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EDITORIAL NOTICE

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

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Scranton and Jamestown

It is a pity that the cause of union labor is so everlastingly injured by the reproach that extremists bring upon it. Not long since we had occasion to comment on the sad state of affairs at Jamestown and the lengths to which street car strikers there had gone in prejudicing not alone their own cause but the general welfare of the city. Scranton is now repeating what has thus occurred at Jamestown, and the local company is enduring the contumely and withdrawal of patronage of a large part of the population because it insists on the right to manage its own business. Scranton is very largely a "union" city, and hence a voluntary abstention from use of the cars has been comparatively easy to enforce. Whether the restriction on public freedom can be long maintained is another matter, especially as those who ride meanwhile in old stages are paying 10 cents for a rather short trip. Indeed, at this moment the business men of the community have moved to settle the matter, but the manager of the road will not turn adrift the employees who have been willing to operate his cars, and have done their work satisfactorily. The men insist, of course, that they will only come back in a body—and that is an issue on which they would appear destined to lose. Such a decision would not touch the main controversy in any way, arising out of the discharge of two conductors last September, one for shortage and the other because on a certain run he had given more transfers than he had passengers. Besides, the men do not seem to see that if they are to go in and out in one body, as they choose, a "vested interest" is created alongside which, for monopoly and tyranny, anything ever seen before would be child's play.

The Advantages of Smooth Acceleration

A well-known electrical engineer, who has also in days past been an authority on steam locomotive practice, smiled in a knowing way the other day when someone mentioned the often-heard argument that electric motors having no dead centers make it possible for an electric locomotive to exert a higher average horizontal effort than a steam locomotive on which the torque is greater at certain portions of the revolution of the driving wheels than at others. The smile was drawn out by the fact that the engineer had recently witnessed some tests between steam and electric locomotives which demonstrated that in practice there is much more variation in the horizontal effort with electric locomotives than with steam. This is due solely to the rush of current that follows a change of the controller from one point to the next higher. If it were possible to make a controller with an infinite number of resistance steps, the theoretical argument in favor of the even torque of the electric locomotive would hold, but with controllers having but a few steps in which the resistance is cut out, the argument will not hold. This only goes to show the importance of putting as many steps in the controlling resistance as possible. The advent of the multiple-unit system for places where rapid train acceleration is wanted, however, makes the argument of no more practical interest one way or another at the present time. As the multiple-unit system, with a large per cent of weight on the driving wheels, is the only means to securing rapid acceleration, the electric motor is the only thing that can be considered for such work at the present time, for a multiple-unit steam system is impracticable.

While on this subject, it is in place to refer to a matter which was of common note among passengers on the South Side Elevated Railroad of Chicago at the time steam locomotives were abandoned in favor of the first multiple-unit system to be put in use. The locomotives were taxed to their utmost during rush hours to maintain the fast schedule with the long trains that were in use. When trains were being accelerated the surging due to the jerking of the locomotives as the engineers opened the throttles, accentuated by the spring in the couplings of the long trains, made it very unpleasant for all passengers, and especially for those standing. Electric traction, with the automatic throttle which was employed, produced such a smooth acceleration that



the change from the steam regime was quite marked, and very welcome.

In everyday street railway practice, it is too common to see cars on which there is not the proper gradation of resistance between the points on the controller, and where, as a result, there are certain points where there is a jerk when current is turned on, and others which seem to have no effect. But even the finest proportioning of resistance can be spoiled by a careless motor-man.

#### Ventilation of Underground Railways

While the Board of Health of New York City is decrying the New York Central tunnel and is endeavoring to secure the adoption of means by the company for the immediate ventilation of its approach to the Grand Central Station, it is interesting to note that the same subject of ventilation of sub-surface tunnels is attracting great attention among our London brethren. The iniquities of the old London underground road, with its smoke-producing locomotives, are too well known to need further comment, but the poor ventilation of the Central London Underground Railway, or the two-penny tube, which is operated by electricity, is so great as to attract the attention of the *Lancet*, the well-known authority in medical matters. The theory of the ventilation of this tunnel was that as a separate tube was provided for each track, and as the contour of the cars approximated very closely to that of the inside of the tunnel sheath, they would act as a sort of plunger passing through the tube, and would draw in fresh air from behind through the station openings in the rear and force out the foul air in front. Nevertheless, this method does not seem to have been fully effective to secure the results desired either in the tunnels or the stations. It is found that in the latter the carbonic acid gas in some instances was no less than 10.3 parts per 10,000; while between the stations—that is to say, in the tunnels—it reached 11.9. Now, since the average amount of carbonic acid gas in the outer air seldom exceeds 4 parts per 10,000 and as whenever the amount of carbonic acid gas in the air of a room exceeds this amount by two parts per 10,000, it is not fresh and has a stuffy smell, six parts per 10,000 has been fixed as the limit of impurity. The "tube" air contains nearly twice this amount. This fact is explained by the medical journal already quoted on the theory, already said to have been demonstrated by experiments, that a very considerable portion of the air must be driven backward and forward unchanged in the tube. In other words, the tunnel air is diluted, but the whole of it is never swept out, and the *Lancet* believes that if the observations referred to had been extended to the air of the cars, the result would probably have shown a greater pollution still. While the air on the older steam underground roads of London, as regards carbonic acid, is said to be more than twice as bad as the Central London, the *Lancet* is inclined to doubt whether the carbonic acid from human sources is any more on the former roads than in the tunnel of the "two-penny tube." As the chief impurities in the former case are derived from coal, it is gratifying to learn under these conditions that an experiment with a system of ozonisation to relieve this condition is going to be made shortly by a syndicate.

#### The Charms of Inaccessibility

The preservation of the beauties of nature is a matter to the importance of which the public is far more alive than it was a century ago, but it seems to us that some of those who declaim against the invasion of the trolley do protest too much. For example, we note the following from the *Buffalo Commercial*, a journal which was doubtless stimulated by its own name to complain that the world is too much with us:

The Adirondacks have some merits as a wilderness, but there are strangely constituted persons who will never rest content until the North Woods are furnished with all the modern conveniences, including street railways, electric lights, asphalt pavements and afternoon concerts. A trolley line from Lake Champlain to Lake Placid is already projected, the rest will follow. The deer and the guides will slowly retreat before the march of civilization, and soon

will take their places with the stage drivers of the old school, among the "figures of the past." That is to say, such will be the inevitable end of the present tendencies, unless they are seasonably arrested. When every portion of the Adirondack region is made too easily accessible to the casual tourist, the wilderness passes into history.

Now, this all depends on the point of view. It would indeed be a pity to spoil or despoil the Adirondacks, but after the prolonged assaults of the steam railroad, the tourist and the lumberman, it is rather invidious to jump on the poor trolley as the one reason why the editor of the *Buffalo Commercial* cannot have the wilderness all to himself while he communes with nature.

Probably the trolley less than any other transportation agency leaves any trace of its presence on the country it traverses, whether as to noise or dust or smoke, or the setting on fire of the contiguous shrubbery. The same objections have been raised to the electric railroads up the Swiss and Tyrolean Alps, yet it takes a keen eye to detect from a distance the electric cars that climb from the valley of the Arve or those that wind around the Wengern Alps up the slopes of the Jungfrau. There are many thousands of quiet, cultivated, nature-loving people who could never tread the higher Alps or penetrate the Adirondack woods but for the modern conveniences of travel; and we really do not see why their love of nature and desire for a more intimate relation with it is not as properly to be gratified as the ambitions of some mere deerslayer or well-to-do misanthropic tramp, with hobnail boots and an alpenstock. There is solitude enough left in the world for all who want it. All they have to do is to go a little further afield; to plunge a little deeper into the woods. Meantime, the ugly, unæsthetic trolley has done more than any other known agency to take man back to nature, to put the country at the very door of the dweller in the city, and to enable everyone who will to dwell under his own vine and fig tree.

#### Street Railway Taxation

The subject of street railway taxation is approached in many different ways, but mainly, it would seem, with the idea of making a corporation pay an ever increasing proportion of the tax burden of the community. At the same time, in a surprisingly contradictory manner, the question of more transfers or longer haul for the same fare is incessantly urged, the advocates of these plans being apparently quite unable to see that the fund out of which all these exactions can be met is strictly limited. In a recent article in the *Forum* review, Walter S. Allen suggests a few reflections of this nature, pointing out that the trolley has increased the living area from 38 square miles up to 2000 square miles, a man now being able to pick his home just as easily within the larger area as he once did in the smaller area, when he walked from house to place of business. The increase of valuations is but one way in which a street railway repays the community for the franchise issued to it. As Mr. Allen puts it:

The results of this widening of the city area have been of incalculable value to all whose business requires them to spend their days in its heart. Instead of being obliged to reside within narrow limits, where land is expensive and rents are high, the population may be spread out into large districts, where land is cheap, and where each house may stand detached. Rapid means of transit with low fares have affected the tenement house districts, where overcrowding is the rule, and have, therefore, exerted a great influence on the social conditions within the cities. Extended areas in the country have been built up with houses of medium cost, the rents of which fall within the means of the day laborer; and these lower rents and improved conditions have led to the removal of many families from the crowded parts of the cities out into these newly established suburbs. This transference of population has had an effect on rents in both city and suburbs; and as the better-paid class of workingmen, brought by improved methods of transit within comparatively easy access of their work, have moved away from the cities, their place has been taken by newly arrived immigrants from foreign countries. Real estate values also have been affected to a marked degree. The land in the older city remains dear, because of the increased demand for land for business purposes; but values in the suburbs are enhanced many times because of the availability of these districts or residences. These opportunities for the improvement of the condition of the workingman are a form of compensation which the street railway gives in return



for the right to occupy the streets, and it is one which is of the greatest importance to the whole community.

Facts of this kind appear so likely to be forgotten, it can do no harm to have them thus pointed out again. We are not claiming them on behalf of the street railway companies as virtues. They are true alike of the most selfish and the most public-spirited corporations. But it is fair to assume that where they are fully recognized, the service is likely to be most efficient and progressive. Whatever the effect may be, it is a trifle absurd to clamor for more and more cars, and then clap a stiff tax on every one that is run out of the barns; to load up with paving work a system that wears the roadbed less than any previous method; to insist on free lights from roads whose cars are already the best lit in the world; and to tax a franchise which but for the service given to the community would not be worth a cent to anybody.

### The Relation of Technical Papers to the Engineering Profession

We publish elsewhere in this issue a very interesting address by Prof. Hibbard, of Cornell, delivered to the Society of Mechanical Engineers at Sibley College on the advantages of the systematic reading of current engineering literature. Although addressed to students in a technical college, the remarks apply with equal force to the active worker in the field to whom a knowledge of current development and improvements in his particular industry is equally important. As Prof. Hibbard says, "A good engineering paper should be one of the life partners, ready at hand when moments of leisure permit its instruction and enjoyment, better understood and liked as the years roll on, acquaintance or perhaps friendship formed with editor, contributions made, suggestions given and taken; some share had in its mighty influence in the engineering world." In any industry which is progressive, and this applies to all branches of engineering, it is impossible to cover in any text book the knowledge which a person actively engaged in the business requires in his work, as much of the practice by the time that it is compiled in a book has become antiquated. Many managers of railway and other engineering properties appreciate this fact, and the advantage of keeping their heads of departments informed as to the improvements in operation, and have made a practice of calling the attention of their superintendents to articles which appear in the technical papers particularly relating to their respective departments. This practice, however, even when followed, does not absolve the respective division officers, and in fact any person connected with the property who believes that responsibility of any kind attaches to his position, from keeping himself informed as to the improvements made in the industry which affect his own work. No better plan can be followed, where such a thing is possible, than for a number of persons interested in the technical side of a property to have a regular time of meeting, and engage in the interchange of opinions on technical subjects. We know of a number of such clubs which have been organized among the employees of railway companies with most satisfactory results. The topics can often be selected to advantage from the latest issue of the technical publications, or publication devoted most closely to the industry, and discussions and criticisms of the methods suggested in the paper will often lead to most valuable information.

But the value of the technical paper, no matter what industry it represents, does not close with the perusal of it. Many of the articles printed are often those for which the reader has not any immediate application, but to which later he would refer gladly if he can quickly turn to them. For this reason, a system of indexing the most important articles which appear in the technical publications which a person reads is often the most valuable asset in his professional library, and we know of many engineers who make a specialty of indexing or clipping all articles which they believe they will have occasion to consult at a later date. Suggestions as to the method which Prof. Hibbard has found most convenient in card indexing are contained in his paper, and this plan certainly has many advantages over that of preserving clippings, as the index itself is more compact, and if the bound volumes of the different periodicals

indexed are kept, the rest of the contents is available, should it be required. Undoubtedly the index plan for the reading pages and the clipping plan for the advertisements which are to be preserved will often prove the most satisfactory method of preserving and making available this class of literature. We believe that street railway information can best be classified under both a subject and geographical index, as very often the article sought can be more easily found by being identified with some city than if the subject index only was depended upon. Both methods are followed in the annual index of this paper.

Another point which we have found of value in connection with a card index of current technical literature is that of changing the color of the cards every four or five years. In this way the date of publication of the article can readily be identified without a search for it on the card, indeed without looking at the card except to notice its color, and as the value of the article is often dependent largely upon the approximate date at which it was published, the user of the index can quickly locate the cards which he wishes to examine and which are useful for his purpose.

### Improvements at Des Moines

The Des Moines City Railway Company, of Des Moines, Ia., besides the improvements it has made during the past year in its electrical equipment, the building of a new and modern power house, the extension of its lines within the city limits and the re-laying of the tracks with heavier steel, has recently completed and equipped a new construction and repair shop. A part of the old power house has been converted into a two-story structure, which, with a one-story addition, constitutes the new machine shops. Two tracks long enough to accommodate two large type cars have been laid within the building, and the equipment includes a hydraulic pressure machine, iron planers, lathes, a hydraulic trip hammer, drills, grooves, and other appliances. In addition to the machine shop a new foundry building, 40 ft. x 40 ft., has been erected, and a four-bellows blacksmith shop provided. The foundry building is equipped for making both iron and brass castings and for working steel. The second floor of this building is used by the electrical department, where repairs to the equipment are made.

South of the machine shops and the foundry, a new one-story building, 50 ft. x 200 ft., has been erected. This will be used as a carpenter shop. Two tracks have been laid through the building, and it is equipped with the latest machinery.

With the new shops completed, the company now has facilities for the construction of its own cars, not only for use within the city, but also for the lines of the interurban company, work on which was commenced this year. Seventy-five men are now employed in the shops, being employed in making repairs and construction of new rolling stock. Several large new cars will be constructed during the winter. It is the intention to construct a sufficient number of cars, so that all the single truck or smaller cars now in use on the more important lines of the system can be taken off in the spring, and used on lines where the traffic is lighter, and also to furnish temporary equipment for use in the construction work on the interurban lines.

The new power plant of the company, which will soon be completed, will afford nearly enough power to operate one hundred cars in addition to the equipment the company now has in operation. Four 500-hp boilers have been installed in the new power house, and one Allis-Chambers cross-compound condensing engine is now being put in. This engine has a capacity of 2400 hp, and will be direct connected to a 1000-kw G. E. generator. The boilers are equipped with revolving chain grates.

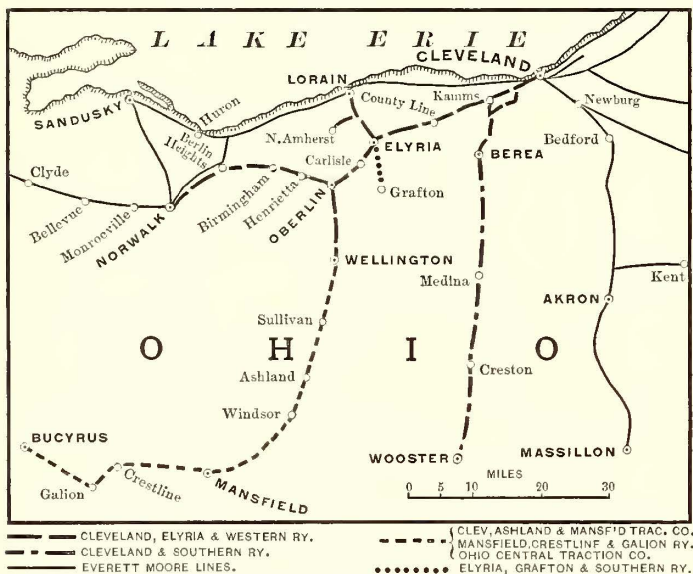
The apparatus in the old power plant has been overhauled, and the switchboard system changed, so that the entire power generated by it can be united with that of the new plant. The new plant will be completed by Jan. 1, and will be used alternatively with the old, until such time as the entire power will be used to take care of the extensions and increased traffic. The equipment of the new plant is to be further supplemented with a second 2400-hp engine, a duplicate of the one already installed. The order for this engine has been placed with the Allis-Chambers Company, of Milwaukee, but it will not be installed until early in 1902.

Electric conduit lines on the upper part of Manhattan Island were flooded and traffic suspended during the heavy storm which visited New York the first of the week.



## The Pomeroy-Mandelbaum Lines in Ohio

One of the most important electric-railway systems in the country, which has grown up step by step from a very small beginning, is shown in the accompanying map. Back in the early '80's O. D., A. H. and F. T. Pomeroy and others of Berea, Ohio, built a bob-tail horse-car line, something over a mile in length, in that city, extending from the center of the village to the railway station. This was the first step. The second came some years later, when, shortly after the introduction of electricity on the street-car lines of Cleveland, the owners of the Berea line conceived the idea of connecting that village with the nearest Cleveland city line, a distance of about eight miles. Wiseacres in street-railway operation shook their heads at this bold step. It was freely predicted that the slow-going and then unreliable trolley cars could not compete for the suburban business with the Big Four Railway, one of the best steam roads in the country. But the Cleveland-Berea line was finally built, and it proved a good investment. The success of the venture suggested a line to the city of Elyria, twenty-four miles from the city limits of Cleveland. A number of Cleveland people were interested in the project, among them



MAP OF POMEROY-MANDELBAUM LINES, SHOWING ALSO EVERETT-MOORE LINES IN VICINITY.

the members of the firm of M. J. Mandelbaum & Company, bankers. In 1895 the Elyria line was placed in operation, it being one of the first electric railways in Ohio to be equipped with the modern type of cars and equipment. Like nearly all of the electric railways at that time it was built along the highway, but at present this, with the Berea branch, form the only parts of the system so constructed.

The great advantages given to the town of Elyria by the new line at once attracted the attention of the surrounding towns, and they clamored to be connected with the system. As soon as possible the line was extended to Oberlin, and a year or so later spur lines were built to North Amherst; then on to Lorain.

The Cleveland, Berea, Elyria & Oberlin Railway Company formed the nucleus for what is now popularly known as the Pomeroy-Mandelbaum syndicate, the leading members of which are the Pomeroy, M. J. Mandelbaum, A. E. Akins, E. F. Schneider, W. H. Lamprecht, Will Christy, L. J. Wolf, H. C. Lang, L. M. Coe, F. D. Carpenter and M. A. Sprague. These gentlemen are extending their operations to all parts of the State, and have interests in a number of other States. Two years ago they bought up the lines between Dayton and Cincinnati, and organized the Southern Ohio Traction Company. Last year the Oberlin line was extended to Wellington, and the company reorganized as the Cleveland, Elyria & Western Railway. The several lines around Cleveland are shown by the heavy lines in the accompanying map. For convenience of reference, the Everett-Moore lines running out of Cleveland are also shown by a lighter line. The Pomeroy-Mandelbaum syndicate is now building the Western Ohio Railway, which, when fully developed, will connect with the Southern Ohio Traction Company, giving a through line from Toledo to Cincinnati. This system is eventually to be connected with the system radiating from Cleveland, and a step in this direction is the Norwalk extension of the Cleveland, Elyria & Western, now under construction and to be placed in operation early next year. It is also part of the plan to ultimately connect Cleveland

with Columbus. The Mansfield, Galion & Crestline Railway, connecting the towns mentioned and a link in the Cleveland-Columbus line, is shown on the map. This is now partially completed, and will also be placed in operation next spring. To connect this line with the Cleveland, Elyria & Western, the syndicate will build the Cleveland, Ashland & Mansfield Railway, extending from the Wellington branch to Mansfield. Private right of way and franchises from villages and counties have been secured, and the line has been surveyed, so that the work of grading will be started early next year. In order to defeat the plans of another company for a line between Crestline and Galion, the syndicate recently bought out the Ohio Central Traction Company, which operates a line from Bucyrus to Galion. The Cleveland & Southern Railway, another company controlled by the same people, is building from the Berea line to Wooster. The section from Berea to Medina is nearly completed and will be placed in operation next spring; the balance is being graded and will probably be finished next year. Early this year another distinct company was organized: the Elyria, Grafton & Southern Railway Company. This line was pushed to completion and was placed in operation very recently.

For the next two or three years at least the lines mentioned will be operated practically as one system, cars being operated direct from the terminals to Cleveland over the Cleveland, Elyria & Western tracks. Power for practically the entire system will be furnished from a single power house located at Elyria. This will be accomplished by means of high-tension transmission and eleven transformer stations. The system will be arranged as follows. The Cleveland, Elyria & Western eighty-nine and a half miles of road will have transformer stations at Kamms, Elyria, Birmingham, Norwalk and Wellington. The first mentioned will occupy the present power house, which is to be abandoned as a primary station, and will consist of two 300-kw rotary converters. All of the other stations will be equipped with two 300-kw rotaries each. The C. A. & M., 35 miles, will have two stations, one near Savannah and another near Windsor. The C. & S., 42 miles, will have four stations; one near Liverpool, one at Chippewa Lake, another near Creston and another at Wooster; two being necessary on the lower section of the line because of a bad hill north of Wooster. The E., G. & S., nine miles, will be supplied from the rotaries at Elyria, and there will be a high-tension feed wire extending cross country from Elyria to the sub-station on the C. & S. at Liverpool. The equipment of the Elyria power house consists at present of two 500-kw direct-current Westinghouse units direct connected to Slater engines.

The power house was designed to ultimately take care of the system outlined, and it has space for several larger installations. It is the present intention to install two 1000-kw alternating-current Westinghouse units, direct connected to Slater engines. The high-tension current will be generated at 22,000 volts and delivered at the sub-stations at about 20,000 volts, to be transformed to direct current at 650 volts for the trolley wire. The Norwalk sub-station will be arranged for lighting service, as the syndicate holds a contract for lighting the city. The present Norwalk lighting plant, which was recently bought up, will be held as a reserve. Four of the sub-stations have already been contracted for, and plans for the other seven are being prepared. The system will be Westinghouse throughout. The equipment of the power house at Kamms, the original station of the C., E. & W., consists of three 250-kw Westinghouse generators, one driven by a Slater engine and two by Allis engines, all direct-belted.

The M., C. & G., seventeen miles, and the O. C., twelve and a half miles, are to be operated from the latter company's power house at Galion, the present equipment of which consists of two 150-kw General Electric generators driven by Slater engines, direct-belted. The capacity of this station will probably be increased. The boilers at all of the stations are Sterlings.

Some months ago nearly all of the C., E. & W. cars were destroyed by fire, so that the present equipment is almost entirely new and modern. The cars are twenty-seven in number, the majority being Kuhlman's and the balance Jewetts. They are 44 ft. and 46 ft. in length, mounted on Peckham trucks, and equipped each with four 50 hp Lorain Steel Company's motors, and Christensen air brakes. For the extensions, fourteen new cars have been ordered from the Kuhlman Company. They will be 46 ft. in length, and the equipment will be the same as the others. Other cars will be ordered as soon as required.

As has been stated, nearly all of the system is on private right of way, the greater part 30 ft. wide and fenced. Sixty-pound rails are used throughout, the C., E. & W. main line having been recently rebuilt. The O. C. line is being thoroughly overhauled, grades are being cut down, and the line ballasted. The high-tension and feed wires are all aluminum, and the trolley wire is all 000. Brackets are of the flexible suspension type. Bridges are of steel,



with high open span. Since the building of the original line the grades have all been changed to steam railway practice, and on the new lines steam shovels are being used for excavating and ballasting. The lines are completely covered by a telephone system, and the despatching is as accurate as on steam roads.

Data for the above was furnished to the writer by W. H. Abbott, electrical and mechanical engineer for the C., E. & W., and consulting engineer for the extensions.

### Boston & Worcester Street Railway Awards Contract ; Wellesley Petition Withdrawn

The Boston & Worcester Street Railway Company, which proposes to build an electric railway from Boston to Worcester, Mass., has awarded James F. Shaw & Co. the contract for the construction of the road, and the plan is to rush the line to an early completion. The contract aggregates about \$1,500,000. Plans for construction were matured some time ago, and much material for the line has been distributed along the route. The power station for the new line is now under construction at Framingham, and car houses will be built at Wellesley and Westborough. The company, it is announced, has acquired the Framingham Street Railway, Southboro & Marlboro Street Railway, Framingham Union Street Railway, and the Marlboro Street Railway Company. These properties will, however, be operated from the power stations now in use. It is estimated that the running time between Boston and Worcester will be two hours. The fare will be 50 cents. The distance between Worcester and Boston, by the Boston & Worcester, will be 38 miles, while by the Boston & Albany the distance is 44 miles. The present fare charged between the two cities by the Boston & Albany Railroad Company is \$1.

The company, which has experienced some difficulty in securing a grant in Wellesley, has formally withdrawn its petition before the Massachusetts Railroad Commissioners asking for a location in the town, with the intention of securing the necessary rights of way from the town itself. Before securing its charter, the company chose to be considered as an "association in the process of organization," and was acting on this basis when, having failed to come to terms with the town in regard to its location, it secured a hearing on Nov. 8 before the Railroad Commission, asking that the board grant its location on the ground that it was the connecting link between the other locations secured for its through line between Boston and Worcester. Since Nov. 8 the company has secured its charter, and can no longer be legally considered as "in process of organization," and the attempt once more to get the location from the town authorities is virtually the abandonment of whatever it had so far accomplished with the Railroad Commission, and the beginning of its negotiations all over again. Nothing took place at the adjourned hearing of Nov. 18 except the withdrawal of the petition by the company, and the announcement of the hearing's adjournment.

The reason for this sudden change of plan is believed to lie in the announcement by H. E. Warner, counsel for the objecting abutters, at the first hearing that if the board should rule that the company was properly before it on the matter in hand, under authority of sec. 16, chap. 578 of 1898, he would take the case before the Supreme Court of Massachusetts.

The contention of Mr. Warner was that the street railway act gave the right to appeal to the Commission (as the Boston & Worcester Company was appealing) to a corporation, and not to a company "in process of organization." The Boston & Worcester Company's other locations are all held under the provision that they shall lapse unless work is begun on or before Jan. 1, 1902. Consequently, to have this link location get into a legal entanglement would be likely to delay its acquisition until some time after Jan. 1, a contingency which the company has the strongest reason to avoid. So, although the intimation given by the board at the last hearing did not suggest much that was unfavorable to the company's side of the case, the company considered it wiser to draw out on its present basis and begin as a corporation. A new petition will be filed with the town for either a single or double track location, as the town may prefer. New hearings will

be given in the town, but unless further disagreement arises, the matter will not again be brought before the Railroad Commission.

The officers of the company are: William Butler, president; H. Fisher Eldridge, of Portsmouth, N. H., vice-president; George A. Butman, of Boston, treasurer; H. W. Sprague, Arthur E. Childs, W. H. Trumbell, of Boston; Charles C. Pierce, of Brookline; John H. Whipple, of Brockton; Albion R. Clapp, of Wellesley; Fred C. Hines, of Newton; Charles W. Shippee, of Milford; Alexander B. Bruce, of Lawrence, directors.

### An Automobile Emergency Wagon

As mentioned some time ago in these pages, the Brooklyn Heights Railroad Company has contemplated greatly increasing its emergency service. Several sites have been selected for the construction of stations similar to fire engine houses, and much care has been given to creating a service which will approximate the efficiency that is obtained by the fire patrol. A large amount of the delay occasioned by breakdowns and other unavoidable accidents on the line could be obviated by promptly repairing the damage, and it is thought that when the new system



AUTOMOBILE EMERGENCY WAGON FOR BROOKLYN

gets into operation that much valuable time will be saved.

In the accompanying engraving is shown a view of a new automobile delivery wagon which has recently been tried by the Brooklyn Heights Railroad Company. The new wagon is handsome in appearance, and has the power to develop a high rate of speed. In a self-propelled vehicle, the saving effected in maintenance over the keeping of horses is no small item of the desirability of employing this class of apparatus. The photograph from which the engraving shown herewith was made was taken before the wagon was equipped for service. At present ladders have been placed along the side where they are out of the way, but extremely convenient, and the necessary supplies and materials for repairing an accident are placed in the body.

The high rate of speed at which the automobile is expected to run necessitates some additional emergency brake beyond the regular band brake on the driving wheel. This brake may be seen in the photograph on the rear wheel. It is also arranged so as to grip the fellow of the wheel without injuring the hard rubber tires with which the wagon is furnished. The application of this brake will stop the wagon in a very short distance, when going at its maximum speed, and it enables the driver to have perfect confidence in his ability to avoid collisions while hastening to the scene of trouble. The equipment of the emergency wagon consists of the ordinary tools, such as jacks, bars, pulley blocks, etc., and rope, wire, trolley cars, and other overhead material and miscellaneous supplies of all kinds. The power by which the wagon is operated is steam, it being furnished with an engine of the "Mobile" type, placed under the forward seat. Between the engine and the driving wheels are two shafts, connected together by a sprocket chain, and making a reduction in speed between the engine and the drivers.

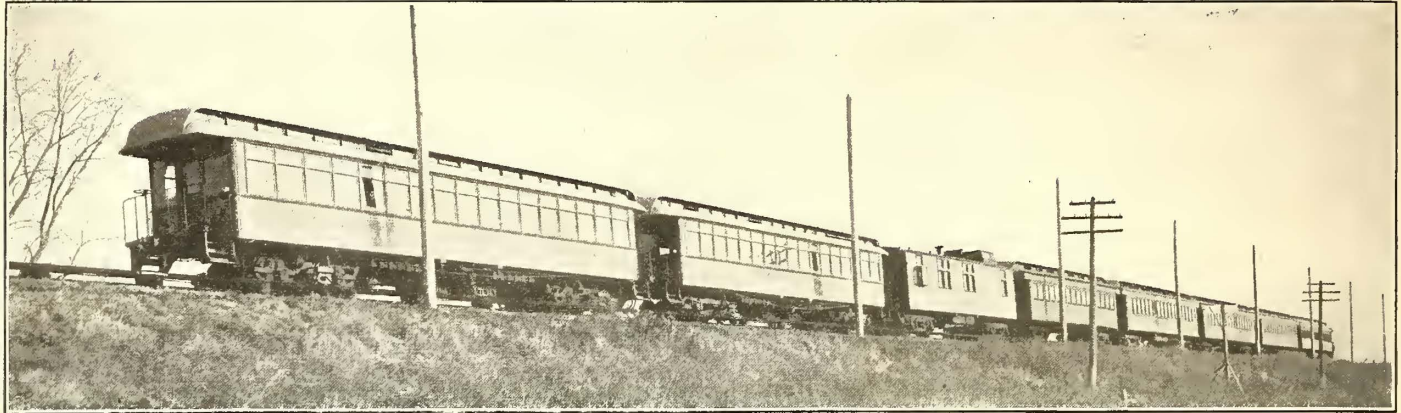


**Tests for Acceleration and Draw-Bar Pull**

A comparative test of a steam locomotive and cars equipped with General Electric train control apparatus was made on the experimental railway of the General Electric Company and on the track of the New York Central Railroad the latter part of last week and the first of this week. The test was made under the direction of Bien J. Arnold, recently of Chicago, but at present of New York, and W. B. Potter, of the General Electric Company. The

duced to \$2,264,000. The city appealed to the Supreme Court, and that body rendered judgment in favor of Newark, upholding that city's contention that rights of way in public thoroughfares were easements, and as such constituted real property and were taxable as such.

Attorney-General Grey was called into the case by Governor Vorhees, calling his attention to the fact that two or three municipal corporations have assessed real estate of street-using corporations under the franchise tax law of 1900, and will, therefore, receive "an enormous proportion" of the franchise tax, while



SPECIAL TESTING TRAIN FOR COMPARING STEAM AND ELECTRICAL OPERATION

connection of Mr. Arnold with the New York Central Railroad makes this test of particular interest.

In the making of the test the special dynamometer car No. 17, of the University of Illinois, and the Illinois Central Railroad, operated by Professor Edward C. Schmidt and John N. Snodgrass, was used to take readings on the draw-bar pull, speed, acceleration and distance traveled by the train when drawn by the locomotive and when drawn by the General Electric cars. Readings were also taken in the motor cars on the speed, time of acceleration, distance, voltage and current, and at the power station the watt consumption of the line was recorded. As it is obvious that recording potential at the power station would not be satisfactory, the actual voltage of the car under different conditions was obtained by running potential wires back to the wattmeter from the end of the line.

A train was made up varying from one to six cars, and drawn first by two motor cars, then one motor car, then by the eight-wheel, four-driver engine, No. 968, of the New York Central, and finally by the new fourteen-wheel, six-driver engine, No. 1407, specially designed for the suburban work of the New York Central. Owing to the difficulty in getting engine No. 1407 into the yard, it was tested on a track of the New York Central very similar to the experimental track of the General Electric Company. The total weight of the six cars drawn in the train was approximately 250 tons. Engine No. 1407 was built in August, 1901, by the American Locomotive Works, at Schenectady, and weighs about 214,600 lbs.

The two electric cars used were of the large railroad type, built by the St. Louis Car Company, and weighing, with equipment, 71,150 lbs. and 69,800 lbs. respectively. They were mounted on Peckham and Brill trucks, with four G. E.-55, 160-hp motors per car. The type M-control was used, so that the train was controlled and run by one man in the cab. There was a separate set of contactors, cut-out switch, and reverser for each pair of motors, so that the motors on any of the four trucks could be cut out of service at any time. On each car there was a C. P.-14 air compressor, and motor with automatic governor, which supplied the air for the brakes on the train. There was also a small dynamo and engine, driven by air from the truck, and used when necessary to send a small current through the pick-up rail to make the third rail alive.

**The New Jersey Tax Fight**

The Court of Errors and Appeals, at Trenton, N. J., is now hearing argument on the appeal taken by the North Jersey Street Railway Company, of Jersey City, from the decision of the Supreme Court, concerning the assessment made for taxes of 1900 against the company by the tax board of the city of Newark. The final decision, which it is expected will be rendered in a month, will be sweeping in its effect, and the result is anxiously awaited.

Newark assessed the corporation's property in that city at \$3,100,000, and this the State Board of Taxation subsequently re-

municipal corporations that failed to act under the law of 1900, expecting a reversal of the decision of the Supreme Court, will get a very small percentage of the franchise tax, thus making the matter a State affair.

**The Buffalo High-Tension Cable Distribution System\***

BY HAROLD W. BUCK

In the development of the electrical transmission of power many propositions are being presented of a water power or coal mine situated within such a distance of a city that it is cheaper to transmit power from the mine or waterfall than to generate it by steam in the city itself. In such systems three engineering elements must be considered: first, the generating plant; second, the

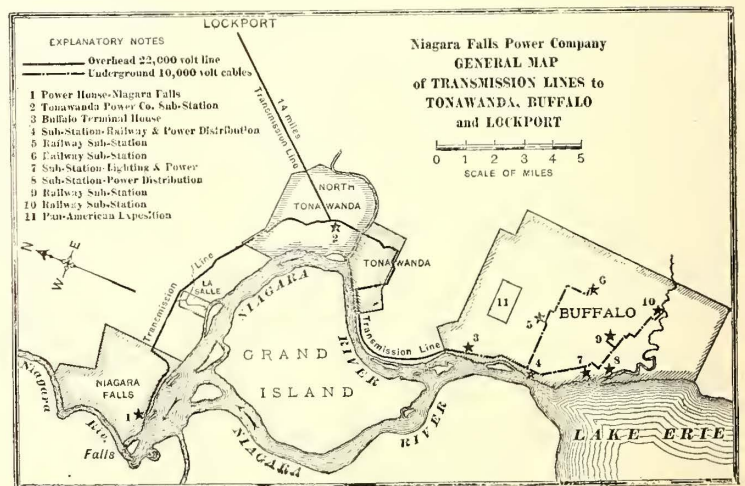


FIG. 1.—GENERAL MAP OF TRANSMISSION SYSTEM

transmission line, and third, the method for distributing the power at the end of the transmission line. Electrical generating plants and transmission lines have been the subject of many discussions, but the terminal arrangements for transmission lines are newer in their development, and it is the object of this paper to bring the matter up before the members of the Institute for discussion, the problem presented being the best method of distributing the power throughout a city after a point has been reached on the transmission line where it is no longer safe to carry the power overhead at the transmission voltage. Such limitations exist on the outskirts of all cities.

In order to serve as a basis for discussion and to point out the

\*A paper read before the American Institute of Electrical Engineers, Nov. 22, 1901



various considerations which enter, a brief description will be given of the method which has been adopted for the distribution of Niagara power in Buffalo.

Fig. 1 shows a map of the Niagara-Buffalo transmission line indicating the relations between the overhead circuit and the circuits of distribution within the Buffalo city limits, the numeral 3 on the map indicating the terminus of the 22,000-volt overhead three-phase lines. At this point the three overhead circuits, each having a capacity of 10,000 hp at 7 per cent line loss, enter a terminal house, and are connected, as shown in Fig. 2, through circuit breakers, selector switches, bus-bars, etc., to the 22,000-volt primaries of the step-down transformers. These transformers have a capacity of 3000 hp each, and are of the oil-water cooled type. The secondaries of the transformers are wound for 11,000 volts, making the ratio of reduction of voltage 2:1. The secondaries of the transformers are connected through selector switches and two sets of bus-bars to the underground cables, each of which is connected through an air-break circuit-breaker. With the arrangement shown, the Buffalo system can be operated in two

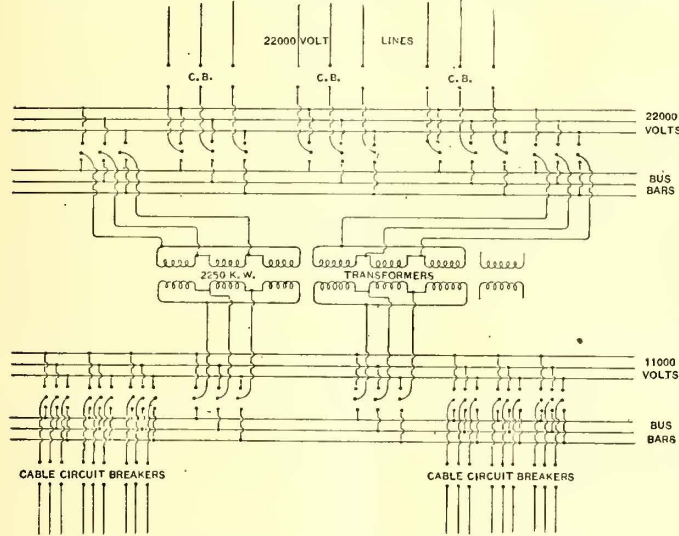


FIG. 2.—CONNECTIONS, BUFFALO TERMINAL HOUSE

sections if desired, and any overhead circuit or any cable connected to either of the banks of transformers. The 11,000-volt cables supplied from the secondaries of the terminal house transformers are drawn through tile ducts under the streets in the usual manner, and carry the power to the various sub-stations throughout the city of Buffalo. At present there are five feeders, each consisting of No. 000 triple-conductor lead-covered cables. Two of these have 9-32-in. rubber, two 8-32-in. rubber and one 6½-32-in. paper and 4-32-in. paper over all. The lead in all cases is ⅞-in. thick.

Fig. 3 shows the general arrangement of cables throughout the city, with the various methods which are used for transferring from one to another and for cutting out damaged sections of a cable by means of section switches, so that the entire length of cable from the terminal house will not have to be cut out of service. Special attention is called to these section switches, which are shown in Fig. 4. They are of the triple-pole, single-throw type of oil-break switch, with a waterproof hood of iron bolted to the top of the switch frame for the protection of cable heads and leads. These switches are installed in vaults under the city streets, placed at convenient intervals. Some of the vaults are as large as 10 ft. x 12 ft. These switches are absolutely waterproof and could be submerged if necessary without danger, and will open the circuits under heavy loads without difficulty. They have proved of great convenience at times when repairs have been necessary on sections of the cables, and for locating faults without the necessity of cutting the cable. I believe that underground section switches of this kind would prove of great service to all high-tension cable systems, and believe that the design shown is entirely safe for service at 11,000 volts.

In all, seven sub-stations are supplied with power at 11,000 volts, three-phase, distributed as follows with reference to Fig. 3:

Station No. 4.—2000 hp, for railway purposes, transformed from 11,000 volts to 360 volts and fed to four 500-hp rotary converters. 1000 hp, for general power distribution on a tertiary system at 2200 volts, three-phase, the voltage being lowered from 11,000 volts by three 250-kw transformers. This 2200-volt distribution is partly overhead and partly underground.

Station No. 5.—1500 hp, for railway purposes, transformed from 11,000 volts to 360 and fed to three 500-hp rotary converters.

Station No. 6.—1000 hp, for railway service, as in Station No. 5.

Station No. 7.—5000 hp is transformed from 11,000 volts to 360 volts and fed to the plant of the Buffalo Lighting Company in an adjacent building. 1000 hp, transformed to 2200 volts, three-phase, for general power distribution on the tertiary system.

Station No. 8.—2000 hp, transformed from 11,000 volts to 2200 volts, three-phase, for power distribution on the tertiary system.

Station No. 9.—1500 hp, transformed from 11,000 volts to 360 volts, for supplying power to three 500-hp rotary converters for railway purposes.

Station No. 10.—1000 hp, for railway purposes, as in Station No. 9.

It might be asked why the power is not transmitted from Niagara Falls at 11,000 volts and distributed through the underground cables without transformation. It will be found, however, that the saving in copper on the transmission lines by the use of 22,000 volts more than pays for the transformer installation in the terminal house, and that the saving in line loss is greater than the loss introduced by the step-down transformers. The longer the transmission line the greater would be the proportionate saving. It may also be asked why, if the overhead lines are to be operated at 22,000 volts, the transmission cannot continue at this voltage throughout the cable system in order to avoid the use of step-down transformers. It is true that there have been examples of successful operation of underground cables at voltages even higher than 22,000 volts, notably the transmission from the plant of the St. Croix Power Company, but, obviously, what can be done on a through trunk line cannot be safely done on a network, and the Buffalo underground system is essentially a network. It has many lateral connections, frequent joints, section switches, cable heads and switchboard connections, and under these conditions, which are probably no different from the requirements of other cities, I believe that 11,000 volts is, in the present state of the art at least, the highest voltage which should be considered. The success of the Buffalo power distribution at 11,000 volts, which has covered a period of about four years, has, however, demonstrated the safety and feasibility of using a potential as high as this, provided the greatest precautions are taken in the selection and installation of cables, and in the insulation of all terminal appliances. It seems to show that there is no longer any reason for fixing the prevailing voltage of 6600 volts as the safe limit for underground work and for paying for the extra copper and ducts required by the lower voltage.

In cases of short-circuit in the cables, practically no damage is done at 11,000 volts on account of the small current. Short-circuits have occurred on these cables, which have had the whole of Niagara power back of them, and it has been found, after locating the fault, that the lead was barely melted off around the fault. At 6600 volts such a short-circuit would undoubtedly blow

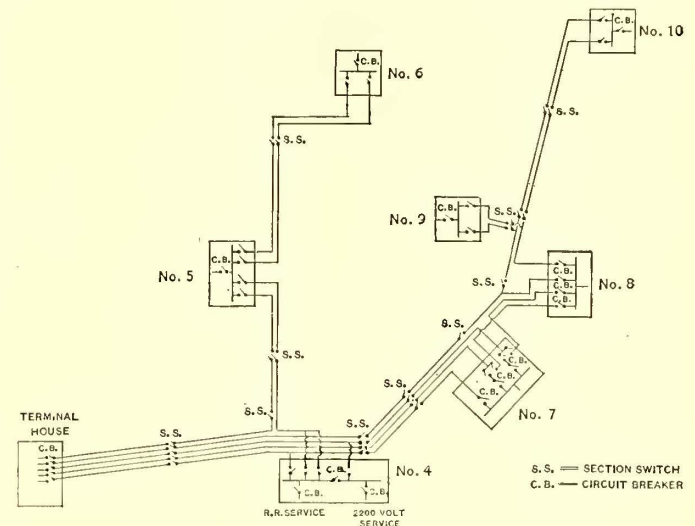


FIG. 3 — BUFFALO 11,000-VOLT CABLE SYSTEM

the cables to pieces, on account of the greater current, the heat energy at the fault being nearly four times as great. This is a practical advantage, for it reduces the risk of damage to adjacent cables and ducts.

In the city of Buffalo, then, we find a distributing company called the Cataract Power and Conduit Company purchasing power from the Niagara Falls Power Company at the Buffalo city line, at the transmission voltage, lowering it to 11,000 volts, three-phase 25 cycles, and distributing it as raw material in this form as dealers in power. To the railway company it is delivered



for transformation and conversion for use on their own direct-current circuits, to the lighting company for conversion into the various forms in which they redistribute it to small consumers, and it is also delivered to various factories using power in quantities from 75 hp upward, to which consumers power is supplied from the tertiary system mentioned at 2200 volts, three-phase, from sub-stations owned and operated by the Cataract Power and Conduit Company.

From a business as well as an engineering standpoint it is believed that the methods used in Buffalo as described are very satisfactory and economical. The primary company, viz., the Niagara Falls Power Company, confines its attention to the generating plant and transmission line, the distributing company to the delivery of three-phase, 25-cycle, alternating-current power, and

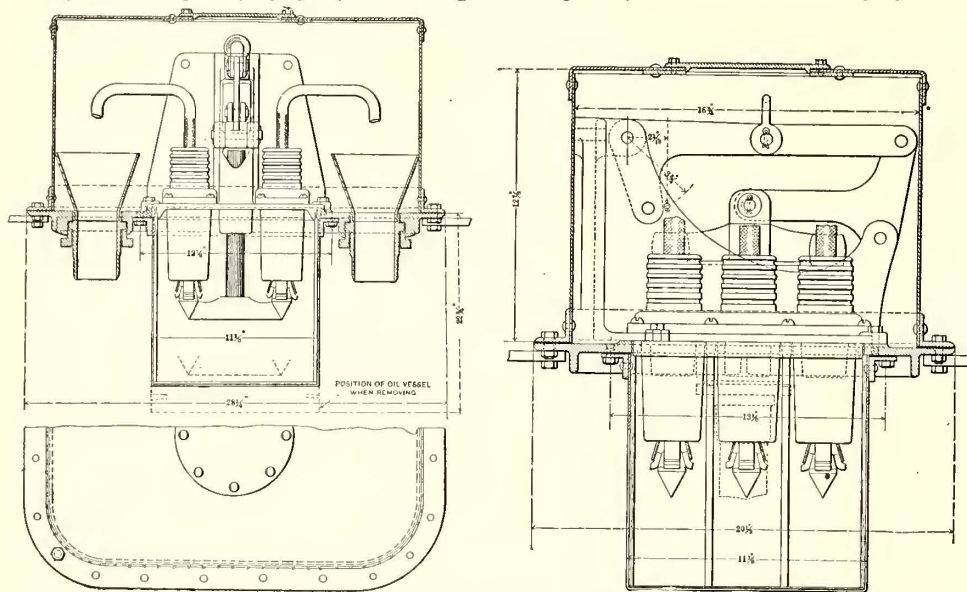


FIG. 4.—DETAILS OF UNDERGROUND SWITCH

the railway and lighting companies to the interests of their own circuits. This separation of responsibilities is entirely logical and most convenient. It would be still better if the Cataract Power and Conduit Company could confine itself to the delivery of power at a single voltage, viz., 11,000 volts, but the tertiary distributing system at 2200 volts is necessary, for the reason that it is obviously not safe to supply small consumers of power, such as small factories, with connections at so high a voltage. By transformation to 2200 volts the numerous "grounds" which occur on these circuits are made independent of the main cable system, and the introduction of the transformers adds to the self-induction of these circuits and limits the violence of the short-circuits which occur upon them.

The transformation of voltage at the city line from 22,000 volts to 11,000 volts, besides being necessary, is also a positive engineering advantage, for the reason that it renders the 11,000-volt cable system independent of "grounds," and high-voltage disturbances from lightning, resonance, etc., which occur at times on the transmission line, since there is no electrical connection between the two. Although there have been several instances of rises of potentials on the overhead line far above the normal, resulting probably from resonance, no rises of voltage have been noted as having been transmitted to the cables by induction through the cores of the step-down transformers.

It is believed that the methods here described are practicable and convenient, and can be safely followed in principle by those who are planning similar systems of distribution.

The Butte Electric Railway Company, of Butte, Mont., has recently opened and placed at the disposal of its employees a suite of rooms where the men can comfortably and profitably spend their leisure hours. The rooms, two in number, adjoin the main office of the company, and while the appointments are not elegant, they are bright and new, being admirably suited for the purposes to which they have been put. The latest magazines, technical and daily papers are provided, and the plan is to add a small library. A club, to which any employee of the company shall be eligible, is to be organized. There are over 100 men in the employ of the company, and they are highly elated over the personal interest that the company has more than once shown it manifested in them.

### Mr. Lang on Interurban Roads and the Everett-Moore Syndicate

At the annual banquet of the Toledo Chamber of Commerce, held Saturday evening, November 23, Albion E. Lang, president of the Toledo Railways & Light Company, made a speech in which he gave some interesting information relative to the development of the interurban and city railways of Toledo, together with several hitherto unpublished facts regarding the plans of the Everett-Moore syndicate, which now controls the Toledo lines. Mr. Lang said in part:

"The newspapers are constantly filled with items pertaining to electric railway syndicates and the properties in which they deal.

As some of the items are very much exaggerated, and are not strictly in accordance with the truth, I deem it proper at the outset to say something personal of the leaders of the Everett-Moore syndicate, both of whom are essentially Ohio men.

"Mr. Everett is the son of Dr. Henry Everett, and was associated with Cleveland's first street railways. He built his first street railway in Montreal, converting a horse line into an electric line. He was the first man in this country to introduce the workingman's ticket and a 3-cent fare. From Montreal he went to Toronto, and did the same thing; thence to London, Ontario, to Detroit, and returning to Cleveland identified himself with the Cleveland Electric Railway Company, of which he has been president during the past five years. He is a young man, forty-five years old.

"His partner, Mr. Moore, came to Cleveland from Canal Dover, and became cashier of the Dime Savings Bank. He is one of the best equipped financial men I know, possessed of a wonderful

quick perception, and makes friends wherever he goes.

"The syndicate absolutely controls 950 miles of interurban and suburban railway properties. It controls all of the Cleveland lines except the Cleveland City Railway, which is owned largely by Senator Mark Hanna; all but one line in Detroit and everything entering or in Toledo except the Toledo & Western and the Toledo, Bowling Green & Southern roads. It has an option on the Toledo & Maumee Valley Railway, and will come into possession within a short time.

"The Everett-Moore syndicate represents 75 or 100 men. When it sprang into existence, investors were timid. So successful have the leaders been in their various enterprises that they now have all the financial interests in Cleveland back of them. Their greatest difficulty now is in keeping the men back of them from fighting to see how much percentage each shall get. But they allot each purchase proportionately among the members.

"Over 75 men outside of Toledo are financially interested in our electric railways. The roads the syndicate will acquire in the future aggregate 1400 miles. At present their lines are capitalized at \$47,000,000. These lines earned last year \$5,500,000. It is astonishing to note the growth of these roads without in any way detracting from the business of the steam roads.

"The main system starts at Port Huron, Mich., and extends across Ohio to the Pennsylvania State line, an almost unbroken line of 360 miles, drawing from a population of from 4,000,000 to 5,000,000.

"The lines are not so largely capitalized as they would seem to be. The Lake Shore steam road stands for \$75,000 per mile, and the T., F. & N., which it parallels, at \$45,000 per mile. The average earnings of a steam road are \$1,600 per mile, while the electric line earned \$3,800 per mile, and this was almost wholly on passenger traffic with rates one-half less than the steam road. The freight business has not been developed. In Detroit the entering lines did a freight business last year of \$150,000; in Toledo \$50,000 so far as we know. The steam roads depend upon the freight business for the bulk of their revenue.

"The effect of the electric lines upon this city are hard to estimate. The Hollenden Hotel at Cleveland had to build two additional stories because of the growth of patronage due to electric roads. Traveling men now take the cars to the surrounding small towns, transact their business and return to the city for the night. What is true in Cleveland is true elsewhere. During the past year 1,000,000 people were carried on Toledo electric railways. In



Detroit they accommodated 3,500,000. All told the lines accommodated 8,000,000. Twenty years ago, when I first entered the street railway business, the earnings of the local lines were \$400,000 per year. In 1897 when we acquired the Robinson lines, they were \$670,000. For the past ten months they have been \$950,000. Fifteen years ago a four miles ride cost 5 cents. To-day we can ride 12 miles for the same fare. Then we operated 35 cars; at present we have 120. Our pay-roll is about \$36,000 per month; we employ 850 men in the winter months and 1000 during the summer.

"Syndicate management of the big interurban system will effect immense savings. At present there are fourteen power houses, but engineers figure this can be cut down to eight.

"Our engineers are at present preparing plans for the largest power house in the world. It will be located in the coal belt of Ohio, and it will utilize refuse coal. Its energy will reach out 100 miles in several directions. Other power houses will then be dismantled, retaining only central houses, one each in Detroit, Toledo and Cleveland. It will be a zone system, the big houses feeding in a measure on the others. Economy in this way means reduced charges on passenger traffic.

"In the vicinity of Toledo there is much work in progress. There will be lines to Findlay, Fostoria, Defiance and Napoleon. Two lines are being built from Toledo to Bryan, but it is hoped the gentlemen will get together and build but one. There will be a perfect network of line radiating from Toledo as a center, some of them built by the syndicate and others by independent interests. The advantages to Toledo are immense.

"As to the city lines, we are figuring on abandoning some of our smaller car houses and will erect a large central car house and repair shops. When we built our power house in 1895 we investigated the subject of how to handle coal mechanically. We wanted a combined stoker and smoke consumer. We have now commenced to install such an arrangement in our power house which will do away with all smoke."

### Engineering Periodicals and the Card Index\*

BY H. WADE HIBBARD

Among the most valuable members of the engineering profession to-day are the moving spirits of the engineering press. Much matter of great value is regularly to be found in the current periodicals of a profession growing so rapidly and in so many directions as is mechanical engineering.

Books, monographs upon particular subjects, necessary as they are by their gathering within one cover all the required material of years and many places, and by their orderly classification, logical discussion, and evolving of principles, are, by very necessity of their production, always and inevitably behind the times. The reason for existence of the engineering press is to collect all recent valuable information—news, if you please—and present it weekly or monthly, less or more digested, to as large a circle of readers as possible. The American papers, representing special branches of the profession, far surpass in numbers and variety and excellence the like papers of the old world. Their general use proves that they have a most important place. With these may be grouped the published transactions of the many engineering societies and clubs. Unthinkingly or deliberately to neglect forming acquaintance with so great a source of engineering knowledge is not fitting for the student who has his own future to make in a country where ruts and old fashions are only for the failures.

Should one read, and preserve what he reads? To take knowledge into one's hand temporarily, and then not afterward have that knowledge available for desired use, is as foolish as onee to have seen a life preserver and not be able to find it at midnight collision. But that is for the second part of this subject.

#### Of Reading:

Habits are excellent balance wheels, generally. Brilliance being given to but few men, the great majority must hammer out lesson or problem or engineering feat. In fact, genius has been defined as an infinite capacity to take trouble. Regularity of mind, a habit of undivided intensest application, may place the worker far beyond the one who thinks to accomplish by fits and starts. Let then the student distrust his ability to commence reading the technical papers after graduation, unless he has learned to read them before.

Skepticism is the normal state of the scientific mind. It is ever looking for something better, not satisfied that the present is perfect. The reading of articles over the names of famous engineers, afterward to find them severely criticised, is good for the

confiding student who perhaps has supposed that all engineers and professors are agreed. It is just as well for him to learn not to believe all that is in print, unless there are good reasons presented.

Independent investigation is promoted by reading the papers. A printed controversy stimulates anyone who loves a fight. Blessed be the man whose engineering eye is fired and mettle aroused by the prospect of a battle royal between men of fame. Perhaps he too can put in a lance, if extra spare hours or thesis subject will permit.

Commercial methods are often not fully practicable in college shop, drafting room and laboratory, because of the necessary limitations for instruction purposes. The papers, if read with discrimination, will throw light upon these departments. The reading student will learn of the difference between "exactly right" and "good enough;" between no payment of wages and production under competition; between instruction designing and the spur of a contract date for completion.

A subscription to a paper should not be made in a hurry. And yet the reading from the start should be carried on with that end always in view. After the different papers become known, then the heart of the very human editor should be gladdened by a little note of appreciation—with some of that necessity for which he works, though not chiefly. A good engineering paper should be one of the life partners, ready at hand when moments of leisure permit its instruction and enjoyment, better understood and liked as the years roll on, acquaintance or perhaps friendship formed with editor, contributions made, suggestions given and taken, some share had in its mighty influence in the engineering world.

A union of readers will economize time and enable each to cover more ground and gain greater good. A reading club for discussion, in which each member reads one or two papers and reports upon his leading articles to the rest, is an excellent institution in college and afterward. It has frequently been run with success by the younger men gathered from a railway drafting room, test department, and even including some of the more ambitious young men in the shop. Sometimes a deferred and announced discussion, or an occasional more formally prepared paper, are useful additions and promote deeper thinking. Such a club adds, to the advantage of a reader coming into contact with paper, the decided advantage of more open friction between man and man, a defending of one's position, an acquirement of ability to think while talking, a cultivation of logical placing of thought and word so necessary for the engineer who must present his ideas to others with force. This rubbing against one's fellows in like pursuits is, by the way, not among the least of the advantages of a college education in general.

Years afterward, when official responsibilities come, this earlier training will bear good fruit. A superintendent's office will take regularly several papers or several copies of one most useful paper. He marks in these papers articles appropriate for the instruction or spurring of particular subordinates; and sends them out. Later he will call for meetings of these heads of divisions or departments in his office; and the resulting interchange of opinions on the papers, tempered with experience, will prove of decided advantage to the business, promoting unanimity of feeling between the departments and the introduction of the best methods suited for each or perhaps all. The speaker recalls with much pleasure such meetings on the Lehigh Valley Railroad, and has been told only recently by President Vreeland of the Metropolitan Street Railway of New York City of the success of attending his marking of such articles and sending them out, not merely to subordinates, but to some thousands of motormen and gripmen.

The Card Index.—But what of that dimly remembered life-preserver which could not be found when there was dire need? Editors of papers, engineering and otherwise, are frequently in receipt of letters like the following: "A number of months ago I read an article in your paper, or one like it, bearing upon such a subject. At the time of reading I recognized its value. Not only did I think that I had its essential items impressed upon my memory, but I recall making some record in my note-book. I find now a problem has come up in my practice for which I greatly need, and at once, the information contained in that article, but I can find neither it nor my note, the latter being evidently hidden in the midst of other material. If it appeared in your paper, will you give me the date and if possible send me the copy? I am willing to pay a good price for it." Even when one has the annual indexes of his engineering papers bound up with the volumes, it may be a search of hours to unearth an article whose general subject or whose most valuable details are more strongly impressed upon the memory than its title as appearing in the index. The average subscriber does not get the full value out of his paper, because of this very inability to find again what he has read.

The card index will obviate the difficulty, giving ready access

\*An address before the students of the Society of Mechanical Engineers, Sibley College of Mechanical Engineering, Cornell University.



to what has been read by its maker, recording information in the form best adapted to his professional needs and to his own peculiar habits of mind and memory, and following his own pet system. The speaker gave up the note-books ten years ago and commenced a card index or, as it is sometimes called, "Index Rerum" (Index of Things), making it really a written memory of everything which "might come in handy some time;" of reading, of experience, of oral information; engineering, household, athletic, religious; references to catalogues, drawings, clippings; lists, future plans, addresses—everything.

The mechanical features of a card index are, first, the cards. These are of white linen ledger, very tough, like very heavy letter paper. A thicker card will not give flexible handling, and is too bulky. A thinner card is not durable and works up out of place unless held in by some locking rod passed through all the cards. The convenient size of card is about 3 x 5. It is very essential that all cards in one index be exactly alike in the smaller vertical dimension. To test this, in buying a pack, remove one-half and reverse it to bring the outer cards next to the middle ones; these must then be of the same height, uniformity in the long dimension not being so important. In fingering the index, it is almost impossible to catch a low card between two high ones. The leading book stores are cutting these for 60 cents per 1000. A half dozen companies cut their standard cards, guaranteed perfectly uniform in size, for a little higher price.

Guide cards or heading cards are needed, at first only for one alphabet. These cards are much thicker and tougher than the others, because of greater handling. The student may cut and letter these for himself out of calendar backs or other cardboard, or they may be bought, with letters upon them on a small portion projecting  $\frac{1}{4}$  inch to  $\frac{3}{8}$  inch above the common cards. As one's card index gets large along some special line, guide cards may have that subject placed upon the projection, and a following series of smaller-projection alphabetical supplementary guides inserted to subdivide that particular subject for easier reference. One will not err on the side of having too many guides in a large and much used card index. They greatly increase speed of reference.

The cards may be kept in a pasteboard envelope box for a few years. A beveled block of wood may be placed at the back of the pack, to keep the cards slightly fallen back out of the vertical position. This will render the projecting letters more visible.

The above three paragraphs relate the cheapest form in which a card index may be started. Any book store sells complete and quite inexpensive equipments of perforated, ruled and tabulated patented cards, guides with various widths and locations of projections, tabs (use explained later), drawers with card-locking devices, cabinets, to suit all purses. Where more than one person handles a card index, the cards should be perforated near the bottom for some form of rod to pass through, thus avoiding the danger of a spill.

The making of a card index is a growth. The easiest way to get started is to read the papers with slips in hand and fountain pen or indelible pencil (ordinary purple copying) ready for use. Read an important article. At the top of a card place the subject of the article, very likely not the author's title of the article, but the *subject that appeals to your type of mind* after the reading. Right here is the most difficult part of a card index. You are in danger of indexing an article on compressed air under C the adjective, when it should be under the noun A; or Blowers under B, when it should be under A as Air Blowers. Perhaps the most accessible guide for the inexperienced indexer is the table of contents of Kent's Mechanical Engineers' Pocket Book. On page 447 of the American Society of Mechanical Engineers' Proceedings for 1896, a discussion on card indexes, Mr. Kent explains his method of general heads—*e. g.*, to put everything relating to steam under Steam, as steam boilers, steam engines, steam pipes. The railway mechanical engineer should follow the Car Builders' Dictionary, and the index of the Master Mechanics Association on page 67 of the proceedings for 1900, to be revised by a special committee for the proceedings of 1901. The Dewey decimal system, as expanded for engineering, was advocated in A.S.M.E., 1893, page 780, though the secretary of the A.S.M.E., in the proceedings for 1896, page 423, shows its limitations and recommends a different system as used in the library of the Society and the engineering library of the Franklin Institute of Philadelphia.

Sometimes one is uncertain how to index some piece of information. Remember then that almost everything will have two parts—the thing and its function; and if the thing is the more prominent, catalogue it under the thing; or if the function, then under the function; but, and the following is called "cross indexing," be sure and make out a card for the other and write on it: "See the main card" (giving its subject). A liberal use of cross indexing is no fault; one's mind does not always work on the same

lines, and data might be buried even in a card index. Five years later one may not be able to recall just the one heading under which he indexed an article, but is sure to remember one out of the several headings of the cross indexing.

After the subject is written on the card, add the name of the paper, with year and page. The card is as yet practically worthless. Add a short description of the article with your opinion of its value or applications. Perhaps you can place upon the card all of the article that is of value. At least enough must show on the card to give the future searcher after information some discriminating idea of the article and whether it will pay to read it again to aid him in his engineering problem.

If the card is made out of information not in print, it should of course be full. A note-book may, however, be needed, and in that case the card will refer to the note-book by number or date upon the cover and the drawer number where finally deposited.

The card should be filed away in proper alphabetical order the same day it is made. No accumulation should be allowed, for it soon clogs the work and makes untold disorder. Later in life the busy engineer should handle his papers like his morning mail, reading them as soon as received, marking important articles and turning them over to an accustomed clerk for index cards and filing.

Where a number of technical papers are to be read each week or month, it becomes essential to learn how to get the cream without drinking all the pans of milk. It is out of the question to read them all thoroughly. Before attempting any reading an engineer should look them all over and note important articles to be read later if possible. In this way there is obtained a general idea of the contents of the papers and also of the relative importance to him of the articles noted. These are then carefully read in the order of merit, so far as time will permit. In this way, one will see and read many things of the first importance, whereas without such a preliminary glance through the papers, they might have been missed. Without going through papers, it cannot be known what they contain; while to begin and read as you go, results in using up all the time over matter which may be of little relative importance. One must, however, avoid the danger of being satisfied with the preliminary skimming; the thorough reading must follow.

Current engineering literature should not be left here without calling attention to the published volumes of index notes now so happily carried on monthly in the *Engineering Magazine*, 120 Liberty Street, New York, the annual compilations of the same being assembled every five years in future volumes as in the past.

Interior classification, and several classifications just as easily, may be carried on simultaneously throughout the one card index, if found desirable in any business, by means of "tab cards." These are like the supplementary guides, but with numbers or other characters upon them, the projection at the top being raised in a particular piece of card for each particular class, the tab cards being also of different class colors if wished. For example, all things made of brass may be indexed on yellow cards, while still placed in the proper alphabetical places of the things. If a tool index, every tool made of a "brand three" of steel will have 3 on the little projecting tab, and those tabs will show perhaps one inch from the extreme left throughout the entire index.

Yet, remember, that at the start the simplest scheme is the best, and the new maker of the card index will escape the danger of its toppling on account of its own weight of cumbersomeness while the foundation—the habit of adding to the list—is weak. The refinements may come later and for the special indexes, like that for tools.

#### ADDITIONAL USES

What may be indexed? Everything. The advertisement clippings previously mentioned may be placed in numbered envelopes, they in numbered drawers, and indexed. Other clippings or pamphlets may be disposed of in the same way. Or material may be pasted in scrap books and the pages indexed in the card index. Some engineers prefer to tear apart all papers and file away only the valuable parts as indexed. Sometimes it is best to insert envelopes, open at the end, of the same size as the cards, into the card index; these envelopes to have subjects as though they were cards, small clippings being placed within. The books of one's own private engineering library are made far more useful by suitable contents references in one's card index.

Commercial literature, in the form of trade catalogues, forms a vast and growing collection of excellent technical and professional matter, which, while sometimes partial, yet is always fresh and is hence valuable in the experience of every engineer.

A systematic arrangement of catalogues (greatly facilitated if of standard 6 ins. x 9 ins.), giving instant reference to any one wanted, is a very important requirement of all who are designing, building or purchasing. Numbered, they are placed in numbered



drawers and indexed with contents on the cards. It is usually possible, in addition, to group catalogues on the same subject into drawers together, if portions are torn apart which relate to different subjects. A cross index of catalogue subjects is also advisable, unless the plan of the previous sentence is fully realized; and in this a card on one subject will refer the searcher to all the pages and catalogues related.

Articles of these, as suggested by a writer in the *Engineering Record*, call for an extremely useful application of the card index. In preparing one of these papers the first step should be to jot down on temporary index cards facts of interest and data as collected in consulting references upon the subject. The references should always accompany the notes on the cards. If these notes are of sufficient value to be saved on their own account they should be made on permanent cards as for the index. For bulky data a note of reference only will be sufficient to enable the scheme of the article to be planned. These data as collected are assorted in the order of their sequence in the article to be written and will give at any time at a glance the general outline of the article and its progress. When all data have been collected and the notes arranged in their proper order, it is a very simple matter to write the article with the notes spread out in their proper order at one side. The majority of the notes can be enlarged upon for the article, probably without consulting the references, but by checking off each slip as used in the article time may be taken to consult references without causing confusion.

Correspondence, however extensive, becomes under perfect control when systematized by a card index.

Drawings are indexed on cards, though not in the index rerum, as indeed it is not advisable to do with catalogues above mentioned. The card of each drawing serves also for records related to the drawing. These and the following cards are usually of larger size, as 4 ins. x 6 ins. Obsolete drawings will have their cards withdrawn from the working index. Patterns may be treated in the same way, with card record of dates when made and altered, cost of making, changing and repairing, where shipped and when returned, weight and material of part, etc. Stock accounting is facilitated by a card index, with records of purchases and sales, or receipts and distributions as of a general storehouse; the foreman is enabled to keep close and low stocks, and taking inventory is easier. This is found very successful in the great railway general storehouses where everything is found from driving wheels to oil, from books to fry pans; porcelain, pins, pig iron, velvet, acids and gunpowder. Employees' records are peculiarly suited by the card index, cards being so easily transferred from active list to left list, or then reinstated. Foremen are apt to keep these by memory only, and a new foreman would be without such a record. Mistakes in wages offered are prevented. Tools are sometimes not used because a workman says he can do a job in less time with an improper tool than would take to hunt up the correct tool. A systematized tool room uses the card index to excellent advantage, for no one can memorize all the special tools and their uses. The making of duplicate tools is also prevented. Factory costs use cards having accurate count of labor and material for each machine carded, where labor was spent, profit and loss being also entered upon the same card. Every maker of any salable article, and almost any dealer, knows the value of a ready reference record of the cost of his article, or of the markets; costs of freight handling are as easily added, together with the various and fluctuating quotations that may come to his hands. Cost keeping must be so simple that it will be kept up readily; and doing away with clerical labor tends to this. Test department records are kept on cards to good advantage. Such records are expensive, hence should not be buried, but be readily accessible when sudden demand comes, as is so often the experience in that department of a railroad.

This subject might be extended into hours if once the field of mechanical engineering were left. The card index has been welcomed into every field where system and time are valuable. Half a dozen years ago it was unknown to the great body of business men. To-day it is seen everywhere where progress is the rule. Devised for use as a library catalogue, it has been adopted by business men in all the leading branches of commerce. Transportation companies, insurance companies, banks, building and loan associations, schools, laundries, dentists, physicians, scientists, governments, real estate agents, societies, publishers, advertisers, churches—the list is not ended of those flocking to the new method.

The secretary of the American Society of Mechanical Engineers, himself an eminent engineer, writes: "I would say that in my opinion the card index is a branch of study which should be made part of every engineer's college course."

Briefly, the card index then has the following advantages:

Accessibility—always get-at-able—nothing is buried and lost.

Time-saving—for the searchers after information.

Expansibility—only one end, the beginning. Can enlarge forever and still be as good.

Order—new material inserted into the exactly proper place.

Adaptability—suits every frame of mind, and every sort of business; varied classification.

System—encourages system in vast accumulating data and brings it under general heads of classification.

Divisibility—some cards can be removed for temporary use elsewhere, or for permanent transfer.

Labor-saving—nothing has to be rewritten, saves clerical labor.

Simplicity—can be operated by the inexperienced.

Contractibility—no need of retaining useless, outgrown matter.

No wasting of spaces—it is impossible to apportion blank spaces in books so that they will fill evenly.

Always being up to date.

Rearrangement made easy.

Substitute for memory—supplementing it and becoming independent of existing hired memories.

Classification within the index—by using tab cards.

In conclusion be it said that engineering periodicals, to the extent that they record or store in ink but do not disseminate information, are fulfilling only a small, a very small, portion of their possible usefulness. It is for each individual student, and even the greatest engineer is still a student, to declare which portion of the paper's usefulness he will accept at once and the day following. Can he afford to neglect the opportunity of becoming acquainted with all the papers? Form a good habit, it will cling. Learn to doubt; you will afterward believe better. Feed on the plains of the nations rather than always in your own manger. Share your good things and unite forces; and some day a leader, know how best to lead. Engineering periodicals and the card index are not the fabled philosopher's stone, turning all metals into gold, but an unfading love for our profession can use them, among the other reagents, to bring out the measure of true worth within the capacity of each man.

### Sale of Washington Traction and Electric Company

Under a decree of the United States Circuit Court, in the suit of the United States Mortgage & Trust Company, trustee, against the Washington Traction & Electric Company, of Washington, D. C., the stock and bonds of the various properties of the latter company, covered by a collateral trust mortgage, were sold at auction at Norfolk, Va., Nov. 24. The property was bought in for the reorganization committee by Julien T. Davies and Brainard Tolles, of New York.

The Washington Traction & Electric Company owns 39,865 shares of the stock of the Anacostia Railroad, out of 40,000 shares, and 30,602 out of the 35,000 shares of the City & Suburban. Other constituent lines are the Metropolitan Railroad, Columbia Railway, Georgetown & Tennallytown, Brightwood Railway, Wilmington, Woodside & Forest Glen, Washington & Great Falls, Washington & Rockville, and the Washington & Glen Echo. Of all these lines the Washington Traction & Electric Company owns 110,478 of an aggregate issue of 115,993 shares, of the total par value of \$5,818,100. It also owns the stocks of the two electric light plants of Washington. These securities were pledged to secure an issue of 4 per cent bonds.

### Disastrous Fog in Chicago

On the morning of November 19 a dense fog settled over the city of Chicago with results so disastrous that it is doubtful if any such atmospheric condition ever caused such a number of accidents in that space of time before.

There were two rear-end collisions on the Metropolitan Elevated, two on the Lake Street Elevated, one on the South Side Elevated, and one on the Northwestern Elevated, to say nothing of numerous bumping together of surface cars and some small wrecks on the suburban steam lines. The list of injured on the west side elevated roads is a long one, and three were killed.

It seems to have been generally true that the motormen in charge of trains did not realize the density of fog in front of them. While orders were out that motormen were not to proceed at a speed greater than would allow them to stop within their range of vision, it would seem that many of the motormen did not realize that they were exceeding this speed.

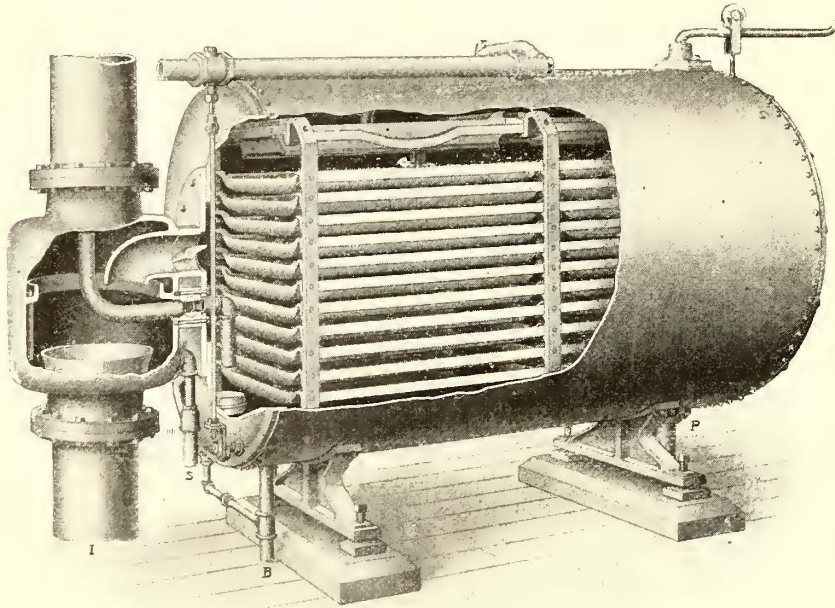
The Metropolitan Elevated has always been especially well provided with block signals at curves, but this did not prevent it from being a heavy sufferer. The fog was so dense that even signals



were hard to distinguish, and even when trains were proceeding with caution it was a difficult matter to stop them in time to prevent rear-end collisions. Such a fog occurs but a few times in a century, but certainly brings with it the most dangerous possibilities of any condition that ever exists in railroad operation. Trains were proceeding with caution on all lines, both surface and elevated, but the fact that this did not prevent numerous collisions shows that the average motorman or engineer is not prepared to judge of a very dense fog owing to its comparative infrequency, and herein lies the greatest danger.

**A New Method of Connecting Feed-Water Heaters**

The installation of a feed-water heater so that it may be cut out for cleaning or inspection usually requires three straight way



INDUCTION CHAMBER FOR FEED-WATER HEATERS

valves, several large fittings and considerable extra pipe. To simplify this matter, the Hoppes Manufacturing Company, of Springfield, Ohio, has placed upon the market what is termed an induction chamber. By the use of this device, no valves, fittings or pipe are required, aside from the main upright exhaust pipe. The illustration herewith shows very clearly the construction of this attachment, which is bolted to the rear end of the heater.

The exhaust passes upward through the chamber, and as much as is required to heat the water flows into the heater through the large downwardly curved pipe, the end of which is in line with the flow of steam through the chamber. The latter is supplied with steam through this pipe in sufficient quantities to keep the water flowing through it at the maximum temperature obtainable by exhaust steam. To allow the steam to freely enter it is necessary to carry out of the steam space of the heater the air and other non-condensable gases, and to accomplish this a small pipe leads from near the bottom of the heater to a point slightly above the center of the chamber. The heating of this pipe by the exhaust inside the chamber and the current of steam passing its upper end causes the circulation which carries the gases from the heater into the upper chamber, from which they pass out with the exhaust steam.

In order that the heater may be cleaned while the plant is in operation, valves are provided for both inlet and outlet connections to the heater. This attachment also acts as an oil separator, not only for the steam entering the heater, but also for that which passes out of the top. The separation of the oil from the steam is effected by means of troughs, partly filled with water, the same as in the well-known Hoppes oil eliminators, and is clearly shown in the illustration.

**The Chicago Tax Suit**

The application of the Chicago Union Traction Company and the Consolidated Traction Company for an injunction restraining the State Board of Equalization from assessing the capital stock

of these companies for 1900 was denied by Judges Grosscup and Humphrey, in the United States Circuit Court, on Nov. 22, and the temporary injunction issued Nov. 19 by Judge Grosscup has been dissolved.

No written opinion in the case was filed. Judge Grosscup stated orally at length the reasons for the decision, explaining that later Judge Humphrey would file a written opinion.

Immediately after the decision was announced assessments aggregating \$75,000,000, and involving over \$1,000,000 in 1900 taxes were made by the State Board of Equalization as the fair cash value of the capital stock of the traction companies over and above the assessment on their tangible property. The \$75,000,000 valuations made take the place of \$3,500,000 valuation made last year as representing the fair cash value of the property assessed.

The method to be followed in determining the value of the capital stock for purposes of taxation was discussed by Judge Grosscup at length. As to bonds, he said, the judgment of the money lender might be reasonably safe, but with capital stock it was different. It would be grossly unfair to base the assessment upon the stock value quoted on the Stock Exchange. These were frequently, if not generally, determined by circumstances quite distinct from the real value of the stocks in question. He cited, as an illustration, the Northern Pacific flurry of a few months ago. There nobody would contend that the real value of the stock exceeded par, yet the quoted price reached \$1,000. Nor had any court decided that the equalization board must be governed by the quotable market prices of capital stock.

It was the decision of the Supreme Court of Illinois in the franchise tax case recently decided, he said, that these prices merely must be taken "into consideration." It still remained for the equalization board to exercise its judgment in determining the real value of capital stock for purposes of taxation.

**Indiana Electric Railways**

According to the auditor's report for the year ending Oct. 31, 1901, there are 493.98 miles of interurban, urban and suburban electric railway in Indiana. Together with rolling stock, improvements and rights of way, the total value for taxation is placed at \$7,746,452. A list of the companies, together with the miles of line in operation, assessment per mile, value of rolling stock, value of improvements and right of way and total value, follows:

NAME OF COMPANY	Miles	Assessment per Mile	Value Rolling Stock	Value Improvement and Right of Way	Total Value
Brownstown & Ewing Street Ry.....	1.00	\$1,500	-----	-----	\$1,500
Broad Ripple Traction.....	6.00	7,500	\$2,160	\$600	45,540
Cincinnati, Lawrenceburg & Aurora Electric Ry.....	9.13	4,000	4,560	-----	41,085
John S. Crupp Electric Ry.....	4.24	4,000	1,060	2,000	20,020
Evansville Street Ry.....	23.37	10,000	28,044	5,000	267,467
Elwood, Anderson & Lapel Ry.....	1.15	20,000	2,300	350	28,650
Ft. Wayne Traction.....	19.35	25,000	77,400	30,000	591,150
Hammond, Whiting & Chicago Elec. Ry.....	17.41	10,000	15,669	-----	210,169
Indiana Ry.....	40.20	11,000	24,126	5,250	471,686
Indianapolis & Greenfield Rapid Transit.....	16.44	7,000	16,440	4,500	138,260
Indianapolis Street Ry.....	113.78	30,500	274,450	86,025	3,720,975
Indianapolis, Greenwood & Franklin Electric Ry.....	16.53	10,000	17,060	5,000	108,300
Jeffersonville City Ry.....	2.00	2,500	500	85	5,585
Kokomo Ry.....	4.50	8,000	5,400	3,500	45,020
Lafayette Street Ry.....	14.25	7,000	14,250	14,570	130,570
Lake Cities Electric Ry.....	2.00	4,000	500	3,000	11,500
Logansport Ry.....	5.50	7,000	3,850	1,600	44,450
Madison Ry.....	3.00	10,000	4,500	-----	16,750
Marion Transit.....	4.28	10,000	2,996	700	46,616
New Albany Ry.....	4.58	15,000	9,160	-----	78,400
Richmond Street & Interurban Ry.....	9.25	8,000	9,250	4,000	87,250
Terre Haute Electric Ry.....	32.94	5,000	49,410	20,000	236,910
Union Traction Co. of Indiana.....	139.67	8,000	269,072	86,650	1,379,852
Vincennes Street Ry.....	4.50	3,000	2,250	3,000	18,150

The Quincy-Scoville line of the Cleveland Electric Railway Company, of Cleveland, Ohio, was recently tied up for several hours from a peculiar cause. When it was time to start the morning cars it was discovered that brass thieves had stolen every controller handle in the barn. It was necessary to secure a supply of handles from one of the other barns of the company.



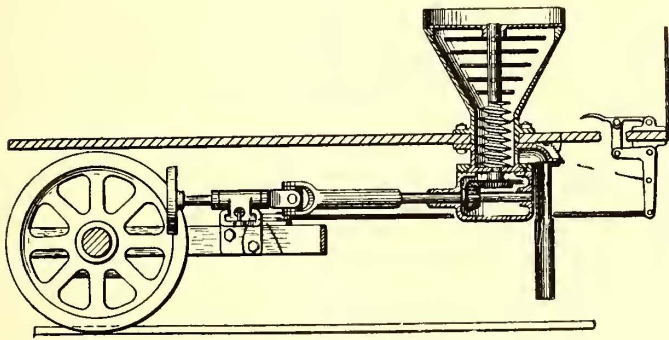
**Street Railway Patents**

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

UNITED STATES PATENTS ISSUED NOV. 19, 1901.

686,739. Electric Railway; F. Klepetko, Great Falls, Mont., and G. K. Fischer, Salt Lake City, Utah. App. filed July 19, 1899. The two conducting rails are secured to the opposite faces of a plank, the rails and the plank together then serving to guide the trolley, which makes upper contact with the rail.

686,797. Tramway for Street Cars; F. B. Anderson, Dayton, Ohio. App. filed May 20, 1901. An extensible platform between cars is furnished by a series of telescoping rods enclosed in spiral springs.

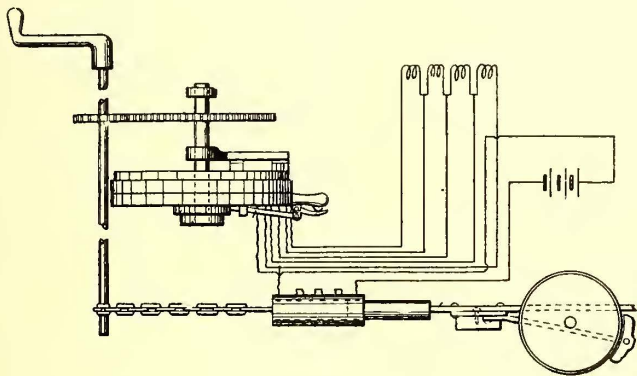


PATENT NO. 686,988

686,969. Car Fender; C. H. Hofmeister, St. Louis, Mo. App. filed July 27, 1901. Details.

686,988. Track Sanding Apparatus for Cars; W. P. L. Pentland, Baltimore, Md. App. filed Aug. 23, 1901. A conveyor screw in the sand box is driven, when desired, by gearing from the axle, which can be thrown in by the motorman.

687,087. Switch Signal; B. H. Urschel and E. P. Thomas, Sugar-ridge, Ohio. App. filed May 26, 1900. Mechanism operated by a



PATENT NO. 711,945

moving car in such a manner as to leave a signal light at one switch, and at the same time turn on a light at the next switch ahead, and upon passing the latter switch, to turn out both lights.

687,091. Rail-Bond; C. Walther, Berlin, Germany. App. filed June 27, 1900. A cylindrical expansible plug, having external grooves, adapted to receive the individual wires of a flexible bond.

687,098. Electric Railway; G. T. Woods, New York, N. Y. App. filed June 29, 1900. The switch controlling the current to the conductor section is forced to open automatically by mechanical means, when no current in excess of a predetermined minimum is flowing through its coil.

687,123. Switch-Throwing Device; C. Carpenter, Swissvale, Pa. App. filed June 21, 1901. Details.

687,164. Car Seat; E. T. McKaig, Chicago, Ill. App. filed April 20, 1901. An arrangement of links for reversing the back, of such construction as to afford strength and be made of ordinary commercial sizes and shapes of flat metal.

711,945. Railway Brake; A. Green, Rochester, N. Y. App. filed March 26, 1901. A mechanical and electrical brake are applied by the same handle, but the electrical devices adjustable, so that the electric brake will be thrown on at the point where it will act with the greatest electrical efficiency.

**ENGINEERING SOCIETIES**

ENGINE BUILDERS' MEETING.—The Engine Builders' Association of the United States will hold a meeting at Sherry's, Fifth Avenue, New York City, Dec. 2-3, to be followed by dinner at the same place, on Dec. 3, at 8 p. m.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—The annual convention will be held in New York City on Tuesday, Wednesday, Thursday and Friday, Dec. 3 to 6. It will be opened on Tuesday evening at 8 p. m., in the society's parlors, 12 West Thirty-First Street, when the annual address will be delivered by President S. T. Wellman. Many interesting papers are to be read this year, and the meeting promises to be a very successful one. One of its features will be the dedication of the memorial to Robert Fulton, erected in Trinity Churchyard. Special railroad rates have been secured for the members, and a large attendance is expected.

**PERSONAL MENTION**

MR. S. ROY WRIGHT has resigned as general manager of the Colorado Springs Rapid Transit Company, to engage in the real estate business in Denver.

MR. GEORGE B. DOVEY, who, for the past six months, has been connected with the office of Giles Allison, the well-known dealer in railway supplies, has resigned his position, and severed his connection with the company. Mr. Dovey's plans for the future have not yet been announced.

MR. WALTER H. TIFFANY has resigned the position of master mechanic of the Oakland Transit Company, of Oakland, Cal., which position he has held for several years. Mr. Tiffany was banqueted by his former business associates before leaving for Portland, Ore., where he has accepted a position.

MR. FRED W. TEAL, formerly chief engineer of the Lincoln Wharf power station of the Boston Elevated Railroad Company, and now general manager of the new electric railway and lighting company at Port au Spain, Trinidad, has sailed for New York, and is expected to arrive about the end of this week.

MR. J. A. PEIRCE, who, until recently, has been superintendent of the southern division of the Brooklyn Heights Railroad Company, has resigned to accept a position with Rossiter, MacGovern & Company, New York City. Mr. Peirce's duties in his connection with this well-known machinery supply house will, in the main, be those of a traveling salesman.

MR. J. C. H. STUT, of San Francisco, who recently took a trip East to investigate the underground electric conduit systems, has submitted his report to the board of public works, of San Francisco, for whose benefit his observations were made. The report covers most thoroughly the situation in those cities where the underground trolley is used, and estimations are given of the probable cost of transforming the San Francisco roads to the same system. Mr. Stut is an engineer, having a high reputation of long standing among railway men in the West, and his observations will undoubtedly be of great value in determining the best traction system for his city.

MR. B. FRANKLIN HART has announced that he is no longer connected with the Wheeler Condenser & Engineering Company, and that he has associated himself with Mr. Edwin Burhom, M. E., and Mr. B. F. Coffey, M. E., in a general engineering and contracting business, with offices in New York City. Mr. Hart received the degree of mechanical engineer from Stevens Institute, but after graduating he devoted some time to commercial work in business with his father. His position with the Wheeler Company has given him a large acquaintance in engineering circles. Mr. Burhom was formerly head of the firm of Burhom & Granger, and Mr. Coffey was with the International Contracting Company.

MR. JEROME C. SIMMONS, president of the Atlanta Rapid Transit Company, of Atlanta, Ga., recently tendered an elaborate dinner to Mr. C. R. Spence, of Baltimore; Mr. T. Jefferson Coolidge, of Boston, and Mr. W. H. Whipple, of New York, all of whom are largely interested in the Atlanta Railway & Power Company, and the Atlanta Rapid Transit Company. Nearly 150 prominent merchants and city officials, among them Mayor Mims, accepted Mr. Simmons' hospitality. Mr. Simmons acted as toastmaster, and the speeches were short, but brilliant and to the point. Among the speakers were Mayor Mims, Mr. W. H. Whipple, Mr. Clark Howell, Judge H. E. W. Palmer, Captain E. P. Howell, Mr. C. R. Spence, ex-Governor Bullock, Captain J. W. English and Mr. T. Jefferson Coolidge, who laid particular stress upon the unparalleled advantages that Georgia, not alone Atlanta, offered to the investor.



## FINANCIAL INTELLIGENCE

### THE MARKETS

#### The Money Market

WALL STREET, Nov. 27, 1901.

The money situation has passed beyond the stage of uncertainty with the developments of the past week. It was already evident a week ago that the domestic exchanges had begun to turn in favor of this city. The local banks, in the seven days ending Friday last, gained upward of \$2,000,000 net from the interior centers. It was also appreciated a week ago that the offerings of bonds under the Treasury's standing offer of redemption would go a great ways toward offsetting any possible drain that might occur. Some doubt existed, however, as to the future dimensions of the gold exportations, which reached the unprecedented sum of \$7,000,000 on Tuesday week. All apprehension on this score has now been set at rest by the sudden violent reaction of the last few days in the exchange market. Up to last Friday sterling exchange was not affected in the least by the gold engagements. The demand rate had risen to 4.88¼, and many authorities predicted that gold would be shipped direct to London. A sharp recovery in exchange at Paris had removed the immediate probability of further shipments to that center, but in view of the continued rise in the local market, it seemed altogether likely that the flow of gold would be diverted to London. The change came when foreign bankers decided to renew a large quantity of sterling loans which were maturing, and which would naturally have had to be settled in gold. This unexpected action at once arrested the principal demand for exchange bills, while to some extent it increased the supply. Sight drafts fell rapidly until by the close of business Monday they recorded a loss of 1¼ cents from the previous high level. The question still remains whether, in view of the abundance of local money supplies, the movement of gold to Europe will not be resumed later on. If the current inferences are true, however, that the greater part of our floating obligations to the foreign markets have been settled, no more engagements are likely for this season. In all probability the cash holdings of the local banking institutions will undergo a gradual expansion from now on, which will be checked only momentarily, if at all, by the customary withdrawals of funds at the holiday season next month. An even more promising feature of the situation is the liquidation on a large scale which has begun during the last fortnight, of credits taken out at the time of the Northern Pacific purchase seven months ago. The addition which this operation will bring to the available resources of the banks greatly increases, of course, the likelihood of a steady enlargement of the surplus reserve. Altogether easy money for an indefinite period seems reasonably certain. Call money has relaxed perceptibly in the face of heavy Stock Exchange demands, and the ruling rates are 3½ and 4 per cent. Time money is offered freely at 4½ per cent for all dates.

#### The Stock Market

Interest in the stock market during the week has mostly centered around a few individual stocks, and among these Manhattan has been as conspicuous as any. The highest price reached during the boom last spring was 131¼, but the top quotation this week was nearly 6 points above this figure, and it therefore established a record for recent years. All manner of rumors have arisen to account for the rapid advance—a lease by the New York Central, a lease by the Metropolitan, and the new-fangled story about a holding company to take over all the local traction shares. But the only cause for the circulation of such rumors lies in the well-known fact that speculative Wall Street must have some extraordinary explanation for a 15-point rise in a security like Manhattan, occurring within three weeks. The real reason for the advance it still must be insisted, is to be found wholly in the present earnings of the road which are surpassing even the sanguine expectations of the management and the prominent outside capitalists identified with the company. These "insiders" have been buying heavily during the last six months in the confident belief that both the current earning capacity of the Manhattan lines and the further advantages which will come after the change to electricity is accomplished, have both so far been greatly underrated by the general run of speculators and investors. Of the other two important local tractions, Metropolitan has shown some strength at times in sympathy with the rise in Manhattan, but the pool in Brooklyn Rapid Transit have apparently taken advantage of the favorable opportunity to unload part of their holdings.

The general share list has undergone very little change during the week. New York Central has been a remarkable feature,

making a new high record in a movement which anticipates the announcement of the much-talked of Vanderbilt consolidation plan. Pennsylvania shares have been sympathetically affected by this advance, and the Readings and high-priced coal shares have been bid up by powerful pools which are acting on the belief that the prosperity of the coal trade will before long lead to a larger distribution of dividends upon the various shares. On the other hand Amalgamated Copper has been extremely weak in expectation of an investigation of its affairs by the Attorney-General, and its severe break during the last few days has adversely affected the rest of the market. With the easing of money, the uninterrupted record of business prosperity and the magnificent gains in railway earnings, the outside features of the financial situation are obviously favorable to a rise. But the leading financial interests with few exceptions do not seem to be ready to support another speculative campaign, and while initiative is lacking from this quarter, the movement of the market is necessarily somewhat undecided.

#### Philadelphia

Apart from two or three of the regularly active issues, there has been little or nothing doing in the Philadelphia traction market for the last week. Union Traction was the feature, rising to 33¾ on Friday, which is the highest point reached since early last summer. A partial reaction since that time still leaves the final price for yesterday at 31¾ as against 31 a week ago. The rise, which has been accompanied by comparatively large dealings, is evidently due to the manipulation of an inside clique which accumulated its holdings during the depression of the last few months. This clique has made full use of the report that a dividend will be declared to meet half of the \$5 assessment which is expected to be called in January, and it has probably also been acting on knowledge that the Union Traction interests have provided fully against any action being taken on the new rapid-transit franchises which were granted by the City Council under authority of the State Legislature last summer. Philadelphia Traction, which always sympathizes with the movement of its lessee company shares, advanced to 98 on Saturday, and retains all but a fraction of its gain. American Railways, continuing under the influence of the recent increase in the dividend rate, rose from 44 to 46 on moderately active trading. The minor transactions for the week comprise 200 shares of Railways General at 5½, 250 Consolidated of Pittsburgh preferred at 64, 10 shares of Consolidated Traction of New Jersey at 67½, and 100 Columbus Railway at 45¾. There has been no special feature to the dealings in bonds. Sales were reported of Electric-Peoples Traction 4s at 97½ to 98, Peoples Passenger 4s at 106½ to 107, Rochester Passenger 5s at 110¼, Indianapolis 4s at 87¾, Consolidated of New Jersey 5s at 111, United Railways 4s at 89¾, and Second Avenue of Pittsburgh 5s at 118½.

#### Chicago

The refusal of the Federal Court in Chicago to grant the Union Traction Company's application for an injunction against the new franchise levy has given the market for the surface line securities another violent shock this week. While the Union Traction management proposes to carry the contest up to the United States Supreme Court if necessary, investors in the property have become thoroughly alarmed, and under steady selling the common stock dropped from 125¼ to 105¼ and the preferred from 52 to 47. The total valuation fixed for the combined Union Traction, North Chicago and West Chicago companies under the new regime is \$77,000,000, and it is estimated that the Union Traction will be assessed something like 1 per cent of this amount or \$770,000. West Chicago shares, which sold as high as 94¼ last Wednesday, fell to 91½ on Saturday and North Chicago dropped from 183½ to 180. Chicago City Railway shares were also weak, falling to 186, but friends of the company assert that in spite of the tax, earnings will suffice to pay the 9 per cent dividend. Elevated securities have held very firm during the week. Metropolitan has sold in small lots at 92 and the common went up to 41¼ on Friday, subsequently receding, however, to 40¾. Lake Street has changed hands on a half-point range from 12 to 12½, and South Side the same between 109 and 109½. Northwestern was inactive but steady. It is said the company has in mind building an independent line to Milwaukee, but the report is a mere rumor so far.

#### Other Traction Securities

The regular features of the Boston market have not changed particularly during the week. Massachusetts Electric common on



sales of a few thousand shares was steady around 36¼, and the preferred around 94¼. Odd lots of Boston Elevated commanded 166, and sales of a few hundred shares of West End were reported all at the one price, 95. United Railways of Baltimore securities have been strong, the income bonds selling from 72 up to 72½ and the 4s changing hands at 94¾. Knoxville Traction 5s, the rise in which was the feature of the previous fortnight in the Baltimore market, merely held their ground at 99¼, but Lexington Railway 5s sold up two points from 103 to 105. City Railway of Newport News on fairly large transactions rose sharply from 94½ to 99. Other sales of less note occurred in Norfolk Railway 5s at 96½, Toledo Traction 5s at 105½, Charleston Consolidated Electric 5s at 94 and Richmond Traction stock at 43. On the New York curb, St. Louis Transit on light transactions sold off to 29½, the preferred to 87¾ and the 4 per cent bonds to 90¾. Rochester Railway common advanced on the bid price to 34. No transactions were recorded in such stocks as Columbus, Indianapolis and Louisville. The first sale of New Orleans common in two weeks was made last Wednesday at 29¾. Under the provisions of the Pearson offer, the stockholders of the company which wish to co-operate in his plan of readjustment must have their certificates deposited by December 1. It is pretty well known that the pool has acquired enough of the common stock to insure its control, but it is desirous of having as much preferred stock as possible deposited also. A local authority says that Mr. Pearson will exercise his option for the purchase of the property by the 1st of January whether or not he succeeds in buying control of the other New Orleans street railways.

**Security Quotations**

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

	1901	
	Closing	Bid
	Nov. 19	Nov. 23
American Railways Company.....	44¼	45½
Boston Elevated .....	165	165
Brooklyn R. T.....	68	67½
Chicago City .....	188	188
Chicago Union Tr. (common).....	127½	11¼
Chicago Union Tr. (preferred).....	52¼	47¼
Cleveland City .....	111	106
Cleveland & Eastern .....	31	31
Cleveland Electric .....	86	86½
Columbus (common) .....	45	45
Columbus (preferred) .....	100	100
Consolidated Traction of N. J.....	67½	67¼
Consolidated Traction of N. J. 5s.....	109¾	110¾
Consolidated Traction of Pittsburgh (common).....	23½	23
Consolidated Traction of Pittsburgh (preferred).....	63½	64
Detroit United .....	76	74½
Detroit United certificates .....	..	a75¾
Electric-People's Traction (Philadelphia) 4s.....	97½	97½
Elgin, Aurora & Southern .....	40	40
Indianapolis Street Railway.....	42	42
Indianapolis Street Railway 4s.....	..	87
Lake Street Elevated .....	12½	12½
Louisville (common) .....	107¼	107¼
Louisville (preferred) .....	115¾	115¾
Manhattan Ry. ....	130½	136¼
Massachusetts Elec. Cos. (common).....	36	35½
Massachusetts Elec. Cos. (preferred).....	94	93¾
Metropolitan Elevated, Chicago (common).....	40½	40¾
Metropolitan Elevated, Chicago.....	92	91
Metropolitan Street .....	168½	167¾
New Orleans (common).....	29¾	29¾
New Orleans (preferred) .....	105	105
North American .....	92	93
Northern Ohio Traction (preferred).....	88½	88½
North Jersey .....	22½	22½
Northern Elevated, Chicago (common).....	39	a41
Northwestern Elevated, Chicago (preferred).....	90	87
Philadelphia Traction .....	96¼	97¼
Rochester (common) .....	34	34
St. Louis Transit Co. (common).....	30¾	29¾
South Side Elevated (Chicago).....	109½	a109
Syracuse (common) .....	26	26
Syracuse (preferred) .....	63	63
Third Ave. ....	120	120¼
Twin City, Minneapolis (common) .....	105½	107½
United Railways, St. Louis (preferred).....	88½	87¾
United Railways, St. Louis, 4s.....	90¾	90
Union Traction (Philadelphia) .....	31¼	31¾

\* Ex-dividend. (a) Asked.

**Iron and Steel**

Reports coming in from all departments of the iron industry are of only one character. They continue to tell of scarce supplies following on the heels of enormously increased production.

So great is the demand for pig iron, that the various grades of Southern foundry iron have finally yielded to the pressure and prices are up 50 cents a ton. In the Northern markets the tendency to higher prices is still held firmly in check, but cramped as they are by the lack of sufficient coke for the furnaces, the trade is having the greatest difficulty in meeting requirements. The increased production is measured in another direction by a credible report that 1,400,000 tons more of iron ore has been ordered from the Superior mines than was shipped last year. The scarcity of steel is so serious that it seems likely that imports from other countries will have to be made to make good the deficiency. Bessemer pig is quoted at \$16, steel billets at \$27.50 and steel rails \$28.

**Metals**

Copper is unchanged at 167½ cents, tin has risen again sharply to 29¼ cents, lead is dull at 4¾ cents and spelter is unchanged at 4.30 cents.

SAVANNAH, GA.—Messrs. Stone and Webster, of Boston, and others are said to have arranged for purchasing a controlling interest in the Savannah, Thunderbolt & Isle of Hope Railway Company, of which George Parsons, of New York, is president. It is said that George J. Baldwin, now president of the Columbus Railroad, of Columbus, Ga., and the Houston Electric Company, of Houston, Tex., both of which are owned by Messrs. Stone and Webster and their associates, will be president of the company.

CHICAGO, ILL.—The capital stock committee of the State Board of Equalizers has assessed the Union and Consolidated Traction Companies of Chicago at \$75,000. The basis of taxation is one-fifth this amount, and the rate is 7 per cent, making the amount of taxes \$1,050,000.

LA SALLE, IND.—Representatives of a Cleveland syndicate composed of H. Clark Ford, L. W. Prior and W. V. Coons have bought the La Salle-Peru Electric Railway. It is said that \$100,000 was paid for the property. Recently the same people bought up the Streator Electric Railway for \$160,000. It is stated that negotiations are under way for the purchase of the Ottawa Street Railway, and that in event of the deal being closed the syndicate proposes to construct an extensive system of interurban roads connecting Streator, Ottawa, Utica, La Salle and Peru, in La Salle County, and Spring Valley, Princeton and Ladd, in Bureau County.

SPRINGFIELD, MASS.—The Railroad Commissioners have authorized the Springfield & Eastern Street Railway Company to issue capital stock to the amount of \$175,000 for additional equipment and improvements and for the payment of its debt.

MILFORD, MASS.—The Legislature has been petitioned that the Grafton & Upton Railroad Company and the Milford, Holliston & Framingham Street Railway Company may have authority to contract with one another for the operation of their roads; that they may buy and sell power, and that they may act as common carriers.

BOSTON, MASS.—The Railroad Commissioners gave a hearing Nov. 26 on the proposed issue of \$1,800,000 of 4 per cent 15-year bonds by the West End Street Railway Company, to cover extensions, improvements and additions to property made during the year ending Sept. 20, 1900. No opposition was offered, and the Commissioners took the matter under advisement. The total expenditures made, under the account filed, were \$1,902,272. The annual report of President Russell, of the West End Street Railway, shows total assets of \$28,944,750, a surplus over all liabilities of \$175,815.

AMHERST, MASS.—The result of the operation of the Amherst & Sunderland Street Railway Company for the year just ended was made public at the annual meeting of the company held a few days ago. The figures, as disclosed at the meeting, follow: Gross earnings, \$14,694.59; operating expenses, \$11,207.70; number of passengers carried, 292,735; number of car-miles run, 103,643; capital stock, \$48,000; bonds, \$21,500; floating debt, \$31,200; dividends paid, 4 per cent; miles of track, 10.435. The directors and officers elected at the meeting follow: W. D. Cowles, president; Mason A. Dickinson, vice-president and treasurer; Charles H. Edwards, secretary; W. D. Cowles, M. A. Dickinson, F. A. Cadwell, executive committee; W. D. Cowles, M. A. Dickinson, Levi Stockbridge, F. A. Cadwell, H. B. Edwards, T. L. Page, of Amherst, and F. L. Whitmore, of Sunderland, directors.

ST. LOUIS, MO.—The report of the St. Louis Transit Company for October shows a gain of \$51,107 over the corresponding period of last year. Gross earnings for October were \$531,510, as compared with \$480,403 for the same month in 1900, and \$500,486 in September, 1901. Gross earnings to Nov. 1, 1901, were \$4,833,403, while up to the same time in 1900 they were \$3,568,166, showing a gain of \$1,265,237.

WATERFORD, N. Y.—The Railroad Commissioners have authorized the Hudson Valley Railroad Company to increase its capital stock from \$2,600,000 to \$3,000,000. The company, in addition to its extensive system in Central New York, proposes to construct a new line from Ballston to Mechanicsville, thus connecting Albany and Troy with Saratoga by electric railway.

FT. WORTH, TEX.—District Judge Smith has appointed George West receiver for the Glenwood & Polytechnic College Street Railway Company. The road is 12 miles long, and eight cars are operated.

INDIANAPOLIS, IND.—The Indianapolis & Eastern Traction Company is reported to have purchased a controlling interest in the Indianapolis & Greenfield Rapid Transit Company, the intention being to immediately extend the line to Richmond, and possibly into Ohio. Arrangements have been made with the Central Trust Company, of Indianapolis, so it is said, to finance the new road.



ELMIRA, N. Y.—The Elmira Water, Light & Railroad Company reports earnings as follows:

Quarter ending Sept. 30	1901	1900
Gross receipts	\$47,612	\$33,497
Operating expenses	35,436	24,733
Earnings from operation	\$12,176	\$5,764
Receipts from other sources	309	388
Gross income	\$12,485	\$6,152
Fixed charges	10,869	4,077
Net earnings	\$1,616	\$2,075

NEW YORK, N. Y.—The Metropolitan Street Railway Company reports earnings as follows:

Quarter ending Sept. 30	1901	1900
Gross receipts	\$3,595,545	\$3,445,369
Operating expenses	1,562,200	1,555,035
Earnings from operation	\$2,033,285	\$1,890,333
Receipts from other sources	153,740	162,937
Gross income	\$2,187,025	\$2,053,270
Fixed charges	1,148,714	1,128,985
Net earnings	\$1,038,311	\$924,285
Dividend	910,000	910,000
Surplus	\$128,311	\$14,285

NEW YORK, N. Y.—The Third Avenue Railroad Company reports earnings as follows:

Quarter ending Sept. 30	1901	1900
Gross receipts	\$599,406	\$566,783
Operating expenses	323,638	300,743
Earnings from operation	\$275,768	\$266,040
Receipts from other sources	65,188	23,916
Gross income	\$340,956	\$289,956
Fixed charges	441,152	440,824
Net earnings	*\$100,196	*\$150,868

\* Deficit.

BUFFALO, N. Y.—The International Traction Company reports earnings as follows:

October	1901	1900
Gross receipts	\$580,500	\$234,151
Operating expenses	268,989	120,453
Earnings from operation	\$311,511	\$113,698
Receipts from other sources	20,740	6,265
Gross income	\$332,251	\$119,963
Fixed charges	100,928	82,758
Net earnings	\$231,323	\$37,205
Four months ending October 30	1901	1900
Gross receipts	\$2,382,778	\$995,349
Operating expenses	1,029,687	469,199
Earnings from operation	\$1,353,091	\$526,150
Receipts from other sources	95,015	36,538
Gross income	\$1,448,106	\$562,688
Fixed charges	408,134	324,551
Net earnings	\$1,039,972	\$238,137

UTICA, N. Y.—A certificate of consolidation of the Utica Belt Line Street Railroad Company and the Utica & Mohawk Railroad Company, forming the Utica & Mohawk Valley Railway Company, was filed with the Secretary of State on Nov. 27. The capital is \$461,237, and the directors are: L. B. Grant, Charles V. Nellsay, Charles C. Clark, John T. Wells, Henry L. Merry, of Brooklyn; Richard T. McKinvy, Ashley T. Cole, Charles H. Worner, William J. Bagnell, of New York City.

KINGSTON, N. Y.—The Kingston Consolidated Railroad Company has received the consent of the State Board of Railroad Commissioners to the issuance of a mortgage for \$700,000 and for an increase in its capital stock from \$250,000 to \$400,000. The company merged the former Colonial Traction Company, of Kingston, and will employ the increased capital in the purchase of the Kingston City Road and for new construction.

COLUMBUS, OHIO.—The Columbus, Buckeye Lake & Newark Traction Company, now building an interurban electric railway between Columbus, Newark and the Licking Reservoir, has increased its capital stock from \$1,000,000 to \$1,500,000. Arthur E. Appleyard, of Boston, is the president of the company, and Frank W. Merrick, of Columbus, is the secretary.

PHILADELPHIA, PA.—The banking firms of Bioren & Company and E. C. Miller & Company have purchased a part and secured an option on the remainder of an issue of \$2,500,000 ten-year collateral trust, convertible 5 per cent gold bonds of the American Railways Company, dated Dec. 1, 1901, payable Dec. 1, 1911, and redeemable at 105 and accrued interest at any interest period after Nov. 1, 1904, but convertible into the stock of the

American Railways Company at par at the option of the holder prior to the latter date. The loan is secured by deposit of \$500,000 of the Springfield Railway Company, of Springfield, Ohio, first mortgage gold 6s; by \$1,600,000 of the Chicago & Joliet Electric Railway Company first consolidated 5s, which are a first lien upon the whole property in and from Joliet to Chicago (except only the lien on a mortgage of \$400,000 secured upon a part thereof) and by \$1,050,000 out of a total issue of \$1,100,000 of the stock of the Peoples Railway Company, of Dayton, O., and upon which property the only incumbrance is a mortgage for \$500,000. The loan was issued to retire an indebtedness incurred through the building of the Chicago & Joliet Electric Railway and for extensions and additions made and in process of being made on other properties owned by the American Railways Company.

WHEELING, W. VA.—The acquisition of the property and franchises of the Steubenville, Mingo & Ohio Valley Traction Company by the Wheeling Traction Company has been confirmed by a prominent official of the former company. The deal gives the Wheeling Company control of all the electric railways on both sides of the river from Steubenville to Moundsville, the latest purchase being an important link in the chain of electric railways that will some time connect Wheeling with Pittsburgh.

HOUSTON, TEXAS.—The Houston Electric Street Railway, which was recently sold under foreclosure, has passed into the hands of its new owners, they having complied with the conditions of the sale as specified by the court. The successor company is known as the Houston Electric Company, and at a recent meeting the following officers were elected: George J. Baldwin, of Savannah, Ga., president; J. W. Payne, secretary; W. B. Chew, treasurer.

RUTLAND, VT.—The application of the Rutland Street Railway Company for permission to increase its capital stock from \$150,000 to \$1,500,000 is for the purpose of providing funds for the construction of two of the most important railway lines in the State. One of the lines will run east through Mendon and Woodstock to White River Junction, a distance of about 40 miles, and the other will run from Rutland west through West Rutland, Castleton and Fair Haven to Whitehall, a distance of about 30 miles. The plan of the company is to begin the construction of the lines in the spring.

MANSFIELD, OHIO.—The Vermilion, Mansfield & Southern Railway Company has been incorporated, with a capital stock of \$10,000. The purpose of the company is to build an electric railway connecting Vermilion with Mansfield, passing through Erie, Huron, Ashland and Richland Counties. The company is also empowered to sell electricity for lighting, power and other purposes. The incorporators are: E. L. Coen, George Fischer, R. F. Quigley, C. C. Baumhart and Charles McGraw.

LIMA, OHIO.—The capital stock of the Western Ohio Railway Company has been increased from \$1,000,000 to \$3,000,000. The company has secured from the State permission to construct a branch line from Wapakaneta to Shelly, one from St. Marys to Celina, and another from Celina to a point on the State line in Mercer County.

MINEOLA, N. Y.—The Mineola, Hempstead & Freeport Traction Company is now rushing the construction work in Freeport, and then the line between Hempstead and Freeport will be built—the last link in the complete line between Mineola and Freeport. It is expected that the road will be ready for operation by Jan. 1, 1902. The new line will connect Mineola with the New York & Queens County Railway Company's lines, which lines connect with the lines of the Brooklyn Rapid Transit Company. The new road, as has been stated, will be operated by power obtained from the Roslyn Electric Light & Power Company.

BROOKLYN, N. Y.—A decision that has just been handed down by the Appellate Division of the Supreme Court, Brooklyn, declares that the wooden guard-rail used by street railway companies on open cars is not intended to prevent passengers from falling out of the cars, but to keep passengers from entering or leaving the car on the wrong side. The decision was handed down in a suit brought against a Staten Island company. A passenger claimed that she was forced to stand up, with her little boy by her side, when a lurch of the car, she said, caused her to fall into the street. Her counsel contended that the side bar was a guardrail, and should have been down in position, instead of raised, as she alleged it was. In writing the opinion the Court said: "The side bar is a movable rail, designed when down to prevent persons from boarding or leaving a car on that side."

WALLA WALLA, WASH.—The Walla Walla City Railway Company will not begin the construction of its proposed lines here until March, 1902. About 6 miles of line will be built over the principal thoroughfares of the city. The officers of the company are: Edwin S. Isaacs, president and general manager; Grant Copeland, vice-president; John P. Isaacs, secretary. The officers and William O'Donnell constitute the board of directors.

PITTSBURGH, PA.—The United Traction Company, which owns valuable franchises in McKeesport, is rushing work on an important extension to its present line from McKeesport to Wilmerding. Rails and all other materials are being distributed along the line, and the company will at once build an extension from Wilmerding, a distance of 4 miles up the valley to Stewart Station, in order to reach the new foundries the Westinghouse Company is building at that place.

HOMESTEAD, PA.—Engineers are now engaged in drawing plans for the construction of the proposed lines of the Homestead & Mifflin Street Railway Company, and it is stated that the construction of the lines will be begun early next year. The main line of the company will extend from Eighth Avenue and Hay Street, Homestead, to Mifflin, and a branch line will extend from Homestead to Whittaker. Robert McWhinney, of Pittsburgh, is president of the company.



TABLE OF OPERATING STATISTICS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. \* Including taxes. † Deficit due to strike.

COMPANY	Period	Total Gross Earnings	Operating Expenses	Net Earnings	Deductions From Income	Net Income, Amount Avail-able for Dividends	COMPANY	Period	Total Gross Earnings	Operating Expenses	Net Earnings	Deductions From Income	Net Income, Amount Avail-able for Dividends	
<b>AKRON, O.</b> Northern Ohio Tr. Co.	1 m., Oct. '01 1 " " '00 3 " Sept. '01 3 " " '00 9 " " '01 9 " " '00	51,479 46,426 193,833 158,379 462,800 387,972	28,769 26,562 98,904 94,977 263,361 241,782	22,710 19,864 94,929 63,402 199,439 146,190	----- ----- ----- ----- 98,973 109,786	----- ----- ----- ----- 100,466 36,404		<b>HAMILTON, O.</b> Southern Ohio Tr. Co.	1 m., Oct. '01 1 " " '00 9 " Sept. '01 9 " " '00	31,839 28,431 252,892 218,846	13,862 14,296 138,324 102,023	17,977 14,136 114,568 106,824	7,500 7,500 67,500 67,500	10,477 6,636 47,068 39,324
<b>ALBANY, N. Y.</b> United Traction Co.	1 m., Oct. '01 1 " " '00 4 " " '01 4 " " '00	120,823 117,301 505,041 483,918	84,091 82,489 323,061 319,764	36,733 19,901 181,980 164,154	19,901 19,901 79,604 80,028	16,832 14,914 102,376 84,126		<b>LONDON, ONT.</b> London St. Ry. Co.	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	10,105 9,257 116,814 97,641	6,356 7,203 72,274 69,642	3,749 2,054 44,539 27,999	1,957 1,691 19,800 18,294	1,792 364 24,739 9,705
<b>BINGHAMTON, N. Y.</b> Binghamton St. Ry. Co.	1 m., Oct. '01 1 " " '00 4 " " '01 4 " " '00	16,884 14,792 80,044 69,973	9,294 8,218 40,318 35,660	7,590 6,574 39,726 34,313	----- ----- ----- -----	----- ----- ----- -----		<b>MILWAUKEE, WIS.</b> Milwaukee El. Ry. & Lt.	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	206,812 189,068 1,992,060 1,820,850	99,249 96,023 977,589 933,250	107,563 93,044 1,014,471 887,600	63,409 69,296 624,810 691,962	44,154 23,748 389,661 195,638
<b>BROOKLYN, N. Y.</b> Brooklyn R. T. Co.	1 m., Sept. '01 1 " " '00 3 " " '01 3 " " '00 12 " June '01 12 " " '00	1,090,229 1,019,465 3,433,001 3,226,458 12,135,559 11,768,550	*740,546 *628,696 *225,912 *196,154 *721,608 *710,637	349,683 390,769 1,174,477 1,264,916 4,919,551 4,662,177	----- ----- ----- ----- 4,341,748 4,135,405	----- ----- ----- ----- 577,803 526,772		<b>MINNEAPOLIS, MINN.</b> Twin City R. T. Co.	1 m., Oct. '01 1 " " '00 10 " Sept. '01 10 " " '00	270,952 240,793 2,340,165 2,102,029	118,054 109,501 1,068,846 981,006	152,898 131,291 1,271,318 1,121,023	29,039 25,748 503,273 474,801	123,865 105,543 768,045 646,222
<b>CHICAGO, ILL.</b> Chicago & Milwaukee Elec. Ry. C.	1 m., Aug. '01 1 " " '00 8 " " '01 8 " " '00	24,042 20,702 112,962 92,267	7,479 6,058 49,571 36,795	16,563 14,644 63,391 55,472	----- ----- ----- -----	----- ----- ----- -----		<b>MONTREAL, CAN.</b> Montreal St. Ry. Co.	1 m., Sept. '01 1 " " '00 12 " " '01 12 " " '00	182,584 161,526 1,900,679 1,769,903	----- ----- 1,251,428 1,122,657	----- ----- 649,251 647,246	----- ----- ----- -----	----- ----- ----- -----
<b>CHICAGO, ILL.</b> Northwestern Elev.	12 m. June '01 7 " " '00	978,766 525,023	322,645 180,452	656,121 344,571	400,693 221,553	255,428 123,018		<b>NEWBURGH, N. Y.</b> Newburgh Electric	1 m., Aug. '01 1 " " '00 2 " " '01 2 " " '00	13,615 12,780 27,003 25,769	5,699 4,982 10,767 10,182	7,916 7,848 16,236 15,587	----- ----- ----- -----	----- ----- ----- -----
<b>CHICAGO, ILL.</b> Union Traction	12 m. June '01 12 " " '00	8,158,809 8,345,748	3,942,194 3,761,797	4,216,615 4,583,951	4,058,040 3,979,876	158,575 604,075		<b>NEW YORK CITY.</b> Manhattan Ry. Co.	3 m., Sept. '01 3 " " '00 12 " " '01 12 " " '00	2,284,565 2,081,964 10,455,872 9,950,735	1,312,130 1,236,711 5,328,649 5,195,312	972,434 845,253 5,127,223 4,755,423	632,350 626,925 2,682,132 2,688,644	310,084 218,328 2,444,091 2,066,779
<b>CLEVELAND, O.</b> Cleveland & Chagrin Falls	1 m., Oct. '01 1 " " '00 9 " Sept. '01 9 " " '00	5,128 4,125 34,255 36,800	2,368 2,936 23,144 24,752	2,760 1,189 11,111 12,048	1,362 1,004 9,875 9,902	1,398 185 1,266 2,146		<b>NEW YORK CITY.</b> Metropolitan St. Ry.	3 m., Sept. '01 3 " " '00 12 " June '01 12 " " '01	3,750,285 3,608,396 14,720,767 14,437,134	1,563,260 1,555,036 6,755,131 6,631,254	2,187,025 2,053,270 7,965,636 7,805,880	1,148,714 1,128,985 4,534,068 4,445,720	1,038,311 924,285 3,431,567 3,360,160
<b>CLEVELAND, O.</b> Cleveland & Eastern	1 m., Oct. '01 1 " " '00 7 " " '01 7 " " '00	8,765 7,201 75,163 52,131	4,624 3,443 43,125 29,856	4,141 3,758 32,038 22,278	3,205 3,123 35,653 27,568	936 635 ----- -----		<b>OLEAN, N. Y.</b> Olean St. Ry. Co.	1 m., Oct. '01 1 " " '00 4 " " '01 4 " " '00	4,630 4,183 21,676 19,904	2,145 1,877 9,033 8,613	2,485 2,306 12,643 11,290	1,814 1,188 6,014 5,714	671 1,118 6,629 5,576
<b>CLEVELAND, O.</b> Cleveland El. Ry. Co.	1 m., Oct. '01 1 " " '00 9 " " '01 9 " " '00	200,280 194,615 1,705,634 1,506,701	109,662 100,339 942,983 822,454	90,618 94,276 762,651 684,248	21,256 27,828 179,634 190,385	69,362 66,448 583,016 493,863		<b>PITTSBURG, PA.</b> Consolidated Traction	1 m., Oct. '01 1 " " '00 7 " " '01 7 " " '00	3,575,511 285,277 2,048,300 1,930,716	126,261 108,137 878,495 797,583	179,491 177,140 1,169,805 1,133,134	63,974 63,213 444,825 434,751	115,517 113,927 724,980 698,383
<b>CLEVELAND, O.</b> Cleveland, Elyria & Western	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	22,736 16,812 208,728 147,861	12,611 8,978 113,398 81,200	10,124 7,834 95,330 66,660	4,478 3,228 44,775 32,275	5,647 4,606 50,555 34,385		<b>PHILADELPHIA, PA.</b> American Railways	1 m., Oct. '01 1 " " '00 4 " " '01 1 " " '00	82,378 67,711 345,320 312,137	----- ----- ----- -----	----- ----- ----- -----	----- ----- ----- -----	----- ----- ----- -----
<b>CLEVELAND, O.</b> Cleveland, Painesville & Eastern	1 m., Oct. '01 1 " " '00 9 " Sept. '01 9 " " '00	15,639 14,075 124,184 106,187	8,558 6,218 63,243 49,979	7,081 7,857 60,941 56,207	----- ----- 54,375 54,375	----- ----- 6,566 1,833		<b>PHILADELPHIA, PA.</b> Union Traction Co.	12 m. June '01 12 " " '00	13,431,680 13,249,825	5,836,186 5,624,905	7,595,495 7,624,921	6,734,228 6,686,899	861,267 938,022
<b>CORTLAND, N. Y.</b> Cortland & Homer Tr. Co.	12 m. June '01 12 " " '00	31,624 28,925	19,857 16,927	11,767 11,998	7,237 22,129	4,470 1,131		<b>RICHMOND, VA.</b> Richmond Trac. Co.	1 m., Sept. '01 1 " " '00 12 " " '01 12 " " '00	20,921 20,727 218,569 209,057	15,669 10,770 139,542 108,198	5,322 9,957 79,027 94,859	3,196 3,843 38,618 37,608	2,126 6,115 40,410 57,250
<b>DENVER, COL.</b> Denver City Tramway Co.	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	141,366 114,333 1,255,921 1,077,960	77,403 62,121 686,012 603,150	63,964 52,252 569,910 474,810	32,570 32,112 318,312 311,613	31,394 20,141 251,598 163,198		<b>ROCHESTER, N. Y.</b> Rochester Ry.	1 m., Oct. '01 1 " " '00 4 " " '01 4 " " '00	79,972 77,866 342,856 323,693	45,150 51,107 187,436 195,186	34,821 26,759 155,420 128,508	24,923 24,155 99,784 96,531	9,869 2,604 55,636 31,976
<b>DETROIT, MICH.</b> Detroit United Ry.	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	267,081 231,417 2,392,922 2,116,153	*153,504 *131,010 *123,169 *118,300	113,577 100,407 1,098,243 933,843	62,388 295,097 527,825 511,384	51,189 44,410 570,418 422,469		<b>ST. LOUIS, MO.</b> St. Louis Transit Co.	1 m., Aug. '01 1 " " '00 9 " " '01 9 " " '00	509,048 503,738 3,801,409 2,657,716	----- ----- ----- -----	----- ----- ----- -----	----- ----- ----- -----	----- ----- ----- -----
<b>DETROIT, MICH.</b> Rapid Ry.	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	31,008 28,912 327,216 237,761	*18,747 17,176 188,602 134,583	12,261 11,766 138,614 103,178	9,470 9,692 96,695 62,032	2,732 2,074 41,913 41,146		<b>SCRANTON, PA.</b> Scranton Ry. Co.	1 m., Oct. '01 1 " " '00 10 " " '01 10 " " '00	2,638 48,781 507,989 501,852	29,300 34,787 295,079 298,122	ad(26661 13,903 212,910 206,730	----- ----- ----- -----	----- ----- ----- -----
<b>DULUTH, MINN.</b> Duluth-Superior Tr.	1 m., Oct. '01 10 " " '01	38,678 373,946	22,523 204,074	16,156 169,872	9,181 91,559	6,975 78,313		<b>SYRACUSE, N. Y.</b> Syracuse H. T. Co.	1 m., Oct. '01 1 " " '00 4 " " '01 4 " " '00	56,206 49,481 224,575 194,908	30,825 26,721 132,351 107,213	25,380 22,760 102,223 87,695	19,025 18,687 76,046 74,546	6,355 4,072 26,177 13,149
<b>ELGIN, ILL.</b> Elgin, Aurora & Southern Tr.	1 m., Oct. '01 1 " " '00 9 " " '01 9 " " '00	28,578 25,370 275,504 234,125	16,964 16,984 152,904 149,851	11,614 8,285 122,600 84,274	----- ----- 75,000 67,500	----- ----- 47,600 16,774		<b>TOLEDO, O.</b> Toledo Ry. & Lt. Co.	1 m., Oct. '01 1 " " '00 9 " Sept. '01 9 " " '00	----- 101,220 957,584 871,258	54,617 52,094 461,507 468,239	60,049 49,126 496,077 408,019	37,982 34,370 241,730 216,238	22,237 14,855 254,347 191,781
<b>W. NEW BRIGHTON,</b> S. I. Staten Island El.	3 m., Sept. '01 3 " " '00	80,197 78,432	42,103 46,155	38,094 32,277	27,221 27,348	10,873 4,928								



## NEWS OF THE WEEK

## CONSTRUCTION NOTES

LOS ANGELES, CAL.—Sidney J. Parsons has applied to the Council for a franchise to construct a double-track electric railway to extend from Third and Hill Streets over a specified route. The application has been referred to the Board of Public Works.

OAKLAND, CAL.—The Oakland & San Jose Railway Company has been organized, with a capital stock of \$2,500,000, by F. M. Smith and others connected with the Oakland Transit Company. The plan of the company is to build an electric railway to connect with the Oakland Transit Company's line at Haywards and extending to San Jose. The distance between Oakland and San Jose is about 50 miles. Those who have subscribed to the stock of the company are: F. M. Smith, F. C. Havens, W. H. Martin, E. A. Heron, W. F. Kelly.

LOS ANGELES, CAL.—H. E. Huntington, who, as previously stated, is largely interested in the recently incorporated Pacific Electric Railway Company, says: "The company will operate all the suburban lines now under contemplation in this vicinity, and is entirely independent of any of the other surface roads with which Mr. Hellman and myself are connected. It will have its own power houses, shops and offices, and its business affairs will be taken care of by an entirely different set of men from that connected with the Los Angeles Railway. A number of interurban lines are under contemplation. One will run to Long Beach, another to Monrovia, and another to the Mission Church. It has not been fully decided if we will build to Sierra Madre, and the Santa Barbara road is only prospective as yet. Its construction has not even been seriously considered. We shall prepare ourselves for future contingencies in the way of power supply and other matters, so that we will have the facilities for building and operating as many roads as we please. We have reached no definite conclusion in regard to routes, etc., for the new company, and matters are as yet in an undeveloped state. No officers have been elected, and the matter is in the hands of Judge Bicknell, who is acting as our attorney, and is also one of the stockholders. As soon as the necessary arrangements have been made, work will begin on the shops and power houses for the company, and the construction of roads will also be commenced and carried through without delay. I am unable to say just how long this will take." Among the stockholders of the company are: H. E. Huntington, I. W. Hellman, A. Borel, of San Francisco; C. De Guigne, of San Francisco; Epes Randolph, John D. Bicknell, of Los Angeles.

HARTFORD, CONN.—The Hartford & Worcester Street Railway Company, which proposes to construct an electric railway from Hartford, Conn., to Worcester, Mass., has succeeded in securing locations and franchises in Wales, Holland, Brimfield and Sturbridge, and hearings have been given in Charlton, Oxford and Leicester. The company plans to construct about 2 miles of line in Worcester, and a hearing will be given in that city in about two weeks. The company, besides the 2 miles of independent line in that city, plans to operate over the lines of the Worcester Consolidated Street Railway Company. The plan of the company is to begin construction work as soon as the Worcester franchise is obtained. Among those interested in the road are: Charles H. Wilson, F. C. Hinds, of Boston; R. A. Stewart, of Worcester, and Thomas C. Perkins, of Hartford.

MOLINE, ILL.—The Tri-City Railway Company will double track its line on Fifteenth Street, Moline, and the Elm Street line in Rock Island, and the Second Street line in Davenport will be relaid with new rails. The company will erect a new car house in Rock Island. It is said that \$25,000 will be expended in the construction of the structure.

EAST ST. LOUIS, ILL.—The East St. Louis Electric Railway Company will make important changes in the lines within the next few months. The City Council has granted the company the right to build three cross lines.

EAST ST. LOUIS.—The East St. Louis Electric Railroad Company will begin at once the erection of a \$150,000 power house. About \$500,000 will be expended in making extensions.

DES MOINES, IOWA.—The contract for grading the proposed electric railway from Des Moines to Colfax, which is to be constructed and operated by the Interurban Railway Company, has been awarded to R. A. Elzy, of Marshalltown. The contractor has agreed to put 100 men and teams at work at once, and to push the work as long as good weather continues, but the contract does not, however, call for the completion of the grading between the two cities before June 1, 1902.

BURLINGTON, IA.—The Peoples Gas & Electric Company was incorporated Nov. 18, with a capital stock of \$200,000. The general nature of the business, as defined in the articles of incorporation, is the construction and operation of electric light plants, street railways, interurban railways, gas works, etc. The company is also empowered to manufacture apparatus of all kinds. The officers of the company are: B. E. Sunny, of Chicago, president; Theodore P. Bailey, of Chicago, vice-president and treasurer; George P. Townsend, of Chicago, secretary. The officers and directors are identical.

LXINGTON, KY.—The Georgetown & Lexington Traction Company has succeeded in securing from the Georgetown City Council a franchise for the construction of an electric railway from South Broadway and Jackson Street to the city limits. The plan of the company is to build an electric railway to connect Georgetown and Lexington.

BALTIMORE, MD.—The United Railways & Electric Company is perfecting plans for an addition to its Pratt Street power house. The addition will be 80 ft. x 80 ft.

ANNAPOLIS, MD.—The promoters of the Washington & Annapolis Electric Railway have incorporated the Berwyn & Laurel Electric Railway Company, to build an electric railway from Berwyn, just outside of the District of Columbia line, in Prince George's County, to Laurel, a distance of 10 miles. The incorporators of the Berwyn & Laurel Electric Railway are: Frank Gosnell, Jesse Slingluff, George Weems Williams, Carroll T. Bond and Ernest S. McElroy, of Baltimore. The capital stock of the company is \$500,000.

BALTIMORE, MD.—The Baltimore & Laurel Electric Railway Company has perfected its organization, and the officers of the company are: George R. Webb, president; William A. House, vice-president and general manager; Briggs C. Keck, treasurer, and H. C. McJilton, secretary and auditor. The capital stock of the company is \$250,000. The company is organized and controlled by interests identified with the United Railways & Electric Company, of Baltimore, and the purpose of the company is to build an electric railway from Baltimore, via Relay, to Laurel, a distance of 18 miles. The new line will be operated by the United Railways & Electric Company, the president of which, Mr. Webb, says that the line will be built to supply the existing demand for such facilities.

NORTH ATTLEBORO, MASS.—Application has been made to the Selectmen by the Cumberland & North Attleboro Electric Street Railway Company for a location, with the right to lay tracks on Broadway, High Street, Richards Avenue and Washington Street. The line is a portion of the proposed system which will connect Cumberland and Woonsocket, R. I., with the Attleboros, providing a new line from northern Rhode Island to Taunton and the cape district.

GRAND RAPIDS, MICH.—The Central Michigan Traction Company is being organized for the purpose of building an electric railway from Grand Rapids to Jackson, via Hastings. Major Charles W. Watkins, of Grand Rapids, is the president of the company. The right of way is now being secured.

LANSING, MICH.—The Lansing, St. Johns & St. Louis Railway Company states that its line will be completed and in operation before Dec. 31. The cars have been ordered from the Jewett Car Company, of Newark, Ohio, and are 56½ ft. long, divided into three compartments. Seats are provided for fifty persons.

SANILAC CENTRE, MICH.—The Sanilac Railway Company has been incorporated, with a capital stock of \$56,000, to build an electric railway from Crosswell to Sanilac Centre.

DETROIT, MICH.—The Detroit, Howell, Lansing & Grand Rapids Railway Company has effected a compromise with the Hawks-Angus syndicate, and will not build that portion of its proposed line from Lansing to Grand Rapids. The road will be built from Detroit to Lansing, and will enter the city of Lansing on the lines of the Lansing Street Railway Company.

GRAND RAPIDS, MICH.—The Hawks-Angus syndicate has secured franchises from Grand Ledge, Portland, and nearly all the towns and villages on the line of its proposed road from Lansing to Grand Rapids. All such franchises are being granted with the understanding that work is to be begun within six months, and there seems no doubt that the road will be completed and put into operation early next season.

SUMMIT, MISS.—C. V. Ratcliff, Mayor of Summit, and others are desirous of securing for Summit a street railway that will traverse the principal city streets and extend to Magnolia. Additional information can be had from Mr. Ratcliff.

CHILLICOTHE, MO.—John Doll and P. A. Gibson, of Erie, Pa., are in Chillicothe looking over the field with a view to buying Chillicothe's electric light plant and building an electric railway from Chillicothe to Trenton. Messrs. Doll and Gibson inspected the Peoples Gas and the Electric Company's plant and examined the roadbed of the old Chillicothe & Des Moines Railway. All Messrs. Doll and Gibson ask is that they be granted a franchise for the construction of an electric railway through Livingston County, and expect that they will be awarded the street lighting contract.

MISSOULA, MONT.—Local and foreign promoters have applied to the Council for a franchise to construct an electric railway here. Messrs. Wilson and Finklenburg are the foreign applicants, and Messrs. Brooks, Winstanley and Keith are the local applicants. It is thought that the franchise will be granted to Messrs. Wilson and Finklenburg.

MOUNT VERNON, N. Y.—The Interurban Street Railway Company was incorporated Nov. 25 as the successor of the North Mount Vernon Railway Company, whose franchise, etc., were sold under foreclosure. The company is capitalized at \$500,000. The directors of the company are: Andrew A. Halsey, Frederick C. Cocheu, Joseph F. Coffey, Charles M. Sweeney, Joseph F. McClean, M. J. Kennedy, Louis H. Meht, George W. Seixas and William J. Studwell, of Brooklyn.

SYRACUSE, N. Y.—The officers of the Rochester, Syracuse & Eastern Railroad, which was incorporated Nov. 17 to construct an electric railway from Syracuse to Rochester, a distance of 100 miles, are as follows: Lyman C. Smith, of Syracuse, president; F. W. Roebing, of Trenton, N. J., vice-president; C. A. Lux, of Clyde, secretary; A. K. Hiscox, of Syracuse, treasurer; C. D. Beebe, of Syracuse, manager and purchasing agent. The directors of the company, as previously announced, are: F. W. Roebing, of Trenton, N. J.; Clarence W. Seamans, of New York; Charles A. Lux, of Clyde; William Nottingham, Hendrick S. Holden, Rlbert R. Hiscock, Willis O. Holden, Lyman C. Smith, William K. Pierce, Clifford D. Beebe, Albert E. Nettleton and Frank C. Soule, of Syracuse.