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Nebraska Depreciation Rules

The purpose of the rules adopted by the Nebraska State Railway Commission, in reference to accounting practices of electric railways, is to effect a better classification of charges for maintenance, additions and betterments. Among the rules published elsewhere in this issue one provision is that which directs a monthly accounting in reconstruction work as between operating and capital charges. That such a separation should be made without loss of time and before the records become so old that proper segregation is difficult is a point of view which the companies as well as the commission should approve. Other parts of the rules are fundamental requirements of a system of proper accounting and represent an evident effort to promote better practices. It is the decision of the commission, in brief, that replacements shall be replacements in kind and, if increases in value have taken place, the extra cost is part of the expenditure which appropriately goes with the balance into the operating expense accounts. This policy will tend to the integrity of the capital accounts.

Stimulating Urban Tourist Traffic

Observation of transit conditions in several widely separated cities during a recent tour leads again to the text that it is a wise manager who cares for the stranger within the gates. In so-called "tourist cities," dependent to a large degree upon the attractions of climate, historic background or architectural charm, the need of more highly organized means of traffic stimulation is often a pressing one. At stop-over points where long journeys are broken it is common to hear the question, "How can I see the most of the town in an hour or two?" and yet many companies are doing nothing whatever to encourage this class of travel on the regular cars. There is a field here which the special sightseeing car does not cover. Let the company issue a neat folder showing at least a skeleton map of its principal and street relations with the prices and time required for trips of say one-half hour to two hours each, and let these folders be placed in the hands of tourists at waiting rooms and on trains where it is possible. Combine this form of publicity with an electric sign or two near the station exit—a neat billboard sign equipped with five 16-cp reflector lamps and mounted on a feeder pole is better than nothing—and results will come. The type of car passing the station and the character of its signing are also factors in the stimulation of this limited time traffic—for most of it is of the short-haul type and hence often more profitable than double the volume of business handled over greater distances.

Corporations and Supervision

The initiation by the government of a suit for violation of the Sherman law against the United States Steel Corporation and the decision of the Supreme Court that interstate railroads are amenable to the federal statutes so far as concerns the employment of safety devices on their intrastate cars may not have any direct bearing upon electric railways as a whole, because most electric railway companies engage entirely in an intrastate business. Nevertheless, these events are evidences of the growing closer supervision of the affairs of corporations which now seems to be a feature of American government, both state and national. For many years affairs of corporations, even those of a public utility character, were conducted with almost the same freedom as regards rates and service as if they were purely private affairs. The rates were made very commonly those which the managers thought the traffic would bear, and securities were issued with as much freedom from governmental control as in the case of notes issued by an individual. We do not believe that it would be wise to return to a system of free license in corporate affairs, or that the corporations would wish any such change, even if it were possible. They have come to realize that their best interests lie in their reasonable and businesslike treatment of the public. On the other hand, the sentiment is undoubtedly growing that the corporations in their turn require reasonable and businesslike treatment if they are to prosper in their activities and, as the corporations are the principal employers of labor, that the prosperity of the public depends largely upon that of the corporations.

Engineering Statistics on Small Systems

Although the small electric railway cannot afford to keep such detailed operating statistics as large undertakings do, and does not need them as much as the large company does, occasions will arise when it is very desirable to have exact data on costs and conditions. For example, many of these companies have non-condensing engine equipments but know so little of the real cost of power production that they cannot tell the exact saving, if any, to be secured by the installation of a low-pressure turbine. In a case of this kind, it is clear that before deciding to spend thousands of dollars it would pay a company to appropriate a few hundred dollars for an expert investigation of the power generating and distributing conditions. Such an investigation might well include the kindred question of energy consumption on the car as affected by traction, heating and lighting requirements. In fact, the great progress which has lately been achieved in car meters, controller and heater regulating devices and metal filament lamps shows that the power situation is open to betterment from many sides. In this respect the small company has more to gain proportionately than the large one because its generating costs are higher. On the other hand, the small railway's financial inability to employ specialists in the shop makes it cautious about complicating the standard car equipments by adding new contrivances, no matter how promising. However, the decision on such questions should not be made offhand, but only after a statistical study which will show whether the greatest return for the investment is to be expected from changes in power house, distributing system or cars.

THE FIRST TRUNK LINE ELECTRIFICATION IN GERMANY

The electrification of the Dessau-Bitterfeld section of the Prussian-Hessian State Railways, described elsewhere in this issue, is a logical sequel to the formal adoption of 15-16 $\frac{2}{3}$ -cycle, single-phase alternating current as the standard for trunk-line service in Germany. This decision was reached only after a long series of experiments which date from the classic high-speed tests conducted with three-phase current during the years 1901 to 1903 under the auspices of the government on a line between Marienfelde and Zossen. Even the present installation is more or less experimental, but the employment of the single-phase system on such a scale for main-line traffic clearly indicates that the builders expect to make few if any radical changes in the standards adopted. The reasons for trunk line electrification are more urgent in Germany than in the United States, because the average density of traffic is greater and good locomotive fuel is more expensive. Thus on the Dessau-Bitterfeld line at least thirty-five trains a day are operated through a district bearing coal which is suitable only for stationary power plants. In other parts of Germany water power is available for electric railway operation. Despite these encouraging conditions trunk line electrification has been delayed partly through lack of public funds and partly because of the feeling of the military authorities that the traffic on an electric road could more easily be interrupted by a hostile force than if steam was used as the motive power.

Both the power transmission and overhead construction systems of the new line possess several unusual features. The behavior of a 60,000-volt underground conduit will certainly be watched with interest by American engineers, in view of the fact that few cable installations in the United States exceed 13,200 volts. Indeed, the maximum, so far as we know, is 25,000 volts, as in St. Paul and Montreal. The catenary line construction, however, will doubtless prove of even wider interest, because it is such a radical departure from the truss type of catenary bridge which has been used here almost exclusively in the case of heavy electric traction lines. As a rule the German bridges consist merely of plain channels, which are supported on two or more towers, according to the number of tracks. The spans are about 250 ft. long. This construction is light and inexpensive. At the same time it permits to the locomotive engineers an unobstructed view of all signal indications. These catenary bridges may seem flimsy when contrasted with the original New Haven designs, but it is noteworthy that the latest New Haven bridges are also much lighter than those first erected. This change, based, as it is, upon experience, should be encouraging to steam railroad men who have feared that overhead construction with catenary bridges would be very costly.

Various ingenious methods have been devised to energize the trolley wire over spur loading and shop tracks after due visual and audible warnings have been given to those who are working on the tracks. It is rather difficult to understand, however, why a 10,000-volt trolley should be permitted in any building, as was done in this case. It would seem as if it would have been an easy matter by the

use of transformers to operate the shops and yards with a low-tension trolley voltage at equal efficiency and greater safety.

DOUBLE-CAR UNITS IN CITY SERVICE

We discussed recently in these columns the importance of providing greater capacity in the motors of cars which are designed to haul trailers than in those which operate singly. It may be that cars which are not over-powered in this way would be able to haul trailers without excessive damage for those short periods each day which are understood to comprise rush-hour service. But when once the practice of hauling trailers is begun the exigencies of different traffic situations will force upon nearly every management the use of trailers at other times of the day, and the motor equipment will suffer accordingly.

But trailers constitute by no means the only method of increasing the carrying capacity of a system without increasing the number of transportation units. A review of the large amount of literature which has appeared on this subject recently indicates a general agreement that the operation of double-car units under certain circumstances may be highly advantageous in city service. The use of more than two cars coupled together for such service is by common consent considered undesirable. As yet, little has been done in such train operation on a large scale, although several cities in the East did use a few such trains experimentally for a short time three or four years ago and then abandoned them.

Since that time, however, there have been developments which suggest that an experiment now conducted along similar lines would prove more successful. One of these developments is the general movement toward lighter cars. The two-car train, if now built, would probably consist of cars somewhat smaller and very much lighter than those used with former experimental trains and with two motors on each car. A complete multiple unit system would not be necessary, and both cars combined should not weigh more than 55,000 lb. or 60,000 lb., which just about equals the weight of one heavy four-motor car with sufficient tractive power to draw a trailer of reasonable size and weight. A double unit of this character, if of the center-door type, might easily provide a seating capacity of eighty-five to ninety people and a carrying capacity of perhaps double those amounts. The all-day operation would be with single cars and during the slack hours the seating capacity would be ample for the traffic.

Such an equipment would possess an important advantage over trailers, in that it would be double-ended, and switching would be more easy because each car could move itself. The question of length of stops and the number of stops made by such a train as compared with single units would depend on the character of traffic in which the train or car was used. Under most circumstances, we do not see why the length of stops should be greater than for a single car, or in most large cities why the number of stops should be greater, because there the street congestion demands stops or slow-downs at a great many more points than those at which passengers board or disembark from a single car.

LIGHTENING THE EQUIPMENT

Science to the contrary notwithstanding, fashion rules in engineering circles almost as much as among milliners. This truism is brought particularly to our minds by the changes which have from time to time appeared in the rolling stock of electric lines. Old timers who remember antediluvian things, like the Richmond road, the little flat Sprague motor with two commutators and the ancient saw of "drop a nickel in the slot and see the trolley come off," appreciate the shift in point of view to the full.

The general phases of the changes mentioned are familiar to all electric railway men. In the beginning every electric car was a made-over horse car and the whole equipment was light in proportion. Then came the era of specialized cars for motor service, of heavy track, relatively high speeds and always a demand for more power and quicker acceleration. Now these various items fatten upon each other. Heavier cars mean heavier motors and track, while high speed and rapid acceleration go hand in hand and demand again heavier track, bigger motors and stronger cars. And so the game went merrily on until a point was reached where every little electric road felt it necessary to use 45-ft. cars with the heaviest motor equipment on the market, on the apparent theory that the scene of their operations was about to become a great terminal metropolis for high-speed electric service to the ends of the earth, and the net result has been mostly repair bills, especially for the tracks. It is most encouraging to note at the present time a realization that unnecessary dead weight, whether in the car itself or in its equipment, costs money both in the beginning and for every mile it is hauled. Years have taught car builders a good deal about light construction, and years of meager dividends have taught railway managers to cut their coats according to the cloth and not according to iridescent dreams of the promoters.

Concerning the construction of the cars themselves, we propose here to say nothing more than to direct attention to the well-known fact that builders know how to make cars of good capacity and good wearing qualities at a weight per passenger certainly 20 per cent less than was thought necessary in the days of extremely heavy construction. What is more, everyone now fully realizes that cars of moderate size and weight answer the requirements of city service in most cases better than the extremely heavy ones. With this knowledge has come an effort to effect a corresponding or greater reduction in the weight of the electrical equipment per passenger carried. The report of the committee on equipment at Atlantic City admirably sets forth this tendency. It is particularly interesting to those familiar with the early history of the art that among the methods now being tried for reduction of equipment weight is the use of motors with field commutation for the high speeds. In fact, our old friend "the loop" has arisen, like the phoenix, for a new flight. The interpole construction has made field commutation again practicable, at least for certain not uncommon cases, and is as well responsible for the possibilities of a general reduction of motor weights with respect to the output. The other methods enumerated in the report are raising the working temperature by using refractory insulation, forced ventilation, use of higher speed

motors and re-design for specially light weight. Now, to get the car equipment down to modest weight any or all of these methods give promise of good results; in fact, they co-operate to secure the extreme of light weights, yet each method has in a sense its own field of applicability. General re-design for light weight would, of course, be a good thing, but does not offer the possibilities of weight reduction to be found in the other devices. The use of higher speed motors has its limitations, yet is practicable where high car speeds are to be the rule. Forced ventilation likewise, so successful in locomotive practice, lends itself more readily to heavy service than to that smaller work in which the weight of equipment is now the most serious burden. The use of refractory insulation is, in and of itself, always a good thing and to be encouraged, yet it may be a question whether it should not be taken advantage of rather to increase the factor of safety and so reduce repairs than to force the output.

In connection with the field control motor there is an interesting possibility of recurrence to the more general use of single-motor equipments, particularly in light service. The weight of such equipments per horse-power can be made materially less than that of a double-motor outfit and its first cost and repair cost is notably decreased. Of course, with double motors there is always the possibility of hobbling home after a breakdown, but with simple car equipment and modern insulation it is at least an open question whether the gain in the use of single motors would not be in very many instances greater than the loss in energy in giving up series-parallel control. At the price at which many railway companies reckon their current the possibilities of the single motor with field control ought to be very thoroughly investigated where the service is not so heavy as to demand the extra adhesion of the double drive.

Another line of improvement which impresses itself very forcibly upon us is the reduction of weight in the car wiring system. With the very heavy cars came elaborate wiring installation in heavy iron conduit, put in almost as it would be in a concrete office building. Iron conduit is permanent, true enough, but it is outrageously heavy, and it is a grave question in the minds of many operators whether in the long run it makes for safety. It seems to us that if care is used to select a good quality of cable and to install it carefully this extreme external protection is unnecessary. A suitable fireproof trough or flexible sleeve guards the cables for all practical purposes just as effectively, lessens the risk of abrasion of the insulation and also tends to avert the troubles from lightning which have of late been not infrequently reported. There will always be a field, perhaps an increasing field, for heavy cars adapted for powerful motor equipment and high speeds, but at least three-quarters of the electric railway service in the United States would be positively improved from an operative standpoint by the deliberate adoption of somewhat lighter equipment. One does not need a pavement maul to kill mosquitoes, and it certainly does not seem necessary to go the limit in heavy cars, intricate and costly motor equipment for the everyday work of electric lines worked with moderate traffic and at moderate speed over tracks without excessive grades. The present reversionary

tendency is a wholesome one, and while it will never lead us back to the rickety equipment of ancient days it will certainly result in lower operating costs and smaller repairs.

VALUES CLAIMED IN THE BUFFALO PLAN

The history of the International Traction System of Buffalo, with its early losses and record of superseded property, is not unlike that of other similar companies in various parts of the country. It has been laid before the New York Public Service Commission, Second District, in connection with a plan of reorganization which, in brief, justifies the present capitalization, which, eliminating certain intercorporate holdings, amounts to about \$47,000,000. While the plan thus proposes that the securities outstanding continue without readjustment in the reorganized property, the company outlines its intention of using future surplus earnings, above a fair rate of return, to overcome any excess in capitalization.

In the estimate of the value of the property made by Bion J. Arnold certain elements enter, the most conspicuous of which is the theory that a company is entitled to a fair rate of return upon actual investment from the beginning of operation, provided the records show that it has been managed conservatively. This theory, as stated in the issue of the *ELECTRIC RAILWAY JOURNAL* for Oct. 21, is one that has been upheld by the conservative Railroad Commission of Wisconsin. It has never, we believe, been developed so fully as in the present case. This may be due in part to the fact that none of the Wisconsin companies to whose problems the theory has been applied conducts operations on as large a scale as the International company or has been in business for so many years as the constituent railways of that corporation. The theory, then, is advanced as the foundation of a case where its acceptance involves, probably for the first time, a very large amount of money or, what is the same thing, the acceptance of an equivalent amount of securities.

Added to the sums by which the company has failed to earn a return of 7 per cent on its investment—that is to say, the difference between actual net earnings and 7 per cent—is interest on those sums. This interest is computed, in this case, at the rate of 7 per cent per annum. The net effect of the application of the theory in the Buffalo case is a “cumulative excess,” as it is termed, of \$11,185,908. As is shown in the full figures published in the *ELECTRIC RAILWAY JOURNAL* for Oct. 21, this item becomes an important part of the total capital value claimed by the company. It is, in fact, 23.7 per cent of the full amount. Starting with the year 1866, the investment in the property is stated at \$233,690; in the following year this amount had increased to \$342,335, and at the end of that year there had accumulated an amount of \$11,799 by which the property had failed to earn the fair rate of return used in the calculation.

Until the year 1876, when the investment in the property was \$862,437, the amount of the “cumulative excess” increased each year. In that year the actual net income from operation exceeded for the first time the assumed rate of 7 per cent and, as a result, there was an actual decrease in the cumulative excess. From that time until 1884

there were only slight changes in the amount. In each year intervening the actual net income from operation was in excess of the calculated income at the fair rate of return assumed, but in some cases the excess was so small that the interest upon the cumulative excess caused a net increase in the amount to be made up in the future. By the end of 1892 this amount had risen to \$546,370. Not until 1896, however, did it exceed \$1,000,000. At the end of 1900 the amount was \$3,316,173, and from that figure there was a steady increase to \$6,708,045 in 1905, \$9,168,710 in 1908 and the final figure stated for 1910.

In 1910 the investment in the property was calculated at \$35,889,102. The income at 7 per cent, if realized, would have been \$2,458,817, whereas the actual net amount derived from operation was \$2,239,276, a difference of \$219,541. The interest, however, on the cumulative excess which was developed through the previous years of operation made an actual addition for the year 1910 to the amount of profit unrealized and interest thereon of \$936,995. The interest is thus increasing rapidly. All the figures which have been developed on this point are based, of course, on totals showing the investment in the property. According to the report these values were determined by calculation of the cost new of existing and superseded property. The information regarding superseded property was secured from records of the company, statements of individuals familiar with the history of the properties and published reports of various subsidiaries; and the values as of the dates of purchase thus determined were used.

Inasmuch as the failure of the property to realize the fair rate of return assumed accounts for 23.7 per cent of the full capital value claimed in this case, it will be of interest to show what proportion of the total is represented by other elements in the appraisal. In the valuation of physical property now held and operated, the cost new was computed at \$25,957,015. This is 55.2 per cent of the total capital value. To this amount there was added a charge of \$5,677,952 for expenditures charged against capital account for property that has been superseded. This amount comprises 12.1 per cent of the total, making an aggregate of 67.3 per cent to represent the total capital value charged on account of physical property, either existing and operated now or owned in the past and discarded because of supersession. To the figures stated there has been added \$4,574,135 on account of bond discount, or 9.7 per cent of the total. As the figures given aggregate 100.7 per cent, it may be stated that the excess amount, \$320,000, is subtracted for capitalization of a lease.

The amount of bond discount, as set forth in the report, is developed by a statement of the discount at which bonds of the present company and constituent properties were sold. Some of the discounts were large. From 1867 to 1885 the bonds of the Buffalo Street Railroad were sold at 85 and 90. On most of the bond issues of constituent companies, according to the statement, 85 per cent of par was realized. Even the bonds of the International Traction Company, the present holding company which controls the properties, were sold, according to the statement, at a discount of 24 per cent between 1899 and 1910. Previous issues of the bonds of the holding company were sold at a discount of 12½ per cent in 1899. On the total amount of

bonds involved during the history of the property from 1867 to 1910, \$32,790,500, the average rate of discount was 13.9 per cent. The bond discount is included in the capitalization on the theory, which is consistent with the basis of the plan, that it is part of the cost of raising capital. If the discount at which the bonds were sold had been set up as an amount to be amortized by charges against earnings, it would have increased the amount by which the properties failed in the past to earn the fair rate of return assumed in this case.

As the total cost new of present physical property is distributed in detail in the report, the proportion which each bears to the total may be shown. Outside of an item of \$17,238 for extraordinary carrying charges on track that could not be used promptly because of the failure of the city to open the streets, and an item of \$64,752 investments, the summary of physical property shows a total value of \$25,875,025. This, however, includes \$2,352,275, or 10 per cent, for legal expenses, carrying charges and contingencies. The summary, exclusive of these items, therefore is \$23,522,750. This amount consists of the following items in the proportions named: Track, 33.5 per cent; paving, 12.5 per cent; electrical distribution system, 8.8 per cent; rolling stock, 20.2 per cent; power plant and substation equipment, 7.9 per cent; fixed tools and shop equipment, 0.5 per cent; stores, supplies, floating tools and miscellaneous, 1.5 per cent; furniture and fixtures, 0.2 per cent; buildings, 7.7 per cent; real estate, 7.2 per cent.

The corresponding percentages of different classes of superseded and abandoned property are somewhat different proportions of the total value of that class than the percentages of property in actual use at the present time. These are given below: Track, 51.3 per cent; paving, 19.5 per cent; electrical distribution system, 5.4 per cent; rolling stock, 12.7 per cent; power plant and substation equipment, 8.9 per cent; furniture and fixtures, nominal; buildings, 2.2 per cent. The total of these, without allowance for the 10 per cent added for legal expenses and contingencies, and without deduction for the scrap value realized, is \$5,837,067.

No depreciation is computed in the report for the reason that if a deduction should be made on account of this loss in value it would simply increase the amount to which the company would be entitled, in accordance with this theory, because of the failure to earn a fair return. At the request of the commission, Mr. Arnold is now preparing a report which will show the depreciated or present value of the physical property. The plan well supports the proposition, in which we concur, that, in all cases possible, outstanding reasonable capitalization, issued legally, should be recognized. The Buffalo plan, however, goes a step further in that it provides for the gradual elimination of that part of the present claimed capital value which is not represented by actual physical property in use. This theory of reimbursement for the investment not now represented by property in existence is upheld by Mr. Arnold in this case because of his counterbalancing proposal that this investment shall be retired in the future.

The hearings upon this general plan of capitalization have not yet been finished, so that further testimony upon it may be expected in the early future.

Power and Transmission Methods of the Prussian-Hessian State Railways

This Article Describes the Power Station, Transmission System and One of the Types of Overhead Construction Adopted for the First Trunk Line Electrification of the Prussian-Hessian State Railways Between Bitterfeld and Dessau

On July 29, 1909, the State Railways of Prussia and Hesse were granted a sum for the experimental electrification with the single-phase system of the Dessau-Bitterfeld section of the trunk line which joins the cities of Magdeburg, Dessau, Bitterfeld, Leipsic and Halle, as shown in the accompanying map. The work was begun on Jan. 18, 1910, and the first electric locomotive was placed in operation exactly one year later. The section now in operation is 16.12 miles long. However, the plans contemplate the electrification of the entire line, totaling 95.48 miles. The Dessau-Bitterfeld line is well suited for high-speed experiments, as it is situated in a very flat country and is built with few curves. One of the controlling reasons for electrifying this particular section was the fact that it is in the heart of a great lignite region. This cheap fuel was available for power station use, but could not be employed by steam locomotives.

The present purpose is not to operate with higher speeds than were customary with steam, but merely to maintain the old schedule of twenty passenger trains and fifteen freight trains a day. The freight service, however, is much heavier during the harvesting of the sugar-beet crop. The average weight of express passenger trains is 170 metric tons and of freight trains from 600 to 1500 tons.

POWER STATION

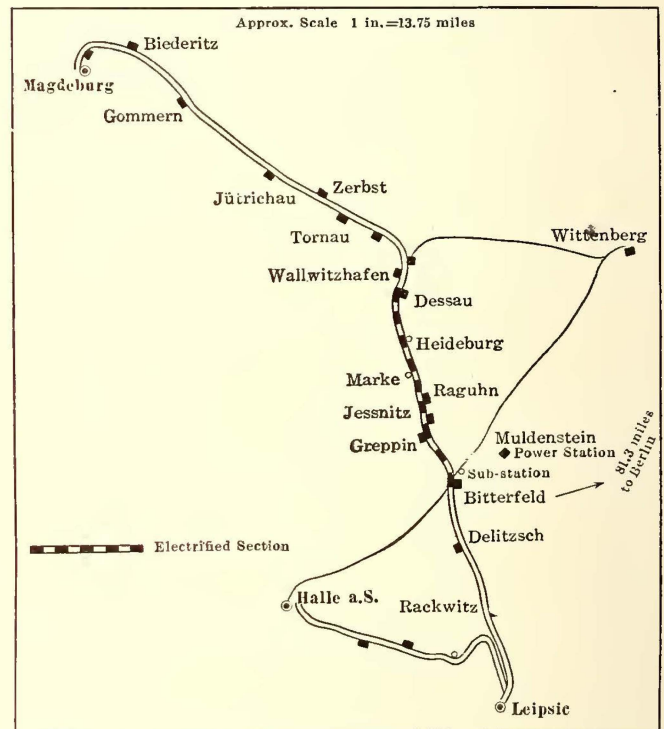
The energy for the operation of the line is generated in a power station at Muldenstein, 3.16 miles from Bitterfeld. The station is not on the right-of-way, but is very favorably located with regard to cooling water supply and coal delivery. The slope of the land also made it possible to build the structure with very little excavation and to install automatic dumping machinery for the coal storage. The station generators supply current at 15 cycles and 3000 volts, which is transformed to 60,000 volts for transmission and then stepped down again to 10,000 volts for the trolley. Of course, a 60,000-volt line was not required for the short distance from the power station to points on the section thus far electrified, but this high potential was installed at once with a thought of the more extended electrification to come and also because of the desire to gain as much experience as possible with high-tension lines of the selected designs before the equipment of more mileage. At present there is only one substation, and this is located near Bitterfeld.

The Muldenstein power station is a radical departure from other generating plants, inasmuch as the boilers, generating machines, switch equipments, auxiliaries, oil storage, etc., are in separate buildings to insure maximum ventilation and light. The order of the buildings is as follows: Fuel storage along the railroad track, then the boiler, machinery and switch gear buildings parallel to the storage building in the order named. Only a portion of each section has been built at present. The boiler house is of "knock-down" construction, but the portions of the generating section so far built are of massive brick to avoid any future shifting of the crane and generating sets. The switch gear is now housed in a part of this building.

The complete boiler house will have eight batteries of boilers, each connected to a stack 328 ft. high and 13 ft. inside diameter at the top. The present equipment consists of four Stirling water-tube boilers and one stack. Each pair of boilers is supplied with a common feed-water heater.

The grate area per boiler is 3229 sq. ft., the steam pressure 120 lb. to 125 lb. above the atmosphere, and the superheat as high as 375 deg. C. The boilers are arranged to use both run-of-mine coal and briquettes.

The machinery room now contains a 5000-hp, 900 r.p.m. steam turbine furnished by the Allgemeine Company, direct-connected to a 3000-kw, 3000-volt, 15-cycle single-phase generator made by the Siemens-Schuckert Company. The latter company also furnished a motor-generator set and a storage battery for lighting and auxiliary purposes. The space now required for the switchboard will eventually be used for a machine shop. The basement of the machine room also contains feed-water tanks, turbine-driven feed



Dessau-Bitterfeld Railway—Map of Territory, Showing the Portion Now Electrically Operated

pumps, condensing equipment and other turbine auxiliaries. The turbine is ventilated by filtered air. It may be operated either condensing or non-condensing, valve arrangements being provided for an output equivalent to five-sixths of the rated output under the latter condition. The generator is rated at 3750 kva, equivalent to 3000 kw at 80 per cent power factor, 3900 kw for half an hour and 4200 kw for two minutes.

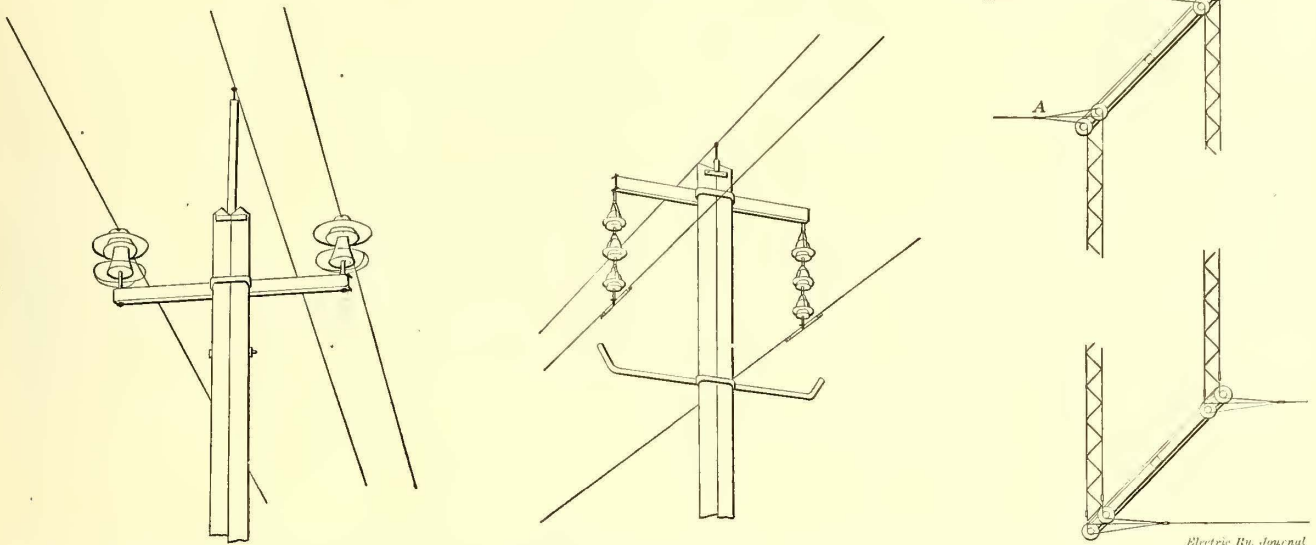
Two 1850-kva, core-type, oil-cooled transformers made by Brown, Boveri et Cie. transform the generator current to 60,000 volts for transmission. The actual step-up ratio is 2925 volts to 60,000 volts. The transformers can be connected for a possible transmission potential of 30,000 volts should the 60,000-volt underground cable transmission prove unsatisfactory. Each transformer has an oil-circulating pump. These transformers can carry a 20 per cent overload for two hours and a 50 per cent overload for half an hour. The switching equipment was furnished by the

Siemens-Schuckert Company. The 22-kw motor-generator set previously mentioned generates 220-volt direct current for lighting, for operating the remote-control switches, etc.

HIGH-TENSION OVERHEAD TRANSMISSION

The high-tension transmission between the Muldenstein power station and the Bitterfeld substation consists of one

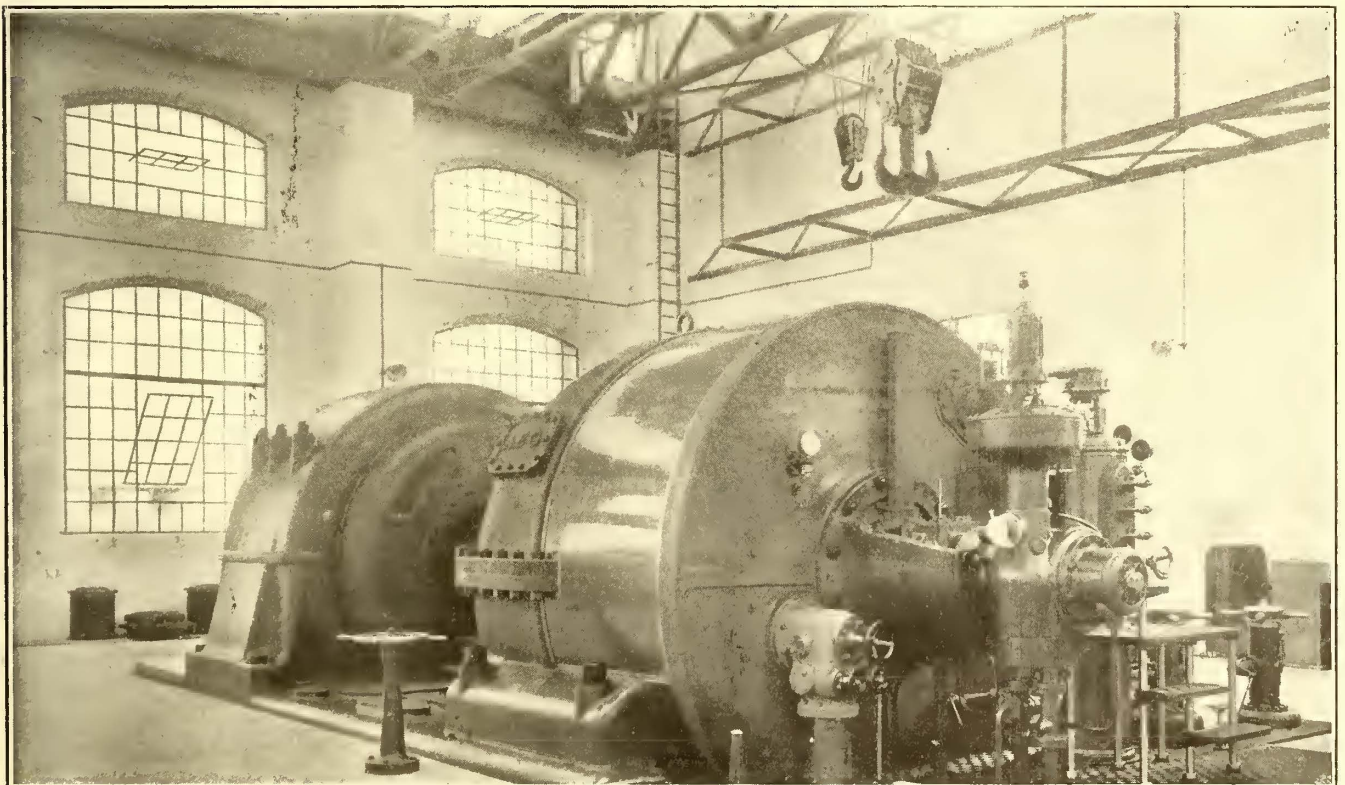
average distance between the twin wooden poles is 230 ft., but between the metal poles as much as 311 ft. The transmission lines are of stranded copper of No. 3 wire carried 19 ft. to 24 ft. above the ground according to conditions. The porcelain insulators have iron pins and comprise the ordinary cross-arm and suspension types illustrated. The



Dessau-Bitterfeld Railway—Examples of High-Tension Line Construction, Including a Crossing Over Steam Railroad Tracks

overhead and two underground 60,000-volt lines. The overhead line was built to forestall delays through the possible failure of the underground cable lines and also to determine its influence on nearby parallel low-voltage circuits.

cross-arm insulators have guard rings for protection against atmospheric discharges and disruptive arcs. All insulators were tested for punctures up to 100,000 volts and for over-arc-ing up to 80,000 volts. The latter test was



Dessau-Bitterfeld Railway—3000-Kw, 3000-Volt, Single-Phase Turbo-Generator Set in the Muldenstein Station

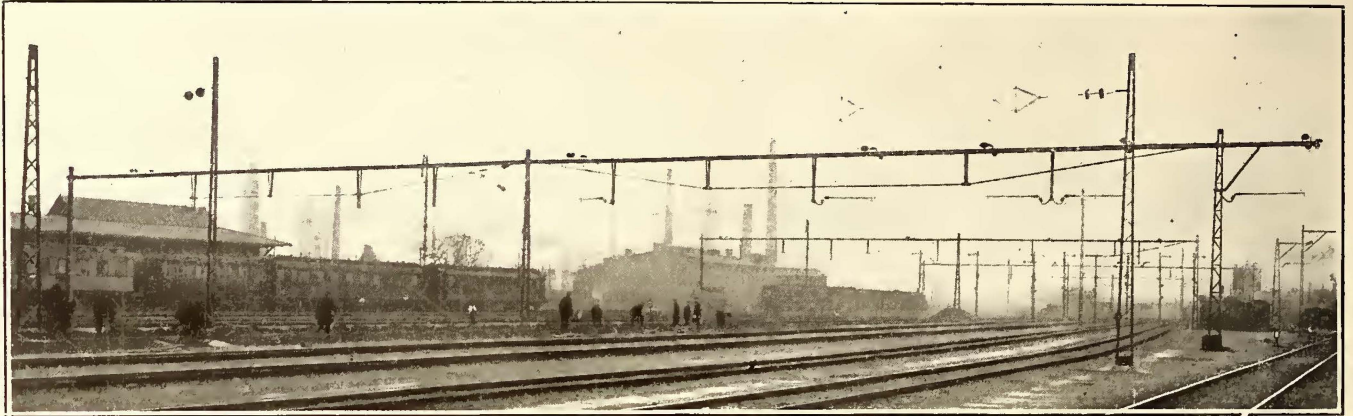
Owing to the limited appropriation, the overhead line which was built by the Siemens-Schuckert Company is of the simplest character consistent with safety. The poles at the stations and over special crossings are of metal lattice design, but elsewhere the wires are carried on pairs of wooden poles which are screwed together as shown. The

made in an artificial shower. Auxiliary wires are used at all crossings to prevent a broken wire from falling to the ground. The grounding wire installed above the two transmission wires is connected to all cross-arms and to eight submerged iron grounding plates.

A somewhat special construction was used in crossing

the Berlin-Halle Railway. As shown on page 979, each of the high-tension wires is connected to two steel wires just before reaching the insulators. Each wire is then zig-zagged across the right-of-way over the corresponding pair of steel wires. These steel wires are connected to the copper

single-conductor aluminum cables of 100,000 circ. mils cross section covered with prepared paper insulation, a double layer of lead and an external protection of asphalted jute. The cables were laid at a depth of about 2.6 ft. in a sand-filled conduit. After installation the cables were sub-



Dessau-Bitterfeld Railway—Long Span Construction in the Yard at Bitterfeld

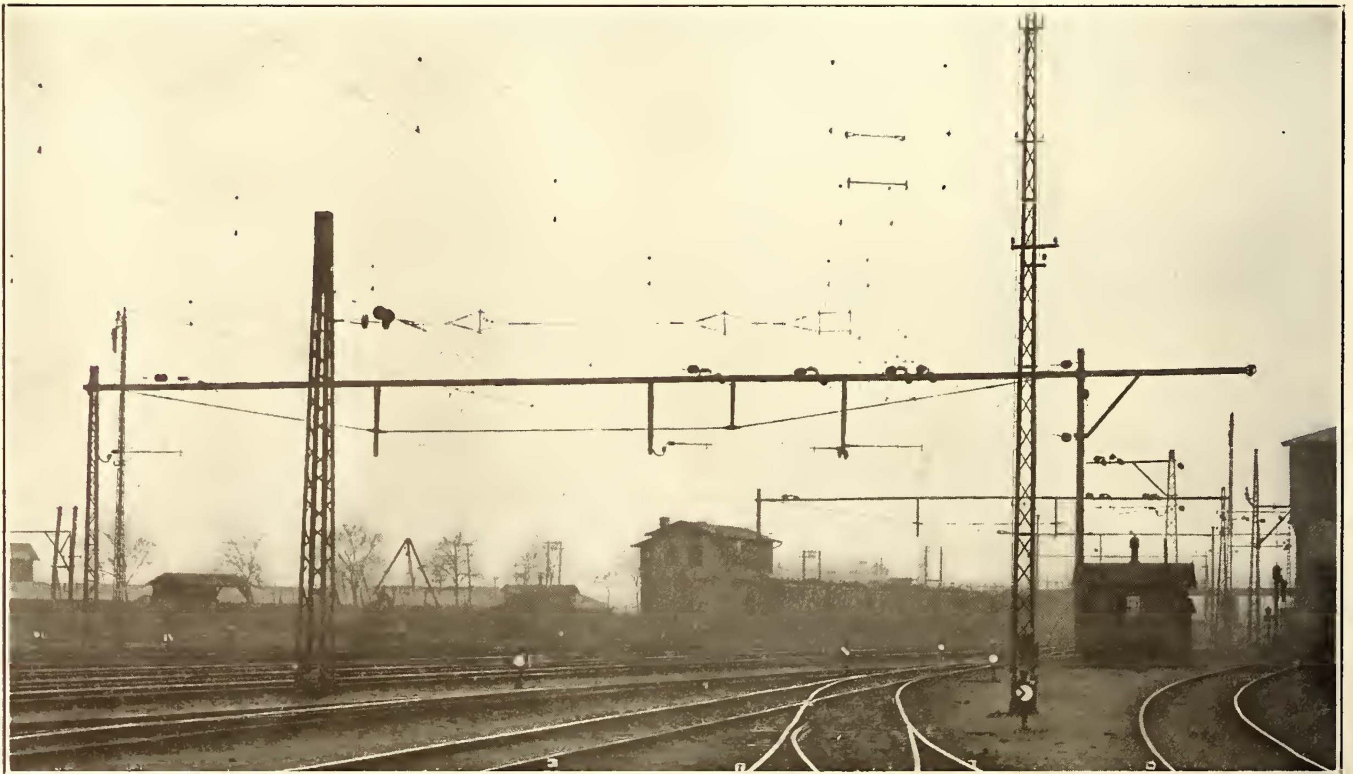
strands with special clamps placed at the points marked A. The insulators were installed in pairs on account of the extra strain at the corners of the transmission lines.

HIGH-TENSION UNDERGROUND TRANSMISSION

Underground cable lines were installed for two reasons. One was to have a high-tension transmission line which could not be so readily located and destroyed by rioters or invading armies as an exposed overhead line; another was the immunity from atmospheric disturbances which such lines would enjoy. It was found on taking up the question with the cable manufacturers that cables could

be subjected for ten minutes to a test of 50,000 volts against the earth. These cables showed the following characteristics: Insulation resistance per mile, 3128 megohms; capacity per mile, 0.2712 micro-farads, and ohmic resistances per mile, 0.4288 ohms.

The Felten-Guilleaume underground lines are also single-conductor cables with lead covering and prepared-paper insulation. The conductors are of copper of 80,000 circ. mils cross-section. These cables were tested to 120,000 volts, 40 cycles, first for an hour and then for ten minutes. They showed the following characteristics: Insulation re-



Dessau-Bitterfeld Railway—Construction at a Curve in the Bitterfeld Yard. The Lattice Pole at the Right Is a Lighting Pole

be built to withstand test potentials as high as 200,000 volts. Finally one set of cables was ordered from the Siemens-Schuckert Company and another from the Felten & Guilleaume-Carlswerk Company.

The Siemens-Schuckert transmission consists of two

distance per mile, 5420 megohms; capacity per mile, 0.2928 micro-farads; ohmic resistance per mile, 0.4928 ohms.

BITTERFELD SUBSTATION

The Bitterfeld substation was built to convert the 60,000-

volt transmission current to 10,000 volts for the contact line. Two transformers with the necessary switching apparatus are installed for this purpose. The substation building, with the exception of the transformer section, is two stories high. The lower floor contains a switch room, a 32-

vice and are rated at 1800 kva. Contact thermometers are installed in the transformers to show the temperature of the oil and to close a circuit in the switchroom as soon as the critical temperature is reached. The transformers were furnished by the Allgemeine Company and the switching



Dessau-Bitterfeld Railway—Overhead Construction for Six Tracks at Jessnitz

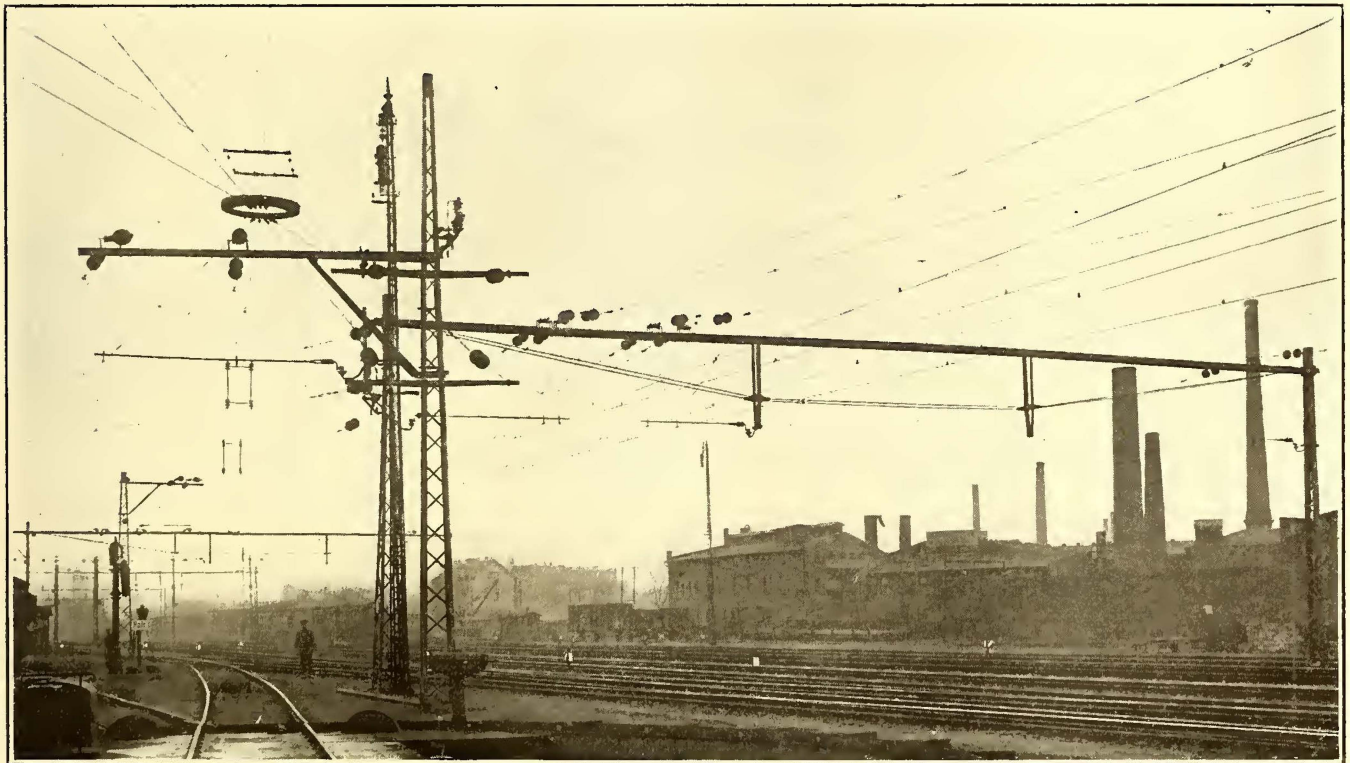
cell storage battery for operating the switches and lighting, and a high-tension room which contains the 10,000-volt and 60,000-volt switches, and the oil and water resistances for the lighting and high-tension discharge protective apparatus. The horns for the latter and the 60,000-volt busbars are placed on the upper floor. In addition to this equipment, the switch room contains a small motor-generator set and telephone.

The two main transformers are placed in individual cells which were carefully designed to insure clean air for cool-

equipment and protective devices by the Siemens-Schuckert Company.

OVERHEAD LINE CONSTRUCTION

The overhead lines between Bitterfeld and Raguhn were furnished by the Allgemeine Company, while the section from Raguhn to Dessau was installed by the Siemens-Schuckert Company. Throughout the entire system great care was exercised in designing the supporting structures to give the locomotive engineers a clear view of signal indications. For this reason, trusses were avoided in the



Dessau-Bitterfeld Railway—Overhead Construction Over Yard Tracks and Turntable

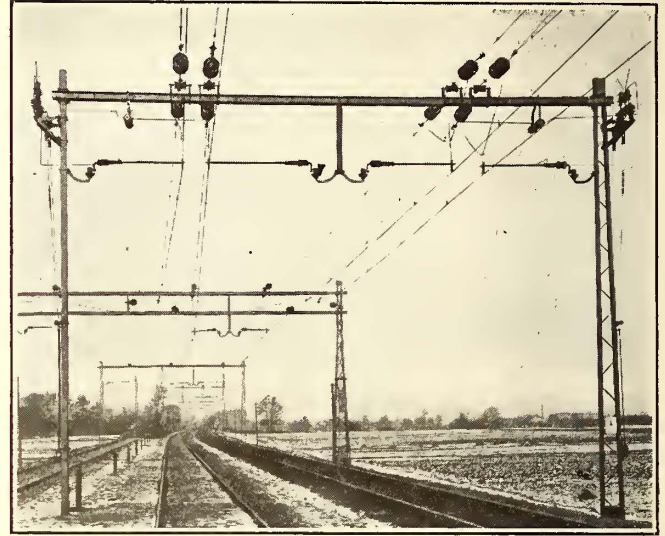
ing the transformer oil. The cool air comes from below through metal gratings and the hot air escapes through ventilators at the top. The transformers can be moved out of the cells over tracks within reach of a crane for ready dismantling. They are built for 15-cycle, single-phase ser-

catenary bridges wherever possible. The particulars in the remaining paragraphs of this article relate to the overhead work of the Allgemeine Company.

This company's contact line is of simple catenary design, the trolley wire being suspended at distances of 19.7 ft. by

hangers from a wire rope catenary. The catenary bridges are about 246 ft. apart. In most cases ordinary channel iron cross-girders are attached by means of hook bolts to the poles or towers erected on both sides of the track. The cross-girders on greater spans are held by tie-rods or are

cable in all sections. This wire, which is also kept taut, has a sliding connection to the messenger cable at all of the latter's suspension points. Its action is as follows: The messenger cable expands when the temperature rises, and consequently its sag increases. The auxiliary tension wire, however, which is of the same material, expands in the same proportion, and, therefore, it takes up the slack with the aid of the tension-regulating weights which are installed at the ends of the section. When the temperature



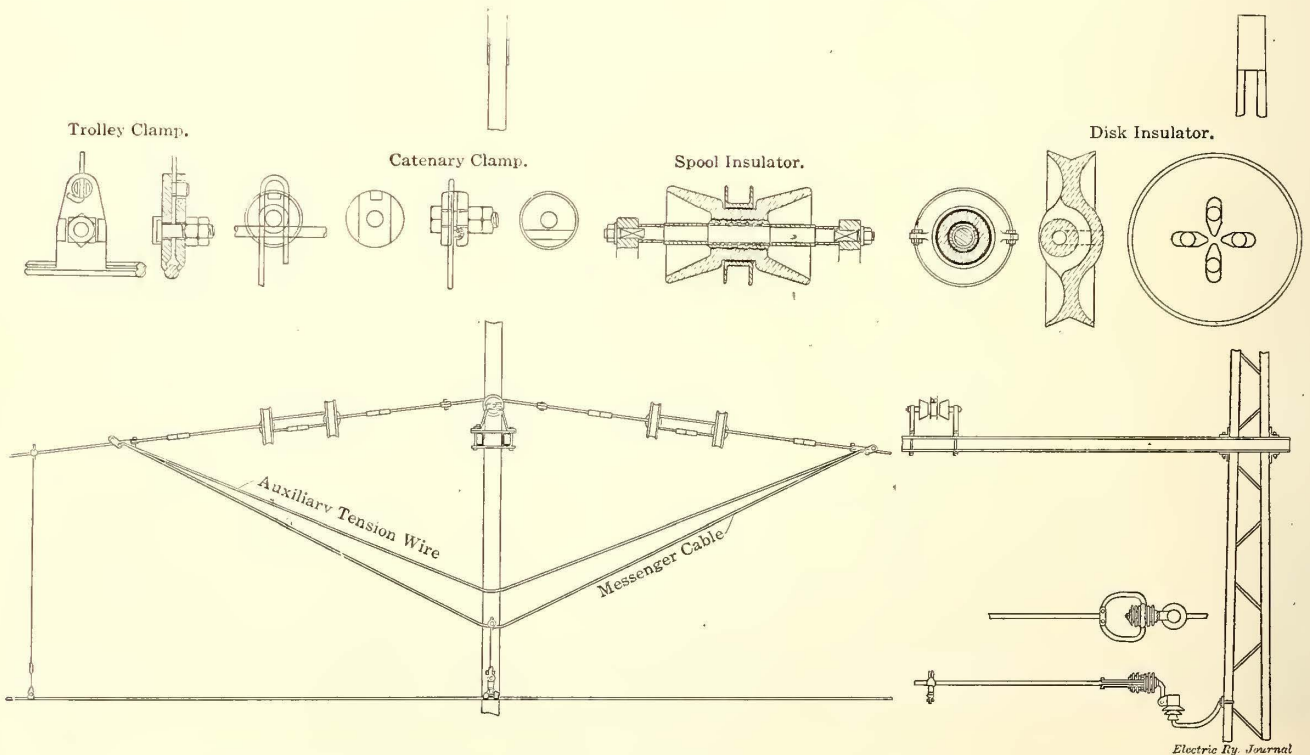
Dessau-Bitterfeld Railway—Construction at the End of a Tension-Regulating Section

Dessau-Bitterfeld Railway—Horn Switch Section Circuit Breakers

fitted with struts. The bridge shown on page 980 is approximately 230 ft. long and spans thirteen tracks.

The overhead line is sectionalized about every 3280 ft. The center of each section is rigidly anchored, while the

falls the two suspension points of the messenger cable approach one another, because of the contraction of the tension wire, thus equalizing the reduction of the sag. Hence, as the sag of the messenger cable is kept practically con-



Dessau-Bitterfeld Railway—Details of the Catenary Line Construction and Insulators

Electric Ry. Journal

two ends are kept taut by automatic tension devices, so that the supporting wires are under approximately the same tension at all temperatures. Both the trolley wire and the messenger cable are kept under tension. A third wire is provided to insure the uniform tension of the messenger

stant at all temperatures, the contact wire remains permanently in a practically horizontal position.

A drawing on this page shows the suspension of the overhead line at a pole or bridge. It will be observed that the messenger cable itself does not rest directly on the spool

or "Diabolo" insulator, but is led under the supporting structure in the form of an unbroken loop which is suspended from the insulator by stranded wire at about 8.2 ft. from each side of the support. The auxiliary tension wire is looped under in the same manner and clamped to the messenger cable as shown. These two wires are insulated from the ground by a pair of disk insulators placed in series in each side of the loop which supports them. The tubular brackets which carry the trolley wire are vertically adjustable and are supplied with one bell and one grooved insulator to secure double insulation from ground. The clamp for the trolley wire can slide along the bracket in accordance with conditions. The contact line is staggered as much as $19\frac{1}{2}$ in. from the center line of the track to insure the uniform wear of the current collectors.

The contact wire is of hard-drawn copper. It has two

with a comparatively small weight. The cast-iron tension weights run in guides which are mounted on the poles or towers. The two ends of overlapping sections are movably connected to each other so that satisfactory current collection can be obtained when the bow slides from one section to the next. This connection is not hindered by temperature variations.

SECTIONALIZATION

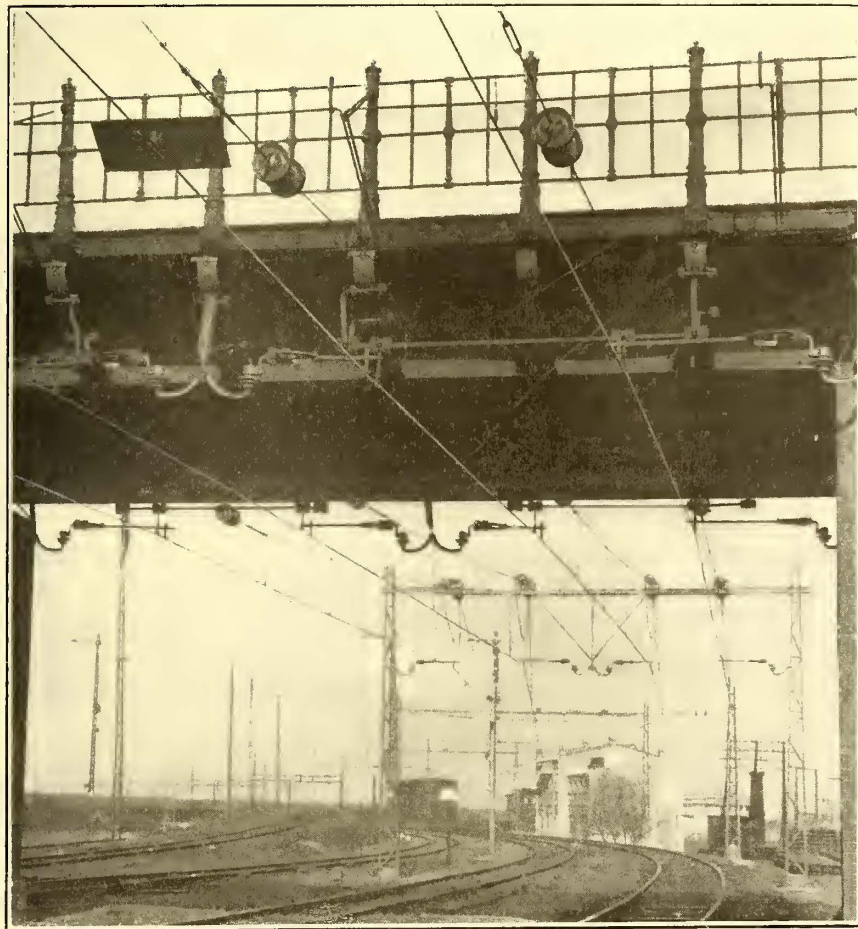
The track is divided into several sections, which can be cut out as required. The arrangement of the trolley line at a section break is the same in principle as that for a tension take-up section. In this case, however, the two ends of the adjacent sections are not connected in the middle of the span, but are carried separately over a section insulating bridge. The two overlapping contact wires are connected to horn switches which are mounted on the towers of this bridge as shown on page 928. Usually these horn switches are closed, but when they are opened, as in emergencies, the sections behind them are cut out of circuit. The horn switches are operated by means of a winch placed at the foot of the tower. The two main lines are completely separated from one another electrically. However, in case of a breakdown a connecting switch in each section is available to feed the following sections from the other main line. This switch is open under normal working conditions. It can be closed by employees after they have telephoned to the substation.

The contact lines over the station sidings are permanently in circuit with the main lines at the smaller stations, except that the contact lines over the loading tracks can be switched in only after the persons working on the track have been requested by warning signals to leave the car. The switch for the signals is actuated by a crank mechanism, inside of which are two contact devices, one connected to a bell and the other to a lamp circuit. The section switch does not close until about 30 seconds have elapsed from the time the crank was operated. During these 30 seconds the bell rings and the lamps burn. The lamps continue to burn as long as the contact wire of the loading track is alive. The current to operate these warning signals is supplied by a pole transformer which is always in circuit with the main line.

SPECIAL OVERHEAD FEATURES

As all curves on open tracks are of a large radius, no special arrangements were necessary to prevent the current collector from sliding off the contact line. On the other hand, pull-offs were required at the stations. At these points the contact line is anchored by means of an extra tower erected on the outer side of the curve as shown in one of the views on page 980.

Among other special constructions is a highway undercrossing at the north end of the Bitterfeld station, where the clearance between the bridge and the rails is limited to 15.8 ft. Here the contact line could not be suspended over the center of the track because of curve elevation. The difficulty was overcome by using two off-side trolley wires for each track and a current collector 7.9 ft. wide. The inner pair of wires is carried from a yoke suspended from the middle of the bridge and the outer pair of wires is carried from brackets anchored in the abutments of the bridge. At



Dessau-Bitterfeld Railway — Double-Trolley Construction on a Curve Under a Bridge with Low Clearance

side grooves for the hanger wire clamps. Galvanized steel is used for all other wires. The hanger wires are prevented from being bent on account of the passage of the collector by providing them with a lower loop which permits the trolley wire to move upward about 2 in.

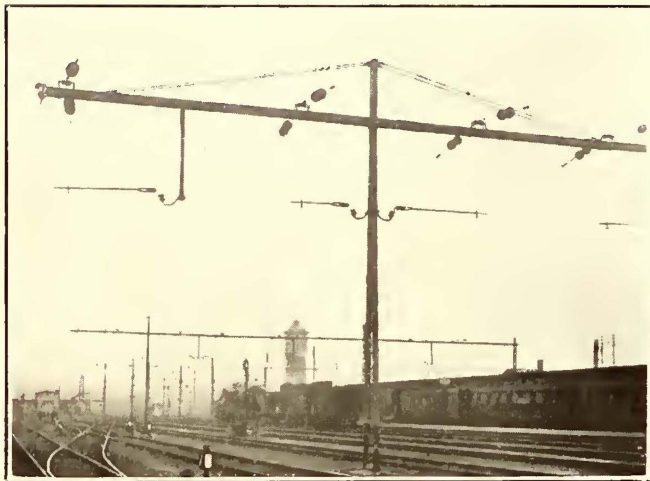
AUTOMATIC TENSION DEVICES

The automatic tension devices previously mentioned are constructed as follows: The two ends of adjoining tension take-up sections are led past one another for a distance of one span and are connected to the tension-adjusting weights as shown on page 982. To divide this tension in the desired proportion between the trolley wire, the messenger cable and the span wire, the ends of these wires are connected to a lever whose arms are so proportioned that the tension remains constant under all conditions. The cable from the tension weights is led over a pulley on this lever. A second loose pulley is provided to secure a quadruple ratio, thereby making it possible to obtain heavy tension (about 2460 lb.)

this location also the Bitterfeld yard is cut off from the open track by section insulators, the several circuits being anchored as shown on page 983. All highway crossings of this kind are protected by screens placed above them at an angle of 45 deg.

The equipment of the locomotive shed at Bitterfeld is worthy of note because the full line pressure of 10,000 volts is used therein on the four maintenance tracks. The corresponding contact lines are interrupted at the entrance, but each track is energized by means of an individual roof switch which grounds the line when in its normal position. Switching-in can only be effected, however, after warning signals are given. These warning signals are similar in principle to those used on the loading track sidings. A signal bell rings and a transparent warning sign which is suspended over each track is illuminated upon operating the switch gear of the affected track. When the operating device is released the switches return automatically to the off position and thus ground the corresponding overhead lines in the shed.

The contact line which is installed over the turntable leading to the shed can also be isolated and grounded. It



Dessau-Bitterfeld Railway—Part of Center-Supported, Double-Channel Catenary Bridge as Installed for Eight Tracks in the Bitterfeld Yard

is fed from the main line, but the separate shed tracks which lead to it are energized from the turntable. The overhead installation at the turntable is shown in the half-tone illustration on page 981. It includes an iron ring which is suspended over the center of the turntable with a separate slot to receive an anchoring clamp from the trolley wire of each track.

Lightning arresters are provided for protection against excess pressures, one being mounted in each of the main lines. They are adjusted to operate at a pressure of approximately 15,000 volts.

NEXT ARTICLE

The second article on this installation will describe the mechanical and electrical features of the several types of the passenger and freight locomotives which have been built by the Allgemeine Company. The speeds of these locomotives vary from 44 m.p.h. to 68 m.p.h., and their axle arrangements and other details vary accordingly.

The United States Bureau of Mines, Washington, has issued a circular (Miners' Circular No. 5) entitled "Electrical Accidents in Mines: Their Causes and Prevention." One section contains rules, with illustrations, for resuscitation from electric shock, the Sylvester method of artificial respiration being specified. According to this older method the patient is placed face upward. In many recent rules the newer Schaefer, or prone, method is employed, in which the patient is placed face downward.

DETROIT UNITED RAILWAY ASSISTS MILK AND CREAM CONTEST—OTHER RECENT FREIGHT WORK

For the convenience of farmers located on the lines of the Detroit United Railway the company did what it could to assist in making a success of an annual dairy meeting and milk and cream contest held in Detroit on Sept. 25 to 26. The contest was held by the Detroit Board of Commerce in the Young Men's Christian Association Building, Detroit, under the direction of the dairy division, bureau of animal industry, United States Department of Agriculture, and the Detroit Board of Health.

Copies of the letter issued by the Board of Commerce explaining the object and conditions of the contest, together with a supply of entry blanks for both milk and cream, were given to conductors of cars carrying milk or cream and distributed. A circular issued to producers and shippers by George W. Parker, general express and freight agent of the company, announced that the letter and blanks would be furnished by conductors on request. Empty packages for samples sent to producers, and also the packages containing the samples of milk and cream to be entered in the contest, were carried free on the regular milk cars of the Detroit United Railway. Circular letters were issued by the company addressed to conductors in charge of milk cars calling special attention to the contest and directing the careful distribution of the general circular letters so that one would reach each shipper or producer of milk or cream. A regular local tariff was filed with the Michigan Railroad Commission covering the free transportation of the packages of bottles.

In the contest all but one of the winners of prizes for high grades of milk and cream were shippers on the Detroit United lines. Altogether there were 108 exhibitors of milk and cream, of whom ninety were shippers on the lines of the Detroit United Railway. In both the milk and cream contests \$25 was awarded for the first prize, \$15 for the second prize and \$10 for the third prize. Other producers who showed a purity of milk or cream above 90 per cent were awarded diplomas.

During the last season the Detroit United Railway has hauled material for the Board of Road Commissioners of Wayne County, Michigan, for the completion of a road on Grand River Avenue. The material was taken by the Detroit United Railway in steam railroad cars from a connection with the Père Marquette Railroad at Greenfield, Mich., just outside of Detroit, and distributed along the Grand River road for a distance of 5 miles. This road parallels a line of the Detroit United Railway.

The material comprised a total of 248 steam railroad cars, of which sixty-five cars were loaded with cement and the remainder with sand and gravel. The total weight of material handled was approximately 9000 tons. On account of lack of water for use in making concrete arrangements were made whereby the Detroit United Railway sent out twelve carloads of water in its regular sprinkling cars. Every courtesy was extended by the company to assist in the completion of the road.

The Detroit United Railway has also hauled material for the construction of a new pumping station for the city of Detroit. Heretofore material has been hauled to the waterworks by wagons as there is no direct railroad connection to the district. A year ago the Detroit United Railway built a track to connect with the Detroit Terminal Railroad. It has also built a line connecting the Jefferson Avenue line to the property occupied by the waterworks of the city and since that time has hauled all the material for the erection of the new pumping station. The company will also haul all machinery necessary to equip the plant. In addition to this work the company has hauled all material for further enlargement of the old pumping station. All the work has been done between the hours of midnight and 4 o'clock in the morning.

New Power Station of the Utah Light & Railway Company

This New Station on the Jordan River Is an Auxiliary to the 60-Cycle Long-Distance Transmission Plant of the Company
—A Special Feature Is a 2000-kw Water Rheostat

An important addition to the generating plants of the Utah Light & Railway Company has recently been placed in operation on the east bank of the Jordan River, about 2 miles from the business center of Salt Lake City. The company conducts a general lighting and power business, besides operating the street railway services of the cities of Salt Lake and Ogden, and the greater portion of its electrical supply is drawn from hydroelectric stations located in the Wasatch Mountains. For several years the company has had at the Jordan River site a steam auxiliary equipment of about 1,800 kw, consisting of a 750-kw, 4400-volt belt-driven, revolving armature alternator, and an exhaust steam turbine with a direct-connected three-phase alternator, capable of being operated in conjunction with the foregoing equipment.

The limited capacity of the old station and the desirability of controlling the entire output of the hydroelectric and steam equipment at a central point led the management of the company to investigate the problem of establishing a new turbo-generating auxiliary plant of high capacity, which would also serve as the load-dispatching center of the system. The engineering firm of Westinghouse, Church, Kerr & Company, New York, was retained in a consulting capacity, and it was decided to build a new plant on property owned by the company at the site of the existing auxiliary plant in Salt Lake City. The installation of the initial apparatus has lately been completed, and the company now has available an emergency supply of about 8000 kw, which is entirely independent of the capacity available in the hydroelectric stations. The new station is built on the unit plan, with ample room for expansion, and contains an elaborate installation of switching apparatus for the control and measurement of the incoming transmission and outgoing distribution feeders.

PRESENT SYSTEM OF ELECTRICAL SUPPLY

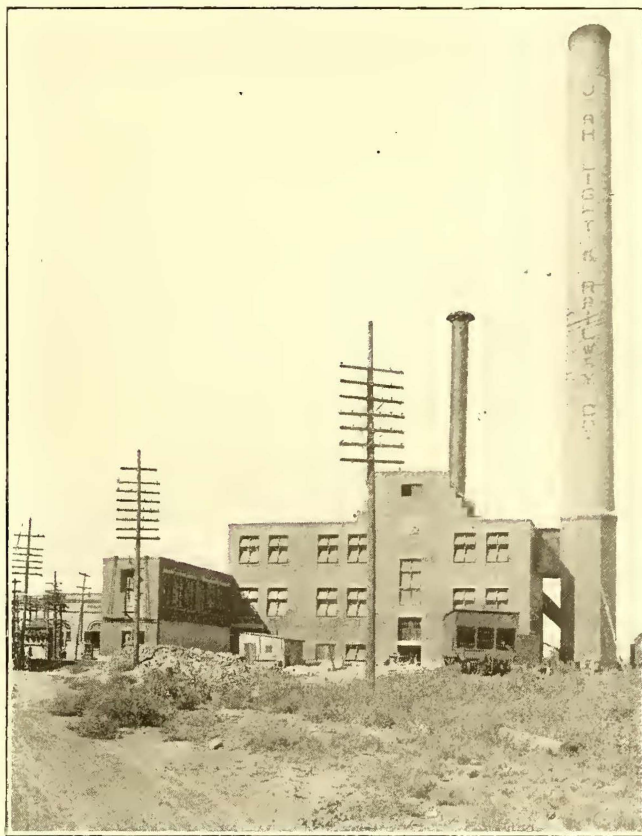
The present system of electrical supply for the company's service is shown in the following table:

Pioneer Station, Ogden Canon,	4 units, total.....	3,000 kw
Bear River Station,	4 " "	4,000 "
Devil's Gate Station,	1 unit, "	3,000 "
Granite Station,	4 units, total.....	1,500 "
Stairs Station,	2 " "	1,600 "
Telluride Power Company service, normally.....		2,500 "
Total hydroelectric service.....		15,600 kw
Auxiliary plant, old and new Jordan.....		8,600 "
Total available generating capacity.....		24,200 kw

With moderate overload upon the above system the company can produce about 30,000 kw at its generating points. The accompanying diagram shows the principal lines of transmission utilized on the system. The Bear River station is owned by the Utah-Idaho Sugar Company, and is located in Bear River Cañon, 85 miles north of Salt Lake City. The Telluride Power Company operates generating plants at Grace, Idaho, and at Logan, Jordan Narrows, Battle Creek and Olmsted, Utah, only a small part of its output being required for the Utah Light & Railway service. The Pioneer station is situated in the outskirts of the city of Ogden, and the Devil's Gate station is a newly built plant owned by the company, located on the Weber River, and about 40 miles north of Salt Lake City. The Granite and Stairs stations are older plants owned by the company and are located in the Big Cottonwood Cañon, about 15 miles southeast of Salt Lake City. At the present writing the company operates a system of transmission lines carrying current at 28,000 volts and 44,000 volts, but the entire

transmission will shortly be conducted at the latter voltage.

In general, the transmission system consists of two three-phase, 60-cycle trunk lines connecting the Pioneer and Devil's Gate stations on the north with the Jordan station in Salt Lake City, through a substation located just outside the site of the auxiliary steam plant; a tie line connecting the Bear River station with the Pioneer plant; a double line connecting the Jordan station with the plants in the Big Cottonwood Cañon, and two lines feeding the system from the high-tension services of the Telluride Power Company. The two northern trunk lines, known as Ogden "A" and Ogden "B," are each 38 miles in length and are being located permanently upon steel towers, the wires be-

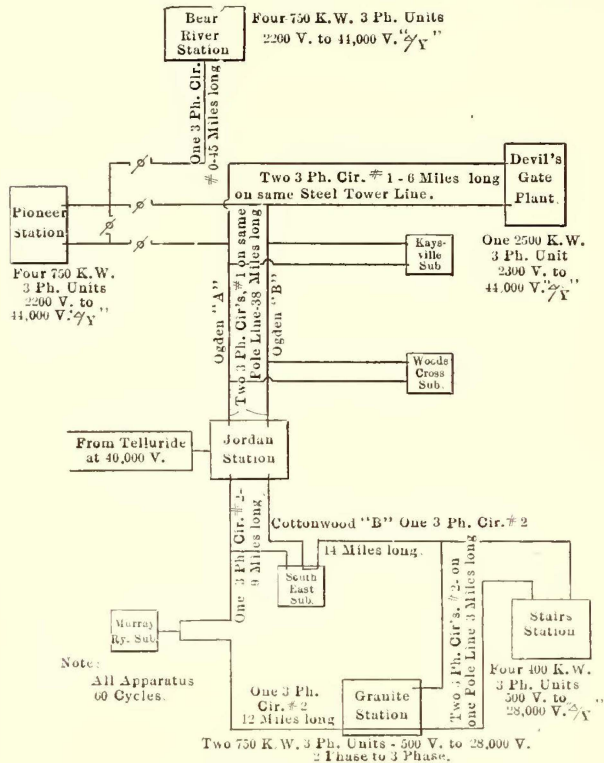


Jordan Power Station—Exterior

ing of No. 0 B. & S. bare copper. The Devil's Gate tie lines are also of No. 1 copper, each being 6 miles in length. The Bear River tie line is 45 miles long and of No. 0 copper. No. 2 copper is used on the Big Cottonwood lines, these being 24 and 14 miles long respectively, the variation being due to the inclusion of various substations between the stations and Salt Lake City.

Substations are located at the Pioneer station in Ogden, at Kaysville, at Woods Cross; and in Salt Lake City, at the Jordan River, West Temple Street, Murray, and at the so-called Southeast distributing point in the city, at Eleventh East Street, between Twelfth and Thirteenth Streets. Both railway and lighting service, as well as the supply of a.c. power, are handled through these substations. The general distribution of current at Salt Lake City is at 4400 volts and three-phase, the street railway supply being obtained at 550 volts through rotary converters and motor-

generator sets delivering direct current in the usual manner. All important switching of high-tension lines and synchronizing of the various sources of supply are handled at the Jordan station, the substation at this site having been provided with apparatus for this purpose before the transfer of facilities was effected between the former and the new turbine station switch house. The potential is



Jordan Power Station—Diagrammatic Layout of High-Tension System

transformers of the following capacities: stepped down from 44,000 to 4400 volts in water-cooled

Ogden "A" Circuit, 3 transformers, total rating.....	3,000 kw
Ogden "B" Circuit, 3 transformers, total rating.....	3,000 "
Cottonwood "A" Circuit, 3 transformers, total rating.....	999 "
Cottonwood "B" Service, 3 transformers, total rating.....	1,500 "
Telluride Power Company, 9 transformers, total rating.....	3,498 "

Total step-down capacity.....11,997 kw

These transformers are all located in a switch house transformer compartment installation situated about 100 ft. south of the new Jordan station, the latter being equipped with a complete remote-control benchboard and concrete busbar and oil-switch house for the expeditious handling of the incoming and outgoing lines and feeders. Disconnecting switches of the air-brake type are provided in all incoming lines, as well as 44,000-volt oil switches for emergency operation. The high-tension line switches are located in the original substation building and will not be re-located inside the new auxiliary steam plant switch house. The latter handles 4400-volt current exclusively.

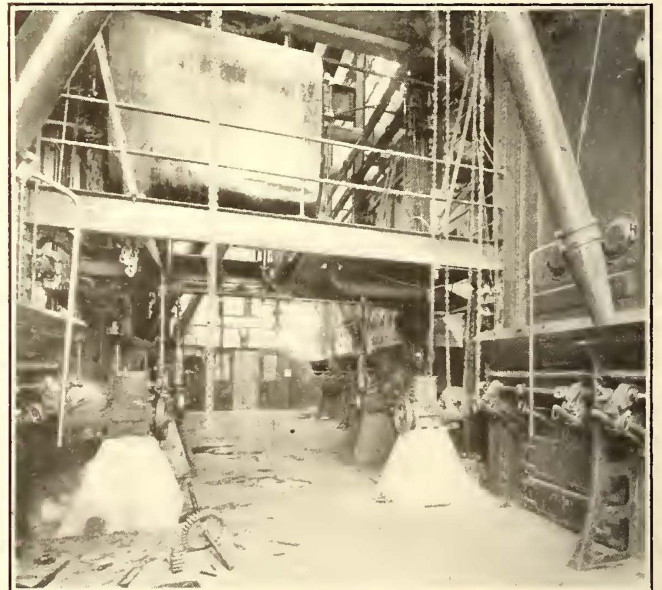
STRUCTURAL FEATURES OF NEW STATION

The new station is a handsome red pressed-brick structure with a steel frame and pile and concrete foundations. On account of the unstable character of the soil 1500 piles, averaging 36 ft. in length, were driven on the station site; the piles were then capped with a 4-ft. concrete slab which served as a machinery foundation. Concrete caps and sills are used at the window openings and at doorways. As the station is built mainly to serve as a steam relay, special pains were taken in its design to secure a compact layout of apparatus. The volume of the plant, including the switchboard room, is 56 cu. ft. per kilowatt of continuous output. The floors, roof and coal bunkers are of concrete slab construction. The piles used in the foundation are of Oregon fir, spaced in general 3 ft. apart between

centers. Draft for the boilers is provided by a Kellogg radial brick stack 226 ft. high and 11½ ft. in inside diameter at the top. The company has utilized the stack on the side toward the city for the display of its corporate name in letters of inlaid black brick, 4 ft. in height, the words being legible at a distance of about 3 miles. The bottom of the sign is 80 ft. from the ground, and the letters also serve to give the company publicity on a popular route to the Great Salt Lake. The station building is rectangular in shape, with a wing at the south end to accommodate the switchboard room and the east end of the bus and oil-switch installation. The over-all ground dimensions of the building are 153 ft. x 71 ft.

FUEL SUPPLY

Coal is brought to the station from mines in Wyoming over a railroad route, terminating in a side track on the north side of the building. The fuel used is of the bituminous type, having a heating value of about 11,700 b.t.u. per lb. Outside the station building a hopper in the track receives the coal by gravity from the cars, the hopper being of 4 tons' capacity and provided with 3 in. x ½-in. screen bars set 3 in. apart on centers. The track is carried over the hopper by a 12-in. I-beam under each rail. No crushing equipment is provided, the cars dumping directly into the hopper, at the bottom of which conveyor buckets receive the coal and elevate it by means of an inclined runway to a point about 60 ft. above the ground, whence it is discharged upon a traveling horizontal rubber belt-conveyor, which distributes the fuel to the bunkers above the boilers. The coal-handling apparatus is of the Stephens-Adamson type, has a capacity of 60 tons per hour and consists of the receiving hopper, bucket elevator and distributing equipment. The bucket elevator is gear-driven by a 15-hp, 220-volt, three-phase induction motor provided with a rawhide pinion and operating at 850 r.p.m. The motor is located at the top of the housing carrying the elevator buckets, the latter running on structural steel supports and protected by corrugated sheet-iron housing walls. The buckets are 18 in. wide and 18 in. deep, and travel at a speed of 100 ft. per minute. A stairway is provided on



Jordan Power Station—Boiler Room

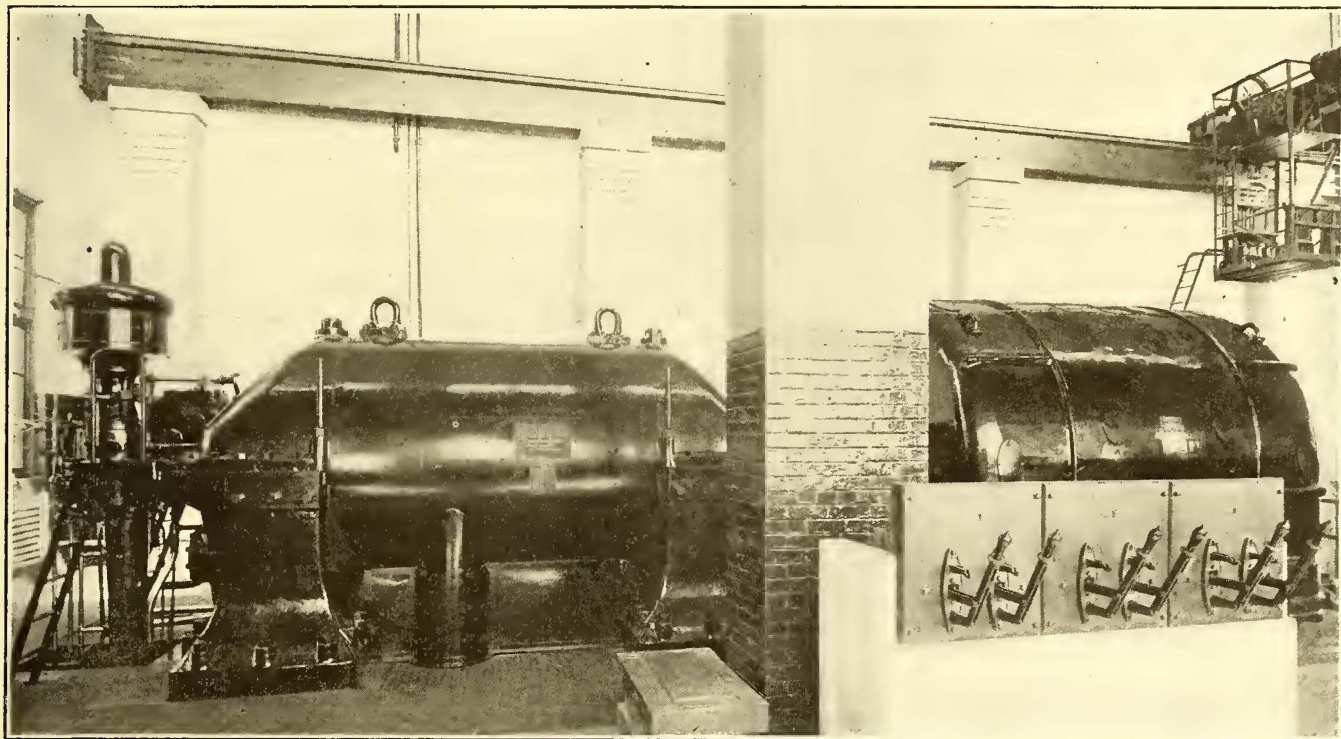
the inside of the elevator housing to facilitate access to the machinery, and the distributing apparatus is designed to permit delivery of the fuel into the bunkers at any point. The coal bunker is designed for a capacity of 2750 tons, and is of concrete carried on steel I-beams. The belt conveyor is 20 in. wide and 72 ft. long, and it is provided with an adjustable hopper equipped with two spouts, which may be discharged into the bunkers either individually or

together, according to the valve setting. The upper portion of the conveyor house is ventilated by four 18-in. roof outlets, and the entire runway is lighted by incandescent lamps of 16-cp rating, supplied with current through circuits run in iron conduits. The rubber belt is driven by a 5-hp, 220-volt induction motor through horizontal gearing, the motor being located near the top of the conveyor house at the east end.

BOILERS

The boiler room occupies the entire northern portion of the plant, being 77 ft. long x 67 ft. wide, with a basement 14 ft. in height throughout its entire area. The boilers are installed in four batteries, aggregating six 600-hp Stirling water tube units, two batteries being located on each side of a central firing aisle about 18 ft. wide. The coal bunker is located immediately above the boiler room, with its axis parallel to the firing aisle, and from it each boiler is served with fuel through a 630-lb. volumetric measuring hopper and adjustable distributing spout. The boilers are equipped

through a hopper into hand cars running on a track of 22-in. gage, and provision is made for the operation of such cars on each side of the basement below the ash hoppers. From the basement the ash cars are raised to the surface of the ground by two hydraulic Otis plunger-type elevators of 2500-lb. capacity each, having a lift of 5½ ft., and operated by water under a pressure of 200 lb. per sq. in., the ashes being used around the premises for filling. City water is used for boiler feeding on account of the unsuitability of the river water. The boiler room is provided with a monitor with wired glass windows, and special lavatory provision is made for the comfort of firemen, there being a separate lavatory for the engine room attendants. The present stack is designed to handle the existing boiler installation, but in event of the expansion of the station, an additional stack will be required. Ample room exists on the property for the symmetrical enlargement of the station along the present lines of development. A 100-gal. boiler-compound tank is installed on the north side of the



Jordan Power Station—Side View of Turbo-Alternator

with Roney stokers driven by Westinghouse vertical engines, one per battery being provided. The delivery spouts are 12 in. in diameter at their upper ends and 6 in. at the feed ends, fuel dampers being provided in each with chain control from the boiler room floor. The stoker engines are mounted on concrete piers, and in common with all steam-driven auxiliaries in the plant, exhaust into the feed-water heater, which is of the Stilwell open type, located on a platform carried by steel I-beams 11 ft. above the floor. Each boiler is equipped with a superheater and delivers steam at a pressure of 200 lb., the superheat being 125 deg. Fahr. Each superheater and boiler are equipped with safety valve connections, the valves being set for 210 lb. Draft gages are installed on all boilers, and the stack connection is provided with an independent draft gage. The products of combustion from each boiler are collected in sheet-iron breechings connecting with a 7 ft x 15-ft. main smoke flue, which discharges into the stack at a height of 33 ft. above the ground. The draft ordinarily varies from 0.1 to 0.25 in. A wattmeter of the indicating type is installed in the boiler room over the center of the firing aisle, as a guide to the operation of the boiler room.

Ashes are dumped from the ash pit of each boiler

boiler room and above the boilers. It is piped with city water, and is arranged for the rapid mixture of the compound when necessary.

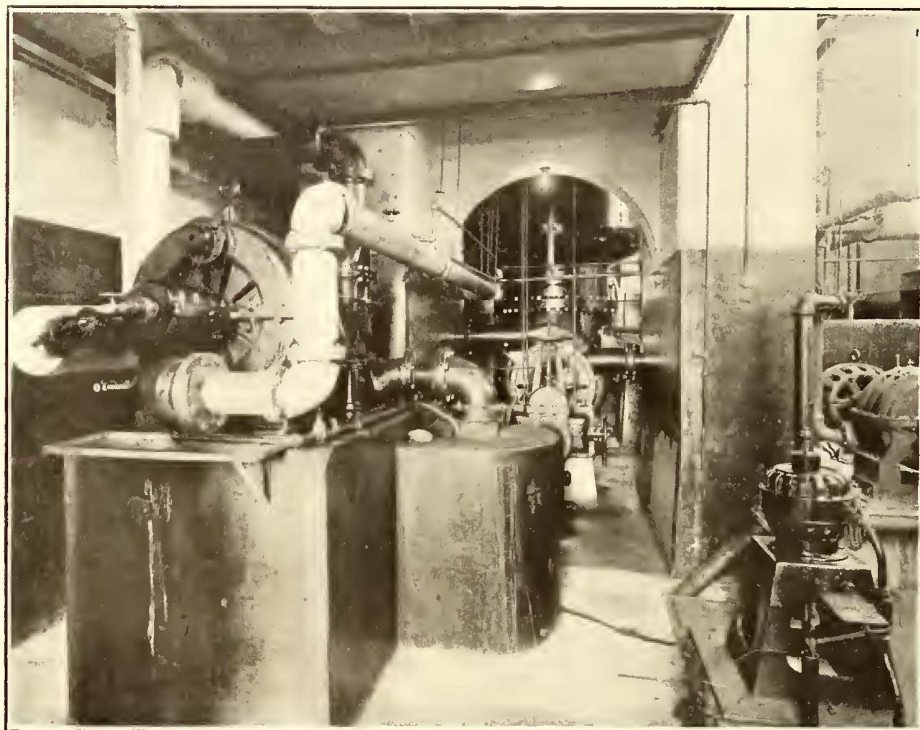
STEAM PIPING

The steam piping is of extra heavy quality, all flanges for high-pressure lines being welded and the fittings and valve bodies being of cast steel. Valve seats, disks and spindles are of "monel" metal. All high-pressure drips are returned to the boilers by the Holly system. From each boiler a steam delivery pipe 8 in. in diameter discharges into a 10-in. header carried in a loop around the ends of the boiler room next the turbine room, stop valves being provided in each outlet between the boiler and the header. The header forms a complete rectangle in a vertical plane so that any valve or section of piping may be cut off for repairs without interfering with the continuity of service. Similarly, a 4-in. feed-water loop extends in a horizontal rectangle around the boiler room, permitting the independent feeding of any boiler battery without regard to the section of main feed piping which may be in service at the time. The boiler feed pumps, located in the basement under the firing aisle, are of the Worthington duplex steam-driven type, with compound cylinders, 12 x 17 x 10

x 15 in. The boilers are ordinarily operated banked, the steam pressure in four being kept at 150 lb., one being run at from 100 to 125 lb., and the sixth without fires. The draft gages are of the Ellison differential type. The feed water is admitted to the boilers at a temperature of from 200 to 210 deg. Fah.

ENGINE ROOM

The operating room of the station is about 24 ft. wide x 67 ft. long, and is divided into a raised section containing an 8000-kva Westinghouse-Parsons 4400-volt, three-phase, revolving field turbo-alternator, operating at 1800 r.p.m., and a lower bay or auxiliary section containing the various exciting and condensing equipment required. Two 100-kw turbine-driven 125-volt Westinghouse compound-wound interpole exciters are installed on concrete foundations at the basement floor level. The turbine room is covered from end to end by the travel of a 25-ton, motor-driven Whiting crane, having a span of 23¾ ft., the crane rails being supported on I-beams carried on brick pilasters



Jordan Power Station—Auxiliaries in Basement of Turbine Room, Priming Pump at Left, Sump Pump with Vertical Shaft at Right, Boiler Washing Pump with Horizontal Shaft at Right, Condensers in Rear

at the side of the turbine room and provided with an operator's cab. The turbine has a capacity of 25 per cent overload for 24 hours and 50 per cent. for one hour. It is wired with star connections with the neutral, grounded through a cast grid resistance aggregating 1.5 ohms located in the basement of the turbine room and screened to protect the operating force from chance contacts. The resistance limits the flow of current in case of a ground on one phase of the 4400-volt system and is a substantial protection to the turbine. The turbine operates at about 6500 kw with greatest economy, on account of the relatively high steam consumption of the auxiliaries at light loads. It is supplied with superheated steam through a 12-in. pipe connecting with the boiler room main. The turbine exhausts into a Westinghouse LeBlanc condenser of the mixing type, with inclosed circulating pump and exterior air pump mounted on a horizontal shaft and driven by a steam turbine at a speed of 700 r.p.m., the condenser being located immediately under the turbo-alternator.

CONDENSERS AND AUXILIARIES

The water supply for condensing service is obtained from the Jordan River through a wooden flume starting

at a screened intake about 150 ft. west of the plant and running toward the station parallel to the turbine room wall, with provision for the branching off of lateral flumes to future condensing equipment required as the station expands. The flume has a cross-section of about 5½ x 11 ft., and is provided with a hand-operated winch for the screens at the intake end. The condenser discharge passes through an 18-in. pipe into a concrete receiving tank in the auxiliary section of the turbine room basement, and from thence the flowage is turned into the river below the intake through a pipe connecting with a 5½ x 7-ft. discharge flume, also of wood, and laid parallel to the intake flume. Both flumes are laid below the surface of the ground. A mixing type of condenser was selected for this installation on account of the increased efficiency of operation secured from a higher vacuum than would be feasible with a surface condenser, combined with reduced cost of maintenance. A vacuum of 25½ in. is usually obtained with the turbine in operation, and the altitude of the plant

is about 4230 ft. The circulating pump is designed so that when running at 700 r.p.m. it will discharge 4,000,000 lb. of condensing water per hour in addition to the steam condensed from the turbine under full load conditions. A 24-in. outboard exhaust is provided with an automatic relief valve for operation in case the turbine loses its vacuum, the exhaust line rising through the boiler room in the form of a spiral riveted galvanized-iron pipe and terminating in a head about 6 ft. above the level of the roof.

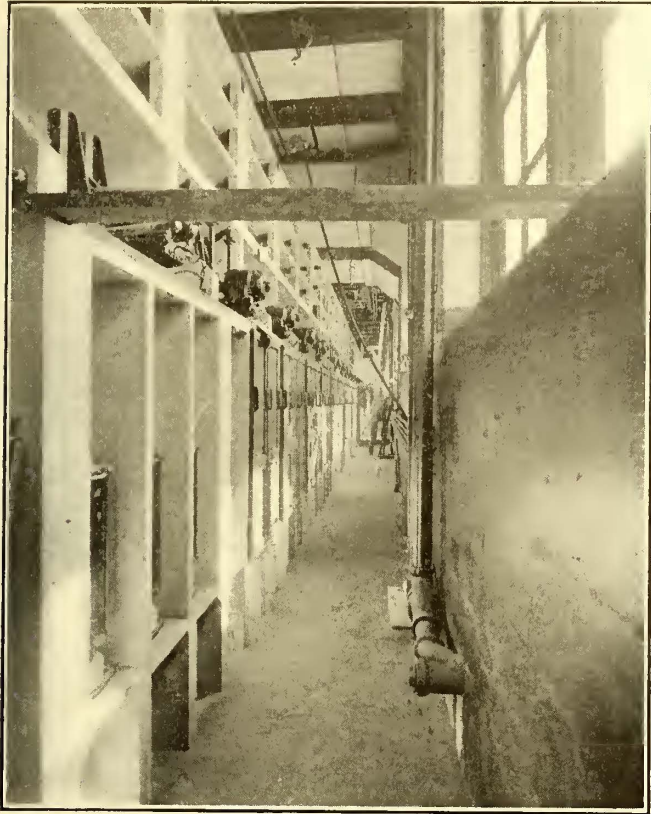
Other auxiliary equipment includes a 3-in. vertical centrifugal sump pump, located in the basement of the turbine room and direct-driven by a 2-hp, 220-volt induction motor at 1120 r.p.m.; a Jeansville three-stage boiler washing pump of the centrifugal type, direct-driven by a 30-hp motor and having a capacity of 200 gal. per minute against a head of 250 ft., and a priming pump of centrifugal type, turbine-driven, for use in the condenser circulating pump service. The sump pump is operated by an automatic float switch and handles all the general station drainage,

discharging it into the river below the plant. The boiler washing pump is piped so that river as well as city water may be used for boiler cleaning purposes, and it has resulted in considerable economy, the cost of city water being 6 cents per 1000 gal. A 15-hp Bury air compressor driven by an induction motor is also installed in the turbine room basement and piped to all important parts of the plant for cleaning service. The auxiliaries are unusually accessible in the plant and are all installed in a well-lighted compartment with ample room for replacing with spare parts, inspection and adjustment. In the boiler room basement a small machine shop is in service, the principal equipment being a group consisting of a lathe, pipe cutter, hack saw, drill press, emery wheel and grinder, all driven by a 10-hp induction motor. The boiler room basement is also provided with flue outlets leading to the combustion chambers of the boilers, to facilitate cleaning the latter. The generator is supplied with air through a galvanized iron and concrete duct brought into the turbine room under the floor and across the ceiling of the bus structure room.

SWITCHBOARD

The switchboard room of the station is designed to

handle not only the turbo-alternator but all the principal outgoing feeder circuits from the 4400-volt busbars and the incoming transmission line connections on both the



Jordan Power Station—Bus and Oil Switch Structure

primary and secondary sides. The installation consists of a bus and oil switch compartment running the entire length of the station below the turbine room, and above the center of this an operating switchboard room containing an instrument board, control benchboard, exciter and auxiliary board, with various lighting apparatus for central station service at the east end. The bus and oil-switch structure is one of the most complete in the West, and is installed in a head room of 16½ ft. and a width of 14½ ft. All the oil switches in the station are of the motor-operated type, furnished by the General Electric Company, each being installed in a concrete cell provided with arc-proof wooden doors. Above the oil switches are installed the various busbars and connections, also in concrete apartments, and on a mezzanine gallery of concrete 10½ ft. from the floor ample space is provided for attendance. Current and instrument transformers are located on the under side of the mezzanine gallery; and beyond these, at a height of about 8 ft. from the floor, disconnecting knife switches are provided between the busbar connections and the outgoing feeders. The latter are carried partly overhead and partly underground, those of the railway service being at 4400 volts, three-phase, and all electric railway circuits in the city are supplied from the substation rotaries or motor-generators, no railway direct-current service being in operation at the Jordan station.

The switchboard room contains a benchboard of seven panels, with remote control switch handles, pilot lights, busbar models and instrument and synchronizing plugs. The instrument board behind contains the usual indicating wattmeters, ammeters and voltmeters for high-tension feeder

service, with recording wattmeters in each incoming line and curve-drawing wattmeters in the more important circuits. The turbo-generator is protected by reverse current relays, and the company is considering the installation of automatic reverse current relays on its incoming lines, with the object of securing automatic disconnection in case of trouble. The remote control motors are operated by a storage battery of 55 cells and 120-amp-hours capacity, which is located in a cabinet in the turbine room and is wired for charging either by exciter current or from the alternating busbars through a mercury arc rectifier. The general arrangement of the 4400-volt busbars is in the form of a ring and bus junction or sectionalizing switches of the motor-operated oil-break type are installed at four points, so that trouble can readily be isolated. In addition a master switch is provided on the front of the benchboard, so that in case of emergency every bus junction switch can be opened simultaneously.

The station busbars in general receive the incoming 4400-volt current from the transmission lines on the step-down sides of the transformers in the Jordan substation, with provision for the parallel operation of the Jordan turbine set, and distribute it throughout the Salt Lake district through numerous outgoing feeders handling all branches of railway, lighting and power service. Three 50-kw, 4400 to 220 and 110-volt transformers supply current from the busbars for general lighting and power service within the Jordan station.

2000-KW WATER RHEOSTAT

A special feature of the plant operation is the use of a water rheostat when artificial loads are required. In common with several other plants in the West which operate hydroelectric stations in parallel over long transmission lines, the company finds it desirable at times when the load is lost wholly or in part to throw a water rheostat having a large percentage of the capacity of the generating station directly upon the busbars, such a course being a decided aid in maintaining speed and renewing synchronous



Jordan Power Station—Benchboard, Instrument Board and Distributing Board

relations with other plants. At the Jordan plant the rheostat has a range of from 0 to 2000 kw, and it consists of

three 2-in. iron pipes surrounded in sewer tile 30 in. apart on centers, the pipes being 4 ft. long and set into a concrete well 7 ft. square and 5 ft. deep. Each pipe is connected through an oil switch with a corresponding bus-bar of the three-phase system of the plant, and the raising and lowering of the pipes into the water is effected by a Dickerson oil governor mechanism, driven by a 2-hp induction motor. Fresh water is used in the rheostat, as the river water is unsuitable on account of the tendency which its low resistivity creates to produce excessive loads. The plant contains a double exciter bus set, and the system voltage regulation is handled by a Tirrill regulator mounted on the distributing board in the switchboard room. The latter board contains two exciter panels, a regulator panel, battery and rectifier panel, station service panel, and six feeder control panels, with the usual instruments. The generator field rheostat is motor-operated from the bench-board.

NEW SUBSTATION

A new substation is now under construction for railway service at Eleventh East Street, between Twelfth and Thirteenth Streets South. It will contain four 875-kva transformers, a 1000-kva motor-generator set delivering direct current to the trolley lines in the vicinity at 550 volts, and two 100-light, 4-amp rectifier sets for use in magnetite street arc lighting. Two induction motor-driven lighting feeder regulators for residential and commercial service will also be in operation, and the substation will be provided with oil switches and wiring capable of handling an incoming current of 44,000 volts, from Cottonwood stations, or from the Jordan substation, with provision for by-passing the substation when necessary.

ENGINEERS

The Jordan station was designed and erected by Westinghouse, Church, Kerr & Company in conjunction with the Utah Light & Railway Company's engineering department at Salt Lake City. R. W. Stovel was engineer in charge, and H. A. Brinkerhoff resident engineer for the former organization, the railway company being represented by O. A. Honnold, electrical engineer, and C. A. Cohn, superintendent of power stations.

RULE FOR TREATMENT OF DEPRECIATION IN NEBRASKA

The Nebraska State Railway Commission has adopted a code of rules to govern charges by electric railways for maintenance, additions and betterments.

The rules, which are prescribed by the commission for the government of accounting officers of all the electric railway companies operating in the State, became effective on July 1, 1911. The order does not state the rate at which depreciation is to be accounted for or how the amount set aside shall be determined. The essential part of the order of the commission is as follows:

"All expenditures for maintenance shall, as they are made or incurred, be charged to their appropriate subsidiary maintenance accounts, and all these various maintenance accounts shall then be closed and cleared into the maintenance and depreciation accounts monthly.

"No charge shall be made against maintenance, additions or betterments for the service of regularly salaried officials and employees, except only where such officials or employees are specifically assigned to the work and their time exclusively devoted to it.

"As distinguishing between additions and betterments and maintenance, it is to be understood that additions and betterments shall include additional structures, property, facilities or equipment not taking the place of anything previously existing, or the enlargement or improvement of existing properties, facilities or equipment, and, when for enlargement or improvement, only the proper proportion of the cost of the new structure, facility or equipment of the

improved or higher class proposed to take the place of that previously existing. When expenditures are made for replacement, enlargement or improvement of existing facilities or equipment, then the amount which may be charged to additions and betterments shall not exceed the difference between the actual cost of the new work, facility or equipment and the value of the old, replaced in kind, at the time when the new work is being done, together with the cost of taking up the old and making preparation for the placing of the new work, facility or equipment. The value of the old, plus cost of removal, and preparation for new, less value of salvage, to be charged to the maintenance and depreciation account, and salvage from old to be charged to material account.

"When construction work is being done, the division as between that part of the cost which is chargeable to maintenance and that which is chargeable to betterments' and additions shall be definitely and distinctly made from month to month, and accounts, so far as maintenance is affected, shall be closed into the maintenance and depreciation account monthly.

"In case, however, the amount to be charged to maintenance and depreciation account is large or extraordinary, and its inclusion in the operating expenses for a single year will unduly burden the operating expense accounts for that year, upon application to the commission, such charge may be carried in an appropriate 'property abandoned' or 'suspense' account, and charged off to maintenance and depreciation account in such instalments and spread over such length of time as may be determined by the commission.

"When property is abandoned and not replaced, the original cost, carefully estimated, if not known, should be credited to the additions and betterments account, and the amount so credited, less salvage, shall be charged directly to profit and loss account and shall not pass through the maintenance and depreciation account.

"When facilities are reconstructed or replaced in kind, all expenditures and costs incident thereto shall be directly chargeable to maintenance account, it being intended herein especially that reconstruction accounts shall not be carried from month to month over a long period and then apportioned as between betterments and maintenance, but that the appropriate charge to maintenance accounts for such construction or reconstruction shall be made monthly.

"Paving, when none has theretofore existed, shall be a charge to betterments, but the work preparatory, if any is necessary in the form of realignment, lowering or raising the track, shall be considered a maintenance charge. In repaving, replaced in kind, the entire cost shall become a charge to the maintenance account."

STRIKE IN COPENHAGEN

On Aug. 1 the Copenhagen (Denmark) Tramways were taken over by the municipality and the wages of the employees increased. The employees of the two other companies operating in and near the city thereupon demanded an increase. This being refused, they went on strike. A boycott of the lines was declared by the strikers and their sympathizers. The radical newspapers even published the names and addresses of the strike-breakers and their relatives, of merchants who sold goods to the strike-breakers, etc. This action has led to a number of lawsuits by the aggrieved persons against the newspapers which published these notices. The strike was practically over at the end of three weeks, but only a small portion of the strikers were re-employed. A peculiar feature of the strike was that many of the municipal employees contributed funds to support the strikers. The wages of the trainmen in Copenhagen who struck were \$8.25 a week. The men also received free uniforms, one day off each week and an eight-day holiday once a year.

Hearing in Buffalo on International Traction Reorganization

An Account Is Given of the Methods Used by B. J. Arnold in Determining the Cost to Produce New as of April 1, 1911, the Physical Property of the International Traction Company of Buffalo

As a supplement to the article in the Oct. 21 issue of the *ELECTRIC RAILWAY JOURNAL* describing the basis of valuation of the property of the International Traction Company of Buffalo, there is published herewith additional information taken from the report of Bion J. Arnold on the plan of reorganization. This deals with the methods used in the determination of the cost of reproduction new of the physical property of the company as of April 1, 1911. The preliminary explanatory chapter says in part:

GENERAL METHOD EMPLOYED

"Throughout the appraisal the 'cost new' in the detailed exhibits and in the subsummaries includes all expense for materials, tools and labor required to furnish each item in place, including the subcontractor's contingencies and profits as of April 1, 1911. To this cost a percentage varying with the different classes of work has been added for the expense of organization, engineering and incidentals.

"The item of organization includes such cost as general office expense, securing bids, awarding contracts, bills of material, purchase of materials, salaries of officials chargeable to construction and legal expenses chargeable to construction.

"The item of engineering includes cost of preparation of plans, drawings and specifications, together with the expense of general supervision and inspection required in carrying out the plans and specifications.

"Incidentals cover all general expenses that lie outside of the contracted cost, such as might be included as extras on the contract price. They may be due to small changes in design; to interference with construction from various causes, such as operation, floods, quicksand, uncertain foundations, insurance against fires and accidents. The aggregate of these percentages varies from a minimum of 5 per cent to a maximum of 15 per cent.

"In case of real estate 5 per cent has been added, which is intended to cover organization as defined above, and what might be the equivalent of engineering, namely, selection of site, search of title and purchase fees.

"These percentages have been added to the subsummaries, and the total represents the cost to the company of the property detailed, but does not include the cost of obtaining the money necessary to finance the property, namely, brokerage, carrying charges during construction, including taxes and interest, and legal expenses not properly chargeable to construction, such as those incurred in organizing the company, obtaining franchises, preparing trust deed, and in securing money. Neither do they include any preliminary engineering, legal or other expense incurred in promotion.

"An additional 10 per cent has been added to the general summary to cover the above charges with the exception of cost of promotion and bond discount. The amount added later for discount is that determined from the records of the company and includes simply the discounts on bonds, no account whatever being taken of the value of stock in this appraisal. The amount of money resulting, with the percentage above noted and the bond discount added, represents the total money that would have to be provided to reproduce the property, thus including in the total cost not only the material and labor costs with their suitable percentages for contractor's profits, organization, engineering and incidentals, but also the expense that would be incurred in financing the property. The value thus obtained includes

nothing for developing expense or for promoter's profit.

"For the purpose of making an inventory the property was divided into track, paving, electrical distribution system, rolling stock, power plant and substation equipment; fixed tool and shop equipment; stores, supplies, floating tools and miscellaneous; furniture and fixtures; buildings, real estate and leases. These divisions were again subdivided into various parts, that is, track was divided into tangent track; track special work; tangent track in carhouses and yards; track special work in carhouses and yards; bridges, culverts and trestles; cuts and fills; fences; miscellaneous. In a similar way subdivisions were made for the other general divisions. These divisions are intended to include all of the physical property belonging to the International Traction Company. In addition to this physical property values are returned for certain long term leases held by the company in accordance with its trust deed, as well as for securities of other companies held by the International Traction Company or its subsidiaries.

"The property is owned by various companies, including the International Traction Company and the subsidiary companies which are controlled by the International Traction Company through stock ownership. No attempt is made in the general inventory to distinguish between the parts of the property used by or belonging to the various companies, but the whole property has been collected and grouped.

"On the subsummaries and detail sheets of the various exhibits there is set up the cost new, together with the date of installation or purchase. Recapitulation sheets are included on which the amount of money represented by the exhibit is shown segregated into the years in which the expenditure for this property was made. The values shown on these recapitulation sheets taken in connection with similar recapitulation sheets for the superseded property are used in the totals of a statement of 'investment in property by years.'

TRACK AND ROADWAY

"The various types of rails and joints, together with their location, the size and spacing of the ties, the depth and kind of ballast and other features of track construction, were determined by field inspection, together with the limits of each type. Unit price estimates of the cost per mile of single track were prepared for each class.

"The amount of tangent track shown as existing on any certain street is the net amount, the number of feet of track included in special work being excluded from tangent track and included in track special work.

"The location and type of all track special work was determined by inspection, and each piece was listed alphabetically by location. Those layouts similar in type were then grouped and given a key number, and unit price estimates were made for the different types. The price shown in the estimates covers not only the cost of the layout together with joint plates and bolts, but also a charge for unloading and hauling the steel to the point of installation. Unless otherwise shown, all special work is of the hard center guaranteed type, 9-in. girder rail, Lorain section 119-341 or equal. Only those curves on which guard rail was installed were classed as special work.

"The length of the tangent track and special work in carhouses and yards was checked in the same manner as the tangent track. The item of excavation does not appear in

this section since it has been considered a part of the building cost and is listed under that exhibit.

"Each item inventoried under bridges, culverts and trestles was inspected and the plans of the larger bridges, whenever obtainable, were checked against the existing structure. Detail bills of materials were prepared for which estimates were made covering the cost of material and labor required to reproduce the structure as of to-day. Whenever the original plans could not be found sufficient sketches were made up in the field to serve the purpose of making an estimate. The matter of joint ownership was investigated and the value returned on all structures in this exhibit which are operated over, or owned, jointly was satisfactorily established before the cost was included.

"A considerable mileage of track is in country districts. The normal quantity of excavation required for any given class of track is included in the unit cost in 'tangent track.' In the sub-exhibit of cuts and fills there is included all that amount of grading that is required over and above the minimum requirement included in the tangent track section. The amount has been determined both from a study of the original profiles and by inspection of the present lines.

"The amount of right-of-way fence was determined by inspection. The inventory of snow fence includes both the number of panels in the field and those stored in and about the various yards.

"Cattle guards, track drains in Buffalo city, derails at steam railroad crossings, and both highway and farm crossings along the various interurban lines are included in 'miscellaneous.' Their number, type and location were checked up by examination in the field.

"On all of the items of track 15 per cent was added to cover organization, engineering and incidentals.

PAVING

"Field inspection was made to determine location, type and width of paved right-of-way. The lengths of right-of-way paved were taken from the maps used in determining the tangent track work. Unit price estimates were made for the various types of pavement which, in connection with the quantities above referred to, served to determine the total cost new. The dates of installation of pavement were assumed to be the same as those of the tangent track in connection with which it was found. To the values thus found 15 per cent was added to cover organization, engineering and incidentals.

ELECTRICAL DISTRIBUTION SYSTEMS

"Field notes were taken including the number, type and location of poles, spans and special work layouts, and estimates of the cost new were made for each type. Special layouts, and those for each carhouse or caryard, were treated individually. Lengths of trolley, feeder or transmission wire were taken from the maps of the International Traction Company and checked and an allowance was made for sag and waste.

"The underground conduit system is shown under three heads—manholes, ducts and cables. The number, location and size of manholes was determined by field inspection and their cost estimated in detail. The number, kind and location of duct lines and underground cables was determined by field inspection, and their lengths, as determined from the records of the company, were checked by field inspection.

"The telephone and signal systems are shown in detail and their cost estimated, using lengths of wire as determined from the company's maps. The ownership of all telephone instruments and signal apparatus was investigated and only those instruments owned by the company are shown.

"Miscellaneous equipment, such as guard wires, trolley guard, trough under bridges, lightning arresters, etc., are inventoried in detail. To the values thus found 15 per cent was added for organization, engineering and incidentals.

ROLLING STOCK

"This has been divided into three divisions, namely, passenger equipment, utility equipment and miscellaneous. Passenger equipment includes all passenger cars, while utility equipment includes all the remainder of the cars and miscellaneous includes all extra equipment and duplicate parts used on cars.

"The cars were divided into groups, according to type, style and make, and in detailing the cost new of component parts of a complete car the following items were used: car bodies, motor equipment, trucks and brake equipment. Car bodies includes all that part of the car ordinarily purchased from the car builder, but does not include such fixtures as brake equipment, fare registers, portable headlights and, in some cases, fenders. Motor equipment includes that portion of the car ordinarily purchased from the motor builders, namely, motors, controlling apparatus, control wiring and light wiring. Trucks include the truck complete, with the exception of the motor equipment and track scrapers. Brake equipment includes both air and electric brakes.

"The cost new of car bodies was determined by preparing a complete specification for a car body typical for the group, from which the cost of car body, f.o.b. builder's factory, could be determined. To this cost the freight charges and cost of assembling the car at destination were added to give the total cost new. Similar procedure was adopted for determining the cost new of motor equipment, trucks, brake equipment and miscellaneous.

"To the total cost new 5 per cent was added for organization, engineering and incidentals.

POWER PLANT AND SUBSTATION EQUIPMENT

"For the purpose of determining the cost of the power plant a detailed inventory was made of all machinery and equipment in the plant. Individual prices were applied to the various items which, together with the cost of labor and installation, were used in arriving at the cost new. All larger items of the equipment were estimated in detail. The cost new of minor items, such as small wiring and miscellaneous equipment about the plants, was determined by applying unit cost estimates to the quantities of this material found in the plant.

"A detailed inventory was made of the tools and fittings required in the various plants, to which prices were applied. To the values thus obtained 10 per cent was added to cover organization, engineering and incidentals.

FIXED TOOLS AND SHOP EQUIPMENT

"All fixed tools and general shop equipment are included in this exhibit. A list of this equipment was submitted by the company and was checked up by field inspection. Such additions have been made to the list submitted as were necessary to complete the list to the date of appraisal, April 1, 1911. To the total cost new 10 per cent was added for organization, engineering and incidentals.

STORES, SUPPLIES, FLOATING TOOLS AND MISCELLANEOUS

"All stores, supplies, floating tools and miscellaneous items are included in this exhibit. By stores are meant those supplies in the possession of the storekeepers and located at the principal store and at the supply stores maintained at the various points. The value of the stores, as determined by the company's inventory of Jan. 1, 1911, and revised as of April 1, 1911, was used in this report.

"Supplies include material of the same class as that included in stores, but which have been issued by the storekeeper to the various departments.

"Floating tools include all the various tools found in each department and listed in detail.

"Miscellaneous includes a number of items as horses, wagons, harness and all barn equipment.

"Patterns included in this exhibit are those that have been made for the purpose of casting duplicate parts of various kinds of machinery and equipment used in operation of the system.

"Drawings included in this exhibit are those that have been prepared for the purpose of making various changes and improvements on cars and general machine shop equipment. The drawings made for the purpose of changes and additions to buildings are not included in this exhibit as the value of these drawings is covered by the engineering percentage.

"To the total cost new of all the material included in this exhibit 10 per cent has been added for organization, engineering and incidentals.

FURNITURE AND FIXTURES

"Furniture and fixtures have been listed in detail by location and a value as of April 1, 1911, has been applied. To the value thus obtained 10 per cent is added to cover organization, engineering and incidentals.

BUILDINGS

"In determining the cost new of buildings as of April 1, 1911, one or more of each of the various types was selected and measurements were made and a detailed inventory taken of the kinds and amounts of material required to reproduce these buildings. To these quantities the current prices, as of the above date, were applied, thus determining the cost new. Measurements of these buildings were also taken, from which their cubical content was obtained, which served to determine the unit price of each of the various types. This method was applied to the larger structures and to typical buildings. The cost of other building structures of the same type was determined by applying the unit price thus obtained, such variation in unit price being made as would properly represent any modification in type or other conditions that might affect the cost.

"The smaller building structures were examined and measured and the cost new determined by applying a unit price to the measurements thus obtained.

"To the values thus obtained 10 per cent is added to cover organization, engineering and incidentals.

REAL ESTATE

"The real estate has been appraised by Gurney & Overturf, real estate experts of Buffalo, and this exhibit contains the property values as determined by this firm.

LEASES

"In 1899 the company leased for 999 years from the Erie Railroad a certain right-of-way, tracks and buildings, at an annual rental of \$16,000 per year. While the railroad company does not actually own the title to this right-of-way and these buildings, it does practically own them, on account of the length of the lease, consequently the valuation was made up as follows:

"The real value of this right-of-way and of these buildings, on the same basis as of other values, was determined as of April 1, 1910, the right-of-way as then determined amounting to \$186,000, and the buildings to \$40,000, or a total of \$226,000. This amount was added to the value of other property of the International Railway Company in

TABLE I.—SUMMARY OF TRACK VALUES.

	Cost New
Tangent track	\$5,013,444.03
Track special work	1,228,285.77
Tangent track in carhouses and yards	110,601.00
Special work in carhouses and yards	226,613.00
Bridges, culverts and trestles	923,755.00
Cuts and fills	324,228.95
Fence	33,258.05
Miscellaneous	15,023.35
Total cost new	\$7,875,209.15

1899, and then from the total thus obtained was deducted \$320,000, the assumed value of the right-of-way and buildings, determined by capitalizing the above mentioned rental of \$16,000 per year at 5 per cent.

NOT INCLUDED IN PHYSICAL APPRAISAL

"The above appraisal does not include any allowances for the following: (a) development expenses, legal, technical or financial, (b) going value, (c) franchise value, (d) water rights."

COSTS THUS DETERMINED

The distribution of the total summary of physical property was shown in the issue of Oct. 21, 1911. The values of the different classes of track are shown in Table I.

These values are also distributed by years in the appraisal. In the appraisal of the various classes of tangent track unit cost estimates were made. One of these estimates is published in Table II.

TABLE II.—UNIT COST ESTIMATE TO PRODUCE ONE MILE OF SINGLE TRACK. Class A.—Girder Rail, 140-lb. 9-in. Lorain Sec. 140-142. 50-ft. Lengths, Steel Ties on 5-ft. Centers, Tie Rods Every 5 ft., Concrete Sub-structure, 12-Bolt 36-in. Joint Plates.

Item	Unit	Quantity	Unit Cost	Unit Cost
Rail, 140-lb., girder	Ton	220	\$38.00	\$8,360.00
Hauling to street	Ton	220	1.00	220.00
Excavation	Cu. yd.	2,112	.75	1,584.00
Ballast—concrete	Cu. yd.	1,017	5.50	5,593.50
Ties—steel I-beam	Each	1,056	1.55	1,636.80
Tie rods	Each	1,060	.30	318.00
Joints, 12-hole, Thermit shoe	Each	211	6.50	1,371.50
Bonding joints	Each	211	1.50	316.50
Labor, track	Ft.	5,280	.30	1,584.00
				\$20,984.30
Organization, engineering and incidentals, 15 per cent				3,147.65
Total cost new				\$24,131.95
Total cost new used				\$24,132.00

The cost new of the paving was distributed as follows: Tangent track, \$2,650,648.44; special work, \$224,013; widening streets and paving from curb to curb, \$66,053; total cost, \$2,940,714.54.

Table III shows the summary of cost of the electrical distribution system. The report also gives a recapitulation of the cost new by years.

TABLE III.—SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEM.

	Cost New
Trolley	\$841,129
Overhead feeders	622,123
Transmission lines	53,059
Underground conduits	485,528
Telephone lines and signals	23,422
Miscellaneous equipment	56,526
	\$2,081,787

The cost new of the rolling stock is divided as follows: Passenger equipment, \$4,385,530.80; utility equipment, \$242,796.75; miscellaneous, \$81,694.02; total cost new, \$4,710,021.57.

Table IV shows the value of the equipment by years.

TABLE IV.—PRESENT EQUIPMENT—RECAPITULATION BY YEARS.

Year	Cost New	Year	Cost New
1885	\$8,644.51	1903	\$365,340.23
1890	5,722.50	1904	300,797.00
1892	30,133.98	1905	3,101.70
1893	381,478.06	1906	1,067,509.50
1895	1,157,820.08	1907	382,458.03
1898	11,530.76	1909	2,066.40
1899	71,522.85	1910	3,328.50
1900	856,013.63		
1901	44,073.75	Total cost new	\$4,710,021.57
1902	27,480.09		

The passenger equipment consists of 917 cars, divided into forty-five groups of an aggregate value of \$4,176,696 plus 5 per cent, or \$208,834.80, for organization, engineering and incidentals. Table V shows the computation for the cost of one group.

TABLE V.—GROUP NO. 1.—150 CARS—TYPE "5000" PAY-AS-YOU-ENTER—YEAR PURCHASED, 1906

	Number	Unit Cost	Total Cost
Bodies	150	\$3,743	\$561,450
Four motors, GE-80 equipment	150	2,025	303,750
Double trucks, Brill No. 27-F. E.-2	150	575	86,250
Air brakes, Christensen A. A.-4	150	350	52,500
Total cost new		\$6,693	\$1,003,950

POWER PLANT AND SUBSTATION EQUIPMENT

Regarding power plant and substation equipment the report says in part:

"The equipment listed under each power plant and substation is compiled from field inventories made in April, 1911.

"The dates of installation of the various items of equipment have been taken from the following records, viz.: office copies of purchase orders and contracts, log books in possession of plant employees, office records furnished by the company. Where the dates are omitted, as in the case of switchboards and wiring, it has been assumed that portions of such equipment were installed at the same time as the machines for which switchboards and wiring are required. In the case of plant tools and furniture, the dates of installation are omitted, since the purchase of these items extends over a long period of years.

"The cost new value represents the cost as of April, 1911, to reproduce and install equipment of like kind in first-class condition, fair allowances having been made for labor and contingencies incidental to the complete installations. Where second-hand equipment is known to have been purchased or installed, the purchase price or an estimated second-hand value for such equipment has been used. Equipment which is now obsolete owing to changes in the art and the discontinuing of the manufacture of the same, making the replacement of the particular apparatus difficult, has been given a fair estimated value.

"In recapitulating the value of power plant equipment by years, all items in general have been credited directly to the year in which each piece of equipment was said to have been installed. Where items have not been so credited, as in the case of certain switchboards, wiring and plant tools and furniture, the amounts have been prorated to the years in which the contiguous equipment was installed in proportion to the kilowatt capacity of generating units installed in each plant in said years.

"The plant, tools and furniture of the Niagara Street power plant have been prorated equally into the ten years during which changes and additions have been made to the plant."

The value of the power plant and substation equipment is distributed as follows: power plant equipment, \$767,555.31; substation equipment, \$993,864.61; dams, canals and pipe lines, \$103,590.85; total cost new, \$1,865,010.77.

To the value of fixed tools and shop equipment as inventoried, \$128,430.87, there was added 10 per cent for organization, engineering and incidentals, making the total cost new of \$141,273.95.

Stores, supplies, floating tools and miscellaneous were divided as follows: stores, \$265,505.29; supplies, \$26,583.38; floating tools and miscellaneous, \$58,278.64; total cost new, \$350,367.31. Each of these items includes 10 per cent for organization, engineering and incidentals.

The total cost new of furniture and fixtures includes 10 per cent for organization, engineering and incidentals.

The method of appraisal of the buildings is indicated in Table VI.

TABLE VI.—POWER HOUSE, NIAGARA AND SCHOOL STREETS, BUILT 1900.

Type of Construction.	
Ground area—13,195 sq. ft.	
Contents—580,580 cu. ft.	
Detail of Construction.	
Preparation of site—General clearing of grounds and removal of old structures.	
Excavation—Excavations for basement and foundations through solid rock.	
Foundations and concrete floors—Rubble masonry foundations. Plain concrete ground floor and reinforced concrete first floor.	
Superstructure masonry—Brick with stone trimmings.	
Structural steel and iron—Columns, trusses, purlins, floor framing, stairs and railing.	
Carpenter work—Roof sheathing and rafters.	
Millwork (including painting and glazing)—Windows, box frame and sash, panel and matched doors.	
Roofing—Vermont slate on main roof, tar and gravel on monitor.	
Sheet metal and skylights—Galvanized iron gutters and conductors and metal clad fire doors.	
Painting (other than millwork)—R. O. W. and cold water paints for main building, oil paints for office.	
Drainage system—Vitrified tile sewer pipes	
General water service—1-in. pipe from city main.	
Lighting system—32-cp. and Thomson arc lamps.	
Telephone and signal system—Booth with wall phone and call gong.	
Value of Building	
Contents—580,580 cu. ft. at 15 cents.....	\$87,087.00
Organization, engineering and incidentals, 10 per cent.....	8,708.70
Total cost new.....	\$95,795.70
Total cost new used.....	\$95,795.00

The real estate is divided as follows: operating property, \$1,582,318; non-operating property, \$122,906; total, \$1,705,224. A letter from Gurney & Overturf, who appraised the real estate, addressed to Mr. Arnold, says in part:

"This appraisal was made on information and description of properties submitted by the company, and represents a close estimate of the current market value, the total appraisal for the sixty plats being \$1,705,224.

"A contiguity factor of three was used on the right-of-way property for the following divisions: Buffalo and Lockport; Lockport and Olcott; Gulf line; Bellevue and Lancaster."

INVESTMENT IN PROPERTY BY YEARS

An important feature of the report deals with the methods by which the totals of the investment in the property were determined. An introductory chapter says in part:

"These addenda include the data necessary to determine the amount of the investment in physical property by years from the time of the inception of each of the subsidiary companies now included in the company. For this purpose it is necessary to include in the cost new, not only the property now existing, which has been included in the appraisal, but also those items that were purchased and utilized during the first years of the life of the property and since have been superseded. With regard to these items it is necessary to know the date at which they were purchased, together with the cost new. After these values have been determined for all of the superseded property they can then be collected on a recapitulation sheet, showing expenditures by years. This will represent the total capital expenditure on account of the property throughout the entire life of the company.

"In case the superseded property has been disposed of for cash, such as by the sale of any real estate or the disposal of scrap in worn-out equipment or apparatus, the amount received was deducted from the expenditures for capital account in the year during which such property was disposed of. Similarly if any items of property were rebuilt or reconstructed, as occurs in the case of cars in which, while the trucks and part of the equipment were scrapped, the car body was reconstructed and forms part of a car now in operation on the system, the estimated second-hand and scrap value of such superseded property is deducted from the capital expenditures for the year in which the reconstruction took place.

"The net capital expenditures for a series of years may then be accumulated annually, and the cumulative statement resulting will represent the net capital invested in the property throughout its life.

"The information with regard to the superseded property was secured from the records of the company and from statements of individuals familiar with the company's early history and from the published reports of the various subsidiary companies now forming the system. The statements showing capital expenditures date back to 1862, when the first horse car lines were organized for operation in Buffalo. The system was gradually extended until, in 1890, there were about 63 miles of line.

"At this time the electrification of the system was decided upon, and during 1890-93, inclusive, the horse car lines were completely replaced. Within the next few years various extensions were built, until in 1895 about 67 miles of electric lines were in operation in Buffalo.

"During this electrical reconstruction period power plants, electrical distributing systems, electrical equipment in cars and reconstruction of track were provided for. This resulted in the displacement of a part of the property that had been used in the operation of the horse car system. Similarly, during the years succeeding the electrification and up to the present time, portions of the electrical system have been replaced. The larger increases in the capital account, however, have been due to the extension

of the lines during these years, and the acquiring of other properties, which have been consolidated into the International Traction Company.

"The reports of these various properties, together with the records of the company, serve to furnish reasonably complete information with regard to the location and type of construction work that has been built and superseded during the period of electrification. A more detailed statement of the methods used follows:

"Track and roadway.—From records of the International Company, supplemented by information from various other sources, the dates of construction of the different horse car lines were determined. The first lines, built in 1862, consisted of a total of about 13½ miles single track. The reports of the company to the Board of Railway Commissioners for 1890, the year in which the electrification of the original lines was commenced, show that 63.75 miles of track existed at that time, and their records were utilized for the purpose of spreading over the years between 1862 and 1890 the 50.25 miles of track which must have been built during that period. Satisfactory specifications describing the early track construction were available, and from these unit cost estimates were made, from which the cost new of the early lines was calculated. During the three-year period of 1890-92 the old lines were completely rebuilt and electrical operation supplanted the horse cars. Since no dates were available from which the exact portion of the 63.75 miles rebuilt during each of these years could be determined, it has been assumed that one-third of this mileage was rebuilt during each of these years. Accordingly one-third of the total scrap value of the horse car lines has been charged against the sum expended during each of these three years. From the dates of construction covering the present lines as shown in the main appraisal, the time at which the various sections rebuilt during 1891-2-3 were in turn replaced was readily determined, and the scrap value of these lines was handled as was that of the horse car lines. As a further check on this method, the report of the company to the Board of Railroad Commissioners, made in 1895, shows that 67 miles of track existed at that time, and the miles of track built previously, which have been shown as superseded, together with the miles of track in the main appraisal built before 1895, will be found to total 67 miles. The proportion of the cost of special work to that of tangent track in the main appraisal was found to be 29.5 per cent in Buffalo, and for that reason it was assumed that the cost of the superseded special work could be fairly taken at this percentage.

"In estimating the scrap value of superseded track, the rails of the first period were given a scrap value, whereas those laid about 1890-91 and superseded within a few years were appraised at a relaying value and the additional value of the varying percentage of the number of ties, depending on their life at the time of their removal, together with the scrap value of the spikes, joints and tie rods, was added to the rail value to give the gross scrap value. The cost of tearing up the track was deducted from this gross cost in order to obtain the net scrap value. A further deduction was made, in the case of abandoned track, of the cost of refilling the right-of-way formerly occupied to establish street grade.

"Paving.—No scrap value was returned on paving, since the cost of hauling the stone to a storage yard would offset the small scrap value which existed in the cobblestone pavement installed along the superseded track.

"Electrical distribution system.—The cost new and scrap value of equipment which has been superseded and abandoned have been determined by using unit prices which are the average of prices obtaining in the period during which such property was installed. The location and quantities of such superseded equipment and the years in which it was originally installed were taken from the records of the International Railway Company.

"Renewals and extensions of trolley lines have been checked by comparing the storehouse records of trolley wire bought with the increase or decrease of total mileage of track.

"In the case of underground cable or equipment, only that equipment which has been renewed on account of the rearrangement of the underground system entailed by the building of new substations has been shown as superseded, as all other underground cables are shown in the main appraisal.

"Rolling stock.—The subdivision of the investment in superseded cars and car equipment into the various years is based upon a report submitted by the company, in which is given the history of the rolling stock from 1860 to 1909.

"The only information offered for the horse car period, namely, 1860 to 1890, was that the company owned five cars in 1860 and 1861, thirty in 1870 and 250 in 1888. From this information, together with the data available as to dates of track extensions, an approximate distribution was made of the number of cars purchased during that period. Some of the superseded horse cars were rebuilt for electric service, and the salvage received from those not rebuilt was approximately \$25,000, which appears under scrap value in the year 1888.

"The information furnished by the company for the period subsequent to electrification was found to be more detailed than that of the horse car period, and appears to be substantially correct.

"Fixed tools and shop equipment.—The information pertaining to the time and quantities in which the fixed tools and general shop equipment were purchased was obtained verbally from parties long in the service of the company. This information, together with the knowledge of the car equipment that had to be taken care of year by year and the present day inventory, made it possible to approximately distribute the money expended for machine tools and shop equipment at intervals of two or three years.

"As the normal life of equipment included in this exhibit has not terminated, it has been assumed that there was no superseded material, and therefore no scrap value or salvage is listed.

"Stores, supplies, floating tools and miscellaneous.—An annual record of inventory of stores dating back to 1900 was submitted by the company. From this information, together with the record of the rolling stock operated from year to year, as well as the present day inventory of all materials covered by this exhibit, it was possible to determine the approximate annual expenditure for this material. Because of the character of material comprised in this exhibit, no scrap value has been returned.

"Buildings.—The records of the company were used to determine the cost new and scrap value of the superseded and altered buildings. These records were verified as far as possible by making inquiries of all persons from whom such knowledge could be obtained, and from notes or other information which they might possess. The percentage for scrap value of superseded buildings varies from 5 to 15 per cent, depending upon the construction of the building and date at which it was superseded.

"Furniture and fixtures.—In determining the value of superseded furniture and fixtures the only information secured was that given by some of the present employees of the company, who claimed to have knowledge of such materials being abandoned. This comparatively small value was listed by years and amounts.

"Since the values for real estate returned by Gurney & Overturf, real estate experts, are the current market value, these values if entered as invested in the years in which the respective parcels of land were bought would be higher than the actual amount paid in these years. A re-distribution of real estate values by years has therefore been made.

"The value of all real estate in Buffalo, exclusive of improvements, was taken from the records of the city

assessor's office, for each year since 1875, and the values of real estate returned by Gurney & Overturf have been distributed over the years after the dates of purchase in the same proportion as the general increase in values throughout the city. The sum of the amounts charged in any year therefore represents approximately the money spent for real estate, plus the increase in value of real estate already owned by the company."

Table VII shows the value of the superseded and abandoned property.

	Cost New	Scrap Value
Track	\$2,994,819	\$274,402
Paving	1,134,048	.....
Electrical distribution system.....	316,811	82,601
Rolling stock	742,035	291,874
Power plant and substation equipment.....	518,188	82,395
Furniture and fixtures	815	.....
Buildings	130,350	11,549
	\$5,837,067	\$742,822
Legal expense, carrying charges and contingencies, 10 per cent.....	583,707	
Total cost new.....	\$6,420,774	742,822
Net value of superseded property.....	\$5,677,952	

Superseded and abandoned equipment in the electrical distribution system was divided between \$119,343 for trolley and \$197,468 for underground conduits. These amounts include 15 per cent for organization, engineering and incidentals.

The item of \$130,350 for buildings in Table VII includes \$91,850 representing the cost new and \$38,500 representing the alterations. Each of the latter amounts includes 10 per cent for organization, engineering and incidentals.

The item of \$17,328 for extraordinary carrying charges, shown in Table II on page 914 of the ELECTRIC RAILWAY JOURNAL of Oct. 21, 1911, is explained as interest at 6 per cent on property that was not in use because "the city of Buffalo has been delayed in opening Morgan Street from Chippewa Street to Virginia Street, thus rendering inoperative the track on Franklin Street from Chippewa Street to Terrace, and on Terrace from Franklin to Pearl Street. This track is to be used as a continuation of the line on Elmwood Avenue. The carrying charges on this property are covered in the main appraisal for a period of six months after construction, and for the remainder of the time to April 1, 1911, are covered by this additional item." Construction of this track was completed in December, 1907.

TENTATIVE SUBWAY PLANS FOR CHICAGO

Before the local transportation committee of the City Council of Chicago and an assemblage including the Mayor and a number of Aldermen and citizens, the subway commission of that city on Oct. 31 presented briefly, in outline, tentative plans which it recommends. These plans are simply general suggestions for the committee to discuss, as working plans cannot be made until the routes are decided upon. John Ericson, city engineer, acted as spokesman for the commission.

The commission was appointed to examine the many plans which have been proposed for passenger subways in Chicago and to make a recommendation. The commission is limited financially to the money on hand, together with that which will be received within two years from the revenues under the traction ordinances of 1907. The subways proposed by the commission are to be used in connection with the existing transportation facilities, except that the abolition of the downtown Union Loop is recommended. The commission has visited New York, Boston and Philadelphia, and Mr. Ericson told of the experiences of those cities with subways.

Two initial subways are recommended to be connected

with the four elevated railways of the city and to furnish through routes for rapid transit through the heart of the city. The first of these would connect the North Side elevated system of the Northwestern Elevated Railroad Company with the West Side system of the Metropolitan company. It would start at the Wells and Kinzie Street station of the former company and run east on North Water Street to State Street, south to Harrison Street and west to Halsted and Pearce Streets, with an approach at Halsted Street between Harrison and Pearce Streets.

The second elevated-railway subway would connect the South Side system with the West Side system of the Chicago & Oak Park company. It would start at Fourteenth Street, connecting with the South Side Elevated between Wabash Avenue and State Street, turning at once into State Street and running north to Randolph Street, thence west to a point near Green Street, with an approach bringing it to the corner of Lake and Green Streets, where connection would be made with the Oak Park road.

High-level subways within 3 ft. of the street surface are proposed. Two-track construction would be used, except on a portion of State Street, where there would be a four-track subway. There would be no grade crossings, as one subway would dip beneath the other at crossing points. It was stated that the present capacity of the Union Loop, including extra stub terminals, was 915 cars an hour. The subways proposed for the elevated railways could handle 1893 cars an hour. By constructing small loops at the downtown termini of each elevated road for local trains as contrasted with through trains, the capacity of the elevated railways, with the subways, could be increased to 3200 cars an hour. The cost of these two elevated-railway subways, including three river tunnels, relocation of sewers and utilities, paving, damages to buildings, etc., is estimated at \$9,812,000, and they could be built in three years.

There may be also two initial surface-railway subways connecting the three sides of the city. One is planned for LaSalle Street, Adams Street, Dearborn Street and Jackson Street and the other for Dearborn Street and Washington Street, transfers to be arranged between these two subways and also between the surface street railway subways and the high-speed subways. The present capacity of the surface lines in the downtown district is 1037 cars an hour, and this can be increased to 1300 cars an hour by through-routing arrangements on surface tracks. The two surface-railway subways would increase this by 720 cars an hour. The cost of the two proposed surface railway subways, including three tunnels, would be \$9,328,000. Thus, the two systems proposed would be about the same in cost, but the one for the elevated railways would increase transportation facilities much more than the surface-railway subways. The present tendency is not to bring surface cars downtown; the function of surface cars is to feed rapid transit lines and for short-haul traffic.

The commission recommends as the initial step the building of the first system mentioned, or the one to connect the elevated railways. This plan contemplates high-level subways, through routing, no grade crossings, easy grades, few curves and low cost and provides for unlimited expansion. The length of the elevated-railway subways would be 3.85 miles. Mr. Ericson added that he understood that an engineer representing one of the transportation companies, and perhaps all of them, would present soon an alternative plan on behalf of the companies to the local transportation committee.

The September report of the British Chamber of Commerce for Spain states that the Soc. Anon. Tramways Electriques de Castile has been formed in Brussels to purchase and operate tramways and railways in Spain. It has already purchased from the Sociedad Nueva Montaña, of Santander, the electric tramways in that city and from Santander to the Sardinero.

MEETING OF THE GERMAN STREET & INTERURBAN RAILWAY ASSOCIATION

The thirteenth convention of the German Street & Interurban Railway Association was held in Berlin from Sept. 19 to Sept. 22, inclusive. The meetings of this association are held every other year, as they alternate with those of the International Street & Interurban Railway Association. All of the sessions were held in the Reichsrat or German Parliament building in Berlin. The following paragraphs summarize the principal facts in the various reports.

TRACK CONSTRUCTION

Committee "B" presented a report on standard track appliances which recommended types of angle-plates, spacings of bolt holes and sizes of bolts for the four rail sections which were adopted as standard at the previous meeting of the association. These recommendations applied, of course, only to mechanical joints. A second report by the same committee related to the use of stone paving between and alongside rails laid in asphalted streets. It stated that the campaign of educating municipalities to favor block paving between and alongside the rails was showing good progress. The report contained cross-sections and half tones of various types of combined block and asphalt construction as installed in Berlin, Bremen, Cologne and Düsseldorf.

The third report of committee "B" was on corrugation. It stated that about \$5750 had been jointly contributed by several street railway companies, the principal German rail makers and the International and German electric railway associations to defray the expenses of a study of this subject. Following out the original program, about 16,400 ft. of rails were rolled by the different mills, the rails being tested from the pig iron to the finished product. Chemical and physical tests were made at every stage, temperatures were noted and the duration of each process was recorded. The ingots were cut at the top, middle and base. Upon completion the rails were laid on eight different sections on the system of the Grosse Berliner Strassenbahn, the greatest care being exercised in the methods of installation, fastening and paving. In this connection a tabulation has been prepared on the traffic conditions, wheel weights, car speeds and other conditions which might have a bearing on the wear of the rails. The results will be checked against the behavior of the old rails installed for the same traffic conditions. To assist in this work, the Grosse Berliner Strassenbahn has furnished a metallographic laboratory and appointed three men to make and record the various tests outlined. No exact data will be published until the trials are completed so that erroneous conclusions may not be drawn from fragmentary reports.

CAR HEATING

The report on car heating was presented by committee "E." This report was based upon replies received to thirty-two questions from eighty-three railways. It appears that about two-thirds of all the cars in Germany are heated in winter, although some of the municipalities do not require it. Thirty-eight companies employ electric heaters which are supplied directly from the trolley circuit, but others also use the heat otherwise wasted in the resistances, particularly on cars which have electric brakes. Most companies heat their cars when the temperature drops to the freezing point. The general practice is to maintain a temperature 6 deg. to 12 deg. C. (from 11 deg. to 22 deg. Fahr.) above the outside air. The higher limit applies more particularly to suburban and interurban lines. Some companies which use stoves endeavor to control the heat by limiting the amount of the daily fuel supply per car. One company which uses electric heaters has installed a meter in the heater circuit.

INTERPOLE MOTORS

Mr. Lehmann, operating engineer, Elberfeld, read a paper on interpole motors with special reference to their use in connection with electric braking. His data sheet had been answered by fifty-six companies which operated 1241 cars with interpole motors in 1911 as compared with 453 cars so operated by twenty-eight companies in 1909. Most of the interpole motors installed were of larger capacity than those which they replaced. The value of the commutating pole design had already shown itself in lower maintenance cost, due largely to cleaner commutators and longer brush life. Another advantage was that the companies could now operate on higher potentials. One system in fact had changed from 550 volts to 750 volts. The writer said that the magnetic field of an interpole motor can be weakened much more without bad effects than in the case of the ordinary series motors, thus affording the possibility of better speed regulation. There was, however, no special advantage in weakening the field so far as electric braking was concerned. The disadvantages of interpole motors were said to be greater weight, less clearances, greater liability that the bottom field coils would become damaged by water, and higher first cost. The first three disadvantages had not proved important, but further experience was necessary to determine whether the fourth disadvantage would not be eliminated by lower maintenance cost.

MISCELLANEOUS

Papers were also presented on the development of the Pomeranian railways, on self-contained cars for light railways, on car-lighting systems and on the proposed law concerning the erection of power transmission and distribution lines. In conclusion a paper on the development of single-phase railways was read by Eugene Eichel, editor of *Elektrische Kraftbetriebe und Bahnen*.

As usual, elaborate entertainments were provided for the delegates and their wives. Excursions were made to the famous Sans Souci palace of Frederick the Great at Potsdam, to the Berlin Zoological Gardens and over the Spree River. The municipality of Berlin gave a reception at the City Hall and a banquet was tendered by the Grosse Berliner Strassenbahn. The delegates also visited the works of the principal manufacturers of electric railway materials in and about Berlin.

VOTE ON ENGINEERING STANDARDS

Norman Litchfield, secretary American Electric Railway Engineering Association, has issued a notice under date of Oct. 30, addressed to member companies and associate members and reading as follows:

"A meeting of the committee on standards will be held at the offices of the association, 29 West Thirty-ninth Street, New York, Nov. 6 and 7, commencing at 10:30 a. m., at which will be considered those matters referred to the committee by the association at its convention held in Atlantic City, N. J., Oct. 9 to 13, 1911. If acted on favorably by the committee at this meeting these matters will then be submitted to letter ballot of the member companies for vote as to their adoption as standards and recommended practices.

"It is the desire of the association that all proposed standards should receive the fullest investigation before their submission to letter ballot, and to that intent suggestions and criticisms in regard to the subjects to be considered at this meeting, as listed below, are invited, and should be sent at once to the chairman of the committee, Paul Winsor, in care of the association, 29 West Thirty-ninth Street, New York.

"PROPOSED STANDARDS

"1. Specification for high-tension, three-conductor, paper-insulated lead-covered cables. See report of committee on

power distribution, Section No. 1, Sub-division a, pages 4 and 60.

"2. Specifications for single-conductor, paper-insulated, lead-covered cable for 1200 volts. See report of committee on power distribution, Section No. 1, Sub-division b, pages 10 and 60.

"3. Section for grooved trolley wire, Nos. 00 and 000. See report of committee on power distribution, Section No. 2, Sub-division a, pages 17 and 60.

"4. Specifications for No. 00 round hard-drawn copper trolley wire. See report of committee on power distribution, Section No. 2, Sub-division d, pages 29 and 60.

"5. Specifications for overhead crossings of electric light and power transmission lines. See report of committee on power distribution, Section No. 3, pages 30 and 60.

"6. Third-rail clearances. See report of committee on heavy electric traction, page 4.

"7. Definitions of third-rail gage and bond. See report of committee on heavy electric traction, pages 4 and 5.

"8. Specifications for heat-treated carbon steel axles, shafts and similar parts. See report of committee on heavy electric traction, page 7.

"PROPOSED RECOMMENDED PRACTICES

"1. Location of automatic train stops. See report of committee on heavy electric traction, page 5.

"2. Instructions to employees for fire protection. See report of committee on buildings and structures, page 9.

"3. Book of rules and regulations for the government of employees of the way department. See report of the committee on way matters, pages 12 and 13."

REDUCED INSURANCE RATES IN RICHMOND

An interesting illustration of the application of the new rating schedule for traction properties recently adopted by the Central Traction and Lighting Bureau and now being applied by the various rating organizations throughout the country has just been furnished in the case of the Richmond and Petersburg properties of the Virginia Railway & Power Company, with its main office at Richmond, Va.



Remodeled Carhouse—Richmond

Some two years ago this property was taken out of the hands of the receivers and placed again under the control of its own officers, and shortly thereafter its board of directors, following recommendations and representations that the saving in premiums alone would amply repay them for this outlay, determined to discontinue some of the old carhouses and obtain the necessary housing capacity due both to this discontinuance and to the purchase of additional cars to meet the increased traffic conditions by building several new depots and overhauling the old ones destined to remain in service.

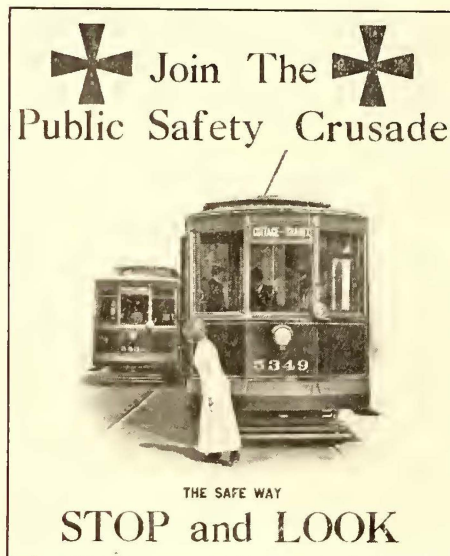
The plans after being drawn were submitted to the engineering department of the Southeastern Underwriters' Association, the bureau having jurisdiction, and were revised to conform to suggestions from that source. This bureau then kept in constant touch with the work during the entire time that the buildings were under construction.

When the work was completed demand was made on the Southeastern Underwriters' Association for the promised reduction in rates. The results were a reduction in total amount of premium from \$20,374.68 to \$10,840.09, in spite of an increase in value of property insured of \$83,000.

Under the new schedules the basis rate has been reduced to 20 cents, and a large number of deficiency charges were added to the list. The rolling stock rate was brought from \$1.35 down to 32 cents.

ACCIDENT PREVENTION CARDS IN CHICAGO

The Chicago City Railway has just had printed 6500 display cards of the form illustrated herewith. These cards are 18 in. square, printed on both sides in two colors—red for the crosses and brown for the



Poster Sent to Public School by Chicago City Railway

the half-tone view and the type lines. The display of these cards is a part of a campaign for the prevention of accidents, and in this work the railway company is receiving the assistance of the superintendent of schools. The display cards are being distributed one to every schoolroom, and it is planned to have the instructors call particu-

lar attention to the need for children taking care of themselves when on the city streets. A letter of transmittal accompanying the signs reads as follows:

"To Principals and Teachers:

"Through the courtesy of Mr. T. E. Mitten, president of the Chicago City Railway Company, the accompanying placards referring to the prevention of street car accidents are being distributed to all the Chicago schools, with the suggestion that they be circulated in the various classrooms and finally posted in conspicuous places about the school buildings.

"It is further suggested that the teachers take this opportunity of talking to their classes concerning the prevention of accidents to children, with particular emphasis on the following points:

"1. To 'Stop and Look' before crossing streets used by cars and other vehicles.

"2. When passing behind a standing car or vehicle to be certain there is not one approaching from the opposite direction.

"3. The danger of playing on or near car tracks.

"The foregoing suggestions permit of amplification as the individual judgment of teachers may dictate. The public safety crusade has the sanction of the school authorities and you are earnestly invited to assist in preserving the lives and safety of school children by bringing these matters forcibly to the attention of your classes.

(Signed) "ELLA FLAGG YOUNG, Superintendent of Schools."

HEARING ON TRANSFERS IN NEW YORK

The hearing on the question of rates of fare on the connecting or intersecting surface railways in the borough of Manhattan was continued before the Public Service Commission of the First District of New York on Oct. 26, 1911.

Edward G. Connette, transportation engineer of the commission, was recalled and examined by O. C. Semple, counsel for the commission, in respect to appraisals of the properties of some of the companies under the jurisdiction of the commission made by him in other cases. Mr. Semple had read into the record of the present case the experience and employments which Mr Connette had prior to his connection with the commission.

Mr. Connette explained that he had caused to be prepared under his direction appraisals of the Central Park, North & East River Railroad and the Second Avenue Railroad, and that he had testified in the Third Avenue Railroad and Metropolitan Street Railway reorganization cases regarding the appraisals made by his department. He had gone over most of the property belonging to these companies, but he had not undertaken to make a complete observation of all of the properties included in the inventory.

Mr. Connette expressed the opinion that in addition to the amount ascertained as the net cost or actual cost of the labor and materials, a contractor's profit of 10 per cent should be allowed on such items as buildings, track, paving, distribution system, power equipment and rolling stock, and that 15 per cent of the net cost plus the contractor's profit should be allowed for incidentals, organization and engineering. He explained in detail why he had allowed only 10 per cent for engineering, contingencies, etc., in the case of the Third Avenue Railroad.

In estimating the life of the various elements of property Mr. Connette assumed the life of buildings and structures at fifty years, the substructure of conduit track at 100 years, the distribution system, including cables, at twenty years, and ducts and manholes at 100 years. In regard to track and other items Mr. Connette explained that he assumed that the property was maintained on a fifty-year basis. A certain number of renewals took place annually, and in the course of a certain number of years the renewals were completed, forming a circle. On that basis there would be 50 per cent accrued depreciation, minus the scrap, at all times. It would be extremely difficult to obtain the actual amount of depreciation of the rails.

This examination was preparatory to the introduction into the testimony of appraisals of the tangible property of the street railways operating in Manhattan which had been made by Mr. Connette. The companies included were the Metropolitan Street Railway, the Central Park, North & East River Railroad, the Second Avenue Railroad and the

each, as of July 31, 1911, as shown in Mr. Connette's valuations, appear in the accompanying table.

In the case of the Metropolitan Street Railway the following values are placed on the property not in use for railroad purposes: Net cost, \$5,338,737; cost to reproduce, \$6,102,267; present value, \$5,072,677.

In the case of the Central Park, North & East River Railroad the following values are placed on the property not in use for railroad purposes: Net cost, \$174,444; cost to reproduce, \$212,880; present value, \$156,884.

In the case of the Second Avenue Railroad the following values are placed on the property not in use for railroad purposes: Net cost, \$354,513; cost to reproduce, \$404,510; present value, \$320,556.

John Flint was recalled at the hearing on Oct. 30, 1911, and was cross-examined in regard to the details of the accounts of the Third Avenue Railroad.

The hearing was adjourned until Nov. 2, 1911.

HEARING ON EIGHT-CAR ELEVATED TRAINS IN NEW YORK

At the continued hearing before the Public Service Commission of the First District of New York on Oct. 27, 1911, on the question of the operation of eight-car trains during the rush hours on the elevated lines of the Interborough Rapid Transit Company both Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, and E. G. Connette, transportation engineer of the commission, were recalled.

In answer to a question by James L. Quackenbush, counsel of the Interborough Rapid Transit Company, as to why eight-car trains in the subway could be increased to ten-car trains whereas seven-car elevated trains could not readily be increased to eight-car trains, Mr. Hedley added the following to the statements made by him at previous hearings:

"When we were operating eight-car trains in the subway the track conditions, the station conditions, the approaches to the stations and the station platforms were very different from those on the elevated, so that the elevated and subway cannot be compared. In the subway we had considerable space that was not occupied by trains, because it was considered necessary to hold the trains back from the station a safe braking distance to avoid rear-end collisions. We have covered a very large amount of the space that was not formerly occupied by trains with the lengthened ten-car train.

"On the elevated lines the trains follow each other now so closely that it is impossible to get any more cars past; in short, the seven-car unit is the one that fits the elevated railroad service best, and enables us to operate the largest number of cars over the track within a given time. The interval between trains in the subway is one minute forty-eight seconds. That equals thirty-three and one-half trains an hour, or 335 cars passing a given point during the busiest hour of the twenty-four. On the elevated railroad, the Third Avenue line, for instance, we are operating seven-car trains. The interval between trains is sixty-two seconds, which gives fifty-eight trains of seven cars, or 406 cars per hour in the busiest hours, which is a great many more cars per hour on the elevated railroad with seven-car trains than we can possibly operate in the subway with ten-car trains."

Mr. Connette said that the cost of equipping the cars on the elevated lines with new drawbars and draft rigging, and strengthening the cars for the introduction of the new draft rigging and drawbars, and for taking care of the train stresses that might be introduced by reason of adding an extra car, would cost approximately \$700 per car. As he understood that the company had approximately 1800 elevated cars, the total cost would be \$1,260,000, plus \$250,000

METROPOLITAN STREET RAILWAY.

	Net cost.	Cost to reproduce.	Present value.
Total	\$48,368,222	\$57,812,861	\$42,075,826
Real estate.....	13,808,987	13,808,987	13,808,987
Grand total.....	\$62,177,209	\$71,621,848	\$55,884,813
CENTRAL PARK, NORTH & EAST RIVER RAILROAD.			
Grand total.....	\$2,492,426	\$2,948,220	\$2,251,993
SECOND AVENUE RAILROAD.			
Grand total.....	\$6,131,676	\$7,262,210	\$5,710,525
THIRD AVENUE RAILROAD.			
Grand total.....	\$28,441,133	\$32,166,526	\$24,544,350

Third Avenue Railroad. For each of these companies except the Third Avenue Railroad two statements were filed, one showing the property as a whole and the other showing separately the property in use for railroad purposes and the property not in use for railroad purposes. The net cost, the percentage for additions, the cost to reproduce, the accrued depreciation and the present value were all included in the statements. The totals of the net cost, the cost to reproduce and the present value of the properties

for replacing and relocating signals. Mr. Connette had not had time personally to reach his final conclusions as to what the total cost would be, but, taking into consideration the elements which he had just mentioned, he did not believe that the total cost would exceed \$2,000,000. He had made no allowance, however, for changes in terminals.

The hearing was adjourned until Nov. 10, 1911.

INSPECTION TOUR OVER THE ILLINOIS TRACTION SYSTEM

A party of electric railway men from Indiana and Ohio were entertained on Nov. 2 and 3 by H. E. Chubbuck, vice-president executive of the Illinois Traction System, by a trip made over a considerable portion of this company's interurban lines in Central Illinois. The Indiana party included the following:

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.

F. W. Coen, vice-president and general manager Lake Shore Electric Railway, Sandusky, Ohio.

R. A. Crume, general manager Dayton & Troy Electric Railway, Tippecanoe City, Ohio.

Charles L. Henry, president and general manager Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

Arthur W. Brady, president; H. A. Nicholl, general manager Indiana Union Traction Company, Anderson, Ind.

R. I. Todd, vice-president and general manager; E. B. Peck, vice-president, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ind.

L. E. Fisher, St. Louis, Mo.

Hugh M. Wilson, vice-president, New York, L. E. Gould, Western editor, *ELECTRIC RAILWAY JOURNAL*, Chicago.

The representatives of the Illinois Traction System on the trip, besides Mr. Chubbuck, were Messrs. Handshy, Martin, Quackenbush, Leisenring, Buffe, Bell, Bascom and Creeviston.

The party gathered at Peoria Thursday morning and were escorted to the office car, No. 233, of the Illinois Traction System, on which breakfast was served en route to East Peoria. At East Peoria car 233 was side-tracked until the passage of the 8:10 southbound limited, which carried signals for car 233, from East Peoria to Mackinaw Junction. This arrangement of first and second sections was made so that the railway men from Indiana might view the operation of the automatic block signals and note the facility with which trains of several sections are handled on protected track.

At Mackinaw Junction a stop was made to inspect the new coal pits which have just been built by the company for under-water storage of Illinois coal. A description of a similar pit built near the Riverton power plant of this system appeared in the *ELECTRIC RAILWAY JOURNAL* April 1, 1911, page 591. The Mackinaw Junction pits have a capacity of 15,000 tons, are lined with concrete and are surmounted by trestles on which a locomotive crane carrying a grab bucket operates for reclaiming submerged coal. After leaving Mackinaw Junction the office car containing the Indiana party was routed around the city of Springfield, Ill., on the new high-speed belt line which recently was opened to service. This belt line is single-tracked and is approximately 5 miles long. It passes through an industrial district of Springfield and encircles the southeast section of the city. Thus it affords opportunity for many loading tracks and connections with several steam railroad trunk lines. All grade crossings are protected with interlockers and the grades are separated at the most important steam road crossings.

The party was then taken southward over the Springfield-St. Louis division, which is 100 miles long, passing

around, also, Edwardsville by the Edwardsville belt line, which is about $3\frac{1}{2}$ miles long. At Granite City the party was again routed around the new Granite City belt line to the Illinois approach to the McKinley Bridge, at which location is the new power station which furnishes energy for the operation of the city cars in St. Louis and the interurban cars on the Springfield-St. Louis division.

After viewing this power station, the party was taken over the McKinley Bridge and shown the two new passenger stations and the new express and freight station at St. Louis. Mr. Chubbuck then entertained the party at a dinner at the Jefferson Hotel. Each guest before leaving was presented with a leather-bound copy of a recent pamphlet issued by the Illinois Traction System. The name of each guest was embossed upon the cover of the pamphlet.

RECENT PREPAYMENT LICENSES

The Prepayment Car Sales Company, New York, reports a large number of recent contracts for licenses and door devices. Some of the more important which have been closed since July 1 are:

Chicago Railways Company; license for 292 pay-as-you-enter cars of the Railways Company standard platform design.

Detroit United Railway Company; license for fifty pay-within type of cars.

Boston Elevated Railway Company; license and door and step mechanism for fifty pay-within cars of Boston special type.

New York State Railways Company, Rochester; license for fifteen new and twelve remodeled pay-as-you-enter cars.

International Railway Company, Buffalo; license for ten cars remodeled to pay-as-you-enter type.

Georgia Railway & Electric Company, Atlanta, Ga.; license for seventeen cars remodeled to pay-as-you-enter type.

Lehigh Valley Transit Company, Allentown, Pa.; license and door and step mechanism for ten new pay-within cars and pay-within door and step mechanism to be applied to ten pay-as-you-enter cars now in operation.

Central Pennsylvania Traction Company, Harrisburg, Pa.; license and door and step mechanism for six new pay-within cars.

Charleston Consolidated Railway & Lighting Company; license and door and step mechanism for six new pay-within cars.

Virginia Railway & Power Company; license for eight cars remodeled to pay-as-you-enter type and door mechanism for two other cars.

Wilkes-Barre Railway Company; license for fourteen new pay-as-you-enter cars.

Lynchburg Traction & Light Company; license for fourteen new pay-as-you-enter cars.

Topeka Railway Company; license for four new pay-as-you-enter cars.

New York & North Shore Traction Company; license for four new pay-as-you-enter cars.

Milwaukee Electric Railway & Light Company; license and door mechanism for twelve cars remodeled to pay-within type.

San Antonio Traction Company; license and door and step devices for ten new combination pay-as-you-enter and pay-within cars, and for nine cars converted to pay-within type.

Richmond & Henrico Railway Company, Va.; license and door and step devices for four new pay-within cars.

Frankford, Tacony & Holmesburg Street Railway Company; license for two pay-as-you-enter cars.

Union Electric Company, Dubuque, Ia.; license for six pay-as-you-enter cars.

RECENT IMPROVEMENTS IN SIGNALS

The Nachod Signal Company, Philadelphia, Pa., has made various improvements in its automatic signals. The new oil-immersed resistance unit is wound on a brass tube which is insulated with impregnated asbestos. It has a mechanically protective covering of Bakelite, applied to the outside, there being a narrow strip running the length of the winding uncovered. The contact bands may thus be placed at any point on the resistance tube and the desired resistance obtained. Consequently, although three different resistances are required, they can be obtained with three different settings of the same unit instead of by the use of separate units, as hitherto. The unit has a resistance of 1100 ohms, but is quite sturdy. Great overload capacity is obtained through the immersion of this resistance in oil.

The main magnet coils are wound with one size finer wire, thereby decreasing the amount of heat liberated to the oil. The coils are form-wound, with paper between the layers, of enamel insulation copper wire, the bobbin heads being pressed on. The terminals are directly on the heads, thus avoiding loose leads. These coils are interchangeable in any location, as only one type is used. The wood parts are impregnated under vacuum, whereby the moisture is removed and replaced with an insulating medium.

Improvements have been made in the jigs and fixtures in order that the parts may be accurately interchangeable. A change has been made in the directional relay which selects the setting or clearing magnet according to the direction of the car under the contactor. This is now series-wound instead of shunt-connected, so that the wire of the winding is enlarged thirteen sizes. By the combination of residual magnetism and a prolonged front contact the armature is released slowly, and the trolley wheel may bounce under the contactor without causing any wrong signal indications. The trolley contactor, which was especially designed to meet high-speed requirements and is without moving parts, is manufactured with contact strips which remain in proper alignment despite their great flexibility.

A new suspension bracket has been designed so that the signal box may be conveniently and uniformly suspended from the pole on either the right or left-hand side. It is a ribbed iron casting, secured to the pole in gains by two through bolts, the signal box itself hanging to the bracket by means of lugs. An adjusting screw on the bracket permits the signal box to be hung vertically if the pole is raked. The entire signal box can be removed from the bracket in the simplest manner by block and tackle through an eye bolt. Thus work may be done on the signal box either in place or when it is lowered to the ground.

EXHIBITS AT CONVENTION OF AMERICAN RAILWAY ENGINEERING ASSOCIATION

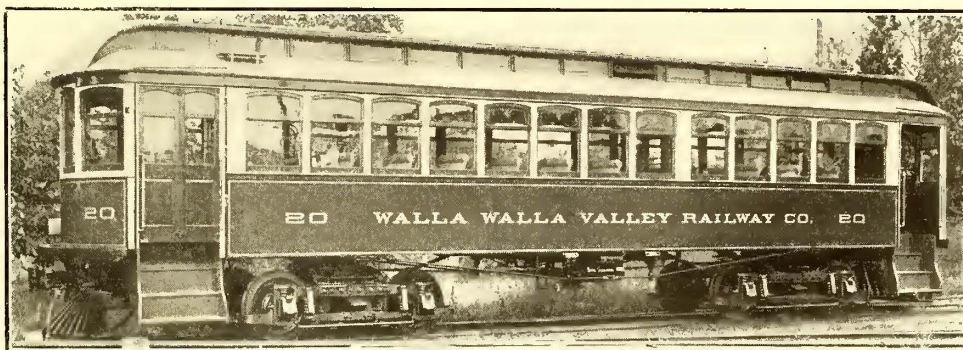
The thirteenth annual convention of the American Railway Engineering Association and the spring meeting of the Railway Signal Association will be held in Chicago, Ill., March 18 to 23, 1912. Preparations are now being made for the annual exhibition of appliances used in the construction and maintenance of steam and electric railways, which will be given at the same time by the National Railway Appliances Association at the Coliseum and First Regiment Armory in Chicago. The arrangement of the main floor space in the Coliseum will be practically the

same as last year, but the balconies will not be used. In order to provide for the increased demand for space, the First Regiment Armory, adjoining the Coliseum, has been leased, and will give an additional 16,000 sq. ft. of floor space. The price of the floor space will be 45 cents per square foot. The additional charge of 5 cents per square foot over last year has been made because of the necessity of buying fixtures this year, instead of renting them as heretofore. The first allotment of space will be made on or about Nov. 1, 1911, by the executive committee of the association. All applications for space should be made to the secretary, Bruce V. Crandall, 1400 Ellsworth Building, 537 South Dearborn Street, Chicago, Ill., before that date.

COMBINATION PASSENGER CAR FOR WALLA WALLA, WASH.

The Walla Walla (Wash.) Railway has lately received from the Danville Car Company the combination passenger and smoking car of the straight-side design shown in the accompanying illustration. This car is 46 ft. long over the outside vestibule sheathing, 36 ft. long over the end panels at the sill and 8 ft. 9¼ in. wide over the post above the belt rail. The platforms are 5 ft. long with an opening and step on both sides. The step openings are inclosed with Brill automatic doors with inside lock, while the car body proper has mutually operating double sliding doors at each end and single sliding doors between the compartments. The smokers' compartment occupies the space of five windows at one end and the passenger compartment the rest of the car, the first seating twenty persons, the latter thirty.

The bottom framing consists of 5 in. x 8 in. side sills cov-



Combination Passenger and Smoking Car for the Walla Walla Valley Railway

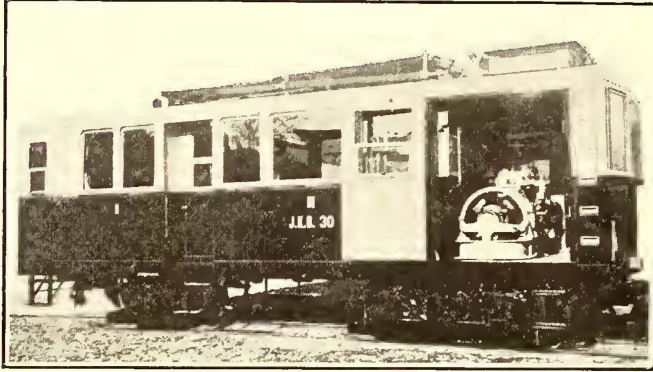
ered with ¾-in. x 8-in. plate; 5-in. x 7-in. white oak end sills and 4½-in. x 6¾-in. center cross joists of white oak. The car ends are protected by Brill angle iron bumpers. The body framing includes 3¾-in. corner posts and 3-in. side posts. The roof is strengthened with concealed steel rafters 5/8 in. thick. To deaden sound the floors are double, with intermediate building felt. The inside finish of the car is of quartered oak and the ceiling of three-ply birch veneer painted light green and decorated. Bronze metal trimmings are used throughout. All seats are upholstered in rattan and furnished with corner grab handles. The windows are furnished with green pantasote curtains and Forsythe No. 86 fixtures.

The car body is mounted on two Brill 27-E-1 trucks with 6-ft. 4-in. wheel base and equipped with 34-in. diameter Midvale rolled-steel wheels and 5-in. axles. Other equipment furnished includes Westinghouse straight-air brakes with graduated release and piped for air signals; G.E. luminous arc headlight; Peter Smith B-2 hot-water heater; Tomlinson M. C. B. radial couplers and "Dumpit" sand-boxes. Eventually the car will carry electrical equipment consisting of four G.E.-57 motors with K-14 control, but at present it will be used as a trailer.

GASOLINE-ELECTRIC CARS IN EUROPE

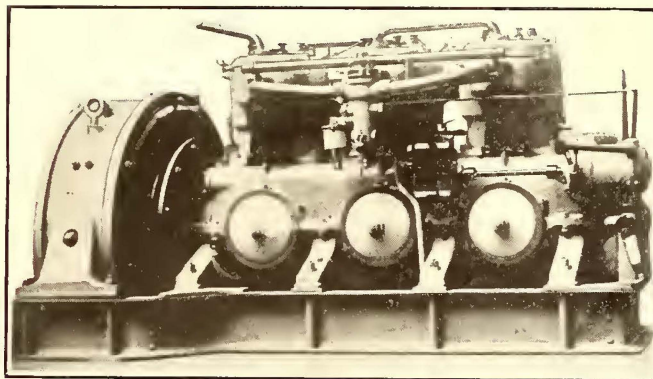
During the last five years the British Westinghouse Electric & Manufacturing Company has developed an interesting type of gasoline-electric motor car. Thirty-eight of these cars are now in service on railways and tramways in Great Britain and Europe. The cars are made in several sizes and have a cab about 7 ft. long at one end in which the engine and generator set is mounted. They are mounted on a four-wheel truck under the engine end and a single axle at the rear end. One motor is mounted on the four-wheel truck and another on the single axle.

The engine is of the four-cycle type and will operate on



Arad-Csanad Gaso-Electric Motor Car

gasoline or a mixture of gasoline and alcohol. It is made in two sizes, 60 hp with four cylinders and 90 hp with six cylinders. The cylinders of both sizes of engines are $5\frac{1}{2}$ -in. bore by $6\frac{1}{4}$ -in. stroke and the speed is 950 r.p.m. The torque and speed characteristics are specially designed to meet the conditions of railway service. The carburetor is of the spray type and gives automatic regulation of the jet according to variations of the load. It permits the engine to be throttled down to a speed of 200 r.p.m. at no load. The governor controls the quality of the mixture by regulating the admission of air to the carburetor in such a way as to maintain the same relative proportion of air and gas admitted to the engine cylinders irrespective of the engine



Engine and Generator for Gasoline Motor Car

speed. Magneto high-tension ignition is employed. The engine is started by hand by means of a geared crank, and when starting a special cam acting on the exhaust valves reduces the compression in the cylinders. Pressure lubrication is employed for all of the principal bearings.

The generator is a shunt-wound machine with interpoles and is direct-connected to the engine by a Zodel-type flexible coupling. Special care has been given to the insulation and the windings are of liberal size to insure low temperatures. The complete generating set is mounted on a bed formed by a channel bent to shape.

The motors on the axles are of the standard Westinghouse traction type. They drive the axles through single-

reduction gears. The controller does not change the motor connections nor vary the external resistance of the motor circuit, but instead varies the excitation, and hence the voltage of the generator, and also controls the speed of the engine. For double-end operation a controller may be mounted in a cab at the end of the car opposite to the engine compartment.

The Arad-Csanad Railway in Hungary, which operates 290 miles of line serving a thinly populated territory, began operating motor cars in 1903. It now has among other motor cars fourteen 40-hp cars, one 50-hp car and one 60-hp car, all of Westinghouse manufacture. These cars run singly and also haul light trail cars in trains. They make about 25,000 miles each annually and the cost per train mile is 16.5 cents, divided as follows: Wages 3.3 cents, fuel 3.3 cents, lubrication 0.5 cents, repairs 5.7 cents, other charges, including taxes, 3.7 cents. The steam trains, which these motor cars have supplanted for the most part, cost 32 cents per mile to operate.

SOUVENIR ALBUM OF THE BERLIN STREET RAILWAY SYSTEM

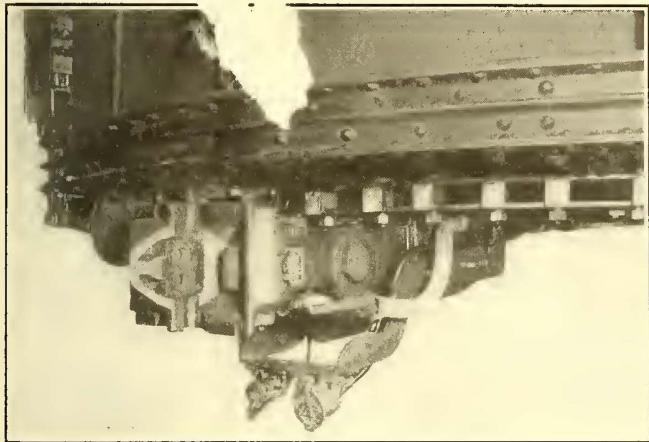
The Grosse Berliner Strassenbahn has published in honor of the September meeting of the German Street & Interurban Railway Association a souvenir album which describes the Berlin street railway system somewhat along the lines followed in the *ELECTRIC RAILWAY JOURNAL*'s convention issue in its description of the Public Service Railway system.

The book, which is bound in cloth, consists of 246 pages printed on heavy coated paper and contains several hundred illustrations in the text besides thirteen half-tone inserts and five traffic maps. The opening chapters describe the development of the company and its subsidiary lines from the original horse car company of 1871. This is followed by a review of the franchise situation, a financial statement and a description of the organization. In all the company employs 10,677 persons, for whom a fortnightly paper is published to give changes in personnel and operating rules, employees' organization notices, etc. The chapter on welfare work contains curves which show that the company has always given its men twice, and even three times, as much as was required by the laws covering sick and death benefit pensions and kindred matters. The chapters immediately following describe the methods of training transportation men, the arrangement of runs, conductors' trip reports and the handling of fare tickets and transfers. The chapter on accidents contains charts which show by months the proportion of accidents due to collisions with different classes of vehicles and also a chart which shows the proportion of accidents according to the time of day. An extended account is presented of the traffic conditions in the city, including many forms, traffic curves and a complete tabulation of every route in the city.

The methods of traffic analysis used by this company were described in the *ELECTRIC RAILWAY JOURNAL* of Feb. 5, 1910. The accompanying chart shows the growth of the system from 1891 to 1910 inclusive, giving the number of passengers per car-km, income per passenger, number of car-km, earnings per car-km, gross earnings, operating expenses, also the comparative increase of population and traffic. The chapter on rolling stock reviews the history of the various types of cars, giving their principal construction features. The rest of the book contains in order chapters on shop facilities; energy consumption and reduction of same through the use of time meters on cars; line construction, including the use of auxiliary wires at ears to prevent broken wires from falling to the street; track construction, including the use of reinforced concrete plates instead of ties.

AUTOMATIC CAR AND AIR COUPLERS FOR INTERBOROUGH SUBWAY CARS

The lengthening of the express trains operated in the New York subway from eight cars to ten cars introduced many new problems in such details as signal arrangements, operation of car doors, train signals, braking apparatus and train connections. With longer trains it was necessary to provide improved brake apparatus of the electro-pneumatic



Coupler Applied to Subway Car

type which would insure instantaneous application of the brakes on all cars in a train in order to prevent destructive surging due to slow application on the rear cars. Closely related to the problem of effective braking was the design of suitable couplings between the cars. In such long trains, composed of alternate motor and trailer cars, even slight inequalities in the rates of acceleration and retardation tend to produce violent and uncomfortable jerks unless the couplers and draft attachments are designed to eliminate all slack. At the same time they must allow for both vertical and horizontal deflection from the center line when the cars pass over breaks in grade or around short-radius curves.

When the change was made to ten-car trains, the Westinghouse Traction Brake Company was prepared to furnish not only the improved electro-pneumatic brake apparatus but suitable couplers of the tight-lock type as well. The necessity for a coupler of this type had been foreseen in advance of the actual need for it, and several years ago George Westinghouse had designed such a coupler which embodied also means for connecting the airbrake train pipes. The practicability of the device had been demon-

and gaskets, which materially reduces the loss of air by leakage.

The accompanying engravings illustrate the subway coupler and draft attachment. The coupler consists of a cast-steel head with a centering projection having a hook formation above and below the projection and a recessed face to engage with the corresponding head of another coupler. The head is pivoted for vertical movement by a pin of large diameter on the end of a heavy cast-steel drawbar, and on the under side there is a lug which engages with a spring plunger incased in a housing cast on the bottom of the drawbar. This spring holds the coupler head up in a horizontal position, but permits some deflection in a vertical plane.

The hook faces of the coupler head are at an angle of about 30 deg. with the butting faces, and the width is such that two couplers will engage and move into position for coupling when their center lines are as much as 7 in. apart. The couplers will likewise gather when the difference in height does not exceed 3 in. In the recessed face opposite the hooks is a pivoted latch, which is forced outward or toward the face by a spring under control of the uncoupling handle. This latch engages with the outside face of the centering projection or guard arm of the connecting coupler. When the latch on both couplers in engagement is forced out, the two couplers cannot be parted, as the guard arms must slide out to one side in order to disengage.

The locking latch is operated by a handle and sector gear engaging with a gear on top of a vertical cam shaft which passes through the shank of the coupler head just in front of the pivot pin. This cam shaft is connected by a rod and crank arm to the locking latch in the coupler head. When two couplers of this type engage and the locking latches are thrown in, the faces of the couplers are tight against each other and there is no possibility of their chafing against each other with the ultimate result of producing wear and lost motion.

The train line air connections are made by two ports in the face of each coupler which are fitted with rubber gaskets. As the faces in which the ports are located do not slide over each other in coupling or uncoupling, the gaskets are not subjected to wear and no difficulty is experienced in keeping the connections air-tight. The air hose is attached by nipples and cut-out cocks to outlets on the side of the coupler head, and only short lengths of hose are required to permit free movement of the drawbar and coupler head without danger of kinking the hose.

The draft attachments for these couplers were furnished by Forsyth Brothers Company. They consist of a one-piece cast steel radial draft beam and spring housing and a series of leaf springs with follower plates at each end



Side View of Subway Coupler and Draft Attachments

strated by a number of these couplers of smaller size operating in regular service on suburban cars, and it was only necessary to change the details of the design so as to make the new couplers heavy enough to withstand the stresses to which they would be subjected in subway service. The protection afforded by this coupler to yardmen when making up trains is at once apparent. The time required in making up trains is also much reduced, and there is a large saving due to the practical elimination of wear and tear on hose

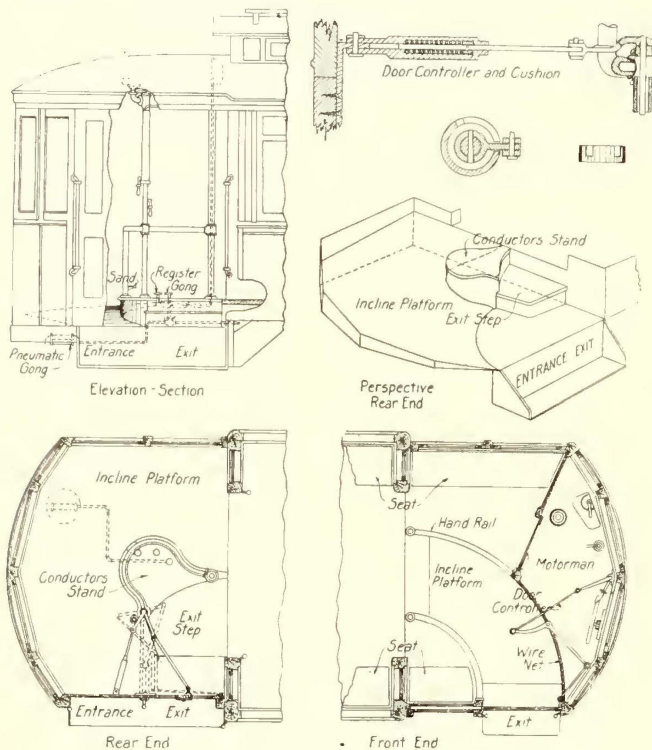
which are inclosed within a yoke formed on the end of the drawbar. These springs supply the friction principle so desirable in a high capacity gear. The draft beam is pivoted under the car center sills near the bolster and is supported at the outer end by a lip cast on the draft spring housing which slides on a radial carry iron. The draft spring consists of thirty-six flat leaves divided into two groups of ten leaves and two groups of eight leaves. Each group of leaves is separated by concave or convex follower

plates. When either of the end follower plates is moved by the drawbar, the flat springs are bent to conform to the curve of the end and intermediate follower plates. The movement of the leaves over each other is accompanied by high frictional resistance in addition to the force required to deflect the leaves, thus giving high buffing capacity with low recoil.

RAMP FOR CAR PLATFORMS

The accompanying engraving shows a ramp for the rear platform of cars which has recently been designed by Charles C. Crewson, shop foreman, Metropolitan Street Railway, Kansas City, Mo. A plan and side view of one of twenty-five cars built with a similar ramp for the Metropolitan Street Railway, Kansas City, was illustrated on page 665 of the issue of this paper for Oct. 7.

The arrangement shown is for single-end cars. As will be noted the rear platform instead of being flat is inclined, so that there is a rise, in the case of the Kansas City cars, of 12 in. between the top of the entrance step and the car door. The floor of the car has another rise of 1½ in. be-



Details of Platform and Ramp

tween the car door and the rear body bolster. Some of the claims put forward by Mr. Crewson for this design of car are as follows:

It makes possible a reduction in the height of the steps from the street without reducing the height of the floor of the car or the size of the car wheel.

It increases the speed at which passengers enter the car and reduces the number of platform accidents.

Conductors are better able to perform their duties when standing at the same elevation as the floor of the car, as they can more easily see passengers entering, leaving or approaching, and can be heard by passengers in the car.

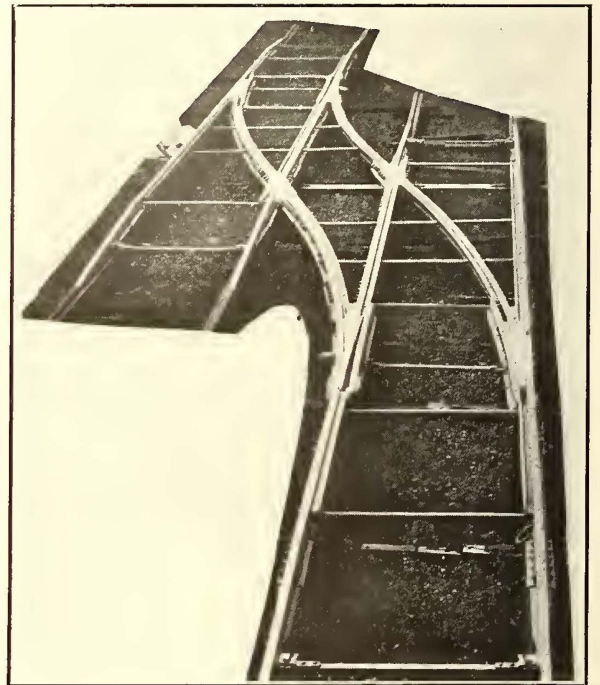
As the front vestibule has an inclined exit-way, and as the front vestibule floor is on the same level as the car floor, there is greater seating capacity, and the motorman has a better view of passengers leaving the car.

In the Kansas City cars the motorman is inclosed by a wire netting so that there is a free circulation of air, and it is expected that there will be a more even temperature in winter. Patents have been allowed the inventor for this arrangement.

SUBSTANTIAL PORTABLE CROSSOVER

The Cleveland Frog & Crossing Company, Cleveland, Ohio, is now making a portable crossover invented by John Kerwin, superintendent of tracks Detroit United Railways. This crossover, of which a specimen was exhibited at the recent convention at Atlantic City, is remarkable not only for its permanent construction, but also for several other features not found in the ordinary style of crossover. It is built of 80-lb. A. S. C. E. rail with the regulation angle bar joints. The frogs are of the maker's "Hard Service" manganese type as used on many steam and electric railroads and the tongues and mates are of the regulation "hard center" manganese construction. The crossover exhibited was 100 ft. long from tip to tip and weighed about 20,000 lb. The base of the crossover was 2-in. above the track or lower rails, which gave a total rise of 7 in.

One of the interesting features is the application of "dutchmen," namely, rail inserts of various lengths to accommodate variations in widths of the devil strip. Another feature is that the crossover rails are provided with shoes which have a lip on one side to engage the flanged side of the track rails. These shoes serve two purposes: They prevent the crossover from getting off the track,



Portable Crossover

and they also permit it to slide along the rails through the medium of end rings and chains which can be attached to any motor car. The rails of the crossover are kept to gage by transverse struts, each consisting of a pipe which serves as a spreader and an inner rod which is used as a binder. One threaded rod is also provided at each end of the crossover to make adjustment for minor variations in gage so that the shoes will fit the track rails perfectly. The accompanying view was taken before the original form of end adjusting rods was replaced by the threaded design. A plan view and detailed drawings of the first Kerwin crossover were published on page 585 of the *ELECTRIC RAILWAY JOURNAL* for April 1, 1911. At that time also figures were given to show the saving in expense effected in Detroit by its use. It has also been found more convenient than the type formerly used.

The substantial construction of this crossover makes it unnecessary to have watchmen or to spike it to the pavement. Furthermore, its permanent character enables it to be used as regular track whenever desired merely by removing the points.

LONDON LETTER

(From Our Regular Correspondent.)

The directors of the North-Eastern Railway are considering the use of electricity to operate freight trains on Tyneside. Although the company has been operating its passenger traffic over the Tyneside suburban area by electricity since 1904, the goods and mineral traffic has been handled by steam. The present proposal is to use electricity for freight traffic and to shunt goods and minerals in the marshaling yards at Heaton Junction and other traffic centers in the electrified area. Vincent L. Raven, the company's chief mechanical engineer, and Charles H. Merz, the company's consulting electrical engineer, are in America inspecting the electrical locomotives in use there for hauling and shunting purposes.

Lord Ormidale gave judgment recently in the Court of Session at Edinburgh in the action brought by the Municipal Council of Johannesburg against D. Stewart & Company, Ltd., Glasgow, and William Beardmore, for breach of contract in the installation of the machinery in the power station at Johannesburg, intended to operate on the electric tramways of the city. It was decided that gas engines supplied with producer gas should be installed in the station. Such engines had not been made in Great Britain up to that time, but Stewart & Company, Ltd., undertook to build them on the Oechelhauser system. It was found after the engines were installed that they got clogged up and would not work on account of the inability to purify the gas. Attempts were made to correct the defects in the plant, but eventually Stewart & Company, Ltd., abandoned the contract. The decision of the court awards the Johannesburg Corporation the sum of about £350,000.

The British Electrical & Allied Manufacturers' Association took advantage of the recent electrical exhibition to hold its inaugural dinner at the Hotel Cecil, London. At this dinner, Mr. Ferranti, president of the Institution of Electrical Engineers, occupied the chair. In proposing the toast "The Association," he pointed out that it was just as vital to the buyer that the manufacturer should be prosperous as it was to the manufacturer himself. There was too much competition in England. While competition was excellent what was really wanted was competition in excellence. Mr. Nalder, chairman of the council, in responding, said that the aim of the association was to temper competition by conference. If all the manufacturers would work together the association might accomplish a great deal. Bruce Anderson, member of council, proposed the toast "The Industry." He devoted most of his speech to a protest against giving electrical work to the foreigner.

At the conclusion of the meeting of the Municipal Tramways Association in Glasgow, referred to in last month's letter, H. E. Blain, general manager of the West Ham Corporation Tramways, was elected president of the association for the ensuing year. In returning thanks, Mr. Blain invited the members to hold the next conference at West Ham. A. R. Fearnley resigned as secretary of the association and was appointed one of the vice-presidents. C. J. Spencer, general manager of the Bradford Tramways, was appointed secretary and treasurer to succeed Mr. Fearnley.

The Lord Mayor of London recently laid the foundation stone of the new electric power station of the Egham & Staines Electricity Supply Company. This station is the first for public service in England to be designed for the exclusive use of Diesel engines.

The London General Omnibus Company has announced that at the end of November the last of its horse omnibuses will be withdrawn from the London streets and that thereafter the entire service will be motor driven. This marks another epoch in the history of transportation in London. After Dec. 1, 1911, only a few horse omnibuses will be left to carry on a hopeless competition against the motor 'bus. The London General Omnibus Company has established a factory in which it is building new motor 'buses at the rate of fifteen to twenty a week and at a cost of about £350, or one-half what the company paid when it purchased vehicles in the open market.

At a recent meeting of the Town Council of Norwich

it was stated by the Lord Mayor that the Council had decided not to purchase the property of the Norwich Electric Tramways.

Negotiations have been completed between the City Corporation and the London County Council in regard to the construction of the tramways across the new St. Paul's Bridge. The bridge has been authorized by Parliament, but the County Council's tramway scheme will have to be formulated into a bill and be approved by Parliament. The suggested tramway will extend from Southwark Street across the new bridge and dip under St. Paul's Churchyard, where there will be an underground station in the vicinity of the old general post office. The new line will not connect with the Southern and Northern systems, as it will go no further north than Cheapside. The whole scheme, however, is a matter of the future, as the renovating of the old Southwark Bridge will have to be completed before the construction of the new St. Paul's Bridge is commenced. This work of renovation will be commenced in the spring, and will probably take two or three years to complete. It will therefore probably be ten years before St. Paul's Bridge is opened, but it is necessary to decide in regard to the tramways as they will have an important bearing upon the design of the bridge.

Up to the present no London County Council tramway has been allowed to cross the boundary of the city proper, but an interesting decision has been rendered by which the tramway at Norton Folgate is to be extended from its present terminus about a quarter of a mile, which will bring it well within the city boundary into Bishopsgate Street, close to the important terminus of the Great Eastern Railway at Liverpool Street. This concession will be of convenience to thousands of passengers. It will bring the trams into the heart of the city and link them with this important railway and with the new terminus of the Central London tube and the Metropolitan system at Bishopsgate. Bishopsgate Street is being widened, and in a few years tram lines will be continued to Cornhill.

A special meeting of the stockholders of the British Electric Traction Company, Ltd., was held in London on Oct. 17, 1911, to consider a resolution in regard to a scheme for the reorganization of the capital of the company. Emile Garcke, chairman, said that the directors felt that something ought to be done to adjust the altered relations between the two classes of shareholders which had been produced by the profits not being sufficient to pay the full preferred dividend. In a memorandum which he had issued he had explained the condition in regard to the profits and had given the reason why they were small in comparison with the paid-up capital. He emphasized the point that in this respect the stockholders of the British Electric Traction Company were perhaps better off than stockholders in other electrical undertakings of the same class. The British Electric Traction Company consisted of fifty-seven companies, with an aggregate capital of more than £12,000,000. Last year the associated companies collectively showed an increase in net profits of more than £100,000, and he hoped they would do still better this year. The question of what proportion of the annual profits should be set aside for reserves could be better discussed after the plan under consideration had been adopted. The board had been advised by counsel that a loss on capital account was not necessarily a loss which had to be made good out of revenue. There was no loss on the revenue account of the company and there was no reason why all division of profits should be stopped because the assets had depreciated in value. With regard to the amendment proposing the appointment of a committee of inquiry he said that the directors would welcome such a committee. The first consideration of the committee, however, must be the interests of the shareholders. The proxies which had been lodged indicated that the directors enjoyed the full confidence of the shareholders, and he understood that in view of the support which the directors had received the amendment for the appointment of a committee would not be moved. He then presented a resolution approving the scheme for the subdivision and rearrangement of the capital subject to such modification as might be made and approved at the requisite extraordinary meetings of shareholders. The resolution to adjourn the meeting to Nov. 3, 1911, was carried.

A. C. S.

News of Electric Railways

Paul Shoup on the Arnold (Los Angeles) Report

Paul Shoup, vice-president of the Pacific Electric Railway, Los Angeles, Cal., was quoted in the *Los Angeles Examiner* of Oct. 27, 1911, as declining to make any formal statement in regard to the partial report by Bion J. Arnold on transit conditions in Los Angeles which was abstracted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 21, 1911, page 907. Mr. Shoup did, however, discuss transit conditions in general in Los Angeles, referring incidentally to the Arnold report, and is quoted in part as follows:

"As soon as the people will permit the company to do so under an equitable arrangement, the Pacific Electric Railway will give Los Angeles the best interurban traffic and terminal system, but the company cannot invest the millions of dollars which will be required until the people have granted us rights under liberal enough terms to warrant the investment.

"The Arnold report shows a clear conception of the situation. It has evidently been prepared with much study and reflects credit upon Mr. Arnold and his associates. I understand this to be only a preliminary study, a foundation on which to build, and that the details are to be worked out as each problem comes up for practical solution. While we may not agree with all the conclusions reached in the report, any objections we have had best await the practical working out of each problem. Certainly the report has such evidence of fair intention as to make it possible for us to approach its discussion with friendly feeling.

"As for the transfer system recommended by Mr. Arnold, I need more light. Under what restriction? Under what limitations as to 5-cent fare radius? This question anyway has to be answered, when answered at all, by the Los Angeles Railway Corporation and the Pacific Electric Railway jointly. The Pacific Electric Railway is essentially an interurban system giving service similar to the steam railroads, and it may be reasonably expected that its present 1,000 miles of track will be very largely increased; and its terminals and tenure of its terminals must correspond to this outside construction. As concerns the construction of other terminals in the city sometime in the future, to be occupied by the Pacific Electric Railway as a tenant, as suggested by Mr. Arnold, it would not be possible to discuss that subject now and reach any conclusion—it is a question to which the answer lies in the future."

Plans for the Cleveland & Youngstown Railroad

The Cleveland & Youngstown Railroad filed an application with the City Council of Cleveland, Ohio, on Oct. 23, 1911, for a franchise to build a four-track railway along Kingsbury run. Because the company's charter will allow it to operate a steam railroad, the local newspapers assumed that the plan for a large terminal at Ontario and Prospect Streets proposed a union station which would be used by all the steam and electric railways entering Cleveland. This is merely a possibility, according to a statement made by Warren Bicknell, who is in charge of the plans. The terminal will be for the use of interurban roads primarily. The Cleveland & Youngstown Railroad will be used to afford an entrance into the city to the proposed terminal.

The Cleveland & Youngstown Railroad was incorporated about a year ago. The following officers, all members of a firm of attorneys at Youngstown, constitute the temporary organization: President, James H. Wilson; vice-president, John T. Harrington; treasurer, Judge U. C. DeFord. The firm of Arrel, Wilson, Harrington & DeFord is perfecting the organization of the company with the intention of completing a railroad between Cleveland and Youngstown. It has been intimated that steam will be used as motive power outside of Cleveland.

In order to secure the right to cross certain streets, which in reality are not streets except as they appear upon the maps, the company has agreed to deed to the city about forty acres of land suitable for park purposes. An appro-

priation had already been made by the City Council to purchase some of this land, but the money may also be used for improvement purposes. If the city accepts the offer of the company the streets will be vacated and the company will thus be enabled to operate rapid-transit cars without hindrance.

An interesting feature of the plan is a tunnel for a four-track system, from East Twenty-fifth Street, near the Nickel Plate depot, to Canal road on the boundary of the terminal property, a distance of 5500 ft.

It is said that more than \$1,000,000 has been invested recently in land for the proposed terminal station. The total investment for construction is estimated at about \$25,000,000. As stated previously in the *ELECTRIC RAILWAY JOURNAL*, the new line will give an entrance to the city to the interurban railroads from the east and south and will reduce their running time within the city limits from thirty-six minutes to eighteen minutes.

After leaving the Cleveland city limits the proposed line will pass through Shaker Heights district to Chagrin Falls Garrettsville, Leavittsburg, Warren, Niles and Girard.

The Question of Six Tickets for a Quarter in Wilmington

The Wilmington & Philadelphia Traction Company recently filed a bill in equity with the United States Circuit Court in Wilmington, Del., to restrain the Public Utility Commission of Delaware from enforcing an order directing the company to restore the sale of tickets at the rate of six for 25 cents. The company has now filed with the court in support of its bill affidavits made by John A. Rigg, president of the Interstate Railways; Oscar T. Crosby, president of the Wilmington & Philadelphia Traction Company, and Henry P. Scott, a director of the company. Mr. Crosby declares that the company was deprived of proving its charter rights and contends that the order of the Public Utility Commission in directing that the sale of strip tickets should be restored was illegal. He gives the financial condition resulting from the operation of the leased railways in Wilmington and vicinity for the year ended July 1, 1911, as follows: Gross receipts, \$553,644.67; amounts expended, \$487,197.71; remaining for depreciation and interest charges and surplus and special charge, \$66,445.96; pro rata of discount on reissue of \$600,000 of Wilmington City Railway bonds upon new mortgage, \$10,286; balance, \$56,159.96; interest on outstanding mortgages, \$24,000; interest on \$400,000 outstanding mortgage bonds of the Wilmington & Edge Moor Railway, \$20,000; balance, \$12,159; rentals, \$113,088.49; deficiency supplied by new capital, \$100,928.53. Mr. Crosby says that the withdrawal of the sale of six tickets for a quarter will result in an increase in the gross revenue of the company in Wilmington from \$25,000 to \$50,000 per annum.

Mr. Scott avers that since its organization the company has expended out of its capital about \$200,000 in improvements to the local property and that of the Southern Pennsylvania Company; that the Wilmington & Philadelphia Traction Company has borrowed \$100,000 to purchase new rolling stock, and that it must expend further sums to make the property efficient. He speaks of the paving which the company has done and that which it is to do, and says that during the year ended July 1, 1911, such paving and repaving amounted to upward of \$24,000; that for grading and paving next year the amount will likely be \$100,000. Mr. Scott states that there should be taken into account the annual depreciation of trackage, overhead work, rolling stock, etc., and continues:

"The power to borrow money has a limit which is eventually reached and is being nearly approached at present by the railway companies complainant in the bill of complaint. The experiment conducted for ten years of selling six tickets for a quarter in connection with straight fares has been ineffective adequately to increase patronage by the public of Wilmington."

Mr. Scott states that the plan to abolish strip tickets was contemplated by the old company, but at the request of persons organizing the Wilmington & Philadelphia Trac-

tion Company, the order was withheld so as to give a further trial of the sale of strip tickets under conditions of improved service. At the end of one year it was found that a larger income was necessary and the tickets were abolished.

The affidavit of Mr. Rigg takes up the cases of the old companies with respect to interest charges, etc., under the terms of the lease.

Air Brake Order in New York

The order of the Public Service Commission of the First District of New York in regard to the use of power brakes on the surface cars of the street railways under its jurisdiction, to which reference was made in the *ELECTRIC RAILWAY JOURNAL* of Oct. 28, 1911, page 960, follows:

"ORDERED (1) That after June 1, 1912, all passenger double truck surface cars in service weighing over 27,000 lb. shall be equipped with power brakes and geared hand brakes;

(2) That after June 1, 1913, all passenger double truck surface cars in service weighing over 25,100 lb. shall be equipped with power brakes and geared hand brakes;

(3) That after June 1, 1912, all other passenger double truck surface cars in service weighing 25,100 lb. or less, shall be equipped with geared hand brakes; and

"(4) That after June 1, 1912, all surface cars in service, other than passenger cars, shall be equipped with power brakes and geared hand brakes; and it is further

"ORDERED, that this order shall take effect forthwith and shall remain in force until revoked or modified; and it is further

"ORDERED, that within five days after the service of a copy of this order upon them, said corporations and said receivers notify the commission whether this order is accepted and will be obeyed."

Reasons Why Portland Railway, Light & Power Desires Additional Franchises

B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has issued the following statement in regard to the company's application for additional trackage, the ordinance to authorize which the city attorney is seeking to load with many onerous conditions, among them the right to fix fares and a common user clause:

"Our application to the City Council for additional trackage is solely to improve the street car service. Rose City Park people desire to get into the downtown district and out of it on shorter schedules. It takes forty minutes to make the trip now. By forming a loop at Stark Street and double-tracking we can cut this time down. In each case the extensions mean additional value to property. In no case will it add to the revenue of the company, except as the city and country grow. In the meantime these extensions will be a burden to maintain. For these accommodations to the people the city attorney suggests that we give valuable consideration, such as paying for paving upon streets not occupied. This question is in the Circuit Court and when it is decided will determine the whole matter as to our rights. The attempt to force us into paying for something which we do not use, before the final adjudication of the matter, is hardly fair and would indicate a fear as to the outcome of the case in the courts on the part of the city attorney. He further provides that we shall donate to the city any realty property that we may own for street purposes. In other words, any private owner receives from the city the value of his property taken for street purposes, while we are requested to donate it. That would appear to be confiscating property.

"We are anxious to give the people of Portland the very best of service. Outlying districts can only maintain their values in realty and in their homes by having good service. If it is the City Council's desire that we give the people the present service, which is inadequate in point of schedules in many cases, we shall be content, for we can continue in our present way. The franchise under which we are operating continues for twenty-one years. The vital thing which a growing city like Portland needs is service—quick service and good service. The application

for an additional franchise was made at the urgent request of the citizens in the various districts involved. We desire to accommodate them."

San Francisco's Municipal Railroad

Commissioner of Public Works Laumeister, of San Francisco, not being satisfied with the progress being made in equipping the Geary Street, Park & Ocean Railroad with electricity for operation by the city, has taken over the task of supervising the work on the line and has announced that hereafter he will be responsible for the work. In an interview in the *San Francisco Chronicle* Mr. Laumeister is quoted as follows:

"I have taken all the drawings and incomplete specification work away from the city engineer, and from now on if there is any delay in the construction of the road I will be responsible.

"I have encountered nothing but delay since I took this office. In the first place, I found that no one would bid on the specifications for redwood ties. I went to the dealers and discovered that the specifications had been drawn in such a manner that no business man would bid on them. When the specifications were rewritten so that they could be understood there was no difficulty in getting satisfactory bids. The same thing happened when we tried to get bids for poles.

"Patrick Broderick, superintendent of construction of the Geary Street, Park & Ocean Railroad, knows how long it will take to tear up the old tracks, and when we have accepted a bid on the cars we may be able to tell when they will be delivered. The present cable cars will be allowed to run up to a day which will allow sufficient time to complete the new track by the time the cars are delivered. The specifications for the power house have not been completed, but we will be able to buy power until we can manufacture it."

It was at first proposed to equip the line with all-steel cars, but home interests protested against this on the ground that a type of car should be adopted which could be constructed in San Francisco. Up to Oct. 21, 1911, the question of the type of car was still in abeyance, but it is hoped to open bids for the cars on Nov. 15, 1911.

Detroit Settlement Plan Presented to Council

The plan of settlement with the Detroit (Mich.) United Railway advocated by Mayor Thompson was formally presented to the Detroit City Council on the evening of Oct. 24, 1911. It was partially read and then referred to the committee on franchises. The same evening this committee reported in favor of directing Corporation Counsel Hally to draft an ordinance embracing the features of the agreement arrived at between Mayor Thompson and the company. Mr. Hally has been at work on this ordinance for several days and the action was taken to ratify informal proceedings which had been taken at a previous session. John McVickar has been employed by the city to inspect the paving between the tracks and the foundations under them on the five lines in which the city is interested and to estimate the expense of putting them in the best condition and maintaining them in that condition.

Onerous Franchise Conditions in Middletown, Ohio.—

W. Kesley Schoepf, president of the Ohio Electric Railway, has written the City Council of Middletown, Ohio, that the franchises submitted to him by that body for a local street railway system are so different from those suggested by the company that it is useless to go into the matter further, adding that any attempt to establish lines in Middletown on the basis suggested in the franchise would be disastrous to the town and to those who undertook to carry out the enterprise.

Pittsburgh Subway Ordinance.—The subway ordinance was before the public service and surveys committee of the Council of Pittsburgh, Pa., for consideration on Oct. 26, 1911. A. O. Fording appeared on behalf of the Pittsburgh Subway Company and presented a bond for \$100,000 binding that company to meet the terms of the general subway

ordinance as now drawn. J. D. Callery, president of the Pittsburgh Railways, was out of town and representatives of that company and the Rapid Transit Subway Company asked a continuance for two weeks. A motion to this effect was carried, but it requires the companies in the meantime to submit their proposal to the City Council in writing.

Decision in Des Moines Arbitration Case.—A decision was reached Oct. 28, 1911, in the arbitration case between the Des Moines (Ia.) City Railway and its employees. A history of the case briefly is as follows: Conductor Hiatt was discharged July 23, 1911, for failure to ring up fares. This led to a strike on Aug. 4 which was stopped by an injunction issued on Aug. 5 and Hiatt was temporarily reinstated. On Sept. 1 and 3 Motorman Roberts was discharged for smoking while on duty, Hiatt was again discharged for alleged shortage and a second conductor, Bruce, was also discharged for the same offense. The company agreed to arbitrate these cases, but a strike was ordered and was later declared off. The decision of the three arbitrators justifies the company in its discharge of Roberts and Hiatt, but states that the evidence in the case of Bruce did not sufficiently support the charge against him. The decision has been accepted by both sides and the company has agreed to reinstate Bruce.

Philadelphia & Suburban Railroad's Plans Outlined.—S. S. Neff, president of the Philadelphia & Suburban Railroad, has appealed to the comprehensive plans committee of Philadelphia for aid in securing a franchise for the construction of a subway in North Broad Street to Lehigh Avenue, Philadelphia, with elevated connections in the latter thoroughfare to Thirty-fourth Street and Strawberry Mansion and to Front Street and by way of Kensington Avenue to Frankford. A third elevated structure, also connecting with the proposed subway, is planned to Wayne Junction. Mr. Neff added two new features to the project as introduced in Councils some time ago. These include a proposed extension of the elevated railroad from Strawberry Mansion to the Convention Hall at the Cliffs, and the leasing by the Philadelphia & Suburban Railroad of the branches of the Pennsylvania Railroad from Wayne Junction to Chestnut Hill and of the Reading Railroad's Frankford branch. Mr. Neff said that the entire system, including a terminal under the north plaza of City Hall, with necessary loops, stations and power plants, could be built for \$20,000,000. The plans of the Philadelphia & Suburban Railroad as outlined by Mr. Neff have been referred by the comprehensive plans committee to a sub-committee for report.

Sub-Committees Appointed by National Civic Federation to Consider Utility Regulation.—The executive committee of the department on regulation of interstate and municipal utilities of the National Civic Federation met in New York recently and arranged for an exhaustive investigation of the problems of which this branch of the federation has cognizance. Emerson McMillin, of the American Light & Traction Company, acted as chairman of the meeting, which divided the work to be done among a number of sub-committees, which will have cognizance, respectively, of rates, control of service, control of capitalization, franchises, accounts and reports. A sub-committee was also appointed to draft a model bill. The general question to be studied is: "What is adequate regulation of municipal utilities, railroads, telegraph and telephone companies, both interstate and intrastate?" The organization of this department of the federation follows the investigation into the relative merits of public and private operation of public utilities both in the United States and in Europe made some time ago by a commission of the federation. That commission unanimously declared for adequate regulation by a competent authority, with power to require for all public utilities a uniform system of records and accounts, giving all financial data and all information concerning the quality of service and the cost thereof, and recommended that no stock or bonds for public utilities be issued without the approval of some competent public authority. The first meeting of the committee of the federation on the regulation of railroads and public utilities was held in New York on June 23, 1911, as noted in the ELECTRIC RAILWAY JOURNAL of July 1, 1911, page 60.

Financial and Corporate

New York Stock and Money Markets

November 1, 1911.

After slowly regaining some of the ground lost after notice of suit against the Steel Corporation the steel shares to-day led a general advance in prices, in which the common reached a price above that at which it sold shortly before the suit was filed. Quietness continues in the money market. Quotations to-day were: Call, 2½@3 per cent; ninety days, 3½@4 per cent.

Other Markets

Prices were higher in Chicago to-day, reflecting the tone of the New York market. Traction issues have been active during the week, but offered no special feature of interest to-day.

Higher prices also prevailed on the Philadelphia exchange in the trading to-day. Transactions in Steel were in large volume, at advanced prices.

Outside buying was in greater evidence in Boston to-day than has been the case for some time. Improvement was made throughout the list, the most noteworthy gains being made in the coppers and the Steel shares.

The Baltimore market also participated in the widespread advance, and prices were much firmer and higher than recently.

Quotations of traction and manufacturing securities as compared with last week follow:

	Oct. 25.	Nov. 2.
American Light & Traction Company (common)....	a295	a291
American Light & Traction Company (preferred)....	a106	a107
American Railways Company.....	a43½	a44½
Aurora, Elgin & Chicago Railroad (common).....	41½	a43
Aurora, Elgin & Chicago Railroad (preferred).....	a85	a85
Boston Elevated Railway.....	a127	a126
Boston Suburban Electric Companies (common)....	a15	a15
Boston Suburban Electric Companies (preferred)....	a75	a75
Boston & Worcester Electric Companies (common)...	a12	a12
Boston & Worcester Electric Companies (preferred)...	a50½	50
Brooklyn Rapid Transit Company.....	75	75½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.	84½	*84½
Capital Traction Company, Washington.....	a130	127½
Chicago City Railway.....	a180	a180
Chicago & Oak Park Elevated Railroad (common)....	*3	3
Chicago & Oak Park Elevated Railroad (preferred)....	*6	5
Chicago Railways, pteptg., ctf. 1.....	a96	a96
Chicago Railways, pteptg., ctf. 2.....	a33	a32¾
Chicago Railways, pteptg., ctf. 3.....	a12	a11
Chicago Railways, pteptg., ctf. 4.....	a7	a7
Cincinnati Street Railway.....	a132½	132½
Cleveland Railway.....	a99¾	a100¼
Columbus Railway (common).....	83	83
Consolidated Traction of New Jersey.....	a76	a75½
Consolidated Traction of N. J., 5 per cent bonds....	a104	a104½
Dayton Street Railway (common).....	a25	a25
Dayton Street Railway (preferred).....	a101	a101
Detroit United Railway.....	a95	a79
General Electric Company.....	150¾	150½
Georgia Railway & Electric Company (common)....	a161½	a160
Georgia Railway & Electric Company (preferred)....	a93	a93
Interborough Metropolitan Company (common)....	a147	15
Interborough Metropolitan Company (preferred)....	44½	45½
Interborough Metropolitan Company (4½s).....	79¼	79½
Kansas City Railway & Light Company (common)...	16	a16½
Kansas City Railway & Light Company (preferred)...	*44	a44½
Manhattan Railway.....	a138	a136
Massachusetts Electric Companies (common)....	a22	a22¾
Massachusetts Electric Companies (preferred)....	a95½	a94
Metropolitan West Side, Chicago (common).....	*27	*27
Metropolitan West Side, Chicago (preferred).....	*75	*75
Metropolitan Street Railway, New York.....	*8	8
Milwaukee Electric Railway & Light (preferred)....	*110	*110
North American Company.....	a70	a74
Northern Ohio Light & Traction Company.....	a57½	*57½
Northwestern Elevated Railroad (common).....	*30	*30
Northwestern Elevated Railroad (preferred).....	*70	*70
Philadelphia Company, Pittsburgh (common)....	51¼	a52¾
Philadelphia Company, Pittsburgh (preferred)....	42½	a42¾
Philadelphia Rapid Transit Company.....	23	a23¾
Philadelphia Traction Company.....	83¾	84½
Public Service Corporation, 5% col. notes (1913)...	*94	*94
Public Service Corporation, ctf. s.....	a104½	a110
Seattle Electric Company (common).....	a108	a108
Seattle Electric Company (preferred).....	a101	a101
South Side Elevated Railroad (Chicago).....	*95¼	*95½
Third Avenue Railroad, New York.....	9½	9½
Toledo Railway & Light Company.....	a10	10
Twin City Rapid Transit, Minneapolis (common)....	a106¾	a107
Union Traction Company, Philadelphia.....	51¼	a51¼
United Ry. & Electric Company (Baltimore).....	*18	18
United Rys. Inv. Co. (common).....	a31½	34¼
United Rys. Inv. Co. (preferred).....	a58½	58
Washington Ry. & Electric Company (common)....	a40½	a41½
Washington Ry. & Electric Company (preferred)....	a90	a91
West End Street Railway, Boston (common).....	a88	a87½
West End Street Railway, Boston (preferred).....	101	a102
Westinghouse Elec. & Mfg. Co.....	a64	64¾
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120	a120

a Asked. * Last sale.

Georgia Railway & Power Company

The Georgia Railway & Power Company, chartered recently, as noted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 7, 1911, page 677, has organized and has applied to the Georgia Railroad Commission for authority to issue \$30,000,000 of bonds in addition to \$27,000,000 of stock. Of this stock \$15,000,000 will be common stock, \$2,000,000 first preferred stock and \$10,000,000 second preferred non-cumulative stock. The hearing on the application for permission to issue the bonds will be held on Nov. 7, 1911. The directors of the company are: President, Charles Magee, Toronto, Canada; vice-president, Alexander C. King, Atlanta; secretary-treasurer, Forrest Adair, Atlanta; George G. Moore, Detroit, Mich., and J. J. Spalding, Atlanta. Mr. Magee was not present at the meeting in the offices of King, Spalding & Underwood, Atlanta, Ga., lawyers, when the company organized, but he was represented by Elliott G. Stephenson, Detroit. Others who attended the meeting were C. Elmer Smith, York, Pa., president of the Georgia Power Company; George H. Moore, Detroit; Alexander C. King, J. J. Spalding, Forrest Adair and E. Marvin Underwood, Atlanta.

The proposed bond issue is to consist of \$30,000,000 of 5 per cent sixty-five-year bonds, with the Fidelity Trust Company, Philadelphia, as trustee. It is stated that \$10,000,000 of the bonds will be used to take up an equal amount of bonds of the Georgia Power Company, \$1,500,000 to retire a similar amount of bonds of the Atlanta Water & Electric Company and \$550,000 to redeem a like amount of bonds of the Savannah River Power Company. The rest of the proposed issue will be held in the treasury. It is said that the stock to be issued to the amount of \$27,000,000 will take the place of \$29,500,000 of other stock as follows: \$10,000,000 of stock of the Georgia Power Company, \$3,000,000 of stock of the Atlanta Hydroelectric Company, \$5,000,000 of stock of the Inter-State Power Company, \$10,000,000 of stock of the South Carolina Company and \$1,500,000 of stock of the Atlanta Water & Electric Power Company. The new company will lease the property of the Georgia Railway & Electric Company, as explained previously in the *ELECTRIC RAILWAY JOURNAL*.

The company's plants will be located upon three distinct and separate watersheds—the Savannah and Tallulah River section, the Chattahoochee River and the Etowah River. Construction is well advanced at Tallulah Falls and the plant there is expected to be in operation by July, 1912. Work will be started soon on the electric railway from Stone Mountain to Decatur to connect with the lines of the Georgia Railway & Electric Company operating in Atlanta and the suburbs.

Chicago (Ill.) Railways.—The annual meeting of the stockholders of the Chicago Railways was held on Oct. 26, 1911. The vacancy in the board of directors caused by the resignation of R. G. Hutchins was filled by the election of M. B. Orde.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—William A. Day and J. A. Thake have been elected directors of the Coney Island & Brooklyn Railroad, to succeed J. H. Hyde and William H. McIntyre, resigned.

El Paso (Tex.) Electric Company.—Perry, Coffin & Burr, Boston, Mass., are offering for subscription at 99 and interest to yield 5.08 per cent, 5 per cent first mortgage collateral trust bonds of the El Paso Electric Company. There are \$1,000,000 of these bonds outstanding, followed by \$500,000 of 6 per cent debentures, \$1,000,000 of 6 per cent preferred stock and \$1,000,000 of common stock paying dividends at the rate of 5 per cent. A statement of earnings of the El Paso Electric Company for the year ended Aug. 31, 1911, as made public by Perry, Coffin & Burr, follows: Gross receipts, \$671,628; operating expenses and taxes, \$405,303; net earnings, \$266,324; bond interest, \$50,000; balance, \$216,324.

International Traction Company, Buffalo, N. Y.—The annual meeting of the stockholders of the International Traction Company was held on Oct. 31, 1911. Charles E. Richards was elected a director to succeed Grant B. Schley. The other directors and the officers were re-elected. It was announced that the annual report of the company would not be made public until the Public Service Commission of the Second District of New York had acted on

the plan of reorganization of the company which is now before that body, as reported in detail in the *ELECTRIC RAILWAY JOURNAL* of Oct. 21, 1911, page 910. Thomas Penner, president of the company, is quoted as follows: "Satisfactory progress is being made toward a plan of reorganization of the International Traction Company, and this plan is now before the Public Service Commission of the Second District of New York for approval. The plan of reorganization provides briefly for a new holding concern, to be known as the International Traction Railways. This company has already received the consent of the city of Buffalo to build a short line there and to issue securities to take over the properties now owned by the International Traction Company and to provide for future capital requirements."

Joliet & Southern Traction Company, Joliet, Ill.—The bondholders' protective committee, representing more than 75 per cent of the bonds of the Joliet & Southern Traction Company, has adopted resolutions instructing the trustee to begin proceedings at once to foreclose the property.

London (Ont.) Street Railway.—The directors of the London Street Railway have voted to issue the remainder of the \$750,000 of authorized stock, of which \$552,000 is outstanding. It is stated that the proceeds of the new stock will be used to build extensions under a clause in the company's charter.

Metropolitan Street Railway, Kansas City, Mo.—The receivers of the Metropolitan Street Railway have deposited with the Old Colony Trust Company, Boston, Mass., the amount necessary to pay the coupons on the \$7,242,000 of consolidated mortgage 5 per cent bonds of the Metropolitan Street Railway and the \$2,000,000 of 5 per cent bonds of the Central Electric Railway due on Nov. 1, 1911.

Montgomery Traction Company, Easton, Pa.—The details of the purchase of the property of the Montgomery Traction Company by the Lehigh Valley Transit Company, Allentown, were arranged on Oct. 25, 1911.

Montreal (Que.) Street Railway.—The report of the Montreal Street Railway for the year ended Sept. 30, 1911, was presented at the annual meeting of the company on Oct. 27, 1911, by E. A. Robert, president. The gross earnings were \$4,775,300; operating expenses, \$2,679,805; net earnings, \$2,095,494; interest on Montreal, Park & Island Railway, \$114,807; total income, \$2,210,302; taxes, rentals, interest and city's percentage on earnings, \$583,904; net income, \$1,626,398; dividend, 10 per cent, \$1,000,000; surplus, \$626,398. After deducting from the surplus \$275,000 for the contingent account and for the fire insurance fund there was left to be transferred to the general surplus \$351,398.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad has been incorporated in California with \$5,000,000 capital, as the successor to the Ocean Shore Railway, the property of which was sold some time ago under foreclosure. The incorporators were P. I. Mullen, S. M. Mannon, Jr., S. W. Reynolds, O. B. Wyman, F. E. Boland, S. I. Langmaid and O. C. Greene.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—The Des Moines River Power Company is reported to have exercised the option which it secured some time ago on the property of the Oskaloosa Traction & Light Company.

Riverside Traction Company, Camden, N. J.—The Public Service Corporation of New Jersey has leased the property of the Riverside Traction Company through the Public Service Railway. Under the terms of the lease interest is guaranteed on the bonds, 5 per cent dividends on the preferred stock and dividends on the common stock increasing on a sliding scale.

Tampa (Fla.) Electric Company.—The Tampa Electric Company has declared in addition to the usual quarterly dividend of 2 per cent on the \$1,700,000 of stock an extra dividend of 1 per cent, both payable on Nov. 15, 1911, to holders of record on Nov. 3, 1911, making a total of 10 per cent in 1911.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—Arthur L. Spamer has been appointed special master and auditor of the Washington, Baltimore & Annapolis Electric Railway. This action was taken fol-

lowing the filing on Oct. 31, 1911, of the final statement of the receivers in the United States Circuit Court. The statement of the receivers, George T. Bishop and George W. Williams, shows total assets of \$365,416 and total liabilities of \$2,188,271. On March 30, 1911, all the property, franchises, etc., of the Washington, Baltimore & Annapolis Electric Railway were sold at foreclosure, and on March 31, 1911, all the property, rights and franchises thus purchased were conveyed to the Washington, Baltimore & Annapolis Electric Railroad.

Dividends Declared

Cape Breton Electric Company, Ltd., Sydney, N. S., 3 per cent preferred; 2 per cent common.
Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.
Texas Traction Company, Dallas, Tex., 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

HOUGHTON COUNTY TRACTION COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Aug.,	'11.... \$28,534	\$13,189	\$15,345	\$7,756	\$7,589
1 "	"	'10.... 29,709	13,537	16,171	6,637	9,534
12 "	"	'11.... 304,956	159,690	145,267	80,985	64,281
12 "	"	'10.... 317,014	167,787	149,228	76,978	72,249
HUDSON & MANHATTAN RAILROAD.						
1 m.,	July	'11.... \$216,375	*\$105,676	\$110,699	.....	.....
JACKSONVILLE TRACTION COMPANY.						
1 m.,	Aug.,	'11.... \$44,565	\$23,861	\$20,704	\$12,365	\$8,339
1 "	"	'10.... 47,043	27,100	19,943	9,494	10,449
12 "	"	'11.... 576,353	317,323	259,029	126,320	132,709
12 "	"	'10.... 551,983	290,728	261,255	112,473	148,783
METROPOLITAN STREET RAILWAY, NEW YORK.						
1 m.,	July,	'11.... \$1,134,765	*\$727,006	\$407,758	.....	.....
NEW YORK & QUEENS COUNTY.						
1 m.,	July,	'11.... \$131,146	*\$116,814	\$14,332	.....	.....
NORTHERN TEXAS ELECTRIC COMPANY.						
1 m.,	Aug.,	'11.... \$135,529	\$69,585	\$65,944	\$26,009	\$39,935
1 "	"	'10.... 119,813	63,952	55,860	20,301	35,560
12 "	"	'11.... 1,561,348	809,592	751,756	272,611	469,144
12 "	"	'10.... 1,377,638	743,535	634,102	221,411	412,692
PADUCAH TRACTION & LIGHT COMPANY.						
1 m.,	Aug.,	'11.... \$21,470	\$12,097	\$9,373	\$7,828	\$1,545
1 "	"	'10.... 20,786	11,807	8,973	7,071	1,902
12 "	"	'11.... 258,450	141,744	116,706	92,279	24,427
12 "	"	'10.... 241,341	143,931	97,410	82,864	14,546
PENSACOLA ELECTRIC COMPANY.						
1 m.,	Aug.,	'11.... \$23,555	\$15,418	\$8,137	\$5,860	\$2,277
1 "	"	'10.... 24,178	14,483	9,695	5,243	4,452
12 "	"	'11.... 284,626	167,364	117,262	67,824	49,438
12 "	"	'10.... 260,462	153,157	107,306	57,949	49,357
PUGET SOUND ELECTRIC RAILWAY.						
1 m.,	Aug.,	'11.... \$155,665	\$96,661	\$59,004	\$51,878	\$7,125
1 "	"	'10.... 173,989	100,169	73,820	52,145	21,675
12 "	"	'11.... 1,809,871	1,226,821	583,050	602,554	†19,504
12 "	"	'10.... 1,922,895	1,267,097	655,798	602,657	53,137
SAVANNAH ELECTRIC COMPANY.						
1 m.,	Aug.,	'11.... \$58,681	\$40,331	\$18,350	\$18,342	\$8
1 "	"	'10.... 56,871	38,681	18,190	18,181	9
12 "	"	'11.... 668,756	448,774	219,981	218,604	1,377
12 "	"	'10.... 618,104	403,951	214,153	213,940	214
SEATTLE ELECTRIC COMPANY.						
1 m.,	Aug.,	'11.... \$448,863	\$240,443	\$208,420	\$116,260	\$92,160
1 "	"	'10.... 479,573	258,749	220,824	111,081	109,743
12 "	"	'11.... 5,529,712	3,071,971	2,457,741	1,345,171	1,112,570
12 "	"	'10.... 5,720,820	3,336,691	2,354,129	1,290,010	1,064,118
TAMPA ELECTRIC COMPANY.						
1 m.,	Aug.,	'11.... \$56,408	\$30,151	\$26,256	\$6,603	\$19,654
1 "	"	'10.... 50,346	25,070	25,276	5,958	19,318
12 "	"	'11.... 627,172	332,669	294,503	77,472	217,032
12 "	"	'10.... 621,395	345,983	275,412	48,674	216,738
THIRD AVENUE RAILROAD, NEW YORK.						
1 m.,	July,	'11.... \$337,434	*\$167,389	\$170,045	.....	.....
UNION RAILWAY, NEW YORK.						
1 m.,	July,	'11.... \$252,033	*\$169,838	\$82,195	.....	.....

†Deficit. *Includes taxes.

Traffic and Transportation

Passenger Traffic in the New York Subway

The Public Service Commission of the First District of New York has made public a statement of passenger traffic on the subway division of the Interborough Rapid Transit Company as indicated by the number of tickets sold at each station of the subway in the year ended June 30, 1911. The summary shows a considerable change in the starting points of travel and consequently in the distribution of population. Although the subway carried 7,742,681 more persons in the twelve months ended June 30, 1911, than in the preceding year, nearly half the stations reported an actual decline in the sales of tickets. Most of these were in the center of the city, while the increases were at the outlying stations, particularly along the West Farms branch. The following summary has been prepared from the original report to show the returns of the stations on the Lenox branch, the Broadway branch, the main line from Ninety-sixth Street to the Battery and the Brooklyn branch, with figures for the express stations at Ninety-sixth Street, Seventy-second Street, Grand Central, Fourteenth Street and Brooklyn Bridge, also Times Square and all the stations in Brooklyn:

Stations.	Total	Year's Increase	1911	1910	1909
Lenox Branch (total)...	52,120,508	3,321,459	153,296	143,527	126,233
Broadway Branch (total). 96th St. to South Ferry (total)	34,018,155	1,662,800	100,053	95,163	79,978
96th Street.....	155,735,045	602,634	458,044	456,272	414,762
72nd Street.....	4,581,128	d602,634	458,044	456,272	414,762
Times Square.....	4,102,000	d66,404	12,065	12,260	11,212
Grand Central.....	11,663,025	387,590	34,303	33,163	29,756
14th Street.....	13,799,160	d207,237	40,586	41,195	36,725
Brooklyn Bridge.....	12,516,177	d289,816	56,813	37,665	34,703
Brooklyn (total).....	16,909,540	d50,145	49,734	49,881	48,147
Borough Hall.....	34,652,559	2,176,472	101,919	95,518	79,657
Hoyt Street.....	7,755,366	d84,509	22,810	23,058	22,630
Nevins Street.....	6,044,714	835,193	17,779	15,322	10,522
Atlantic Avenue.....	4,133,629	3,219	12,157	12,148	11,031
Atlantic Avenue.....	16,718,850	1,422,569	49,173	44,989	35,474

Grand total..... c276,704,796 7,742,681 813,837 791,065 701,265
a Treating Sundays as half days (340 days to the year). c These totals are arithmetical only and do not account for passengers who buy tickets at "island" stations. d Decrease.

Instructions in Regard to Reports of Accidents in Connecticut

Henry F. Billings, secretary of the Public Utilities Commission, of Connecticut, has addressed the following letter to the public service corporations of the State in regard to filing reports of accidents with the commission:

"Section 17 of Chapter 128 of the Public Acts of 1911, being 'An Act Concerning the Regulation and Supervision of Public Service Corporations,' reads as follows:

"Companies to report accidents. Every public service company shall, in the event of any accident attended with personal injury or involving public safety which was or may have been connected with or due to the operation of its plant or equipment, or caused by contact with its wires, notify the commission thereof, by telephone or otherwise, as soon as may be reasonably possible after the occurrence of such accident. If said notice be given otherwise than in writing it shall be confirmed in writing within five days after the occurrence of such accident. Any company failing to comply with the provisions of this section shall be fined not more than \$500 for each offense."

"While this commission has no power or desire to abrogate or waive any of the requirements of the section quoted above, a compliance with the following instructions will, in the opinion of the commission, meet the intent of the statute:

"1. Accidents attended with slight personal injury must be reported in writing to the commission within five days of the occurrence of such accident.

"2. Accidents resulting in severe personal injury which were or may have been connected with or due to the operation of the plant or equipment of any public service corporation, or caused by contact with its wires, must be reported immediately to the commission, and a notice sent by telegraph to the chief engineer and inspector of the commission, Charles C. Elwell, at New Haven, Conn.; such report must be confirmed in writing within five days after the occurrence of such accident.

"3. All railroad wrecks (either steam or electric) which

At a meeting of the London County Council reports on the tramway accounts for the year 1910-11 were submitted by the highways and finance committees. The accounts showed a gross income of £2,232,817 15s 1d, and the working expenses amounted to £1,337,769 13s 1d, leaving a surplus on working of £895,048 2s 9d. After reductions for debt charges, Parliamentary expenses, etc., the net surplus was £232,726 14s 5d. The finance committee pointed out that the surplus on working was 4.8d a car mile against 5.06d to 5.17d in the four preceding years.

occur attended with personal injury or involving public safety must be reported at once by telephone and telegraph to the chief engineer and inspector of the commission, Charles C. Elwell, at New Haven, Conn., and a like report made to the commission; such report and notification must be confirmed in writing to the commission within five days after the occurrence of such wreck.

"4. All notices and reports required to be given to the commission concerning accidents should be sent to the office of the Public Utilities Commission at Hartford, Henry F. Billings secretary.

"This commission respectfully requests that all public service corporations strictly comply with the above instructions."

School Tickets in San Francisco.—The United Railroad, San Francisco, Cal., has offered to replace the former commutation tickets issued to school children with tickets to be sold in pads at the rate of forty for \$1.

Near Side Stops in East St. Louis.—The East St. Louis & Suburban Railway, East St. Louis, Ill., has decided to stop its cars on the near side of the street. It was planned to put the new rule into effect on Nov. 1, 1911.

New York Rapid Transit Route Approved.—The Board of Estimate of New York has approved the rapid transit route known as the Fifty-ninth Street-Queensboro Bridge route, which runs from Seventh Avenue, Manhattan, out to Woodside and Corona, in Queens. The board has also approved the contract for the construction of Section 15 of the Lexington Avenue subway, Manhattan.

Tickets Restored in St. Joseph.—The St. Joseph Railway, Light & Power Company, St. Joseph, Mo., which recently issued an order to conductors to refuse all tickets detached from ticket books so as to put a stop to the practice of newsboys selling tickets with papers, has decided to resume the sale of tickets, orders having been issued by the police department to policemen to arrest all persons who offer a ticket for sale or who refuse to abide by the company's rule holding tickets void if not detached in the presence of conductors.

Extension of Electric Truck Service.—In the *ELECTRIC RAILWAY JOURNAL* of Oct. 28, 1911, page 966, mention was made of the success which followed the use of electric trucks by the Louisville & Northern Railway & Lighting Company, New Albany, Ind., in connection with its express business, which is handled under the name of the Interurban Express Company. The trucks, which have a capacity of 1½ tons, have been used for New Albany business only. They have proved so economical and advantageous that it has been decided to use another truck of the same type in the down-town district of Louisville.

New York & Long Island Traction Company Reduces Fare.—The New York & Long Island Traction Company, Hempstead, N. Y., has made a reduction of 5 cents in the fare between the end of the Kings County elevated line of the Brooklyn Rapid Transit Company at the city line of Brooklyn and Rosedale, Lynbrook and Rockville Centre, and cars will be run on a fifteen-minute headway in the rush hours, or from 6 a. m. to 8 a. m. and from 5 p. m. to 7 p. m. Hereafter the fare from the end of the elevated railroad to Rosedale will be 5 cents; from the same point to Valley Stream and the heart of Lynbrook, 10 cents, and from the same point to Rockville Centre and Stop 81, at Baldwin, 15 cents. The question of a 5-cent fare over the company's line between Hempstead and Belmont Park, instead of a 10-cent fare, was to be heard at Mineola on Nov. 4, 1911.

Ordinance Vetoed to Require Sale of Tickets on Cars.—Mayor George W. Dilling, of Seattle, Wash., has vetoed the ordinance requiring the Seattle Electric Company to sell street car tickets on all cars. In his communication to the Council vetoing the ordinance the Mayor said he had been guided by the corporation counsel's opinion that the ordinance was illegal. Continuing, the Mayor said: "The city cannot repudiate the contracts which it has with the company and read into them provisions which they do not contain." The franchise of the company provides that the company shall sell twenty-five tickets for \$1 at its main office and power stations. Recently the company has voluntarily established about fifteen more stations where tickets are on sale.

Fare to the Suburbs of Birmingham.—The city commissioners of Birmingham, Ala., as a whole have been appointed to take up with the Birmingham Railway, Light & Power Company the 5-cent car fare proposition, and other questions between the city and company, excepting that of freight service on the city streets. On May 6, 1911, the board passed a resolution requesting the company to carry passengers over its lines between Wylam and Nineteenth Street in Birmingham, and between Ensley and Nineteenth Street in Birmingham, and between Pratt City and Nineteenth Street in Birmingham, and between intermediate points between Wylam, Ensley and Pratt City and Nineteenth Street in Birmingham, at the rate of 5 cents for each passenger, this rate to apply in each direction with the usual transfer privileges. This request the company declined.

Argument Heard in Washington Transfer Case.—Justice Wright, of the District Supreme Court, Washington, D. C., devoted the entire session of Equity Court No. 2 on Oct. 18, 1911, to the hearing of arguments on the question of universal transfers in Washington as incorporated in a petition of Arthur L. Shreve, receiver of the Baltimore & Washington Transit Company, to compel the Capital Traction Company to make reciprocal transfer arrangements at Fourteenth Street and Kennedy Street. The hearing was on a motion of the Capital Traction Company to dismiss the petition of the receiver on the ground of lack of jurisdiction in the court. The company also contended that even if the court has jurisdiction it should disregard the petition of the receiver, as the enactments of Congress relied on are unconstitutional and there is no physical connection between the two lines as contemplated in the act which requires transfers to be issued between connecting lines of street railways.

Hearing on Height of Car Steps in Connecticut.—J. K. Punderford, general manager of the Connecticut Company, New Haven, Conn., appeared before the Public Utilities Commission of Connecticut at Hartford on Oct. 24, 1911, as the representative of that company at the hearing on the question of the height of street car steps. Considerable testimony was presented bearing on the injurious effect which high car steps have on the health of women. Mr. Punderford said that the company would endeavor to remedy the trouble. He thought that the fifteen bench open double-truck cars were enjoyed by many of the patrons of the company. He spoke of the two and three step cars on the Unionville line, but feared that there would be more or less trouble because of the additional steps. The company was co-operating with car builders and truck builders and he would like to see the present type of car continued in service if the car can be lowered. As soon as the information had been obtained which he sought he would lay it before the commission. The company has 511 double truck cars, and to put an additional step on each of these cars would involve a large expense.

Two things stood out clearly at the recent meeting of the Municipal Tramway Association in Glasgow, Scotland, as important subjects for further discussion; first, the building of a proper reserve, and, second, the relief of the rates. Mr. Rogers, in his paper on tramways finance, attacked the various municipalities which were not providing for the future in this way. On the whole, it was the opinion of the conference that there should be no more relief for rates from tramway profits until the financial position of every tramway undertaking had been made unassailable. Some of the municipalities were evidently of the opinion that it was sufficient for them to take care of their sinking fund and pay for renewals out of revenue. Councilor Rogers charged that many of the tramway committees allowed their profits to be raided from political fears and that all chairmen of committees should withstand this attack upon profits of the tramways for the reduction of rates. Another subject considered was the question of further concessions in the matter of fares. It seemed to be the general opinion that fares were as low as they could possibly be made except in a few isolated cases. There is also a growing disposition to raise the workman's fare, as the underpaid clerk or professional man is considered to be as much entitled to a reduction in fare as the man who has to go to work before 7 a. m.

Personal Mention

Mr. F. E. Wood has resigned as treasurer of the Gray's Harbor Railway & Light Company, Aberdeen, Wash.

Mr. J. W. Williams has been elected secretary-treasurer of the London (Ont.) Street Railway to succeed the late George H. Bentson.

Mr. August Beidenbender has resigned as general superintendent of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.

Mr. John W. Aker has resigned from the Kentucky Traction & Terminal Company, Lexington, Ky., to become chief engineer of the Paris Gas & Electric Company, Paris, Ky.

Mr. J. S. Thornton has resigned as secretary, general manager and purchasing agent of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., and Mr. H. B. Zimmerman has been appointed to these positions to succeed him.

Mr. James K. Gray, assistant superintendent of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has been appointed superintendent of the company to succeed Mr. C. E. Palmer, whose appointment as superintendent of transportation of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., was noted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 14, 1911.

Mr. George W. Dunlap, whose appointment as electrical engineer of the Public Service Commission of the First District of New York in charge of the bureau of transit inspection under Mr. E. G. Connette was noted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 27, 1911, was born in North Berwick, Maine. His first work was with the Portland Locomotive Works, Portland, Maine. From 1884 to 1891 he was a locomotive engineer on the New York & New England Railroad running between Boston and Hartford and Boston and Willimantic. For three years Mr. Dunlap was employed at the Magid-Hope silk mills in Milford, Mass., which he equipped for electric operation. Subsequently he installed a 2600-hp electric plant for the Stevens Manufacturing Company at Fall River, and then became consulting engineer for the Davoll mills at Fall River. Mr. Dunlap was also chief engineer of the Waltham Gas & Electric Company, Waltham, Mass., chief engineer of the Newton (Mass.) Street Railway and chief engineer of the Hyde Park Electric Company, which furnishes power to the Suburban Street Railway, and equipped the power plant of the Biddeford & Saco Street Railway, Biddeford, Maine. During Mr. Dunlap's connection with the Worcester Consolidated Street Railway important improvements have been carried out affecting the power distribution system, the most noteworthy being the construction of the new Millbury station, which was described in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26, 1911, page 342. Mr. Dunlap is a member of the American Society of Mechanical Engineers.

OBITUARY

Sherman Culp, president of the Sandusky, Norwalk & Mansfield Railway, Norwalk, Ohio, and a prominent attorney, died at his home in Norwalk, on Oct. 26, 1911, after a long illness.

George E. Randolph, who was prominently connected with street railway development in Denver, Col., from 1889 to 1897, died in Denver on Oct. 22, 1911. Mr. Randolph was born in Quincy, Ill., on March 29, 1840, and was educated in the public schools of Providence, R. I. As the representative of Eastern capitalists, Mr. Randolph supervised the construction of the West End Street Railway, Denver, and the Denver City Cable Railway, and subsequently was general manager and purchasing agent of the Denver City Cable Railway. Later he and Cornelius E. Sweatland were appointed receivers of these companies. The Denver City Railroad was chartered in 1896 as the successor to the Denver City Cable Railway and the West End Street Railway, and Mr. Randolph served the Denver City Railroad as general manager and purchasing agent. Mr. Randolph was for several years Colorado agent of the Massachusetts State Mutual Life Insurance Company and had lately been chairman of the board of public works of Denver.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

San José & Almaden Railway, San José, Cal.—Application for a charter has been made in California by this company to build an electric railway from San José to Almaden. Capital stock, \$120,000. Incorporators: Charles A. Nones, H. F. Tatham, New Almaden, and A. P. Anderson and D. M. Burnett, San José. [E. R. J., Oct. 21, '11.]

Hamilton (Ill.) Railway.—Incorporated in Illinois to build an electric railway from a point on the bridge over the Mississippi River between Hamilton, Ill., and Keokuk, Ia., to Warsaw. Headquarters, Chicago. Capital stock, \$1,000,000. Directors: George Higginson, Winnetka, Ill.; Joel D. Harvey, Geneva; Joseph L. Valentine, Chicago; Hayne Wells, Chicago, and A. W. O'Hara. [E. R. J., July 9, '11.]

***Kansas City & Fort Scott Electric Railway, Topeka, Kan.**—Chartered in Kansas to build an electric railway from the terminus of the Metropolitan Street Railway in Rosedale via Stanley, Prescott, Fulton, Louisburg and Pleasanton to Ft. Scott. Surveys are now being made through Johnson and Miami Counties in Kansas. Capital stock (preliminary), \$10,000. Incorporators: W. S. Quarles, Stanley; M. M. Sweetman, Kansas City, Mo.; D. E. Ainsworth and T. W. Conboy, Stilwell; W. H. Foster, O. K. Reed, C. Kohlenberg, C. A. Bodenhammer and R. J. Rogers, Louisburg; M. Langan, Paola; A. Graves, Drexel; John Rose, Merriam; J. Frank Smith, Pleasanton.

Laurel Electric Power & Light Company, Laurel, Miss.—Application for a charter has been made in Mississippi by this company to build an electric railway and power plant in Laurel. Capital stock, \$75,000. Incorporators: P. H. Saunders, Herbert Lampe and S. M. Jones. [E. R. J., Oct. 14, '11.]

***Flathead Power & Traction Company, Polson, Mont.**—Incorporated in Montana to build an electric railway between Polson and Dixon, a distance of about 30 miles. Incorporators: F. L. Gray, G. R. M. Stritzel, T. R. Arnold, F. E. Faucett, M. A. Myhre and A. W. Pipes, all of Polson.

Chattanooga (Tenn.) Traction Company.—Application for a charter has been made in Tennessee by this company to build an electric railway in Chattanooga under a franchise granted by the City Council several months ago. It will also build interurban lines. One of the first will be to Dayton, Tenn., requiring construction through Hamilton and Rhea Counties. Another line will be built to the Georgia State boundary and the terminus of this line will be Ringgold, Ga. A line up Lookout Mountain is also proposed. The company expects to obtain its power from a hydroelectric company now completing a dam near Chattanooga. Capital stock, \$100,000. Incorporators: C. E. James, D. F. Beckhaw, J. L. Davies and Franklyn Harris. [E. R. J., May 13, '11.]

FRANCHISES

Sacramento, Cal.—The Sacramento Electric, Gas & Railway Company has received franchises from the City Trustees to extend its lines through Sacramento in four new sections.

San Diego, Cal.—The San Diego Electric Railway has asked the City Council for a franchise to extend its lines in San Diego.

Savannah, Ga.—The Savannah Electric Company has received a franchise from the City Council to extend its tracks over several streets in Savannah.

Averyville, Ill.—The Peoria & Northern Railway has received a fifty-year franchise from the Board of Trustees in Averyville. [E. R. J., Oct. 14, '11.]

Averyville, Ill.—The Peoria Terminal Company has received a twenty-year franchise from the Board of Trustees in Averyville.

DeKalb, Ill.—The DeKalb-Sycamore & Interurban Traction Company has received a forty-year extension of time on its franchise in DeKalb.

Kankakee, Ill.—The Kankakee Electric Railway has received a franchise from the Board of Supervisors to extend its East Court Street line in Kankakee to the Commercial subdivision, which is outside the city limits.

Logansport, Ind.—The Indiana & Northwestern Traction Company, Monticello, has asked the City Council for a franchise in Logansport. [E. R. J., Oct. 21, '11.]

***Terre Haute, Ind.**—John W. Ratliff, West Terre Haute, has asked the Commissioners of Vigo County for a franchise to construct an electric line from West Terre Haute to Clinton on the west side of the Wabash River.

Tama, Ia.—The Tama & Toledo Electric Railway, Toledo, has received a franchise from the Council in Tama.

Pittsfield, Mass.—The Berkshire Street Railway, Pittsfield, has received permission from the Railroad Commissioners to extend its tracks in Pittsfield.

Hibbing, Minn.—Victor L. Power, representing the Northern Traction Company, has asked the City Council for a franchise in Hibbing.

Springfield, Mo.—The Springfield & Western Railroad has secured a franchise from the City Council to enter the city from the west on Division Street. A party is now in the field making the permanent location of the line from Springfield west toward Joplin. M. M. Hollenback, Springfield, Mo., is chief engineer.

Patchogue, N. Y.—James A. Gifford, representing the receivers of the South Shore Traction Company, has obtained from the Board of Estimate an extension of thirty days for completion of a line from the Queensboro Bridge to the Nassau County line through Jamaica, L. I.

Fargo, N. D.—The Fargo & Moorhead Street Railway, Fargo, has received a twenty-five-year extension of its franchise in Fargo.

Cincinnati, Ohio.—The Cincinnati Traction Company, Cincinnati, has received a franchise from the City Council to extend its lines to Bond Hill. It will not become effective for sixty days in order that a referendum petition may be filed if desired.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise to double track Sandy Boulevard in Portland.

Connellsville, Pa.—The West Penn Railways, Pittsburgh, has received a franchise from the Town Council to extend its lines on Seventh Street and on Leisenring Avenue, in Connellsville.

Coraopolis, Pa.—An application has been made by the Coraopolis & Sewickley Railway to build an electric railway in Moon Township, Coraopolis and Sewickley, crossing the new Sewickley-Coraopolis bridge. S. L. Tone is interested. [E. R. J., Oct. 14, '11.]

Scranton, Pa.—The Scranton & Ariel Railway, Scranton, has asked the Council for a franchise in Scranton. This line will connect Lake Ariel and Scranton, a distance of about 20 miles. J. J. Brown, president. [E. R. J., July 1, '11.]

***West Pittston, Pa.**—The Pittston & Exeter Street Railway has asked the City Council for a franchise in Pittston.

Dallas, Tex.—The Board of Municipal Commissioners has granted the Dallas Southern Traction Company right-of-way for its proposed interurban line over Zang's Boulevard from the southern limits of Dallas to a junction at Jefferson Street with the line of the Northern Texas Traction Company. The company has a contract with the latter company and the Rapid Transit Railway Company for the use of their Jefferson Street and Commerce Street tracks in Dallas. J. F. Strickland, president. [E. R. J., Oct. 14, '11.]

Ridgeley, W. Va.—The Ridgeley & Miller Avenue Railway, Ridgeley, has asked the Court of Mineral County for a franchise through Mineral County. This railway will extend from the Potomac River bridge just opposite Cumberland about 2 miles through Ridgeley. John L. Miller, Ridgeley, is interested. [E. R. J., July 1, '11.]

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has awarded the contract for

the concrete and pile bridge work along its line to H. A. Hansen, Fresno.

San Francisco, Oakland & San José Railway, Oakland, Cal.—Plans are under way, it is said, for the extension of this company's lines through Contra Costa County and as far east as Stockton. One extension is planned through the Livermore Valley to Stockton.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—It is reported that this company plans to extend its line north to Healdsburg.

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—This company has awarded a contract for a new line on Third Street, Sacramento, to the Clark & Henery Construction Company, Sacramento.

Sacramento & Woodland Railway, Sacramento, Cal.—Grading has been begun on this company's line near Woodland which is to connect Sacramento and Woodland. [E. R. J., Oct. 21, '11.]

Stockton (Cal.) Electric Railroad.—Plans are being considered by this company to extend its lines to Fair Oaks.

San Joaquin Valley Electric Railway, Stockton, Cal.—Plans are being considered by this company to construct a line between Fresno and Modesto.

Denver (Col.) City Tramways.—Material is at hand and construction will soon be begun by this company on its extension east of Denver to Park Hill Heights.

Willimantic & Stafford Street Railway, Stafford Springs, Conn.—The organization of this company has been completed and surveys will soon be made for the route of its proposed line between Willimantic, Mansfield Center, South Willington, Spring Hill, Storrs and Stafford Springs. The following officers were elected: William H. Hall, South Willington, president; Charles A. Capan, Willimantic, secretary, and Lewellyn J. Storrs, Spring Hill, treasurer. [E. R. J., April 22, '11.]

Twin Falls (Idaho) Railway.—This company has begun the construction of its 125-mile electric railway between Twin Falls, Kimberly, Fisher, Buhl and Jerome. Capital stock authorized, \$500,000. Officers: L. B. Peraine, Twin Falls, president; E. B. Williams, vice-president; Charles M. Smith, secretary; D. B. Moorman, treasurer, and Paul S. A. Bickel, chief engineer. [E. R. J., Oct. 14, '11.]

East St. Louis, Columbia & Waterloo Railway, East St. Louis, Ill.—It is expected that this company's lines will enter East St. Louis by Jan. 1. The line, to be supplied with current by the East St. Louis & Suburban Railway until it builds its own power house, will extend through Dupon, Prairie du Pont, Cahokia, Columbia and Waterloo and enter St. Louis over the Eads Bridge, using the tracks of the East St. Louis & Suburban Railway.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—This company has decided upon the route of its proposed line from Boonville to Chrisney and to Lynnville. It is expected that the line will ultimately be extended to Louisville, Ky. Subsidy elections are soon to be held in the various counties through which the proposed line is to pass. J. P. Chrisney is interested. [E. R. J., Oct. 17, '11.]

Vincennes & Southeastern Interurban Railway, Vincennes, Ind.—This company has agreed to build its line through Newtonville since the citizens of Newtonville have accepted the company's proposition to donate \$2,300 to be paid when the line is completed. G. B. Hazleton, Vincennes, president. [E. R. J., Sept. 9, '11.]

Des Moines (Ia.) City Railway.—This company placed in operation on Oct. 22 its first crosstown line in Des Moines.

Red Oak & Northeastern Railway, Red Oak, Ia.—This company advises that its proposed railway between Red Oak and Des Moines will be operated by steam and not by electricity, as reported in the ELECTRIC RAILWAY JOURNAL for Oct. 21.

Union Traction Company, Coffeyville, Kan.—Construction has been begun by this company on the western extension in Coffeyville.

Frederick (Md.) Railroad.—Surveys have been begun by this company on its 6-mile extension between Jefferson and Brunswick.

Springfield (Mass.) Street Railway.—Plans are being considered by this company to double track its Belmont Avenue line in Springfield.

Monterey Railway, Light & Power Company, Monterey, Mex.—This company is preparing to make important extensions of its railway. One of its lines will be extended to the suburb of Gonzalitos, a distance of 3 miles. The other extensions will be run to new residence sections that are being opened up.

Detroit, Mich.—P. N. Jacobson, Detroit, and associates plan to construct an electric railway from Wyandotte to Ann harbor, via Ypsilanti, a distance of about 40 miles. It is expected to extend this line to Lansing and later to Grand Rapids. [E. R. J., July 2, '10.]

Michigan-Indiana Traction Company, Lansing, Mich.—Right-of-way is being secured by this company in Coldwater and Athens. The line will connect Columbia and Coldwater, via Athens and Union City. Walter Powers, Battle Creek, is interested. [E. R. J., Oct. 21, '11.]

Hattiesburg (Miss.) Traction Company.—Plans have been outlined by this company for improvements and extensions which will mean the expenditure of about \$200,000.

Columbia & Northern Electric Railway, Columbia, Mo.—This company advises that it will begin construction within thirty days on its 60 miles of electric railway between Columbia, Jefferson City, Mexico and Moberly. P. M. Johnson & Sons, St. Elmo, Ill., are the contractors. The company will furnish power for lighting purposes. Its power station and repair shops will be located at Columbia. Headquarters, Victoria Building, St. Louis, Mo. Capital stock authorized, \$1,500,000. Bonds authorized, \$1,500,000. Julius W. Koch, Victoria Building, St. Louis, secretary and treasurer. [E. R. J., Oct. 21, '11.]

***Canton, N. Y.**—J. F. Hammond and others are considering plans to construct an 8-mile electric railway between Canton and Pyrites.

North Carolina Traction Company, Danbury, N. C.—An extension from Rock Hill to the Seaboard Air Line Railway at Catawba Junction, a distance of about 8 miles, is being considered by this company.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—It is reported that the Cincinnati, Milford & Loveland Traction Company is formulating plans for an extension to Washington Court House, which is 76 miles from Cincinnati on an air line to Columbus.

Columbus (Ohio) Railway & Light Company.—This company has placed in operation its extension of the Schiller Street line in Columbus, a distance of 1½ miles.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio.—Work has been begun by this company on the construction of a new concrete and steel bridge at Zimmerman.

Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio.—Work has been begun by this company double tracking its line through Follansbee.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—It is reported that this company will extend its line from Crooksville to New Lexington in the spring.

Berlin & Bridgeport Electric Street Railway, Berlin, Ont.—This company contemplates important improvements of its lines in Berlin. Plans for a belt line to circle the city making connections at King Street with the present main line between Berlin and Waterloo and the present radial are being considered.

London (Ont.) Street Railway.—Plans are being made by this company to extend its lines in London.

***North Toronto, Ont.**—Plans are reported to have been presented for a new electric railway in North Toronto on Melrose Avenue, south on Mt. Pleasant Road to St. Clair Avenue. E. A. James, Eglinton, Ont., engineer, is interested.

***Owen Sound, Ont.**—Elias Lemon plans to construct a 6-mile electric railway in Owen Sound.

Willamette & Molalla Valley Railway, Canby, Ore.—Preliminary surveys have been completed and application for a charter will soon be made by this company to build an electric railway from Molalla Valley to Portland, via

Canby, a distance of 30 miles. At Canby the line will cross the Willamette River over a bridge and from the Tualatin Valley into Portland through a tunnel owned individually by the company and a subway to a point on Washington Street. From Tualatin a branch will be built to Oregon City, across the Willamette River, and to Abernathy. W. J. Lee, Canby, general manager. [E. R. J., June 10, '11.]

Johnstown & Altoona Railway, Johnstown, Pa.—This company is considering the purchase of catenary overhead construction material. The roadbed, track and bridge construction is being managed by the Pierce & Barnes Company, engineers, 7 Water Street, Boston, Mass. This 40-mile electric railway will connect Altoona and Johnstown. G. U. G. Holman, 52 William Street, New York, N. Y., agent. [E. R. J., May 21, '10.]

Sunbury, Lewisburg & Milton Railroad, Sunbury, Pa.—This company has completed one mile of its line. The route will cross the river at Winfield, where a new bridge will be built, and will continue to Lewisburg and West Milton. W. H. Lyons, Sunbury, president. [E. R. J., July 22, '11.]

***Three Rivers, Que.**—The citizens of Three Rivers have voted to construct an electric railway in Three Rivers.

Greenville (S. C.) Traction Company.—This company will extend its North Street line 1 mile in Greenville.

Southern Traction Company, Dallas, Tex.—The required amount, \$150,000, in stock has been raised by this company in Waco, thus closing the deal for building this railway through Waco. The line will connect Dallas, Hutchins, Wilmer, Ferris, Waxahachie, Milford, Hillsboro and Waco. [E. R. J., Oct. 14, '11.]

***Gainesville, Tex.**—A syndicate represented by E. B. Blanton, Gainesville, has under consideration the construction of an interurban railway from Gainesville to McKinney, a distance of about 45 miles. It is planned to operate the gasoline motor cars.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—Surveys for two extensions have been made by this company. One mile will be to Willapa Harbor and will be built first. It will necessitate the building of a free bridge across the Chehalis River. The other branch will be built to the Sound from Gray's Harbor. H. B. Zimmerman, general manager.

Bellingham-Skagit Railway, Bellingham, Wash.—The route of the main line of this railway has been definitely decided upon and will connect Bellingham, Happy Valley, Sockeye, Samish, Ladysmith, Allen, Burlington and Mt. Vernon. Work on the grade has progressed as far as Allen and construction of the tunnel at Mount Vernon has been begun.

South Morgantown Traction Company, Morgantown, W. Va.—Plans have been decided upon by this company for the immediate construction of a 2-mile extension in Morgantown.

Morgantown & Southern Railway, Morgantown, W. Va.—Work has been begun by this company on the extension in South Morgantown to its South Park carhouse. Later the company will extend the line over the old survey and down through South Park to Euclid Avenue, connecting with the extension of the South Morgantown Traction Company's tracks as now proposed.

***Rawlins, Wyo.**—The Nebraska Coal Company, Rawlins, has prepared plans, estimates and surveys for a 200-mile railway traversing the lignite fields of central Wyoming. The plans include three large gas producer power plants operating electrical units. About 20 miles of line will be equipped for electrical operation. H. Larsen, Rawlins, is president and general manager, and Hiram A. R. Gray, vice-president and consulting engineer.

SHOPS AND BUILDINGS

San Francisco, Oakland & San José Railway, Oakland, Cal.—Stations of the Mission type are to be built at Piedmont, East Oakland, Fruitvale, San Leandro, Hayward and at intermediate points where population warrants, by this company.

Tampa (Fla.) Electric Company.—This company plans to build an oil house, pumping station, paint shop and a reel house as soon as the main shed is completed.

Illinois Traction System, Peoria, Ill.—A large freight yard will be built at East Peoria on property at the end of the company's bascule bridge over the Illinois River and close to the center of Peoria. The yard as laid out by L. B. Martin, engineer maintenance of way, will include ten storage tracks and modern facilities for transferring freight.

Boston & Eastern Electric Railway, Boston, Mass.—A station will be built by this company on Ballard Street, in Saugus.

Portland Railway, Light & Power Company, Portland, Ore.—This company is constructing two brick buildings on East Seventeenth Street in Portland, the first two units of its carshops. The first building will be 100 ft. x 200 ft. and one story high. Work has been started on the second building on the north side of the first structure and covers a little more space. It is also a one-story brick structure and is nearly a duplicate of the first building. It is announced that the completed plant includes six buildings similar to the first two units, but it is not probable that the company will undertake to put up any more than the first two this year.

Flathead Power & Traction Company, Polson, Mont.—A. L. Jaqueth is securing sites for car shops and other traction facilities for this company.

Rhode Island Company, Providence, R. I.—This company has purchased in the name of the Union Railroad land on Cranston Street between Burnham Avenue and Prince Street in Cranston, on which it will build a new carhouse.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—The construction of a new central office building in Aberdeen is being contemplated by this company. H. B. Zimmerman, general manager.

POWER HOUSES AND SUBSTATIONS

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—Plans are being made by this company to install a 5000-kw turbo-generator in its central plant at Batavia. The improvement will include the erection of another wing at the north end of the main building of this plant.

Metropolitan West Side Elevated Railway, Chicago, Ill.—This company has awarded a contract to the W. J. Scrown Building Company, Chicago, for the construction of a new substation at 259 South Franklin Street, Chicago. The structure will be one story and basement, 62 ft. x 65 ft., and of brick, steel and concrete construction.

Union Electric Company, Dubuque, Ia.—This company is now more than doubling its power plant capacity by the installation of a 2500-kw six-stage horizontal Curtis turbine.

Bangor Railway & Electric Company, Bangor, Maine.—This company has ordered one motor generating set; one 1000-kw 220-volt generator with direct-connected exciter; three H-25 375-kva transformers; lighting arrester, oil switches and a switchboard from the General Electric Company.

Nebraska Transportation Company, Omaha, Neb.—Plans are being made by this company for the construction of a steam power plant on the Elkhorn River near Elk City, Neb., which will be capable of developing 21,000 hp.

Trenton-Mercer County Traction Company, Trenton, N. J.—This company will install a 1100-hp De Laval steam turbine at its power plant at Trenton.

Johnstown & Altoona Railway, Johnstown, Pa.—This company is considering the purchase of two 750-kw turbo-generators, 1200-hp capacity in water-tube boilers with the necessary condensers, piping and pumps. G. U. G. Holman, 52 Williams Street, New York City, agent.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—Plans and specifications are being prepared and bids will soon be asked by this company for the construction of a power plant in Waynesburg.

Southern Traction Company, Dallas, Tex.—Plans are being considered by this company to construct a power plant near Waco.

Wausau (Wis.) Street Railway.—This company, the Marathon Paper Mills Company, and the Wausau Sulphate Company, of Mosinee, will build a joint power plant near Wausau.

Manufactures & Supplies

ROLLING STOCK

Memphis (Tenn.) Street Railway has ordered ten 23-ft. 3-in. car bodies from the St. Louis Car Company.

Redlands University Railroad, Redlands, Cal., expects to purchase two cars. Gardner S. Turrill, Redlands, president.

Public Service Railway, Newark, N. J., has ordered thirty-five partial independent air brake equipments from the General Electric Company.

Vicksburg (Miss.) Traction Company has ordered two semi-steel double truck cars equipped with St. Louis No. 99 single motor trucks from the St. Louis Car Company.

Metropolitan Street Railway, New York, N. Y., has requested bids for 640 air-brake equipments with motor compressors, etc., complete. These bids are due next week.

Cleveland (Ohio) Railway has ordered twenty quadruple direct current interpole motors equipped with K-35-G control from the Westinghouse Electric & Manufacturing Company.

Detroit (Mich.) United Railway has ordered from the Westinghouse Electric & Manufacturing Company four quadruple interpole motor equipments arranged for multiple-unit control.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y., has fifteen GE-1022 two-motor storage battery car equipments with type K-45 controllers, from the General Electric Company.

Central Pennsylvania Traction Company, Harrisburg, Pa., has ordered six double equipments of No. 101-C motors and K-36-F control from the Westinghouse Electric and Manufacturing Company.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va., has placed an order with the Westinghouse Electric & Manufacturing Company for quadruple, direct current, No. 306 interpole railway motors equipped with K-35-G control.

Johnstown & Altoona Railway, New York, N. Y., is considering the purchase of seven interurban combination passenger and smoking cars, one express car, one snow plow and two snow sweepers. G. U. G. Holman, agent, 52 William Street, New York.

TRADE NOTES

Dodge, Day & Zimmerman, Philadelphia, Pa., engineers, announce that the name of the firm has been changed to Day & Zimmerman.

A. Eugene Michael, New York, N. Y., advertising engineer, has moved his main office to the Park Row Building, New York, where larger space has been secured.

Pennsylvania Equipment Company, Philadelphia, Pa., desires to purchase, for immediate delivery, 1400 ft. to 1500 ft. 600,000 cir. mil double braid weatherproof cable, in first class condition.

Robb Engineering Company, Ltd., South Framingham, Mass., has completed the installation of two 78-in. return tubular boilers in the power plant of the Lewiston, Augusta & Waterville Street Railway at Gardiner, Maine.

Walter R. Burrows, New York, N. Y., has resigned as manager of the railroad department of Topping Brothers, New York, and will continue the manufacture and sale of Burrows jacks on his own account, with offices at 150 Chambers Street, New York.

C. G. Young, New York, N. Y., has added to his staff D. Sterrett Pindell, B. A., E. E. Mr. Pindell has had a broad experience in the construction and operation of public service utilities and his activities with Mr. Young will be especially in connection with engineering examinations and reports.

E. P. Roberts, formerly president of the Roberts & Abbott Company, Schofield Building, Cleveland, Ohio, will continue under his name the business of this company, which has recently been dissolved. In addition to acting as consulting engineer in various lines of work, Mr. Roberts will devote special attention to electric railway work, including reports and investigations.

Allis-Chalmers Company, Milwaukee, Wis., has announced the resignation of David Van Alstyne as vice-

president, in charge of the manufacturing department of the company, effective on Nov. 15. Mr. Van Alstyne was formerly vice-president of the American Locomotive Company. He will engage in business in New York. C. E. Search, formerly assistant to Mr. Van Alstyne, has been appointed works manager.

United States Electric Company, New York, N. Y., has furnished telephone train-dispatching equipment, including individual Gill silent calling keys, to the Missouri, Kansas & Texas Railroad for operating the double track main line from McAlester, Okla., 95 miles south to Denison, Tex., and for the Waco division extending from Smithville, Tex., north to Hillsboro, 158 miles, including 47 miles of the San Antonio line. These lines have been in operation since Oct. 1, 1911.

Allgemeine Elektrizitäts Gesellschaft, Berlin, Germany, reports net profits derived exclusively from manufacturing of \$5,535,500 for the year ended June 30, 1911, as compared with \$4,606,500 in the preceding year and \$4,096,500 in the year before that. It is proposed to maintain the dividend at 14 per cent on \$20,000,000 of old shares, and to pay 7 per cent on the \$7,500,000 new shares whose dividend rights commenced Jan. 1, 1911. The report states that the orders booked exceed those of the corresponding period of 1910-11, which aggregated \$60,000,000.

Railway Roller Bearing Company, Syracuse, N. Y., reports that thirty-five storage battery cars of the Third Avenue Railroad, New York, equipped with Rollway bearings are now in operation; and that the Third Avenue Railroad has just placed its third order for Rollway equipment, making a total of fifty-five cars to be so equipped. The company has also furnished Rollway bearings for the electric locomotive built by the Baldwin Locomotive Works for the Portland, Grey & Lewiston Railway. These roller bearings are said to be the largest of their kind ever built for railway work.

Thermit, Ltd., London, Eng., calls attention to a typographical error which appeared in the advance report on city track practices in Great Britain, read at the Glasgow convention of the Municipal Tramways Association, Sept. 27-29, and published in abstract on page 738 of the issue of this paper for Oct. 11. The report in question stated that the breakages of these joints in Manchester, where there are some 7000 thermit joints, had amounted to less than 3 per cent during the past five years. The correct figure, as explained by J. M. McElroy, general manager of the Manchester tramways, on the floor of the convention, was less than 0.3 per cent, or only one-tenth of the ratio quoted in the advance report.

Northern Equipment Company, Chicago, Ill., has completed a sales arrangement for its Copes boiler feed regulators and Copes pump governors with the Dravo-Doyle Company, engineer, of Pittsburgh, Pa., which has recently established a steam specialty department, with headquarters in Pittsburgh, covering the Pittsburgh, Cleveland, Philadelphia, Chicago and West Virginia territories. D. D. Pendleton, who has for the past five years represented the Northern Equipment Company in the Pittsburgh district, has completed arrangements with the Dravo-Doyle Company so that it will have all rights in that district, thus giving it complete jurisdiction over the territory previously mentioned.

Dick, Kerr & Company, London, Eng., held their annual meeting of stockholders recently. John Kerr as chairman said that keen competition for orders has continued in all departments. The greatest interest in electrical undertakings had now been awakened in England. A considerable amount of equipment had been ordered, and a number of important installations were under consideration. At the last general meeting it was stated that the company intended to manufacture steam turbines. The efforts of the directors in this connection were meeting with satisfactory results. In view of the demand for metallic filament lamps the directors decided to add a lamp factory. This factory was approaching completion. Prospects for the coming year were encouraging. The balance sheet showed an improvement over the two previous years. The plant and machinery had been amply depreciated. The rearrangement of the staff necessitated by the death of George Flett last year had been carried out.

United Electric Car Company, Ltd., Preston, Eng., held its annual meeting recently. George Richardson, chairman of the company, said that the net profit for the year, after making due allowance for all expenses, was £4420. The directors regretted the smallness of the profit, but considered it satisfactory in face of the stagnation in the car-building trade during the year. The company had had, as usual, a fair share of the business, but the output of the works had been so small that the profit was very small after taking into account the fixed charges. After adding the amount brought forward and deducting the preferred dividend for the half year to Dec. 31, 1910, already paid, there was an available balance of £5481 and the directors felt justified in recommending a dividend at the rate of 6 per cent per annum on the preferred shares for the six months ending June 30, 1911, leaving £2481 to be carried forward to next year. The prospects for the future were better than for some years past. There were now 710 men employed by the firm, as against 327 in 1910. The cars on order numbered almost a hundred more than at the commencement of the current year.

ADVERTISING LITERATURE

Okonite Company, New York, N. Y., has published a booklet entitled "Economy in Joint Making, with Instructions."

The J. G. Brill Company, Philadelphia, Pa., has issued Catalog No. 200, which serves as an order guide for parts of Brill trucks. This catalog supersedes Brill order guide No. 165.

Schutte & Koerting Company, Philadelphia, Pa., has issued Catalog 6, section B, which fully describes the Koerting system of spray cooling. The publication contains several tables showing the results of tests made with Koerting centrifugal spray nozzles; also illustrations of spray-nozzle plants. Catalog 5, section A, describes and illustrates the company's eductor and induction condensers.

Clark Electric & Manufacturing Company, New York, N. Y., has issued several bulletins illustrating specialties of its manufactures, among which are insulated clamps for use with both the pin and suspension type of insulation, guy and strain clamps, clamps for use on street arc lamp circuits or for holding in place angle or vertical conductor twin splice connectors, split tinned copper connectors and overhead clamp sets.

Wheeler Condenser & Engineering Company, Carteret, N. J., has issued Bulletin No. 107, which contains a discussion on high vacuum jet condensers. Several installations of this type of condenser are illustrated, and a number of tables of actual tests showing very high efficiencies are presented. The bulletin also describes and illustrates the Wheeler barometric ejector condenser, Wheeler direct-acting jet condenser and other important products which the company manufactures.

Universal Lubricator Company, Cleveland, Ohio, has issued a four-page circular entitled "Tulc Lubricant." Tulc is known as Tulc No. 2-H, a plain solidified oil, Tulc No. 2 WW, staple wool waste impregnated with Tulc No. 2 H, and Tulc No. 2 yarn, a high-grade staple wool yarn, impregnated with Tulc No. 2 H. Facts about Tulc lubricant are contained in a series of short paragraphs and the statement is made on the concluding page of the circular that sufficient Tulc will be furnished by the manufacturer to prove the assertions made in the circular.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4891, composed principally of illustrations of the railway equipment installed in the United States by the company. These illustrations comprise interiors of the power stations, both main and sub-stations, and the rolling stock of various railways. Bulletin No. 4883 is devoted to the general principles of the Curtis steam turbine and generator, with numerous illustrations of turbine and generator parts, and complete representative installations. Bulletin No. 4885 describes a new meter designed for accurately measuring the power used by relatively small consumers. Bulletin No. 4889 describes and illustrates two types of commutator grooving machines. Another bulletin, No. 4894, is devoted to cylinder controllers for railway service. This bulletin supersedes the company's previous bulletin on this subject.