse or relative) arrives, the injured person will be left in their charge and you will at once proceed to fulfil your other duties in the matter.

In case of accidents to animals, vehicles or other property, any needed assistance *must* be given to the riders, drivers or owners.

(2) The *next* duty is to obtain the *full and correct name and address* of the person or persons injured or of the riders, drivers or owners of animals, vehicles or property injured or damaged.

(3) The *next* duty is to obtain the *full and correct names and addresses* of all bystanders and eye-witnesses. If the accident is on or caused by a car, the name and address of *every* passenger must be obtained. For this purpose, the "witness slips" will be distributed to *every* passenger and to *every* bystander, and they must be politely asked to "please write their full name and address on them and give them back to you." If they refuse to do so, or seem very unwilling to do so, you will urge them to do it, or will ask them to give you their name and you will put it down. If they still refuse, or seem unwilling to give their names, tell them that it is a strict rule of the company and that your failure to obtain their names and addresses will be a detriment to you, as your failure to obtain names of witnesses will look as if you had not tried to obey the rules of the company. In case you are then unable to obtain their names and addresses you will, in case they were passengers or bystanders who you are pretty certain were witnesses of the accident, try if others around know them or can give you their names, and if such information cannot be obtained, you will take good notice of them so as to be able to recognize them at any time in the future. Every effort *must* be made to obtain the *names and addresses of all possible witnesses*; it is better to obtain a hundred useless ones than to miss a single person who *was* a witness of the event. In this matter the operation of the car *must* be a *secondary matter*; the motorman will remain with and in the car, unless he is incapacitated by injury or unless his assistance is absolutely necessary with the injured, and he will then go only a short distance away, and will, before leaving the car, make certain that the brake is on tight, and will throw the overhead switch and controllers to "off" and take both controller handles with him. In case, however, of another motorman or conductor being on the car or coming to it, he will leave the controller handles and care of the car with him. In no case must the car be started until the above duties have been fulfilled, unless relieved by the arrival or the direct orders of the starter, inspector, general manager or corporation counsel.

(4) The *next* duty, in case of actual bodily injury, is to notify the officers of the accident by the *quickest possible method*. If the office is closed, the general manager, corporation counsel or inspector *must* be notified wherever they can be reached or found. All employees are empowered to go to any necessary expense for telephone charges or special messengers for this purpose and the numbers of all company telephones and the addresses of the above persons are attached herewith for your information.

(5) The *next* duty is to make out the report. When the corporation counsel or his assistant is in his office or when they can be reached in any way, the report will be made out under their supervision and will be sworn to at once. In cases of bodily injury, where the above parties are absent from the office or cannot be reached, the report must be filled out *under the supervision of the inspector or general manager*. As one of the objects of the report is to fix the facts while they are fresh in the minds of those concerned in the event, *it is necessary that the report be made out as soon after the event as possible*, and therefore employees concerned in any accident, etc., will be immediately excused from their regular duties in order that they may make out such report. The other object of the report is to obtain **ALL THE FACTS EXACTLY AS THEY OCCURRED**. For this reason, opinions and "hearsay" are *not* wanted in it, what *is* wanted is for each employee to tell truthfully and exactly what he did and said and what he saw and heard others concerned do and say, *not* overlooking any detail, however trivial, *not* making excuses for or glossing over any forgetfulness or carelessness on his part or the part of anyone else, simply giving **THE FACTS, ALL THE FACTS, AND NOTHING BUT THE FACTS** as seen and heard and done by himself. The following instructions from the accident report should be carefully read when making out the report and the provisions *exactly* followed.

"NOTE.—Read the following instructions carefully before filling the above space. In case of accident, however slight, by which persons or property are injured, communicate at once with the office, by telephone if possible. Render all possible assistance to

the injured, and at once obtain names and addresses of persons in car and other witnesses to the accident. In making this report, a separate report is to be made out by the conductor and motorman, and their position on the car at the time of accident should be shown. State clearly and briefly just what occurred, as you saw it. State conditions of weather and any obstacle which obscured your vision. State fully the nature of injury to persons or property. Give your reasons why you could not prevent the accident, and state what you did to prevent it. State whether person injured was lame, deaf, intoxicated or of defective vision; and give his or her approximate age. If property was injured, describe condition of property. State any act done by the person injured or whose property was injured, or any circumstances connected with such person, which in the slightest degree contributed to the injury. State what, if anything, was said by the person injured immediately after the accident, and give such further information as you may deem important. Avoid making any statement concerning the accident to outside parties."

(6) The *next* duty is to report for your regular duties and **HOLD YOUR TONGUE!** Under *no* consideration must the matter be discussed with or any information given to anyone outside of the proper officers of the company. *No excuses or accusations must be made*or refuted at the time of the accident nor afterward*. Relatives, friends, fellow-employees, lawyers, reporters and the general public who try to obtain information from you in regard to the event *must* be informed that for you to discuss it *at all* or to give *any* information in regard to it is *positively forbidden* by the rules of the company, and they *must* be referred for such information to *the proper officers of the company*.

To recapitulate:

1. Render necessary assistance.
 2. Obtain full and correct name and address of person or persons injured, or of riders or drivers or owners of animals or vehicles or property injured.
 3. Obtain full and correct name and address of all possible witnesses.
 4. Notify office or officers.
 5. Make out report.
 6. Report for your regular duties and hold your tongue.
- 6a. **KEEP ON HOLDING YOUR TONGUE!**

EJECTIONS

Passengers will be ejected from a car only as a last resort, when all other means have been tried and have failed, and when the conductor is *positively certain* that he is in the right.

Ejections must be made for the following reasons only:

1. Intoxication.
2. Personal offensiveness to the other passengers.
3. Refusal to obey rules of company.
4. Refusal to pay proper fare.
5. Disorderly conduct.

(1) Persons who are *visibly* intoxicated must not be allowed to get on the car. If, however, such a person has entered the car without his condition being noticed, he may, if his condition is not offensive and if he remains orderly, be carried to his destination. If this is done, care must be taken to see that he does not get off the car while it is in motion, and, when he is let off, care must be taken to see that he is entirely free of the car before it is started. Should his condition be complained of as being "offensive" by other passengers in the car, or should his conduct become "disorderly" he must be treated as ordered below.

(2) Any person who is complained of by the other passengers as being personally offensive and who is, in the judgment of the conductor, *actually so*, must be *quietly* asked to leave the car. Should they object or resist, they must be treated as disorderly persons, as below.

(3) Persons who persistently or continually refuse to obey the rules of the company after same have been brought to their notice, must be treated as disorderly persons, as below.

(4) In case of persons who absolutely refuse to pay the proper fare or give the proper ticket, the conductor will have to exercise discretion. When the person is a respectable woman or man who is sober and of respectable appearance it is generally best to carry such persons to their destination or to their transfer point, taking their name and address, their reason for nonpayment of fare or ticket, and in *every case* reporting the occurrence *in writing* to the office. When, however, any person shows plainly that it is their intention to "beat their way," they must be treated as disorderly persons, as below.

Persons giving a wrong transfer or one which is past time for proper use, must be asked to pay their fare and informed that if the transfer has been wrongly punched or given, it will be redeemed at office of the company on presentation and explanation. Should they persistently refuse to pay their fare, the transfer will be

accepted as fare, will *not* be rung up, but will be turned into the office with a *written* report of the occurrence and the name and address of the person presenting it. In no case must a person be ejected for presentation of a wrong or past-due transfer unless the conductor has *positive* proof that they are trying to "beat their way."

(5) Disorderly conduct consists of the above as stated, of violent or unseemly actions, of quarreling and fighting, and of abusive, threatening, profane or indecent language or actions. In all such cases the conductor will quietly and civilly request the disorderly persons to discontinue their conduct. Should this *request* have no effect, he will, still civilly and quietly, *tell* them to discontinue their conduct or leave the car. Should this be of no avail, the car must be stopped, at a street corner if possible, and the person asked to get off. Should they refuse to do so and a policeman be within call, he must be called and asked to remove the person. Should no policeman be within call, or should he, if called, refuse to remove the disorderly person, the motorman must be called on and the person ejected.

In all cases of ejections the car must *first* be brought to a *full stop*, at a street corner or regular stopping place if possible, and always at a *safe place* for a person to alight. If the person has paid their fare or given a ticket or transfer, the same will *always* be *publicly* tendered them **BEFORE EJECTION**.

No more force must be used than is necessary to remove them from the car, *no blows must be struck nor weapons used* by either conductor or motorman except in absolute defense of themselves or their passengers. In case the person voluntarily leaves the car or shows that they are willing to do so, no hand must be laid on them, **except** to assist them in case they are unable to get off without assistance.

No ejection must ever be made of a child or a respectable woman. No ejection must ever be made of any respectable appearing or sober man during a storm or at night in a dangerous or disreputable location.

In all cases it is necessary that the conductor feel *certain* that he is right beyond question before he proceeds to final measures, he *must* keep his temper and his presence of mind. While it is his duty to preserve order and decency on the cars, to see that people do not cheat the company, and to see that the company's rules are strictly obeyed and its property protected, it is best, if there is any doubt in his mind as to his being in the right, to carry such persons to their destination or to some point where he can obtain aid or advice.

In all cases of ejection the *conductor has entire charge and responsibility*. If the disorderly conduct is against the motorman or if seen or heard only by him, he will call the attention of the conductor to it and abide by his decision and orders. He will at all times aid the conductor when called on to do so or when he sees, hears or knows that his aid is required.

In every case of ejection a full report must be made out, the same as in accident cases. Equal care must be taken to obtain names and addresses of witnesses and in all cases of ejection it is best, *if it is in any way possible*, to make the ejection in the presence of witnesses.

Some Notes on Train Resistance.*

BY T. LESTER DANIEL, UNIVERSITY OF MINNESOTA

The subject of train resistance is one of two-fold interest to the railway mechanical engineer of to-day. It is of interest first because of its close relation to tonnage rating, and second, because of the direct saving in expenses accruing from its reduction. The Lake Shore & Michigan Southern Railroad, in 1873, figured that \$785,000 a year could be saved by reducing train resistance 25 per cent, but in spite of the incentive to effort in this direction train resistances are the same to-day that they were then, because, undoubtedly, railway men are too busy to go beyond the routine of their regular work, certainly not because perfection in this respect has been reached.

It seems as though a reduction of 25 per cent were easily within the range of probability, inasmuch as Wellington (Trans. A. S. C. E., April, 1873), has shown that a reduction of 85 per cent in axle friction could be made by substituting oil bath lubrication in place of the common pad lubrication now in use, and when it is considered that axle friction constitutes by far the largest part of train resistance, and that there is further chance for its reduction by changing bearing metals, proportion of journals, and quality of lubricant, it is seen that there is opportunity for considerable improvement, to say nothing of the saving that might be made in the imperfectly understood rolling friction.

Tonnage ratings could be made much more accurately with a

better knowledge of the factors composing train resistance, for a knowledge of the factors as well as the sum total is essential, as can be seen from the following: The proceedings of the Western Railway Club, February, 1900, cite an instance where a rise in temperature lowered the resistance 24 per cent, and the C., B. & Q. Railroad tests (*Eng. News*, 1888, p. 409) show that a strong side wind increases the resistance 60 per cent. The above number of the proceedings of the Western Railway Club also records an instance where a train of empty cars pulled harder than a train of loaded cars by .7 per cent per ton, and these factors, *i. e.*, empty cars, temperature and wind, have received so little attention that they have never been incorporated in the common formulas for train resistance. Obviously, a better understanding of these would result in a much more satisfactory tonnage rating.

Train resistance is generally expressed in pounds of draw-bar pull per ton of weight hauled on a straight and level track; it amounts to about 6 lbs. at 10 miles per hour, and 16 lbs. at 60 miles per hour; it is seen to increase with the speed, which is in accordance with the well-known experimental laws of friction. In colder and windy weather the few isolated observations that have been made indicate that the resistance would be larger, and many other changes besides that of velocity might be imposed affecting the result, but unfortunately experiments have been restricted almost entirely to velocity variation, as illustrated in the following typical formulæ:

$$\text{Clark, } R = 6 + \frac{M^2}{240}$$

$$\text{Baldwin Locomotive Works, } R = 3 + \frac{M}{6}$$

$$\text{J. B. Blood, } R = 4 + .15M + .3\frac{M^{1.8}}{T}$$

(STREET RAILWAY JOURNAL, March, 1899.)

in which R is the resistance in pounds per ton; M, speed in miles per hour; and T, the tons hauled. These differ quite materially in form, although they all give reasonable results. Many others have been proposed, but probably none give better results than that of Blood. He has a term increasing with the 1.8 power of the velocity, which seems reasonable, for it harmonizes with experimental laws. Laws of solid friction state that it varies directly with the first power of the velocity, while laws of fluid friction state that it varies with the square of the velocity. Now, in case of car journals, we have neither a case of solid nor a case of fluid friction, but a case of mixed friction, and it seems reasonable that it should partake of the nature of both solid and fluid friction, and that its exponent should be neither 1 or 2, but some intermediate value. This term also decreases as the tonnage increases; this agrees well with the admirable experiments made by Thurston, where he shows that, within the limits of railway practice, the coefficient of friction decreases as the pressure increases.

The fact that different experimenters obtain different results is no particular cause for distrust; it means that experiments are carried on under different conditions, and until uniform conditions are prescribed and accepted uniform results cannot be expected; different conditions of lubrication, or different lubricants, may be responsible for the resistance varying anywhere between the first and second power of the velocity, for the magnitude of this kind of friction is determined by the nature, quantity and method of applying the lubricant. The condition of bearings, condition and size of wheels, condition of rails and roadbed, also affect the result, together with temperature, wind, number of cars, velocity, grades, acceleration, air friction and curvature of track.

The resistance due to curvature depends on its compensation, elevation of outer rail, kind of couplers, whether rigid or flexible head, length of wheel base, and probably upon the kind of trucks used. Formulæ proposed at different times for some of these factors are:

$$\text{Acceleration, } R = .0132 V^2$$

$$\text{Rolling, axle and air friction, } R = 4 + .15M + \frac{M^{1.8}}{T}$$

$$\text{Grade, } R = .38 G$$

$$\text{Curvature, } R = .438 D \quad (\text{at 25 miles per hour})$$

where R = resistance in pounds per ton, M = miles per hour, T = tons hauled, G = grade in feet per mile, D = degrees curvature, and V = speed attained in one mile, in miles per hour. Air friction amounts to about 4.2 lbs. per car; assuming a loaded car to weigh 45 tons, this amounts to .093 T = R; rolling friction is generally taken at 1 lb. per ton (Trautwine) and is due to the rail resisting the progress of the wheel.

The increased resistance due to curvature at a velocity of 25 miles per hour has been analyzed as follows (Trans. A. S. C. E., April, 1878):

* Paper read before the North-West Railway Club, May 15, 1900.

Due to twist of wheel.....	.001	lbs. per ton per degree
“ slip of wheel.....	.1713	“ “ “
“ flange friction.....	.2450	“ “ “
“ loss at coupling....	.0213	“ “ “
Total.....	.4386	

The “coning” of wheels increases this from .125 to .25 lbs. per ton per degree; loose wheels reduce this loss 20 or 25 per cent.

The increased draw-bar pull due to tonnage made up of empty cars is partially due to increased air friction and partially due to increased co-efficient of friction at lighter pressures. (Thurston, “Friction and Lost Work in Machinery and Mill Work,” p. 304).

The following results for train resistance were obtained from a dynamometer car test made by the Minneapolis, St. Paul & Sault Ste. Marie Railway last winter, and while the results are not as uniform as could be wished, they are as satisfactory as those usually obtained:

No.	Pull in Pounds	Mile Post	Grade in Feet to the Mile	Resistance in Lbs. Per Ton	Miles Per Hour	Remarks
1	24,000	44	42	5.16	6.5	
2	25,000	45	42	6.05	5.8	
3	25,500	48	28	11.8	2	
4	25,750	48.59	42	6.66	4.1	All cars on 4° curve
5	11,000	59.5	Level	9.66	15.3	
6	11,750	68	7.67	7.41	19.8	
7	8,200	70.25	Level	7.2	20.5	
8	5,700	89.75	Level	5.01	26.5	
9	8,100	92.31	Level	7.11	22	
10	24,200	102.32	42	5.35	8.1	
11	28,000	103.4	42.2	8.6	4.9	
12	11,250	109.5	3.68	8.5	19.2	
13	6,900	118.66	Level	5.41	24.4	
14	7,200	125.4	Level	5.64	26	
15	24,350	133.19	42.2	4.76	8	
16	19,100	133.49	29	3.92	9.5	
17	7,400	136.62	Level	5.8	24.7	
18	10,500	141.11	5.28	6.25	20	
19	15,100	146.63	14.72	6.25	17	

The train consisted of thirty-five loaded cars, with a total weight of 1139 tons, tare 474; at Weyerhaeuser (Mile Post 114) the train was increased to thirty-nine cars, 1277 tons. Results were deduced from the draw-bar pull, P, and the grade, G, and the tonnage, T, by the following relation:

Work per mile = $P \times 5280 = Rt \times 5280 + 2000 G T$ where the work is expressed in foot-pounds and Rt is the total frictional resistance due to axle, rolling and air friction; solving for Rt we have

$$Rt = P - \frac{2000 G T}{528}$$

Dividing this by the tons hauled gives the resistance in pounds per ton as tabulated in column five; these correspond closely to the formula $R = 5.25 + .072 M$ where R is the resistance in pounds per ton and M is the miles per hour. As can be seen, the run was made with a freight train and with a small range of velocities, 2 to 27 miles per hour.

In order to ascertain in any case if the tonnage is so large as to produce frictional resistances beyond the capacity of the locomotive, all the various resistances, rolling, axle, air, grade, curvature, etc., as given above, are added together, giving Rs the sum of all the resistances for the particular place in mind; then the draw-bar pull, P, required is found from

$$P = Rs T + \frac{G T}{5280}$$

which may be compared with the known pull which the locomotive can exert. If the train can have a speed, M, at the foot of the upper grade, it may ascend a hill steeper than that given by the above, i. e.,

$$= \left(\frac{P - Rs T}{T} \right) 5280,$$

for its momentum makes it capable of climbing a grade considerably beyond the apparent capacity of the locomotive. The force due to this momentum is found as follows:

Momentum = mv, where m = mass of train = $\frac{\text{weight in lbs. } w}{32.2 \text{ g}}$; and v = velocity of train in feet per second. Now $v = at$, where a = acceleration in feet per second and t = time in seconds to acquire

the velocity v, hence, $mv = \frac{w}{g} at$; but force = $f = ma = \frac{w}{g} a$;

therefore, $ft = \frac{w}{g} at = mv = \text{momentum}$, and $f = \frac{mv}{t}$ where f is the

force due to the momentum of the train of mass $m = \frac{w}{g} \times 62.3$

moving with a velocity v for t seconds. Reducing this to more convenient numbers for our purpose it becomes $f = \frac{T M}{t} \times 2.83$,

where f is the total force in pounds, T is the tons hauled, M = miles, per hour and t = time in seconds to ascend the grade; representing the length of the grade by L miles and taking the velocity at the foot of the grade at 30 miles per hour (for freight trains) t becomes equal to $\frac{2 L}{30} = \frac{L}{15}$ and $f = \frac{T M L}{15} \times 2.83$ and the average force

on the grade = $F = \frac{f}{2} = \frac{T M L}{30} \times 2.83$, hence the grade that can now be ascended is $G^1 = \frac{(P + F - Rs T) 5280}{T}$ where G¹ is in feet

per mile. Results of experiments up to date enable me to make such computations with very fair satisfaction for certain normal cases, but much further experimentation is needed, as the laws of train resistance are still unformulated.

“Every Ohm, Volt and Spark to be Registered”

When the average daily newspaper reporter undertakes to describe an electrical device he usually falls into many pitfalls, and his account is most fearfully and wonderfully made, but the following article from the Philadelphia *Evening Telegram* of Aug. 7 is one which would be hard to beat:

“The wattmeter is the latest addition to the duties of the trolley motorman, and is regarded by that individual as the most exacting of all the things he must keep under his eye, although in this instance he must keep it under his feet and never fail in doing so. If he does it ceases to work, and the object of the wattmeter is continuous work, for it measures the electric current and saves power.

“Heretofore, the motorman has had a comparatively easy time of it alongside the conductor. He has watched the street crossings, listened to the bell calls overhead, kept an eye ahead for trouble and children on the tracks, kicked the button on the floor, manipulated brake handle and electric bar as occasion demanded, taken his meals while on the jump, occasionally saw his family during the course of a day, and stood through every rain storm that came along, together with some other things, but there has never been a measure line on how he turned on or off power such as the conductor has in the line that keeps tab on the nickels.

“Now matters are to be different. The wattmeter will soon measure every ohm and volt and spark of current he applies to the wheels and wires of his car, and if he misses any—if the car goes too fast or the handle gets over the notch on the board too rapidly—the innocent-looking arrangement beneath his feet will tell it all, and he will be well employed. Both hands and feet will be constantly going—the right hand on the brakes, the left on the motor bar; the right foot on the warning gong and the left foot on the meter—and there will be no lost motion, for every movement will tell. This will enable him to sleep well at night.

“The wattmeter was introduced last week on Block 628 of the Tenth and Eleventh Streets line. It is an innocent-looking affair—just a square piece of black rubber that looks like an abbreviated doormat that can’t be moved, and covers one spot all the time and at all times. It connects with the electric machinery of the boxes under the car, and tells tales of every movement of the current on a circular disc just like a gas meter tells the flow of gas. It has been in use in Pittsburgh over a year, and the inventor lives in that city. It is now in use in St. Louis and Chicago, and meets the object of saving the electric current handsomely. The motorman can’t regulate it nor interfere with its workings in any way. He must keep his foot on it, however, all the hours the car runs, and it does the rest.

“The object of the wattmeter is to save power. The meter tells just how much current is necessary for every trip, and in Pittsburgh the motormen have just so many ohms at their disposal every day. If they get beyond they must explain. One day more than usual or the next day less than usual does not take from or add to any given surplus.

“The Traction Company now has special storage batteries in Germantown, on North Ninth Street, above Montgomery Avenue; at Fifth and South Streets, and at the foot of Beach Street, for the accumulation of power. During the hours of the day when travel is lightest power is held in check and stored away, to be sent out when travel is heavy and the cars need it. Heretofore this power has been wasted, but the wattmeter holds it in check the same as

gas and water are held back. The offices at Eighth and Dauphin Streets have a complete record of what is done, and when the wattmeter is generally in place on the ear fronts inspectors will register every trip.

"A Union Traction Company employee said to-day: 'There is no knowing what this new arrangement will do, but it is coming. Everybody is interested, and nobody can explain it. That's the funny business about it.'

"What do you stand on it for?"

"I stand there to keep the current from passing through the bolts. That's all I know."

When this clipping was shown to Mr. Twining, chief electrical engineer of the Union Traction Company, he said, on recovering speech, that the wattmeter was of the usual G. E. pattern, and that it was put on to test the efficiency of some roller bearings the company is trying on one of its cars.

London Letter

[From Our Regular Correspondent.]

The new underground railway which the Central London Railway has opened to traffic this week has proved to be a great success, and all London seems to be as pleased with its latest novelty as a child would be with a toy. During the first day there were no fewer than 84,500 passengers who traveled by the new line, and thousands more stood about the stations and looked on. The universal verdict has been in favor of the new road, which has already been nicknamed the "Two-Penny Tube." The simplicity of the arrangements is also greatly appreciated, though the system of purchasing tickets and dropping them in "chopper" boxes at the gate, in the same manner as is done on the elevated roads in New York, is an absolute novelty to the public in this city. It is a system, however, which will commend itself to the public later on, and is already favorably commented upon. The luxuriance of the cars has also called for many remarks and one can hear on all sides favorable criticisms as to the lighting, the ventilation, the elegance, the comfort and the general pleasantness of the motion of traveling in this underground tunnel. For those who have to travel long distances the price of 2d. commends itself most favorably as the omnibus fare for the same distance amounts to 5d. The first day passed off with the greatest success, and everything worked as smoothly as if the road had been running for years. The majority of the public, however, did not know that for the past three weeks the directors have been running experimental trains at schedule time with the whole force of employees attending to the work just as if the road were open for traffic. In this way, therefore, when the road was thrown open everything started off with the greatest smoothness and each employee knew exactly what was expected of him. After a period of extreme heat in London, when the thermometer has been averaging 90 deg., for the past week or two the deliciously cool atmosphere of the tunnel has proved most grateful, the temperature being always in the vicinity of 55 deg. It may not be out of place to recall at this time that it is just ten years since the scheme was first promulgated, the first application having been made to Parliament in 1890. Since that time many of the most able and experienced engineers and business men who are familiar with railway business have been devoting continuous thought to the successful accomplishment of this railway. The company was actually floated in June, 1895, and the first operation was the sinking of the shaft at Chancery Lane in August, 1896. The cost of the double tunnel has been about £585,000 per mile, so that for the whole road the cost has been about £3,500,000. The line, as is well known, starts at the Bank, and goes to Shepherd's Bush, and is underneath great public thoroughfares throughout the entire length being directly underneath Cheapside, Newgate Street, Holborn, Oxford Street, Bayswater Road and Uxbridge Road. The journey by omnibus used to take one and a quarter hours, and as the running time on the underground road is only twenty-five minutes, it will be seen what advantages it possesses, especially when you can travel the whole distance for less than one half the bus fare. It looks as if the Central London Railway were destined to have a great success, and judging from the number of passengers who traveled during the first day, which, at the same rate, would be a yearly passenger return of 30,000,000, it looks as if it were quite possible that the estimated passenger traffic expected by the company of 50,000,000 would be soon realized.

The half-yearly general meeting of the Metropolitan Railway Company was recently held under the presidency of Mr. John Bell. After making a statement that the result of the half-year's working was that they carried to net revenue a balance of £202,004, out of which it was proposed to declare a dividend of 3¼ per cent per annum, Mr. Bell referred to the following clause in the report which had just been submitted:

"The arrangements, referred to in previous reports, for an experimental working by electricity between Earl's Court and High Street, Kensington, stations have been completed, and an electrical train has been working daily since May 31 last. In view of the importance to the Metropolitan and District Railway Companies of adopting electricity as a motive power, a committee consisting of three members from each of the boards of the companies has been appointed to consider the question of applying electric traction to the working of the Inner Circle, and it has been agreed between the companies to invite eminent electrical traction firms to submit plans and specifications, with detailed estimates and tenders for the necessary installation."

It thus seems very certain that before long part of the underground system at present operated by steam by the Metropolitan Company will be converted to electrical working. The directors have satisfied themselves by the experimental train which they have had working near Earl's Court for the past few months that it is quite possible to convert their system to electricity. The problem which they have is naturally one of considerable difficulty.

The Glasgow District Tramways Bill, which was promoted by William Murphy, of Dublin, which was passed by the Lord's committee last May, has just been thrown out by the select committee of the House of Commons, presided over by Sir Lewis M'Ever. The committee found that the preamble of the bill was not proved, but desired to put on record that in its view the original scheme was a good one, and calculated to be of much use to the district, but that the scheme had been so mutilated and loaded with conditions by the conflicting interests and the excessive demands of several local authorities that, at present, it appeared to the committee to be wholly unworkable. There seems no doubt that when the plan was first brought forward by Mr. Murphy for a system of tramways in Paisley and Renfrew that it was calculated to have been a great benefit in the vicinity of these two towns. Mr. Murphy, however, had to encounter the tremendous opposition of the Glasgow Municipality, and also had to encounter opposition from Paisley and Renfrew and other towns, each one of which insisted upon certain conditions being fulfilled, which, as the chairman of the committee stated, practically amounted to blackmail. The original scheme had therefore to become cut down to such an extent that there remained practically very little of it, and even Mr. Murphy himself now does not value it very highly.

The select committee of the House of Lords, of which the Earl of Camperdown is chairman, has had under consideration the bill promoted by the London County Council under which power is sought to enable the Council to use electricity as the motive power for trams which it already owns in the metropolis and other trams which, under the Tramways act, it may acquire. It was stated that the County Council already owned over 70 miles out of the 115 miles of line which exist in London, and by 1911, if the present policy of purchase is pursued, it will have acquired the remainder. The bill was opposed by the South Metropolitan Gas Company and the Lambeth Water Company, who feared that the proposal would cause electrolysis of their mains, and by the Lambeth and Wandsworth local authorities, who urged that they were not given adequate protection under the bill. Eventually the committee passed the preamble, subject to certain provisions being inserted for the protection of the gas and water companies. The Light Railway Commissioners, however, has refused to grant the order for the proposed electric tramways in Surbiton and Kingston, two suburbs of London, owing to the opposition of the local authorities and the Surrey County Council.

An important report dealing with a proposal to construct a tramway extending along the Embankment from Blackfriars to Putney Bridge is being considered by the Chelsea Vestry. A certain scheme by which trams will be run by way of the Victoria Embankment, Victoria Street, Buckingham Palace Road, and the Chelsea Embankment to Putney has been approved by the improvements committee of the London County Council, subject to the local authorities in control of the various municipal areas through which the line will pass agreeing to contribute between them a third of the cost. Chelsea, it appears from the report, would have to pay as their share about £63,733, and the proposal is not regarded in a favorable light. The Vestry will be asked to point out to the London County Council that the money which would have to be expended on the trams would be spent to much better purpose if laid out for street improvements.

Street Railway Patents

[This department is conducted by W. A. Rosenbaum, patent attorney, 177 Times Building, New York.]

STREET RAILWAY PATENTS ISSUED AUG. 7, 1900
655,216. Switch for Suspended Electric Conductors; J. Floyd, Washington, D. C. App. filed Dec. 8, 1899. The main and branch

wires each have an upwardly turned open loop, affording a passage for the flange of the trolley wheel.

655,217. Crossing for Suspended Electric Conductors; J. Floyd, Washington, D. C. App. filed Dec. 8, 1899. A modification of the preceding.

655,305. Track-Sanding Device; G. W. Mudd, Moberly, Mo. App. filed March 22, 1900. The motorman is able to open a valve to admit a blast of air for driving sand out of the sand-box onto the track.

655,349. Railway Track Structure; H. B. Nichols, Philadelphia, Pa. App. filed May 1, 1900. The hardened plate or block forming a continuation of the crossing rail is supported and secured by a soft metal filling which serves as a cushion, and also as the sole means for locking the plate in position.

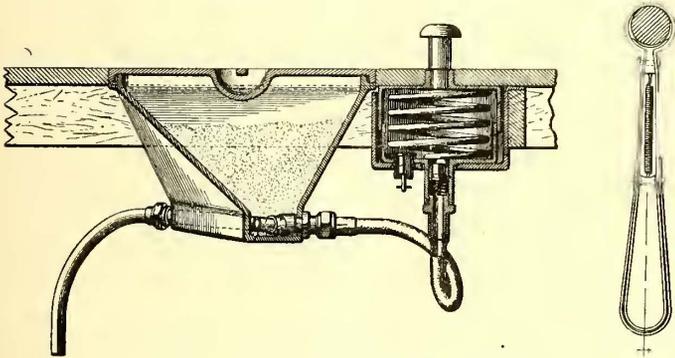
655,370. Rail-Joint; A. Relay, South Norwalk, Conn. App. filed Oct. 16, 1899. A projection from the end of one rail enters an opening in the end of the other, the two parts being shaped to interlock with each other.

655,386. Car Truck Frame; E. S. Woods, Chicago, Ill. App. filed Feb. 15, 1900. The frame comprises two parallel side frames, a transverse truck bolster detachably interlocking with each of the side-frames and removable springs between the bolster and side-frames designed to hold the bolster interlocked with the frames.

655,389. Safety Device for Electric Vehicles; F. E. Case, Schenectady, N. Y. App. filed May 20, 1899. In case the motorman becomes incapacitated, a device is attached to the controller, which cuts off the power.

655,400. Tie-Plate; W. Goldie, Wilkesburg, Pa. App. filed Dec. 9, 1899. A metal plate upon which the rail rests, is provided with spurs to enter the tie and flanges to retain the rail.

655,428. Hand-Strap for Street Cars; T. E. Wardwell, Stamford, Conn. App. filed Feb. 3, 1900. The strap has two loops so that two persons may use it at once; one loop is retracted to an elevated position by a spring, so that it may be drawn downward for the accommodation of short persons.



PATENTS NOS. 655,306 AND 655,428

655,444. Tongue-Rail Fastening for Railways; P. Knittel, Crefeld, Germany. App. filed June 15, 1900. A fastening for a tramway tongue-rail consisting of a cross-key engaged in a slot of the tongue-rail pivot, and having its ends held in a slot of the base-casting.

655,449. Railway Switch; A. G. Moeckel, Detroit, Mich. App. filed April 22, 1899. The movable tongue is located in the hollow of a plate, and carries flanges which always cover the hollow to keep out snow and ice.

655,455. Electric Railway; W. B. Purvis, Philadelphia, Pa. App. filed April 24, 1900. The circuit is closed by a magnet carried by the car which lifts a flexible cable into contact with the terminals of the branch leading to the sectional conductor.

655,465. Car Truck; G. L. Stuedner, New York, N. Y. App. filed March 17, 1900. The wheels of the truck are flangeless, the function of the flanges being supplied by small wheels or discs independently mounted upon the truck.

655,566. Street Railway Car; G. Moore, Boston, Mass. App. filed Feb. 21, 1900. Details of construction pertaining to a flexible panel to be used in the construction of convertible cars.

655,634. Bearing for Car Trucks; C. H. Hartman, Allegany, Pa. App. filed June 4, 1900. The two bearing surfaces between the body and truck are provided with inclined faces between which balls are placed, the body being lifted when the truck turns, to reduce the friction at the bearing.

PERSONAL MENTION

MR. F. L. HART has resigned as general superintendent of the Washington Traction & Electric Company, of Washington, D. C.

MR. EUGENE E. HAWKINS has resigned as general superintendent of the New Paltz & Poughkeepsie Traction Company, of New Paltz, N. Y.

MR. D. F. BURRITT has resigned as general manager of the Palmer & Monson Street Railway Company and of the Central Massachusetts Electric Company.

MR. WILLIAM D. WEAVER, editor of the *Electrical World and Engineer*, of New York, was married last month in Bremen, Germany, to Miss Mildred E. Niebuhr. Mr. and Mrs. Weaver expect to sail for New York about Oct. 1.

MR. SAMUEL G. DE COURCEY has been elected president of the American Railways Company, of Philadelphia, to succeed A. A. McLeod, who recently resigned. Mr. De Courcey was born in Maryland and came to Philadelphia in 1863. He has been president of the Western New York & Pennsylvania Railroad since 1892.

NEWS NOTES

[News notes for this department are solicited.]

LOS ANGELES, CAL.—The Los Angeles Traction Company has made application to the City Council for three franchises for the extension of its lines.

DENVER, COL.—The Denver City Tramway Company has adopted a new bicycle carrier.

DENVER, COL.—The employees of the Denver City Tramway Company held a picnic on Aug. 8, the proceeds of which are to be devoted to the three athletic and literary clubs composed of employees of the company.

HARTFORD, CONN.—The Hartford Street Railway Company has equipped several of its open cars with eave troughs as a protection to passengers from the water which falls from the roof of the car during a rain-storm. The troughs run along the side of the car and are connected at the ends with a waste pipe which carries the water to the street.

HARTFORD, CONN.—The Hartford, Manchester & Rockville Tramway Company has announced through its president, M. S. Chapman, that hereafter every employee of the company who remains in its service five years shall be entitled to wear a service stripe, and also be entitled to an increase of 25 cents per day in wages. Five men, who have been in the employ of the company the required length of time, have been decorated with the stripe and receive increased pay.

WILMINGTON, DEL.—At the recent annual meeting of the stockholders of the Wilmington City Railway Company the following directors were elected for the ensuing year: John A. Rigg, Henry C. Moore, R. N. Carson, W. S. Bell, Thomas S. Bellah, Peter J. Ford and K. A. Fichthorn. No change was made in the management of the system. Numerous improvements have been made during the past year. Changes have been made in the tracks where necessary, new rails and switches being laid in some places. In fact, the entire Wilmington and Chester system has undergone improvement. A full equipment of summer cars had been provided for the Darby line and additional winter cars are now under construction.

JACKSONVILLE, FLA.—The Jacksonville Street Railroad Company has been successful in securing a franchise here.

CHICAGO, ILL.—The Chicago City Railway Company has ordered a number of convertible cars, and proposes to give them a thorough test this winter.

EAST ST. LOUIS, ILL.—The Granite City, Venice & East St. Louis Electric Railway Company has been granted an extension of six months, in which to complete the construction of its line. Work was stopped for some time by an injunction.

DIXON, ILL.—The City Council has passed an ordinance granting the Illinois & Rock River Electric Railway Company a franchise for the construction of an electric railway on River Street from the westerly line of Peoria Avenue to the city limits, or through the city. The franchise requires that construction work begin within one year, and that the line be completed and in operation within two years from the passage of the ordinance.

CHICAGO, ILL.—The Law Department of the city has been asked to decide the matter of the size of a bill a passenger may offer the conductor for his carfare. The matter has been investigated by counsel, who learned that Chicago has no ordinances on the subject. It is alleged that a conductor in charge of an Indiana Avenue car has in his possession a \$10 bill belonging to a passenger, and which was given him three weeks ago for two fares, and that after repeated requests he has not secured the return of the change. It is to be made a test case.

NEW ALBANY, IND.—The New Albany Street Railroad Company has been granted a thirty-year franchise by the Council. There were two other bidders for the franchise.

WICHITA, KAN.—The Wichita Electric Railway & Light Company has decided to place its entire system in the hands of the Kings Daughters on Aug. 26. The young women members of the organization will act as conductors, and will generally have charge of the entire system. The entire revenue for that date will be donated by the company to the Children's Home fund.

ALBERT LEA, MINN.—The application of the Albert Lea & Geneva Lake Electric Railway Company for a franchise has been granted by the City Council. The franchise is granted for fifty years and requires that the company have 2 miles of road built and in operation within two years. A fare of 5 cents is to be charged for one continuous ride within the city.

BIDDEFORD, ME.—The Saco River Electric Railway has applied for a revival of its charter, which had lapsed under the statute.

ATLANTIC CITY, N. J.—The stockholders of the Atlantic City Passenger Railway Company have elected officers as follows: William H. Bartlett, president; G. A. Aldrich, vice-president; A. M. Jordan, treasurer; Eli M. Chandler, secretary; G. A. Aldrich, general manager; directors, G. T. Lippincott, E. J. Petroff, R. J. Powell, of Atlantic City; Thomas F. Durham and Frank Reeder, of Philadelphia. The company has rights to build a line across the Meadow turnpike and through Pleasantville and Absecon.

SCHENECTADY, N. Y.—The mayor has signed the ordinance granting the Schenectady Street Railway Company permission to extend its lines through Lafayette Street and Park Place to Nott Street.

SYRACUSE, N. Y.—Two cars of the Syracuse, Lakeside & Baldwinsville Railway Company collided head-on just outside of the city limits Aug. 8. Nine passengers were injured.

BUFFALO, N. Y.—President Ely, of the International Traction Company, has notified the Mayor that his request for the lowering of the steps of the one hundred new open cars placed in operation by the company this season will be complied with. President Ely asks that the citizens bear with the inconvenience until the advent of the winter cars, as it is impossible to make the necessary changes until new trucks have been placed under the cars. It will require several months to manufacture the new trucks.

BROOKLYN, N. Y.—A man who recently tried to stop a car here by placing a large cobblestone on the track of the Third Avenue line of the B. R. T. was fined \$10. There was a delay on the road, and several cars darted past him regardless of his cries and shouts to stop. In mad desperation he placed the stone on the track, feeling sure that the motorman of the next car would have to stop and remove the stone before proceeding, and knowing that while this was being done he would have an opportunity to board the car. The man's name was obtained by the company, and he was promptly arrested.

BUFFALO, N. Y.—Arrangements are now completed for the opening of the Olcott extension of the Buffalo Railway Company on Aug. 29. The dedication of the new resort fitted up by the company at a cost of \$75,000, will take place on the date of the great Niagara County farmers' picnic. The Olcott branch from Lockport passes through one of the greatest fruit-growing sections of the State. Officials of the road believe that Olcott will become one of the most popular resorts on Lake Ontario. The bathing beach is one of the finest to be found anywhere. A fine park has been fitted up, a large casino built and every provision made for the accommodation and pleasure of the thousands who will be attracted there by the delightful ride and the beauties of the place. A regular round trip fare from Buffalo of \$1 has been decided upon, with special rates of 75 cents on Saturday and Sunday.

LANCASTER, OHIO.—The Lancaster Traction Company has laid off its conductors. Citizens threaten to test the State law passed last year requiring two men on each car.

STUEBENVILLE, OHIO.—The Steubenville, Mingoc & Ohio Valley Traction Company has decided to enter the lighting field, and is soliciting contracts for lighting and furnishing power. A franchise will be asked for if enough business can be secured.

TOLEDO, OHIO.—Ten people were injured in a street car accident here a few nights ago.

TOLEDO, OHIO.—The employees of the power house of the Toledo Traction Company, under the leadership of Superintendent O. E. Olson, gave a trolley party in the company's special car last week. N. E. Wood, of the General Electric Company, Schenectady, was the guest of the evening.

OKLAHOMA CITY, O. T.—The City Council and the Oklahoma City Land & Electric Railway Company, who have been at loggerheads for some time over a franchise grant, have reached an understanding, and a franchise has been granted by the Council which is acceptable to the company. One of the provisions of the ordinance is that the company has cars running on three lines within six months. The officers of the company are: J. M. Lindsay, of Gainesville, Texas, president; S. H. Baird, vice-president; G. R. Stone, secretary; J. H. Everest, general attorney, and George C. Kelly, of Oklahoma City, general manager.

PHILADELPHIA, PA.—The Union Traction Company received this week the first of a lot of new type convertible cars ordered from the J. G. Brill Company. The cars have a number of new features connected with the convertible arrangements. They have cross seats and end entrances, however.

PITTSBURGH, PA.—The Union Planing Mill Company and others have filed suit against the Pittsburgh, Knoxville & St. Clair Street Railway Company and Henry Stamm, trustee, in which they ask for a rule on William J. Fawcett, receiver of the company and on the Pittsburgh & Birmingham Traction Company, to show why the property, franchises, stock and real estate of the Pittsburgh, Knoxville & St. Clair Street Railway Company should not be again offered at public sale. It is alleged that the Pittsburgh & Birmingham Traction Company failed to make good the terms of the previous sale, the paying of the receiver's certificates of petitioners being a part of the consideration of the purchase by the Pittsburgh & Birmingham Traction Company at the previous sale.

ASHLAND, PA.—The Borough Council has finally accepted an amendment to the ordinance granted the Ashland & Centralia Electric Railway Company in July, 1899, by which the company is permitted to use North Third Street on which to place a siding for the storage of cars, and to be used as a passing siding. Under the conditions upon which the permit is granted the text of the original ordinance, which requires the company to operate their cars to First and Centre Streets, is not changed. The cars will

run to the crossing at First and Centre Streets, and after discharging or accepting passengers will then run back to Third Street, and if it is necessary, will run into the siding at Third Street and thus avoid the cars of the Schuylkill Traction Company which may be on the Centre Street line.

PHILADELPHIA, PA.—The oldest conductor in Philadelphia, in point of service, is dead. He was James S. Reeve, and entered the service of the Arch Street Railway Company in 1863. He has been successively engaged in the service up to a few days before his death.

PROVIDENCE, R. I.—The petition of the Rhode Island Suburban Railroad Company for a franchise in Bristol was granted August 6.

MILWAUKEE, WIS.—The Council committee on street lights has recommended that the Council grant the Milwaukee Electric Railway & Light Company a five years contract.

TACOMA, WASH.—Four of the officers and employees of the Tacoma Railway & Power Company have been arrested, charged with manslaughter in connection with the Fourth of July disaster, in which thirty-nine persons were killed and over sixty injured. The four arrested are: S. Z. Mitchell, general manager of the company; F. L. Dame, general superintendent; Charles Purdy, assistant superintendent; F. L. Boehm, motorman of the wrecked car. Bail has been fixed in each instance, and the date set for hearing the cases.

KINGSTON, ONT.—The annual convention of the Canadian Electrical Association will be held here Aug. 29, 30 and 31. The programme has not yet been completed, but will include the following papers: 1. "Utilizing the Available Central Station Capacity." Prof. R. B. Owens, McGill University, Montreal. 2. "Use of Dynamo and Storage Battery in Telegraph Offices." W. J. Camp, C. P. R. telegraph office, Montreal. 3. "Power Factor as Affecting Operation and Investment, with Special Reference to Induction Motors and Enclosed Arc Lamps." F. H. Leonard, Jr., Montreal. 4. "Government Electrical Standards," O. Higman, Ottawa. 5. "Railway Subject: Giving Several Curves Showing the Average Power During a Day, and Maximum and Minimum Requirements for Power called for on the Quebec System." Mr. Blair, Quebec Railway & Lighting Company, Quebec. 6. "Rotary Converters." A. Gordon Grier and J. C. Hyde, Montreal. 7. "Conditions Affecting the Wave Form of Alternators." Prof. L. A. Herdt, McGill University, Montreal, Que. The City Council has made an appropriation for entertainment purposes, and granted the use of the City Council chamber for the sessions, also space in the City Hall for exhibits of electrical appliances, while the local electrical companies have agreed to furnish, free of charge, current and labor to exhibitors.

CONSTRUCTION NOTES

[Information regarding the building of new roads, enlargements of power plants, extensions, etc., will be much appreciated.]

BIRMINGHAM, ALA.—The Birmingham Railway & Electric Company is making a number of important additions and improvements to its system. A new line, 2 miles long, is being constructed to Owenton. Three blocks of new track are being constructed to connect the old steam line of the Highland Avenue and belt. This will give a new route to the residence portion of the city. The Avondale line was recently double-tracked from Avenue F and Twenty-Third Street to Twenty-Eighth Street and F. Now the grading is being done on the same line for a double track from Twenty-Third to Twentieth Street. The South Highland line has been torn up for some ten blocks, and the tracks are being relaid. A handsome new brick and iron round house and barn is about complete. This is 140 ft. x 100 ft. and is one of the most substantial buildings in the city.

MERIDEN, CONN.—The Meriden Electric Railroad Company contemplates making improvements at Hanover Park next season, which will cost \$25,000. This season has proven a very successful one at the park, and the improvements to be made include the general overhauling of the entire grounds and the addition of many new attractions and novelties.

PENSACOLA, FLA.—President Northup, of the Pensacola Terminal & Railway Company has just returned from Baltimore, where he has been in consultation with the directors of the road in regard to the improvement of the system. It has been decided to rebuild and generally overhaul the entire system, and included in the improvements to be made are the overhauling of the lighting plant and system, the addition of new cars, the electrification of the dummy line and the general reconstruction of Palmetto Beach, which it is proposed to turn into a veritable Coney Island.

EAST ST. LOUIS, ILL.—The Venice, Granite City & East St. Louis Electric Railway Company has decided to extend its line. The line will run direct from Granite City to East St. Louis.

MITCHELL, IND.—An electric railway line is projected to connect Oolitic City, Bedford, Mitchell, Orleans, Paloi, West Baden and French Lick Springs.

PERU, IND.—The promoters of the Peru-Converse Electric Railway report that they have secured the right of way for the entire 22 miles except through Miami County, and a petition has been filed with the County Commissioners for a franchise to complete the route.

INDIANAPOLIS, IND.—The Indianapolis Street Railway Company has opened its line to Riverside Park.

INDIANAPOLIS, IND.—The Indianapolis Street Railway Company has selected a site for its new power house. When the new structure is completed, the company will abandon its present power house.

INDIANAPOLIS, IND.—The Indiana & Ohio Railroad is ready to build about 50 miles of electric railway, and will be glad to make the best contracts they can for the material to be used in the construction of the line. J. M. Gore is president of the company.