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Gardens and Shops

The general satisfaction which a little landscape gardening produced among the shopmen of a large city railway, as mentioned elsewhere in these columns, makes it pertinent to inquire how many railway managers have considered the beneficial effect of pleasant surroundings on the morale of their forces. The average shop yard generally contains a collection of material which, properly classified, might form a museum of antiques illustrating the railway history of the locality. This apparent indifference to its property on the part of the company must have a demoralizing effect on the workmen. A weed-filled yard very rapidly can become the burial place of good track work, trolley poles, brake shoes and other parts. When a little horticulture can do so much to make the shops homelike and instill the pride of ownership in all, opportunities to beautify them should be taken wherever the conditions permit.

International Street Railway Convention

The International Street & Interurban Railway Association, which comprises the leading electric railway companies on the continent of Europe and also numbers several of the British corporations among its members, holds bi-annual meetings of a character very similar to those of the American Street & Interurban Railway Association. The last meeting of the International Association was at Milan in 1906, and that for 1908 is being held at Munich this week. The problems which confront the association and the American association are much more similar than many realize who have not followed closely the work of both bodies. The reason for this is that the electric railway industry is comparatively new, and many of the roads abroad were built along American models, and, indeed, were equipped with American apparatus. Moreover, the designers of apparatus in both countries have been closely in touch ever since. While the conditions of fares, government regulations and popular customs differ somewhat, the companies in both continents are contending with the same physical problems and are endeavoring to supply in the most efficient manner practically the same class of transportation with almost the same equipment. Few American managers have probably attended the meetings of the International Street & Interurban Railway Association, but many make frequent trips to Europe and would find it profitable to attend the conventions of their European confrères and study the methods by which they are undertaking the solution of their street railway problems.

The Redondo Power Plant

It is rather seldom nowadays that one finds a new 15,000-kw steam-driven plant with reciprocating engines. Through steady improvement in economy and determined and persistent exploitation the turbine has come to have pretty much the whole field in large power. It would be interesting therefore to know the exact course of reasoning that led to the choice of reciprocating engines for this important plant—a choice that has assuredly been justified in the results. Perhaps the requirement of 18,000 volts generator potential may have had no small influence on the result. It is, if we recollect aright, the highest reached in

any large commercial plant and would not be altogether easy in the contracted dimensions of a turbo-generator, especially of the vertical type. The engines selected for the plant are in themselves somewhat out of the ordinary, being for 100 r.p.m., unusually high for so big a unit, and double compound, with the horizontal high-pressure and vertical low-pressure cylinders. The installation of a double condenser for each unit was another interesting feature of the plant—perhaps a case in which the engineers built more wisely than they knew, since the condensing system has been somewhat bothered by the influx of marine plants making frequent cleaning desirable. The primary requirement in this plant was low cost of power with cheap oil as a fuel, and the guarantee demanded was 170 kw-hours per barrel of oil weighing 334 lb. and giving 18,500 b.t.u. per pound. This requirement amounts to a trifle less than 37,000 b.t.u. per kw-hour and was under a generator load varying from anything up to the full rated load of 5000 kw and averaging for the 19½ hours of daily run between 60 per cent and 80 per cent of full load. The test was for 15 consecutive days after the plant had been some six months in service.

It must be remembered that oil, although a cheap fuel in results, does not give unusually high boiler efficiencies, so that the British thermal unit specification, although apparently very easy to meet, was harder than it looks and, in fact, represented an improvement on the best current practice with such oil fuel. But the contractors under the stimulus of a liberal bonus went in and secured economy records which are noteworthy in engine performance. They actually recorded 252.8 kw-hours per barrel of oil, very closely 25,000 b.t.u. per kw-hour. Lacking details of boiler performance one cannot readily reduce this to a coal and water per kw-hour basis, but it is clearly a very notable performance, not easy to duplicate even with more favorable conditions. We would much like to see results on a similar plant burning high-grade coal and modified suitably to meet this condition—using, let us say, 200 deg. superheat and triple expansion. As the plant stands it is claimed to show a margin under the lowest fuel cost per kw-hour yet recorded and it should deliver energy at the switchboard at a figure below all existing records for similar output. Certainly the competition of the turbine has aroused engine builders to a sense of their responsibilities and they have met the issue squarely. Evidently the last word on station design has not yet been said. The effect of such a record on the mere question of economical size of station is worth serious consideration. If a 15,000-kw plant can do this sort of thing, is there likely to be any gain in further aggregation large enough to offset the added distribution losses that are thereby entailed? As a similar plant could easily be built for railway service with direct-current generators, the bearing of this test on distribution for railways is direct and important.

Cross-Arm Preservation

The continual draft upon the forest resources of the country and the consequent increase in price of timber have been felt in no large industry more keenly, probably, than in steam and electric railway construction. Efforts to reduce the amount of wood employed for ties, poles and cross-arms and in car construction are being made on the one hand, while on the other equal energy is being devoted to the perfection of methods for timber preservation. Steel and concrete seem the most promising substitutes for wood in ties and poles, but even where steel or iron poles are used with ordinary potentials in railway construction, wooden cross-arms are usually preferred, both on the ground of cost and also for the insulation which they provide.

The wooden cross-arm is well adapted on account of its comparatively small size to preservative treatment, and the importance of insuring its integrity makes any improvements in this direction of importance to the entire electrical industry. If all cross-arms were exactly alike, so far as the character and condition of the wood are concerned, their treatment would be a simple process, but as they come from the mill those cross-grained sections cut from the heart of the tree are usually mixed indiscriminately with the more porous sapwood, cross-arms from different species of wood are frequently intermingled, and often seasoned material is shipped with that freshly cut. The result is that if all of these varieties are placed in the impregnating tank together and are given the same treatment, some cross-arms will not absorb sufficient preservative while others will receive more than is required, and on warm days when in place will exude drippings of creosote on the passers-by.

The usual method of treatment by the creosote preservative process consists in placing the wood in a tank and subjecting it to a steam bath at about 20 lb. pressure. The steam is then withdrawn and a vacuum is applied. The compound is then admitted to the tank and forced into the pores of the wood by pressure. The compound is then drawn off and the wood is sometimes given a final vacuum to remove the superfluous oil. If the wood is air-dried or seasoned before treatment, as should always be the case, it will much more readily absorb the preservative, which in turn will not be diluted by the moisture in the wood.

Through its Forest Service and with the co-operation of the American Telephone & Telegraph Company, the United States Government has recently been giving special attention to this subject, particularly as regards loblolly pine, the most common material for cross-arms in this country, and has determined that portions of this customary method are unnecessary while other steps should be taken to secure uniform impregnation of the wood. Great care should first be taken in separating the sapwood from the heartwood by making a division between those arms consisting of 75 per cent of the former material, those consisting of 75 per cent of the closer grained wood and a third or intermediate grade. The timbers should be air-dried in piles protected from rain and snow and so arranged by turning the two end and middle pieces with their wider sides vertical that the air will circulate freely through the pile. Each class of arms should be treated separately and the amount of oil left in the timber after treatment should vary between 6 lb. per cubic foot to 10 lb. per cubic foot, depending upon the porosity of the wood treated. This amount of impregnation can be regulated through the pressure and the time during which the vacuum is applied after the creosote has been blown back into the storage tanks. Finally, the steam bath should be omitted.

Changes in Mohawk Va ley Properties

The changes approved by the New York Public Service Commission, Second District, in the Mohawk Valley properties are important both because of their bearing on other similar questions of public policy and on account of their direct effect on the important lines involved in the financial readjustment described in the issue of the ELECTRIC RAILWAY JOURNAL of Aug. 29, 1908.

A series of steps, somewhat complicated, is involved in the complete plan, the necessity for which is found in the clause of the Public Service Commission's law which forbids a stock corporation other than a railroad or street railroad corporation from taking and holding more than 10 per cent of the total stock issued by any railroad or street railroad corporation. Although this clause did not apply to the holdings of stock which had been acquired by the business corporation entitled the Mohawk Valley Company previous to the passage of the law, it interfered with the financing of the properties and the consummation of plans for their ultimate development. The rearrangement desired was facilitated greatly by the fact that the $20,000,000 stock of the Mohawk Valley Company was held closely, 60 per cent being owned by the New York Central & Hudson River Railroad and 40 per cent by the unincorporated association known as the Central Railway Syndicate. No outside interests, therefore, had to be consulted.

The first step essential is the reduction of the capital stock of the Mohawk Valley Company and the distribution of assets to its shareholders. The company owns electric railway stocks of a par value of $17,065,800 and lighting stocks of a par value of $9,789,860. It is proposed to distribute the stocks of the railway company; of these stocks the New York Central road is entitled to $10,239,480. No reference is made to any proposed distribution of stocks of the lighting properties, and if that is to be a later step in the series of transactions the fact is not disclosed in the present decision. The Mohawk Valley Company appears to continue as the owner of the stocks of lighting properties.

Into the second step proposed many important considerations enter. The New York Central road is to acquire $2,998,700 shares of common stock of the Rochester Railway. The latter corporation has a total stock capitalization outstanding of $6,000,000, of which $3,000,000 is common. Of this common stock, all except $1,300 is owned by the Rochester Railway & Light Company. For the stock to be acquired the New York Central road is to pay $4,500,000, or a trifle over $150 per share, giving in payment to the Rochester Railway & Light Company $4,500,000 notes of the Mohawk Valley Company. Assuming that the Mohawk Valley Company would pay this indebtedness in full, the commission's inquiry as to this phase of the situation appears to have rested largely upon the question whether the price proposed to be paid for this stock was proper. After consideration of the balance sheet and earnings the commission decided, in view of its conclusions as to the value of the property, the physical condition of the Rochester Railway, the layout of the lines, the prospects of the city, and having in mind also the general purpose to be accomplished, that it was fairly justified in assuming that the price would not produce results not in harmony with its general rules as to corporate transactions.

Respecting this step the commission states: "The authorizing a steam railroad corporation to acquire the ownership of a city electric street railroad as an original proposition would, to put it mildly, not be looked upon with favor by this commission; but in this case the existing situation seems to justify another point of view." It is unfortunate that the decision of the commission does not discuss this point more fully. We presume that the object of steam railways in acquiring control of electric railways would be precisely stated if it is said that the motive was to acquire interurban properties, sometimes competitive, which might act as feeders to the steam lines. The fact that the interurban properties might also operate city lines was not of controlling importance except as it would assure the existence of terminals convenient to the station of the steam railways. The present issue, however, does not require a decision of the commission on the principle underlying this transaction for, as it points out, the New York Central road "is to a large extent dealing with itself in this matter," and no extraordinary inquiry into this step is necessary.

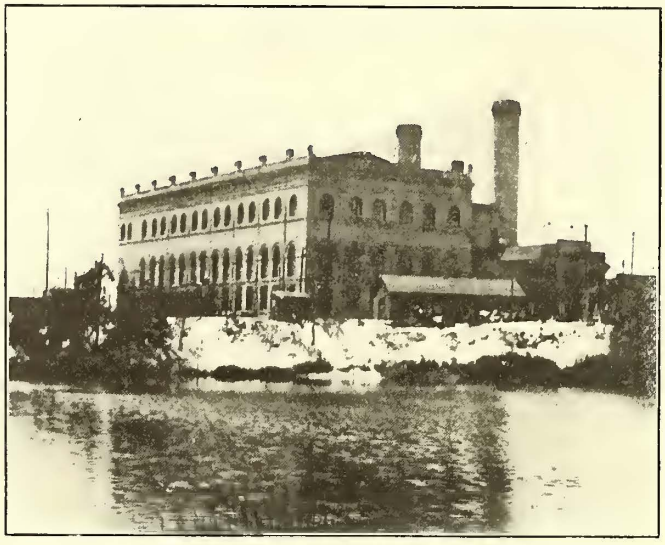
The third step involves the purchase and ownership by the New York Central road of $8,274,120 stock of the Rochester & Eastern Rapid Railway. The latter corporation proposes to increase its stock from $1,500,000 to $15,290,200 and with the increased issue to purchase the $13,790,200 par value of stocks of the following companies held by the Mohawk Valley Company and to be distributed now to its shareholders: Syracuse Rapid Transit Railway, $2,317,500; Utica & Mohawk Valley Railway, $7,500,000; Oneida Railway, $1,922,700; Schenectady Railway, $2,050,000. With the portion of its increased stock not required for the acquisition of the holdings of the New York Central road in these companies, the Rochester & Eastern Rapid Railway is to acquire the stocks owned by the Central Railway Syndicate in these lines.

After this step has been taken it is proposed to consolidate the properties of the following companies, which have a physical continuity: Rochester & Eastern Rapid Railway, Rochester Railway, Rochester & Suburban Railway, Rochester & Sodus Bay Railway, Rochester Electric Railway and Ontario Light & Traction Company. There would then be in existence this consolidated company and four others, as follows: The Schenectady Railway, the Oneida Railway, the Utica & Mohawk Valley Railway and the Syracuse Rapid Transit Railway. The new consolidated company would then be the owner of all the stock of the Utica & Mohawk Valley Railway and of all but $300 of the stock of the Oneida Railway. It is proposed that the consolidated company shall acquire this small amount of stock and then absorb the property of these two companies. The number of companies then would be reduced to three.

To show the extent of the operations of these three companies it may be stated that they operate 643 miles of track, with aggregate gross earnings of about $7,000,000 annually. The capital stocks of these companies aggregate about $27,000,000 and the funded debt will amount to about $20,000,000. In mileage, earnings and importance the system to be created by the changes outlined will be one of the largest in the country.

15,000-KW POWER STATION WITH RECIPROCATING ENGINES AT REDONDO, CAL.

In view of the large number of new steam turbine power stations which have been described recently it is interesting to note that a 15,000-kw power station with reciprocating engines has recently been constructed near Los Angeles, Cal., for supplying power to the Huntington electric railway system in that city and for other power purposes. The station is owned by the Pacific Light & Power Company and is in successful parallel operation with the other water and steam power plants belonging to the same company. It is located at Redondo, a beach town 18 miles from Los Angeles, and crude oil is used as fuel. The economy secured is claimed to be higher than that of any other American central power station.



Redondo Power Station—Exterior

The station was built by Chas. C. Moore & Company, engineers of San Francisco, whose contract covered the entire plant installation, including machinery foundations, but excepting switchboard, building, circulating water pipe line, wharf and any other work outside of building. The work was done on a fixed-sum contract for the entire installation. As customary guarantees for water consumption of prime movers, efficiencies of boilers and various auxiliaries, under ideal conditions, were considered of no protection under commercial conditions of variable load, a definite complete plant economy was guaranteed based on commercial railway load, subject to penalty and bonus stipulations. A further feature of interest was the provision of the contract that the plant be started and operated by the contractor for a period of at least three months previous to the economy test, also during test, thus thoroughly organizing the operating crew and perfecting the adjustment of the apparatus.

GENERAL ARRANGEMENT

The unit or panel system of design was followed, as will be noted from the accompanying diagrams. As each main engine consists in reality of two compound engines connected to the one shaft, each having an independent steam and exhaust connection, a further subdivision has been possible with each unit in the connection of one-half of the panel of boilers to each high pressure cylinder, and the provision of a separate condenser and air pump for each low pressure cylinder, giving in effect the freedom from breakdown corresponding to six instead of three plant units.

All auxiliaries, excepting air pumps, are steam driven, operating non-condensing, the steam exhaust being utilized in feed water heaters.

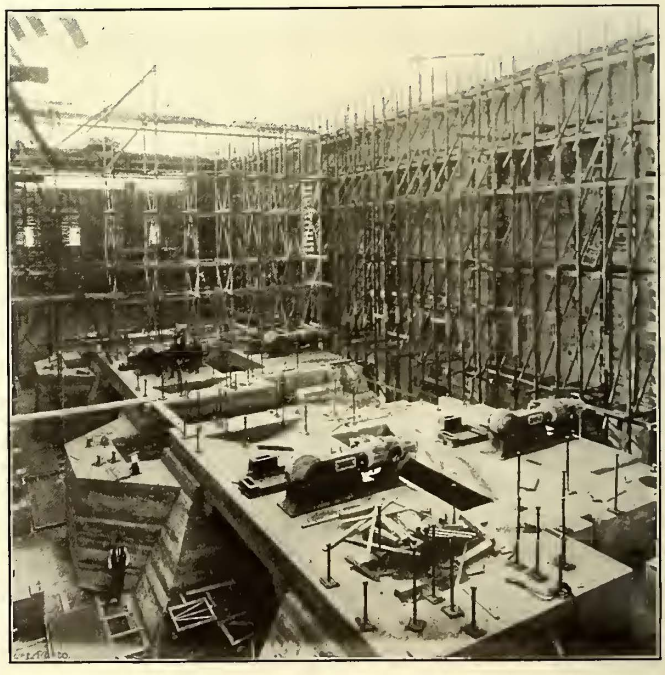
The air pumps for each unit are motor driven, power being furnished from the main generator, insuring gradual starting of both air pumps in synchronism with main engine.

The adoption of a syphon system of suction and discharge pipes for circulating water is due to the location of plant, the use of a conduit or canal system being impossible.

BOILERS

There are 18 Babcock & Wilcox water tube boilers arranged in nine batteries of two each. Three batteries constitute a panel so that five boilers can be operated on nominal load and one in each panel kept in reserve. Each boiler consists of 21 sections, each having 14 4-in. tubes 18 ft. long, over which there are mounted three steam and water drums 42 in. in diameter. The total effective water heating surface per boiler is 6042 sq. ft. These boilers are designed for 200 lb. steam pressure and a working pressure of 175 lb. is maintained at the engine throttle. All auxiliary engines operate on the same steam pressure and superheat as the main engines, with no difficulties due to valves, wear, etc. The waste gases from boilers discharge through short reinforced concrete flues to centrally situated reinforced concrete chimneys. A novel feature of the boiler plant is the use of secondary tight-fitting sliding dampers, which are completely closed during standby periods, to cut down fuel loss due to circulation of cold air through the boiler setting.

Each boiler is equipped with one B. & W. superheater, designed to give approximately 100 deg. Fahr. superheat at the boiler nozzles, but this superheat can be varied slightly by the arrangement of baffling over the first pass.



Redondo Power Station—View of Engine Foundations

Each boiler is provided with a Peabody fuel oil burning furnace, which is fired from the bridge wall forward, but is controlled at the boiler front. These furnaces are arranged for the use of three burners per boiler.

ENGINES

The engines are of the horizontal and vertical compound type, and were supplied by McIntosh, Seymour &

Company, of Auburn, N. Y. The cylinder dimensions are 34 in. and 70 in. x 56 in. Each engine is directly connected to one General Electric 5000-kw, 50-cycle flywheel type alternator and has two horizontal high pressure cylinders and two vertical low pressure cylinders, with a superheating receiver between each set of high and low pressure cylinders. Previous to the acceptance of the plant, an actual demonstration was made, showing that a unit could be successfully run with one, two, three or four cylinders; also with one end of any cylinder out of commission. As one cylinder of the unit is at worst liable to injury at one time, the period of shutdown is at most practically limited to that necessary to disconnect one rod.

The engine governor, which is of the manufacturers' well-known type, is designed to go into the flywheel generator. The valve gear is of the gridiron pattern used by the manufacturers. The admission and exhaust valves for all cylinders are operated by means of fixed eccentrics. The point of cutoff in each cylinder is controlled by an auxiliary valve actuated by the one engine governor. Each engine is fitted with McIntosh & Seymour compound delaying dashpots for parallel operation. They control the governor weights for a small fraction of a second, preventing oscillation of two or more units becoming amplified and from destroying parallel operation of alternators.

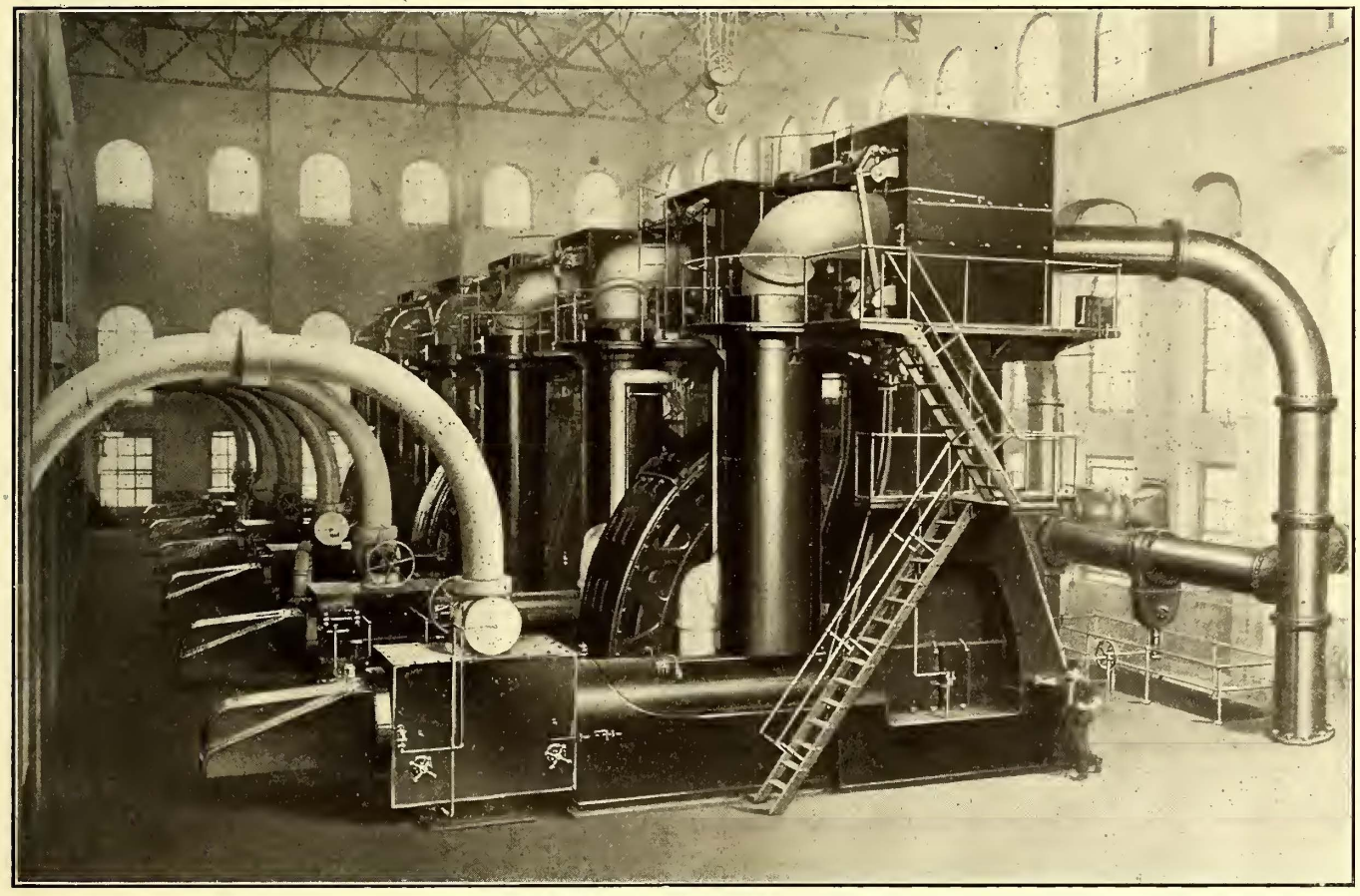
Each engine is also fitted with an electrically operated speed-changing mechanism which is situated in the governor, and is operated by a small induction motor and is controlled from the switchboard gallery. This arrangement not only allows the engine while running to be speeded up or down four or five revolutions, to bring two or more engines into synchronism, but is also used to divide the load between engines.

EXCITERS

Situated beside each main engine is one 75-kw General Electric exciter, direct-connected to one 9-in. and 17-in. x 12-in. Harrisburg tandem-compound, non-condensing piston valve, side crank automatic, enclosed, self-oiling horizontal engine. These engines are designed for the same pressure and superheat as the main engines and operate very satisfactorily under this condition of service.

SURFACE CONDENSERS

The plant contains six Wheeler Admiralty surface condensers, one for each low pressure cylinder of each main engine, but by cross connection either side of the engine can exhaust into either condenser. Each condenser contains 5200 sq. ft. of cooling surface. The tubes are brass ¾-in. O. D. No. 18 B. W. G. With ample water at 70 deg. Fahr. vacuum from 28 in. to 28.5 in. can easily be obtained.



Redondo Power Station—Interior of Station

In addition to the regular cooling surface of each condenser, there is provided in the upper compartment a series of tubes comprising what is termed a Volz heater. After being discharged from the air pump, the condensed water passes through this heater under atmospheric pressure and is heated to within a few degrees of the temperature of the exhaust steam surrounding the heater tubes. The makeup water is also brought in at this point, securing the benefit of heat which would otherwise be wasted.

AIR PUMPS

Each condenser is furnished with one Edwards single-acting, vertical, triplex air pump, having three cylinders 16 in. in diameter and 10-in. stroke and no suction valves. The condensed steam and non-condensible vapors flow continuously by gravity from the condenser to the base of

the pump and are removed by a conical bucket or piston, which works in a base of similar shape. Each pump is driven by a 25-hp General Electric induction motor mounted on an extended base and connected to the pump by a rawhide pinion. Only one-fifth of the rated power of this motor is required during normal conditions of load.

CIRCULATING WATER PUMPS

There are three engine-driven centrifugal circulating pumps having 20-in. diameter of discharge and two 15-in. suctions. Each pump is driven by a 9-in. and 17½-in. x 12-in. Harrisburg tandem compound, non-condensing piston valve engine. The limiting speed of this engine is controlled by a throttling governor. An adjustable eccentric enables the economical adjustment of the point of cutoff in the engine.

BOILER FEED PUMPS

There are four Snow duplex horizontal boiler feed pumps having compound steam ends, outside center packed water ends. Each pump is of ample capacity for one unit, the fourth pump being for reserve. The pumps operate non-condensing, the exhaust steam being led to the feed water heaters.

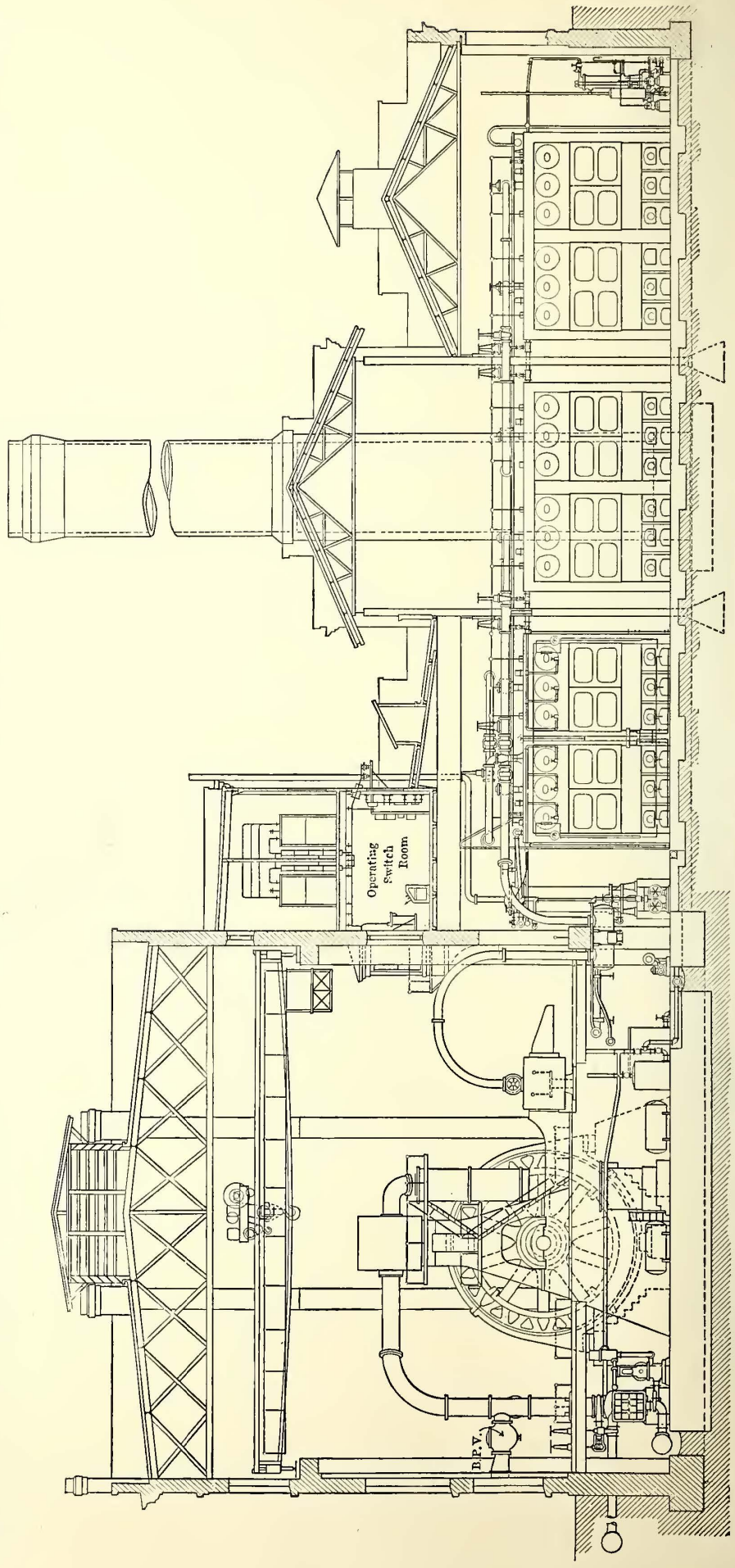
AUXILIARY FEED WATER HEATERS

There are three Goubert vertical auxiliary feed water heaters of the multiple flow type. Each heater contains 1000 sq. ft. of effective tube heating surface. The supply of exhaust steam is such that under practically all conditions of load all of the exhaust from the auxiliaries is utilized within these heaters.

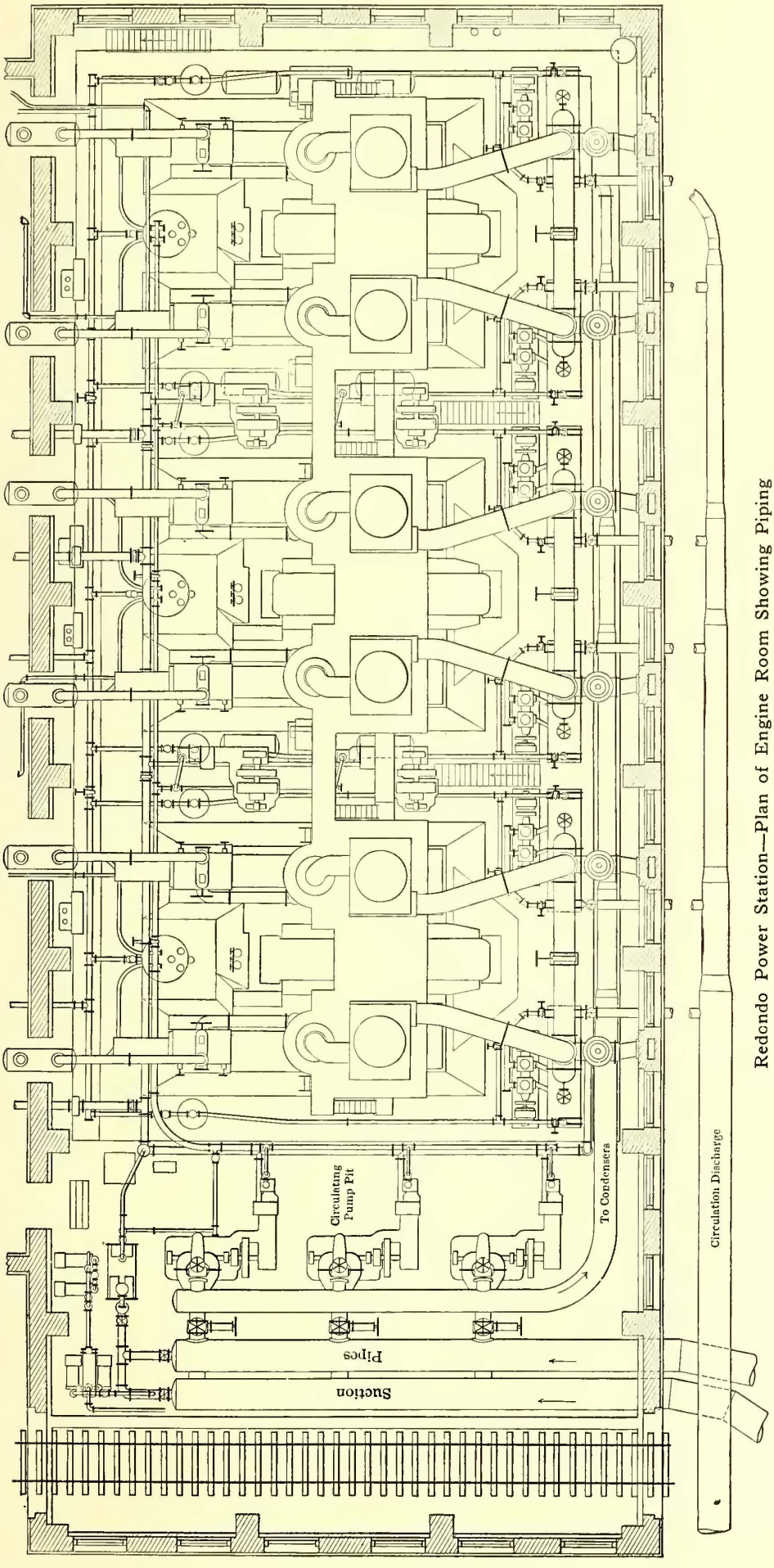
FUEL OIL PLANT

Fuel oil is stored in large steel tanks having a storage capacity sufficient for from 30 to 45 days. The oil is pumped into auxiliary tanks which are outside of the building at one end of the boiler room, and have a capacity of 1000 barrels each. The tops of these tanks are on the same level as the boiler room floor to conform to underwriters' requirements. The grade line is about 14 ft. above the floor of tanks, and the surrounding earth is withheld by means of circular retaining walls. The tank pits are roofed over and are properly ventilated.

The valves in all pipes connecting to the tanks are located on the boiler room side and there is a 3-ft. concrete wall between the tank com-



Redondo Power Station—Cross Section Through Engine and Boiler Room



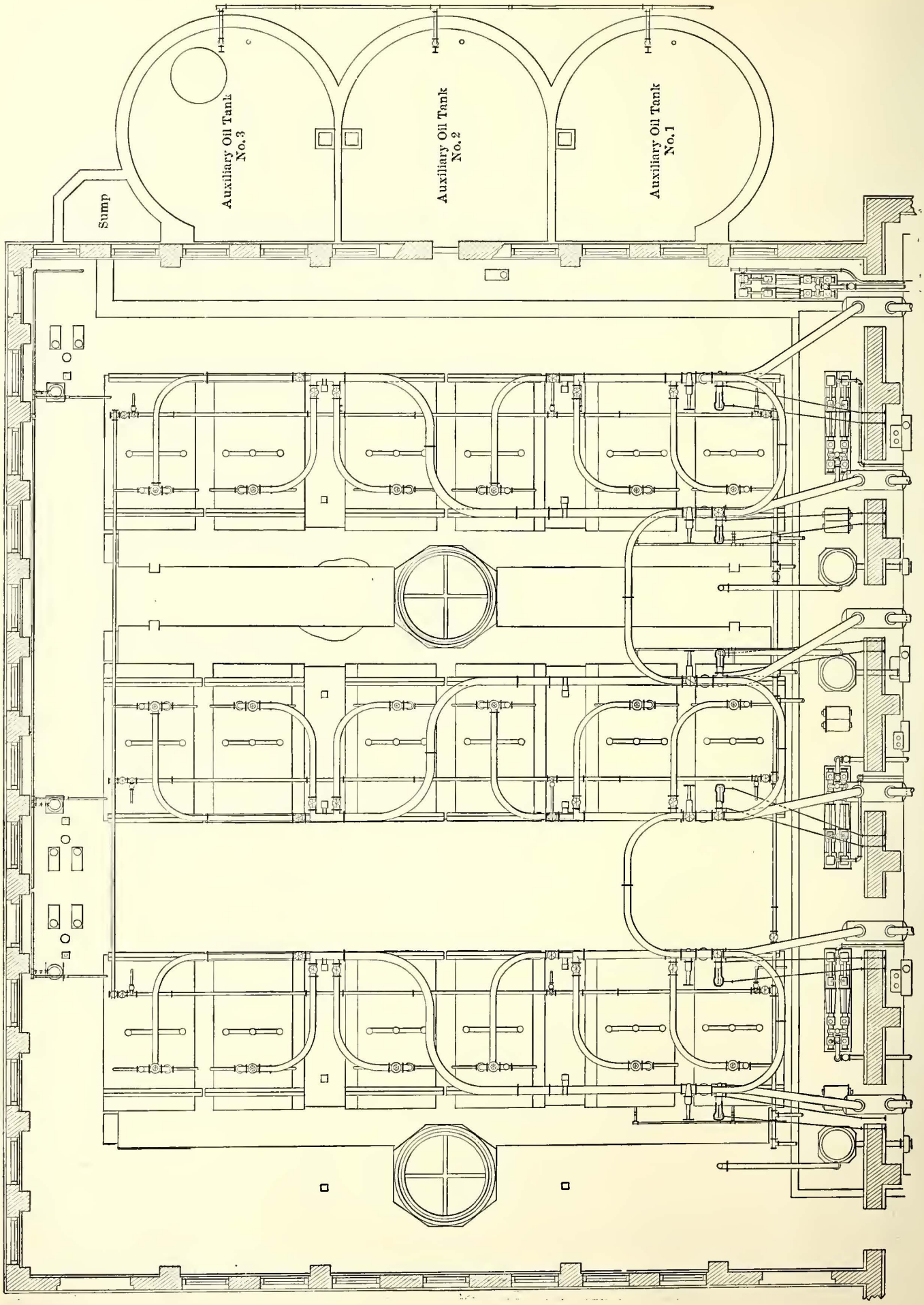
Redondo Power Station—Plan of Engine Room Showing Piping

partments and the operator. Fire partitions separate adjacent tanks. The manhole covers in each tank are padlocked, as an additional precaution. In lieu of steam smothering pipes leading to the interior tank compartment, there is placed above each tank a steam ring of 4-in. pipe having an ample number of jets to provide a sheet of steam which would effectually cut off any supply of air from the outside, and promptly smother a fire which might be started by any possible means.

The station has been designed to provide a duplicate set of oil pumps for each unit, or six oil pumps in all. So far it has been operated in this way, although in the future one set of pumps will supply the entire station. This will reduce the number of pump operators on each shift from three to one. An automatic system of regulating the flow of oil through the burners, patents for which are controlled by Charles C. Moore & Company, engineers of the station, is employed. The burners are kept wide open, or nearly so, and the amount of oil supplied to them is varied according to the load by changing the pressure, which, however, is uniform throughout the plant. In this way the intensity of the fire increases and decreases in all boilers simultaneously. The oil pressure regulator is automatically controlled by a steam pressure gage, so as to maintain a uniform steam pressure in the plant.

Steam for atomizing purposes is supplied to the oil burners by a separate low pressure main, the pressure in which is automatically controlled by variations of the oil pressure in the oil main. A ratio regulator is used, and in this particular plant it has been found that the proper amount of steam for atomizing purposes is furnished under a steam pressure equal to three times the oil pressure, plus 30. This relation will vary with the type of burner used and the relative areas of burner orifices for steam and oil.

The air supply for combustion is controlled by a damper controller, also automatic in its action, which increases the

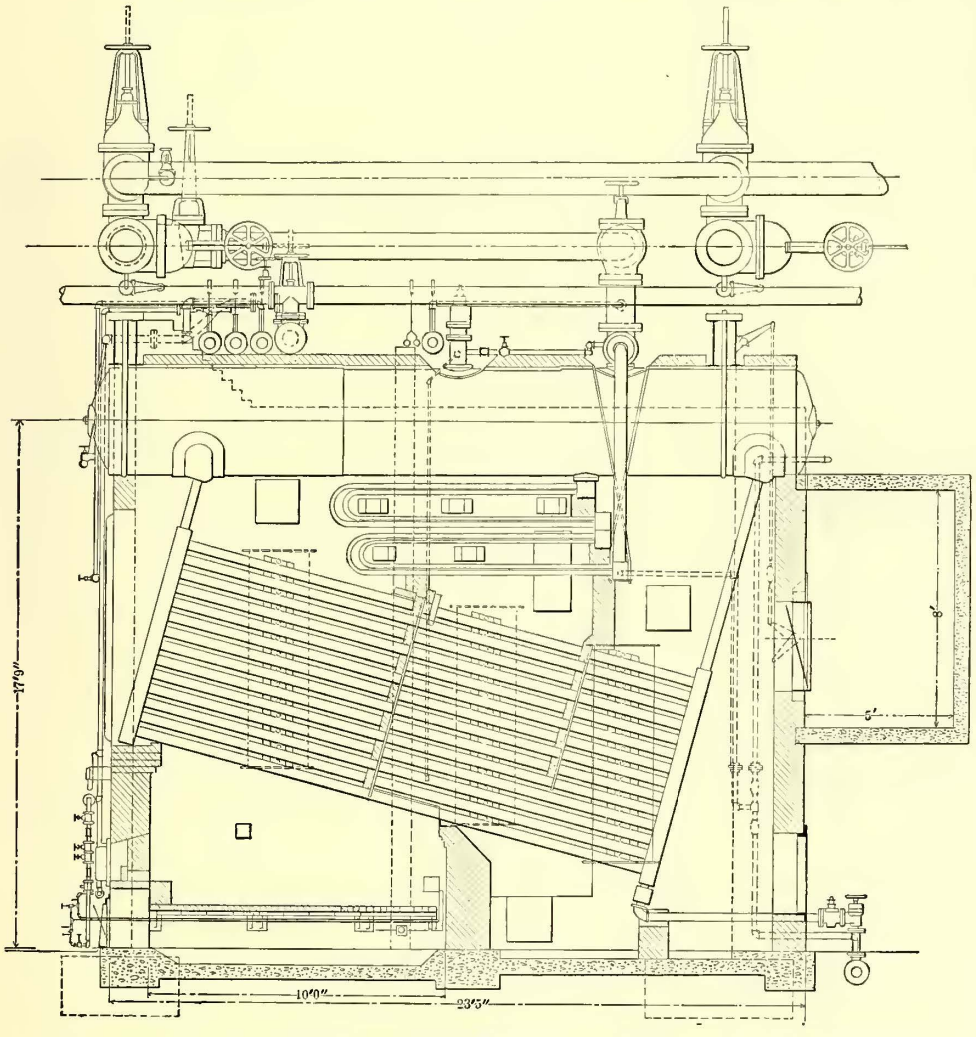


Redondo Power Station—Plan of Boiler Room Showing Piping

damper opening with an increase in oil pressure and vice versa. The movement of the controlling lever is due to the oil pressure acting on a diaphragm. This movement is opposed by the action of a spring, so that the amount of movement on the main lever is proportional to the oil pressure. This movement is multiplied through a hydraulic cylinder connecting to a rock shaft running over all of the boilers in one panel. Each boiler damper is connected to this rock shaft. The connecting levers are set at such angularity, with respect to the connecting rods operating the dampers, as to give the proper air supply for the various ranges of loads, the final adjustment being from actual trial at the plant.

FEED WATER FILTERS

The air pump discharge is pumped through six Day marine type feed water filters, 48 in. in diameter and 5 ft. in height. Each filter has five compartments of filtering material, suitable for the elimination of the greater portion of entrained cylinder oil. In the operation of this filter the discharge is into the top of the filter. The water passes down through the filtering material and out at the bottom to a stand pipe, maintaining a complete submergement of the filtering material. Owing to the slow velocity of the water through the filter, there is a tendency for any oil, not absorbed by the filtering material, to rise to the surface rather than to be carried on and into the boilers by the downward flow of water.



Redondo Power Station—Section of Boiler Showing Furnace for Burning Oil

PIPING SYSTEM

The general arrangement of main steam piping is shown in the diagrams on pp. 621 and 622. All of the piping for the plant except for some of the minor auxiliaries, is arranged on the panel system, dividing the plant into three independent units. In the layout of this station it was desired to reduce the diameter of the steam mains. On each high-pressure cylinder of each engine the throttle valve is for 14-in. pipe. Owing to the necessity for long radius bends and the desire for flexibility, it was determined not to employ any steam pipes over 14 in. in diameter. It was finally decided to connect three boilers in each battery to each side of each unit, thus providing a greater flexibility of service without increasing the cost of the piping system. Hence, in so far as the main steam piping is concerned, the plant can be considered in effect as six independent units. The main steam piping was anchored to the building walls and building columns located with this idea in view. It was found, however, that the columns were not sufficiently rigid for anchorage purposes, and it became necessary to install a cross system of bracing from wall to wall. Drainage is afforded by locating a large receiver drum in each line of piping, as shown in the drawing.

In all high pressure steam piping 5 in. in diameter and over upset lapped joints were used with rolled steel flanges, being an improved type of Van Stone joint. As but a moderate degree of superheat is required, the valves and fittings are of semi-steel, have bronze mountings and Detroit-Edison necks to prevent leakage of steam around valve spindles, etc. Chapman valves were furnished throughout the plant. All high-pressure steam piping is covered with non-conducting covering 3 in. in thickness, there being valve body and flange covers throughout.

Special consideration was given to the design of the exhaust piping to provide the most direct course from the engine to the condenser. As will be noted in the plan, there is but one bend between the engine exhaust outlet and the condenser inlet and this is of exceptionally long radius. Exhaust pipes have been made of large diameter to lower the velocity of exhaust steam and under actual test the loss in vacuum between the condenser shell and exhaust nozzle was at all times less than ½ in. mercury column.

The plant is complete with modern arrangements for handling and storing cylinder oil, filtering oil, etc. Compressed air is used to deliver the filtered oil to the various parts of the plant.

FIRE PUMP

An Underwriters' fire pump, fitted for salt water, has been installed in the pump pit. This pump also serves as

a pressure pump furnishing pressure water for the Lagonda power driven cleaner for boiler cleaning purposes.

COOLING SYSTEM FOR MAIN ENGINE BEARINGS

For the purpose of providing circulating water for cooling main engine bearings and guides, which are hollow and designed for such cooling, a set of circulating pumps and intercooler has been furnished. Fresh water is circulated through the engine parts and is cooled by means of a small surface condenser. The fresh water for cooling flows within the tubes and salt water is circulated around the tubes and is taken from condensing water suction mains.

CHIMNEYS

There are two reinforced concrete chimneys each 13 ft. in diameter and 125 ft. in height. Each chimney is of capacity for two units, the plant being arranged so that a fourth unit may be added to the station and connected to the second chimney.

The chimney gases pass from boiler to chimney through specially designed reinforced concrete flues; these have proved eminently satisfactory for the work, although slight heat cracks in the concrete appear in various places.

ENGINE ROOM CRANE

For convenience in erecting and handling machinery there was installed a 62½-ton Niles-Bement-Pond electrically operated engine room crane. Railroad tracks allow cars to enter the building at one end, heavy machinery being unloaded by crane direct to the engine foundations.

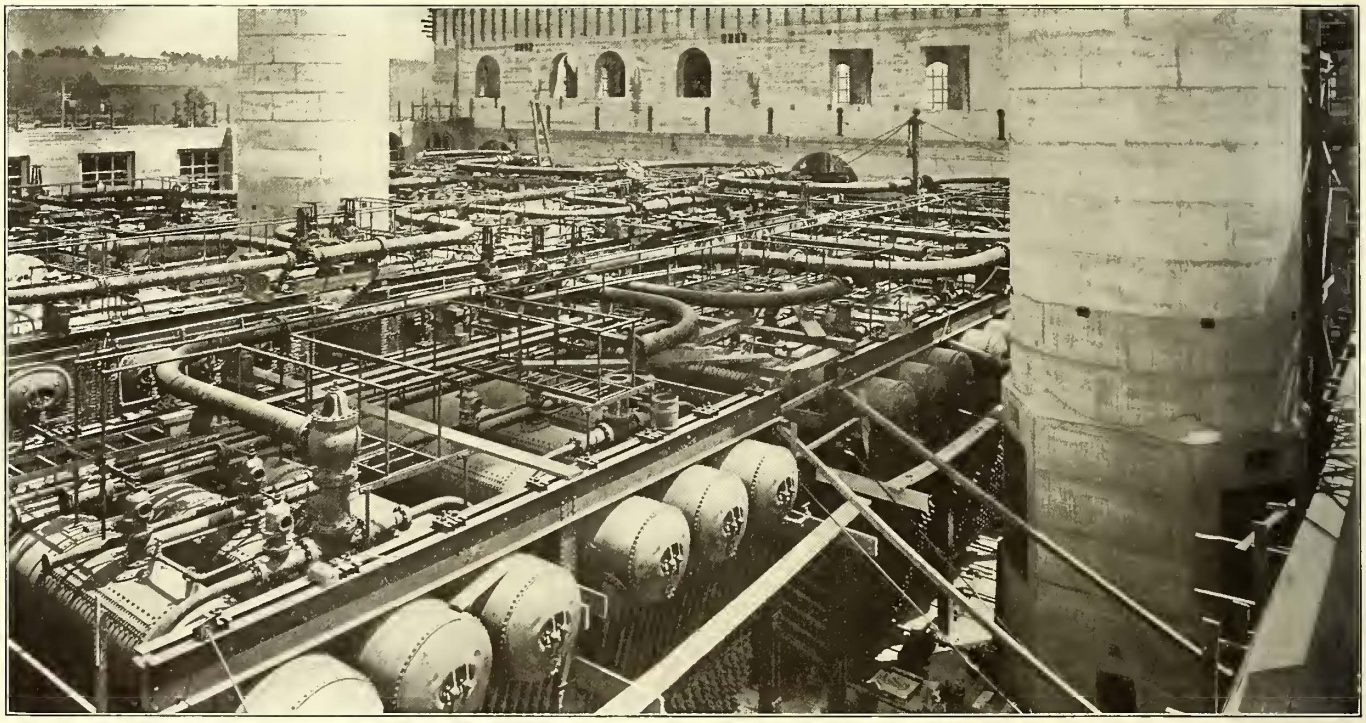
FOUNDATIONS

The plant is installed on the beach within a few hundred feet of the surf line. The sub-soil consists largely of drift or pit sand. To prevent vibration due to the main engines, the design of sub-foundation was carefully studied. It was finally decided that in lieu of piling there would be constructed a sub-foundation 6 ft. in depth the entire width and length of the engine room, except a 2-ft. space all around to prevent interference with building foundations.

This slab is reinforced top and bottom at the critical points. The main engine foundations were built directly on top of this slab rising 14 ft. to the engine room floor line. Foundations for the exciter engines were made by arching over the space between adjacent units suitably strengthened with reinforcement, thus affording ample space underneath for rheostats, filters, etc.

CIRCULATING WATER SYSTEM

Real estate restrictions made it necessary to locate the plant at some distance from the ocean. The shallow beach line made it further necessary to carry a wharf built some distance into the ocean in order to obtain the necessary depth for suction at low tide. The centrifugal circulating pumps are located in the pump pit, the center of the pumps being about 12 ft. above mean low tide. The combined suction and discharge piping comprises a length of 1700 ft. The circulating system consists of two suction pipes 50 in. in diameter made of sheet steel. There is but one discharge line 50 in. in diameter. The suction intakes are open ended, the strainers and the sand settling tank being located at the beach end of wharf.



Redondo Power Station—Boiler Room Showing Steam Piping. View Taken During Erection

As ocean surf is impregnated with air which must be removed from the suction line under vacuum, and further, in order to prime the suction line before starting, after periods of cleaning, a large duplex, motor-driven vacuum pump was installed. This vacuum pump removes the air by means of a standpipe rising 40 ft. above tide, located at the high point of the line.

GENERATORS

The three main generators manufactured by the General Electric Company are of particular interest on account of the extremely high voltage, 18,000 volts, for which they are wound. These generators are rated at B-60 poles, 5000 kw, 100 r.p.m., 18,000 volts, 50 cycles, three-phase, and are of the engine-driven, flywheel type. The following data may be of interest:

Floor space required	31 ft. x 6 ft. 9 in.
Diameter of stator	28 ft. 6 in.
Diameter of rotor	25 ft.

Radius of gyration	8.8 ft.
Weight of stator	186,000 lb.
Weight of rotor	162,000 lb.
Weight of accessories	12,000 lb.
Total weights	360,000 lb.

The commercial efficiencies at unity power factor are as follows:

1.25 load	96.5 per cent
Full load	96.2 per cent
0.75 load	95.2 per cent
0.50 load	93.5 per cent
0.25 load	88.0 per cent

The armature coils of these generators have stood a high potential test of 40,000 volts for one minute.

On account of the severity of the specifications in regard to the operation of these generators in multiple with existing apparatus on the transmission system of the Pacific Light & Power Company, the revolving fields are provided with a squirrel cage winding to prevent hunting.

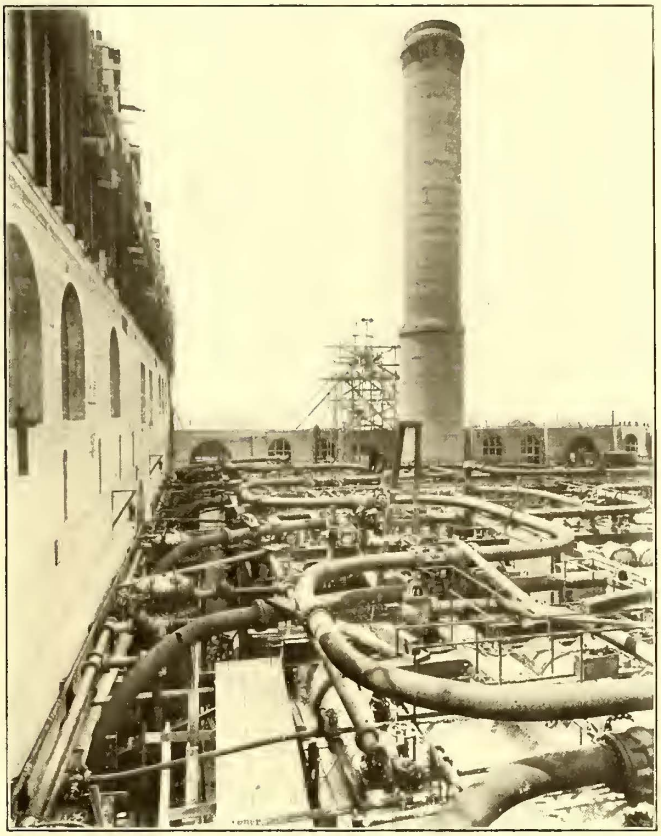
The generator field rheostats are motor operated, with remote control from the switchboard.

The starting, stopping and loading of the various units is controlled entirely from the switchboard gallery, located above the boiler room and alongside the main engine room wall.

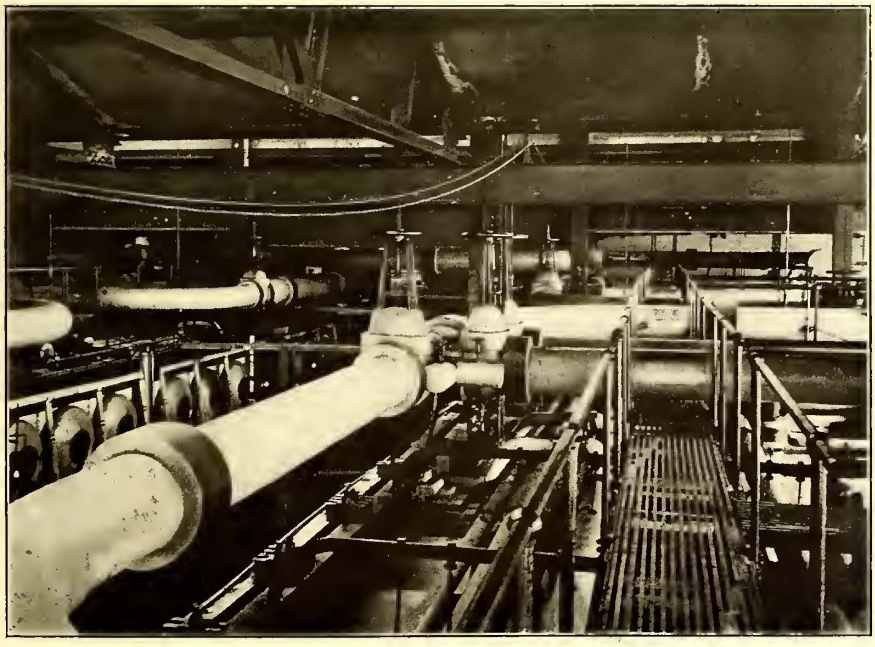
SWITCHBOARD EQUIPMENT

The following description of switchboard gallery was furnished by E. R. Davis, electrical engineer for the Pacific Light & Power Company:

The generator wiring between the generators and switchboard room consists of three No. 0000 bare copper wires, each in a separate duct, on large porcelain insulators. In connection with this, one spare duct and spare cable are installed for use in case any of the three main lines break down or become defective. Each generator is connected through two-way porcelain mounted selector switches to either of two sets of high-tension busbars, these busbars being located in two separate concrete galleries. The feeders, two each to the Los Angeles Railway Company and the Pacific Electric Railway Company, are also connected through two-way porcelain mounted selector switches to either of two sets of high-tension busbars, so that oil switches, insulators, etc., can be killed and repaired in either busbar gallery without interfering with the operation of the generators or the distributing feeders. The oil switches are of the single cell, single throw, four-break, 400-amp type, mechanically connected together in gangs of three poles. These switches are operated by manual remote control, and the entire equipment was built in the shops of the Pacific Light & Power Company. In the operating stand the instrument boards are made from well seasoned oak, the object of using wooden construction in this particular being partly due to the saving in expense in building wooden structure instead of marble, but was principally due to the fact that on account of the rapid progress of electrical science switchboards rapidly become obsolete, and if built of marble they are extremely expensive and hard to replace. There is little danger from fire hazard in connection with the wooden structure, since all the high-tension, alternating-current wiring is communicated to the switchboard instruments through the low-tension wiring of current and potential transformers, and this low-tension wiring is permanently grounded so that the approximate voltage used is 120 volts. The alternating current instruments employed in connection with the feeders and generators on this switchboard are the curve-tracing Westinghouse, graphic recording type. The exciters and field circuits are equipped with Weston d.c. instruments.



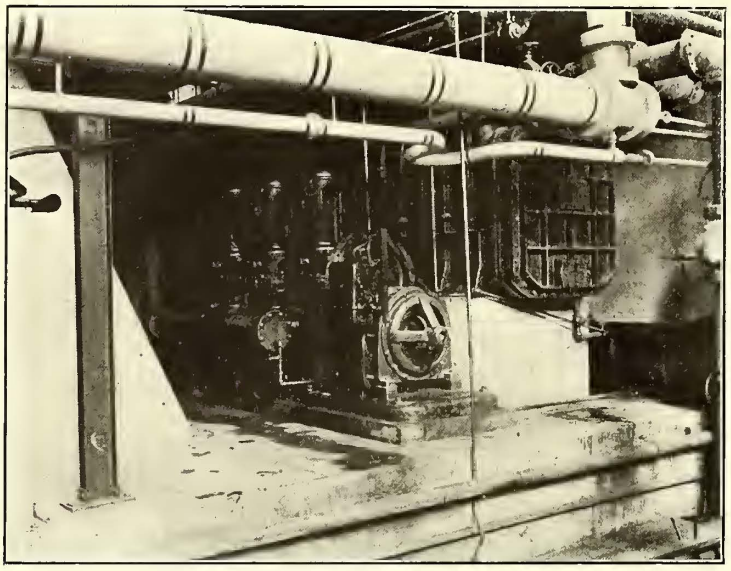
Redondo Power Station—View of Pipes and Boilers Showing Equalization of Units



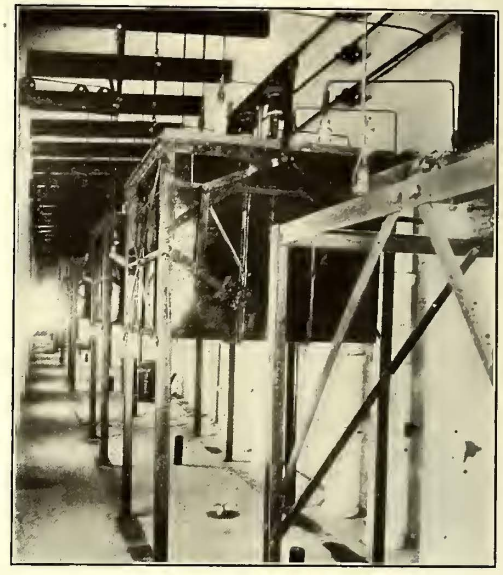
Redondo Power Station—Pipe Platforms on Top of Boilers

The lightning arresters used in connection with this station were furnished by the General Electric Company.

The exciters, four in number, are wired up to the marble switchboards located on the main engine room floor, the switches being operated by remote control with air power.



Redondo Power Station—Triplex Motor Driven Air Pump and Condenser



Redondo Power Station—High Tension Switch Gallery

The wiring is so designed that under ordinary conditions each main unit has its independent exciter, and should anything happen to any one exciter, the fourth, or spare exciter, can be connected to any of the main units.

Field rheostats in connection with the main generators are motor driven for remote control.

The auxiliary induction motors in connection with the Edwards air pumps, small circulating pumps, condenser and feed water motors are operated from a bank of stepdown auxiliary transformers connected to the main generator leads.

The operating room and galleries consist of reinforced construction and are entirely fireproof.

FEED WATER PURIFIER

The makeup water for the plant is supplied by wells on the property of the company. This water contains certain carbonates and sulphates and is purified before being supplied to the plant by an automatic purifier.

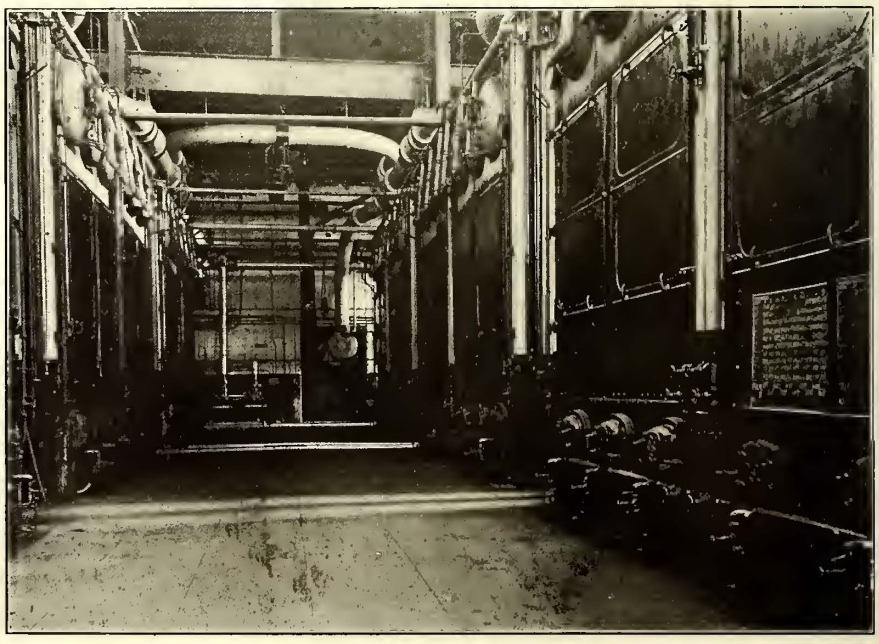
BUILDING

Building, building foundations, wharf and circulating water pipe line were designed and installed under the direction of Edward S. Cobb, chief engineer for the Pacific Light & Power Company, and is entirely of reinforced concrete. The installation of machinery and erection of building proceeded at the same time. The engine crane was erected as the side walls were carried up. It became necessary in hastening completion to use the crane before the roof and roof bracing was in place. With concrete less than 30 days old the full weight of 135,000 lb. live load was carried by the crane the length of the building, without injury to the concrete, a remarkable performance.

OPERATION OF PLANT

Various practical difficulties were met with in starting the plant naturally to be expected in any installation of large size. The entire crew was inexperienced in the handling of machinery of anything more than one-quarter the size of this station. The difficult task of breaking in the crew and the adjustment of the apparatus were entirely under the direction of J. R. Atchison, superintendent of construction for the contractors, Chas. C. Moore & Company, engineers, under whose charge the installation work also proceeded. Although the load was carried from the start without serious interruption, it was not until after some time that the operators were thoroughly systematized and familiarized with their respective duties.

While it is the usual practice under Pacific Coast conditions to attempt to filter cylinder oil out of air pump discharge, it is contrary to the experience of Eastern stations and represents probably one of the most radical departures from Eastern practice in the design and operation of this plant.



Redondo Power Station—Firing Alley Between Second and Third Units

One of the difficulties yet to be solved by the company is the elimination of seaweed and more particularly of the

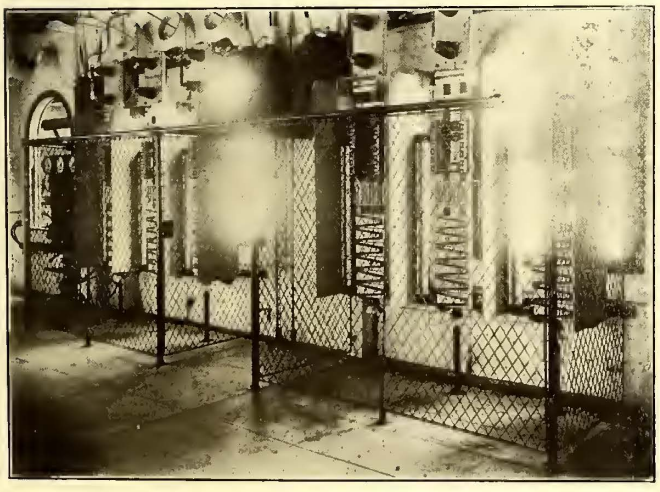
fine sea moss of the Pacific, from the circulating water which fouls the condensers and gives rise to a frequent loss of vacuum, compelling operation non-condensing. It is impracticable to handle this effectively with any type or any make of enclosed strainer, and it is probable that some type of open canal screens will be used to remove this most objectionable difficulty. At present the fact that there are two condensers for each unit is very helpful in this trouble. The entire exhaust steam from one unit has been handled by one condenser, the other condenser being temporarily out of service. The loss of vacuum due to this overloading of one condenser varies from 1½ in. to 2 in.

The circulating water system was designed to operate on the syphon system, with but a nominal head of from 15 ft. to 20 ft. on pumps. This head at times of accumulation of seaweed would rise to 35 ft. and more. Even with this quantity of auxiliary exhaust steam, the amount is below the capacity of the feed water heater, so that no exhaust steam is wasted under any normal condition of running.

GUARANTEE

The contract covering this station embodied an economy guarantee providing for a 90 days' test on one unit on a commercial railway load, under any load curve within the limits of the rated capacity of the generator, the total output being not less than 60,000 kw-hours, nor more than 78,000 kw-hours per 19½ hours running, there being 4½ hours standby each day. On this load the company guaranteed an economy of 170 kw-hours per barrel of oil, each barrel weighing 334 lb. and each pound containing 18,500 b.t.u. The contract provision for a 90 days' test was subsequently modified to cover a period of 15 days in view of the fact that the test was not under way until six months after operation of the plant, when running conditions had presumably become normal.

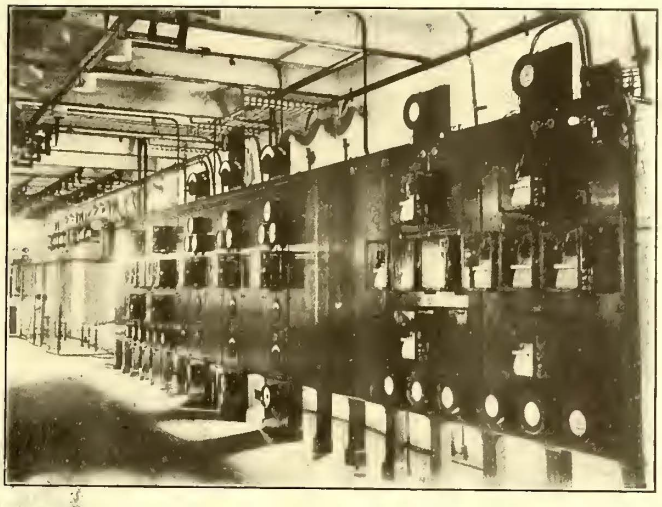
To determine the economy of the plant the contracting parties each appointed a representative, the two jointly selecting a neutral party. The representative for the Pacific Light & Power Company was Edward S. Cobb, chief engineer. The representative of Chas. C. Moore & Company, engineers, was C. R. Weymouth. The neutral member of the testing committee was Prof. C. L. Cory, dean of



Redondo Power Station—Lightning Arresters

the college of electrical engineering, University of California. Other well-known engineers were present. The test was a most elaborate one and included the three shifts for the three parties of interest, engaging about 80 men.

The committee's report gave the result of the 15 days' trial as 252.842 kw-hours per barrel of oil. There is in this result a slight correction in favor of the contractors due to an excessive sulphur and moisture content of the oil. This record is said to exceed all published statements of economy of large power plants operating under commercial conditions. For purposes of comparison with Eastern results,



Redondo Power Station—View of Switchboard

the above economy is quoted as being equivalent to slightly less than 25,000 b.t.u. in the fuel per kw-hour net output of plant.

It should be stated that this test was made on a complete unit with the exception of the circulating water pump. The actual head under which the plant now works due to seaweed difficulties varies from 30 ft. to 35 ft. The contract provided that the purchasers supply a syphon system of circulating water piping, so that the total head of friction and flow would not exceed 5 ft. An allowance was made for the omission of circulating pump by deducting from the total bonus earned a suitable sum. The reduction in economy due to the energy to drive the circulating pump is estimated to have been only a small fraction of 1 per cent, particularly in view of the fact that all of the exhaust steam would have been utilized in the feed water heater.

The bonus earned as a result of the above economy was $363,310, which is undoubtedly the largest bonus ever paid on a steam power plant guarantee. Based on the local market price of crude oil, the fuel saving due to this gain in economy will pay the full amount of bonus in from two to three years.

COMPARISONS WITH TURBINE STATIONS

It may be surprising to Eastern engineers that a power plant of this magnitude should be undertaken with the use of steam engines in lieu of steam turbines. At the time this contract was drawn, a most careful investigation was made by the Pacific Light & Power Company under the direction of its general manager, A. C. Balch. As a result Mr. Balch determined in favor of reciprocating engines and from the standpoint of economy at least believes his selection has been amply justified. On the score of space, the center distance between the engines is 43 ft. Had the exciters been located elsewhere, this distance could have been reduced to 35 ft. The first cost of this plant is said not to have exceeded 5 per cent that of a turbine plant.

ENGINEERING

The power plant proper was designed by C. R. Weymouth, in charge of the engineering department of Chas. C. Moore & Company, engineers, except switchboard, building and other work outside of building.

BEAUTIFYING SHOP PROPERTIES IN BROOKLYN

For the last four or five years the Brooklyn Rapid Transit Company's mechanical department was kept so busy standardizing the elevated and surface cars and building well-equipped shops for their maintenance that it had no leisure to consider plans for making the shop surroundings ornamental as well as useful. By the end of the spring of 1908, however, "the storm and stress" period was fairly over and the department took advantage of its opportunity to show that esthetic appreciation is not incompatible with good engineering.

Brooklyn Shop Gardens—Front of Fresh Pond Inspection Plant

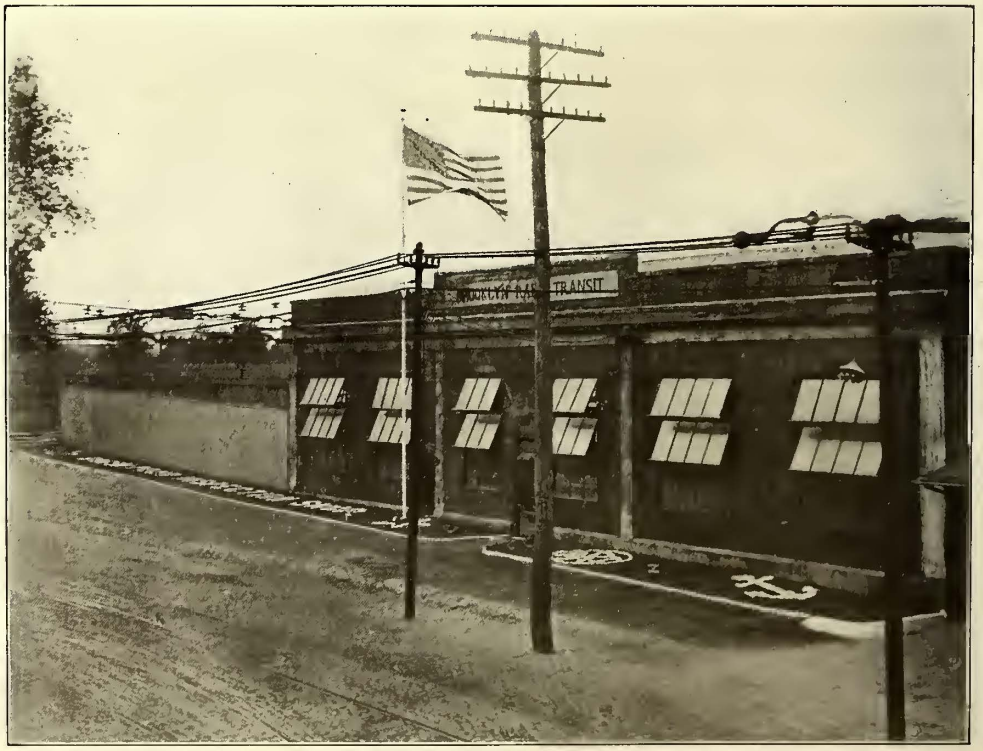
Of course, the different car maintenance structures were designed primarily to give maximum natural lighting and working convenience, as these requirements could not be subordinated to appearances. In general, the surface car houses, which are in charge of the transportation department, have been designed to cover entirely the plots on which they are built, but all the elevated shop and inspection buildings, which are in charge of the mechanical department, and, as a rule, are in the outskirts of the city, have enough spare ground about them to make artistic surroundings possible without much cost.

About the end of June it was determined to have a general overhauling prior to the laying out of the gardens at the elevated plants. This resulted in the removal of tons of unsightly junk and numerous sound parts made obsolete because of the company's reduction in the number of patterns. The house-cleaning also included a thorough inspection of the stock on hand and developed the fact that some of the shops had a great deal more of certain parts than they actually required. In all about 11 carloads of material were turned over to the general storekeeper for attention.

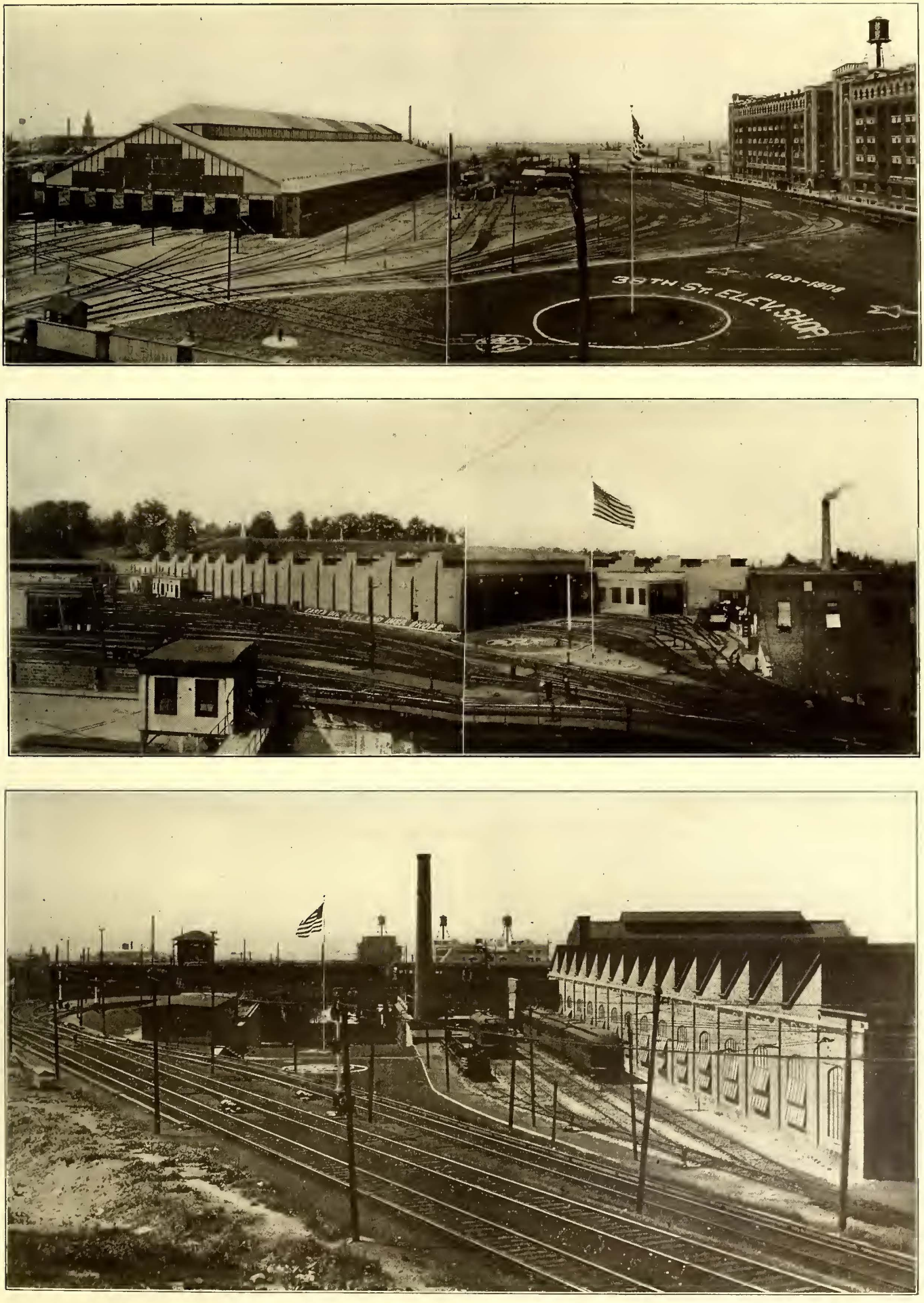
The plan to furnish the shop yards with gardens was communicated to all the foremen affected, who were informed that while the company would bear the expense of installation they would be held responsible for the upkeep of the grounds. To interest all the employees and give patriotic color to the scheme, it was further announced to the men that they would have the responsibility of buying the flags and keeping them presentable.

The work was inaugurated by sending one of the department's engineers to measure the available areas at the different locations, after which the proper amount of sod and flowers were laid down and planted. The general scheme of ornamentation decided upon is practically standard throughout and consists of an anchor, the B. R. T. emblem, a star for centering the steel-tube flag pole, and

Emblem Motive

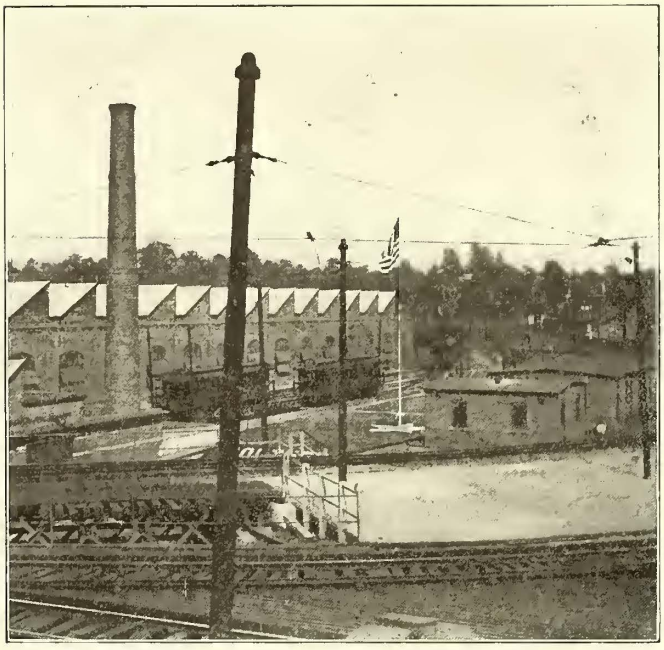


Brooklyn Shop Gardens—Alongside Fresh Pond Inspection Plant

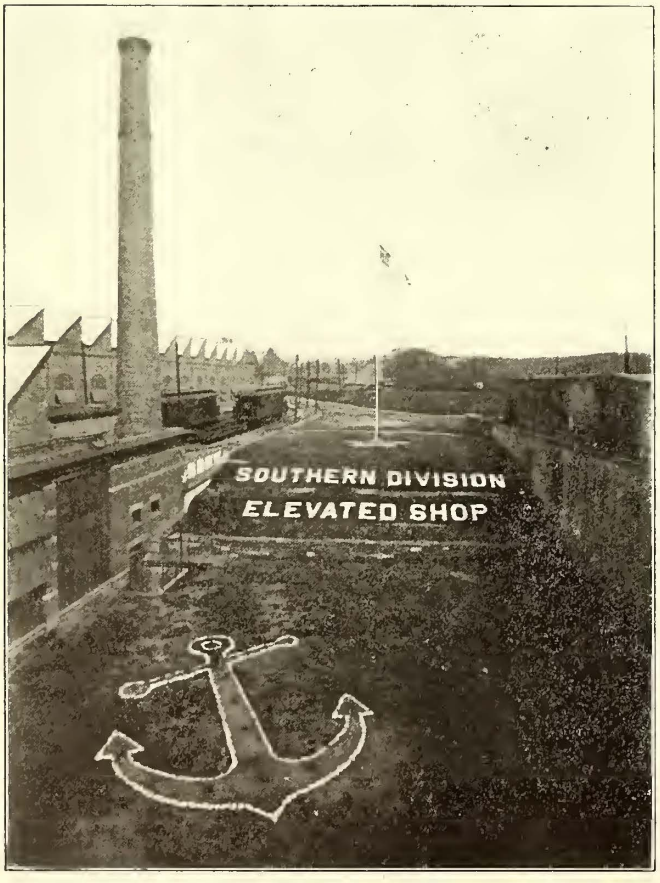


Brooklyn Shop Gardens—Views of Three Elevated Shops

the official title of the property. The way these designs have been applied and the general effect obtained are well shown in the accompanying half-tones. All of this gardening was carried out in less than 30 days. The various garden tools were furnished by the company.



Brooklyn Shop Gardens—Flagpole and Star at Southern Division Elevated Shop



Brooklyn Shop Gardens—Anchor, Division Title and Flag

The shop employees were greatly pleased to have the privilege of owning the flags and the amounts necessary for their purchase were rapidly made up from the many individual contributions. Every flag raising was made the occasion for an ice-cream and cake jollification, at which officers of the company were welcome guests. At the Fresh Pond inspection plant the transportation men were roused to such a pitch of enthusiasm by a flag raising that they bought a banner of their own after the company had promised them a flagstaff.

The pride the men have shown in keeping these gardens in the best possible shape has been extremely gratifying to the management and the former have been imbued with a sense of ownership that could not have been instilled otherwise with such little expense.

Aside from the other advantages accruing to the railway company from this innovation, it is plain that the tendency of promiscuously throwing brake shoes, rods, poles and other parts around the yards will be greatly checked. It is often difficult to impress employees with the fact that these articles represent a lot of money, but here the problem has been solved by making the men naturally unwilling to spoil the grounds.

The mechanical department has every reason to feel satisfied with the good results it has attained at a comparatively trifling cost. Next year it is planned to turn over the sodding and planting of the gardens to the building department, as the latter has better facilities through its care of the extensive gardens at the Brooklyn Rapid Transit Company's Brighton Beach Hotel.

KEEPING SCRAP BOOKS AT MINNEAPOLIS

A scrap book for recording the printed comments about an electric railway becomes more and more valuable as it grows older. The passenger department of the Twin City Rapid Transit Company at Minneapolis is accumulating a valuable fund of publicity information in its carefully kept set of scrap books. The company receives each day all the local newspapers in Minneapolis and St. Paul and papers from some other large cities. These are first delivered to the passenger department office, where they are carefully read and all clippings of any possible interest to the railway company are cut out. These clippings are immediately sent to the general manager's office for earlly inspection, and then they are returned to the passenger department for permanent filing in scrap books.

For ease in finding any desired item separate scrap books are kept for the clippings from each newspaper regularly read. A system of card records serves as a complete index of the subjects discussed in the clippings of the various books. There are 130 subject cards in the index with headings for all matters, such as operation, policy, relations with employees, invention, improvement, parks, franchises, taxes, fares, accidents, etc., not only for the Twin City property, but for properties in other large cities. Each of the index cards presents across its top the name of one of these 130 subjects. The remainder of the card is available for indexing the location of clippings relating to the subject.

Each of the books containing the clippings from one newspaper is given a number and the pages also are numbered consecutively. The entries for indexing clippings are made in the form of fractions, the numerator indicating the number of the volume in which the clipping may be found and the denominator indicating the page of that book. With this simple subject index, which, by the way, is easily kept up to date, there is available a complete reference library of all the comments about electric railway operation made by the newspapers most likely to consider subjects of interest to the Twin City Rapid Transit Company.

INTERVIEWING WITNESSES

BY F. W. JOHNSON, ASSISTANT GENERAL CLAIM AGENT, PHILADELPHIA RAPID TRANSIT COMPANY

The work of interviewing witnesses to accidents constitutes a very important feature of the operation of every well-regulated claim department.

Having taught the men upon the cars how to handle their accidents, and having secured the names and addresses of the witnesses, the next step, and a very important one, is to proceed to interview those witnesses and to secure from them such information as may be of service to the company in its efforts to get at the facts, and to determine the question of responsibility.

In considering this question, and in defining its course for the future with respect to its attitude toward a claim for damages, the company depends upon and is guided largely by the evidence in the case as gathered by the investigator. If the evidence so collected is favorable to the claimant, the case doubtless will be adjudged proper matter for settlement. On the other hand, should the evidence convince the officials that the accident was unavoidable, or that the injured party himself contributed to its occurrence by his own neglect, then the company may elect to defend.

In any event, it will readily be seen that considerable responsibility rests upon the shoulders of the investigator who works up the case. It is therefore of vital importance to all concerned that his work should be accurate and thorough in all of the essential details. If he is careless or indifferent, the whole aspect of the case may be changed. In this way important details are overlooked, and what should have been developed into a powerful defense breaks down through incompetency upon the part of the investigator. Or the pendulum may swing in the opposite direction, and through lack of experience or of judgment he may give undue prominence to certain details of relatively minor importance to the exclusion of other and more valuable facts. This may occasionally result in misleading the head of the department in forming his opinion of the strength and character of the evidence in the case.

With these facts in mind, the thought has occurred to the writer that a brief discussion of some of the various details which properly enter into this phase of claim work may possibly prove of interest to investigators.

In approaching a witness for the purpose of securing a statement concerning his knowledge of the accident under consideration, the investigator should never lose sight of this point: that his sole aim should be to secure the facts, the whole facts, and nothing but the facts. He must be fair toward his witness, and he must be fair with his employers. The one primary thought should be, What are the cold, hard facts? It's not a question of what he himself believes to be the real facts in the case. Nor is it a question of what he wants a witness to say, or what he can influence him to say, or what he can induce him to conceal. Any and all of these things are entirely foreign to the scope of the investigator's duties. He is there for the purpose of getting the facts; just that and nothing more.

His next step should be in the direction of allowing the witness to tell his own story. Here many an otherwise capable investigator goes astray. He forgets that his rôle is merely one of a secondary nature, and he cannot seem to resist the temptation to hold down the center of the stage himself pretty much all of the time. Such a man should understand that he is weak in one of the prime essentials to success in his line of business, viz., that of being a good listener. Anybody at all can talk, talk, talk, but the winning hand in claim work is held by the man who knows when to sit tight and to allow the other fellow to do the talking. He then is in a position to judge of the strength of the other man's side of the question, as well as of his own.

Having explained the occasion of his call, and having secured the necessary data for properly heading up his statement, let him suggest to the witness that he start in at the very beginning and tell his own story in his own words. Give him his head and offer as little interruption as possible. With witnesses who show a tendency to wander off upon side excursions, it will, of course, be necessary at times to steer them back to their subject. The principal facts having been obtained, open up your battery of questions and fill in the gaps not covered by the witness himself.

Many successful investigators follow the practice of allowing their witnesses to give a full recital of the facts in this way before producing writing materials for the purpose of reducing the statement to writing. This idea has much to commend it, for the fact is well known that valuable witnesses frequently are frightened into silence at the mere thought of having anything put in black and white. For some reason or other, the matter immediately seems to assume serious proportions in their eyes and they instinctively take refuge behind the claim that they saw nothing of the accident, and that they therefore can be of no assistance to either side. The situation is somewhat different, however, with respect to the case where a witness has already committed himself to a recital of the facts, and he is far less likely to bolt when the investigator casually pulls out his blanks and remarks in an offhand manner: "I guess that I'd better make a few notes of that instead of attempting to trust it to my memory."

In reducing the statement of a witness to writing, the suggestion is advanced that especial care should be taken to incorporate the witness's own words and expressions in so far as may be feasible.

As an illustration of the reverse, note the effect produced when the written, signed statements of several witnesses to a case are offered in evidence, wherein each and every statement is couched in almost identically the same terms. It is improbable, of course, that every witness to the case should have expressed himself in exactly the same manner. The most natural inference is that the investigator revamped the story given by each witness into a style of his own. The accuracy of the facts set forth in each statement is not disputed, bear in mind. It's simply a question of whether those same statements would not have appeared to better advantage, and have carried greater weight, had they been written more nearly in the language employed by each witness at the time of his interview.

As before stated, this point is readily covered by incorporating in the statements the original comparisons, expressions and opinions of each individual witness. For instance, in the investigation of a case where a passenger has been injured while attempting to alight from a moving car, we have, let us say, four eye-witnesses. The first witness, a local business man, in the course of his story to the investigator, says: "Why, it never occurred to me that that fellow would attempt to alight from the car while it was traveling under such fast headway."

The second witness, a laborer, commenting upon this same feature of the case, says: "The man deliberately

risked his life, for the car was running at a high rate of speed when he jumped off." The third witness, a lady, says: "I heard the conductor shouting to some one not to jump. I quickly turned to my right and saw this man stepping off of the car while it still was under full speed." The fourth witness tersely says: "Any man who would jump from a rapidly moving car, as did this chap, must be insane."

Here we have practically the same thought expressed by four different witnesses in four different ways. And yet the mechanical investigator who follows a stereotyped style would have quoted each of the four as having said: "The man deliberately got down onto the running-board, and without warning, jumped from the car while it still was in motion." All well and good, for the facts would still be correct, and yet—not a single witness really expressed himself in just those words, to say nothing of all four having done so, as would appear from the written statements turned in by the investigator.

Another point to be considered in this connection is this: A statement obtained from a witness to-day may not be needed in court for some months or even years to come. The witness very naturally dismisses the incident from mind and gradually many of the details pass from his memory. Eventually the case is listed for trial and the witness is shown the statement made by him shortly after the accident. If it is couched in language other than his own, he may have difficulty in recalling some of the facts. But if he instantly recognizes certain peculiar expressions of his own in the body of the statement, his confidence in the statement is immediately restored and the details come back to mind much more readily.

Too much emphasis cannot be placed upon the importance of quoting witnesses truthfully and accurately. Absolutely nothing is to be gained by attempting to make a witness appear to say something different from that which he really did say at the time of his interview. Let us stop for a moment and consider the situation wherein a company finds itself when confronted by evidence which has been "colored" or "toned up" by an investigator.

We will say that the evidence in the case as gathered by the investigator has been placed before the head of the department for a final decision regarding the company's attitude. A careful review of the papers reveals some six or seven witnesses who clearly establish the non-responsibility of the company for the accident. Relying upon this evidence as a defense, the claim is turned down and the matter subsequently goes into suit. Several months elapse and the case eventually is marked for trial. The witnesses are subpœnaed and the company's counsel proceeds to reinterview them for the purpose of verifying their statements. To his astonishment, he learns at the eleventh hour that the witnesses are not measuring up to their statements, and as a natural result the defense falls to the ground at a most critical moment. The responsibility for such a state of affairs must rest squarely upon the shoulders of the investigator who worked up the evidence. Such a man is deserving of the severest censure.

As we have before said, it is not a question of what the investigator would like to have the witnesses say, or what he can persuade them to say, or what he can hoodwink them into saying. The only question involved is, what are the facts, regardless of the direction in which they may lean. If the company is in the wrong, it is just as important that that fact should be clearly established, as it is if the injured party himself was solely at fault.

Some investigators make the fatal mistake of skimming along the surface in gathering their evidence. They fail to recognize the importance of digging down after the facts if the witness himself fails to produce them. They're too easily satisfied, and as a result they never develop into heavy timber. Men of this type should recollect that the time to secure all of the facts concerning an accident is at the first interview; the opportunity for a second interview may never be offered. People change their mind, and the friendly witness of to-day may be hostile 10 days or two weeks hence. Again, the various details of an accident are comparatively fresh in the mind of a witness within a short time after the accident. Let several weeks or months elapse between a first interview and a second, and some of the vitally important facts which were neglected at the time of the first meeting will have slipped from mind. Also, some witnesses will positively refuse to give a second statement after having once furnished one.

All of which goes to demonstrate the tremendous importance of making the original statement as full and as complete as possible. It is impossible for an investigator to look into the future and to forecast just what features of his investigation will be of value and what will not. By far the safe course is to set forth all of the facts, and thus to allow the company's officials and attorneys to intelligently weigh the case as a whole.

It is indeed difficult to understand why so many investigators fall short when it comes to obtaining the names and addresses of additional witnesses from those whose names they already have upon their list. Unless printed instructions expressly direct their attention to this point they frequently overlook this opportunity of strengthening their case. Time and again have cases gone to trial in the past in which witnesses have volunteered offhand the names of additional witnesses which were not obtained at the time of their interview because of the fact that the investigator did not ask for them, and that they themselves did not realize the importance of mentioning them. This, of course, reflects directly upon the investigator who thus allowed valuable material to slip through this fingers.

The plan of bringing out the important points of an interview in several different ways, and at several different places in the body of the statement, is also worthy of careful thought. Such a practice definitely commits a witness to a certain state of facts, and likewise precludes the possibility of any misunderstanding existing between the witness and the investigator regarding the details. Instances have occasionally arisen in the past in which witnesses have readily identified written, signed statements made by them shortly after the accident, and have admitted the accuracy of the statements therein contained, with the possible exception of a single line or two. Upon inspection it will be noted that the particular line or two to which exception is taken really contains the meat of the whole situation. The inference is that the investigator did not quote the witness accurately, or else that the disputed portion was inserted after the statement had been read, approved and signed by the witness. This is manifestly unfair to all concerned, and opportunities for disputes of this character should be eliminated in so far as possible.

Let us consider for a moment what the effect of Mr. Man's change of heart would have been had the investigator who interviewed him placed the entire question beyond the possibility of dispute or of misunderstanding, by nailing that one vital point of the whole case in several different ways. For example:

In the first part of the statement, we will say, the investigator quotes the witness's own words to this effect: "I

heard some one shout a warning not to jump. I instantly looked up from my paper and saw a man in the seat ahead of me preparing to alight. At this moment our car was moving quite rapidly. He stepped off while the car was in motion and fell." Along about in the center of the statement the investigator again ties up that all-important detail in this fashion, once more quoting his man: "When the man attempted to alight I judge that our car must have been traveling at a speed of not less than 12 miles an hour." Proceeding, we come to the latter portion of the statement, and here we find this reference to the same point: "I consider the man himself to have been solely responsible for his mishap. He should not have attempted to alight from a moving car, and I so told him immediately after the accident. He admitted in my presence that the conductor was in no way responsible for his accident."

With the one vital feature of the case defined so clearly and so explicitly there remains practically no possibility of a misunderstanding between witness and interviewer, and the shifty witness who wishes to change his testimony every time that the weather changes will be far less inclined to attempt to turn somersaults upon the witness stand.

We once knew of an accommodating investigator who smilingly furnished a full list of his witnesses when so requested by those whom he was interviewing. All that a witness had to do was to say to him: "Whom else have you on your list there?" and it was all off. Needless to say, his thoughtlessness left a well-blazed trail behind him and it was a comparatively simple proposition for others to follow in his wake, once they succeeded in uncovering a single one of his witnesses. It wasn't long, however, before his accommodating ways began to produce results most unfortunate for himself and for his employers. The province of the investigator is to absorb information—not to exude it at every opportunity. The exercise of a little tact in a situation such as this offers the way out without offending the questioner.

It requires but little additional time when interviewing a witness to ascertain his occupation and business address. The value of this information cannot be over-estimated when searching for witnesses who have temporarily dropped out of sight subsequent to their interviews and prior to the trial of the case in court. James Smith may have removed from his Washington Avenue address and none of the neighbors may be able to furnish any tangible clue concerning his present whereabouts. The policeman and the letter-carrier may be equally in the dark. But if we know from his statement that Smith is a jewelry salesman by occupation, and that he is in the employ of Brown & Green, in the neighboring city of X, we have a clue that should produce results in the hands of a good man from the department.

If, however, the witness is employed in some large mill or factory, our information may prove of little assistance unless we go a trifle deeper. Many large concerns which employ thousands of hands, distributed through different departments, will decline to go over their time books in search of a man unless the name of the department is furnished, or of the foreman or superintendent, or possibly the number under which the man works and by which he is known to the concern. Again, men sometimes are known by one name at their homes and by an entirely different one at their places of employment. A little added care in this direction when taking statements will go a long ways toward keeping track of witnesses who subsequently may be needed in court.

Witnesses frequently go astray in their efforts to furnish estimates of speed and of distance. As these two details invariably are of importance in determining the question of responsibility for an accident, care should be taken to obtain as accurate estimates as may be possible. Their ideas as to the rates of speed at which cars travel vary so widely that it sometimes is extremely difficult to arrive at a fair estimate. Witness Brown, for example, is of the opinion that the car was traveling at a speed of not less than 30 miles an hour just prior to the moment of collision. Witness Byrnes believes that an estimate of 18 miles an hour will safely cover the question of speed, while Witnesses Graham and Smith place their figures at 12 miles an hour. The wide difference of opinion in estimates of this sort doubtless lies in the fact that the average person really has but little experience in judging rates of speed. After he gets beyond a speed of 8 miles an hour he begins to guess, and if he happens to be unfriendly toward the local trolley company, his guesses generally are gaged to accommodate the size of his grumble against the company.

It oftentimes is of material assistance to a witness who is endeavoring accurately to estimate the question of speed to direct his attention to the speed attained by a pedestrian or by a good road horse. A comparison of this sort gives the witness something tangible upon which to base his estimate and oftentimes helps to do away with wild guesses concerning the speed of cars, horses, bicyclists, automobiles, etc.

With respect to the matter of estimating distance, many witnesses again become hopelessly lost. They are fairly accurate upon estimates not exceeding 20 ft., 30 ft. or 40 ft. Beyond that point, however, distances increase at an alarming rate, as a general thing. Ask the witness who has just estimated the distance traveled by a car after an accident at "from 200 ft. to 250 ft.," to give his estimate in car lengths, and he says without hesitation, "from two and one-half to three car lengths." As a matter of fact, he really had but little conception of just what 250 ft. in distance really looked like, but he did have a very definite idea of the length of the car upon which he rides into town each morning. His estimate in car lengths unquestionably was the more accurate of the two. Needless to say, there was somewhat of a difference between his two estimates, the first of which was founded upon guesswork pure and simple.

Again, in securing estimates of this sort, it is of but little assistance to the company's counsel in studying the evidence in a case, to read in a witness's statement something of this nature: "The car was traveling at about the usual rate of speed just prior to the accident." That phrase, "usual rate of speed" may mean 10 miles an hour, and it may mean 30 miles an hour. The attorney has no way of determining just what the witness's idea is of "the usual rate of speed." The expression "moderate rate of speed" comes under pretty much the same heading. One person's opinion of "a moderate rate of speed" under the conditions which existed at that particular time and place might be 10 miles an hour, while his seat-mate might consider a speed of 18 miles an hour as coming within the meaning of the word "moderate." It is far more satisfactory to obtain a definite estimate in miles per hour, or at least something by way of comparison which will afford one an opportunity to form some definite idea regarding

the opinion of the witness upon this subject of speed.

The interview with the witness having been reduced to writing, the next step should be to have him certify to the accuracy of it. If there is anything incorrect or unsatisfactory about the statement in its final form, now is the time to find that fact out and to correct it. If it is convenient and the necessary time is available, by all odds the safer course is to have the witness read the document for himself. If time is limited, or the witness experiences difficulty in reading it himself, it is entirely proper for the investigator to read it to him. In the latter event, the suggestion is advanced that the investigator so hold the paper while reading it that the witness may follow him through should he so desire.

Care should always be taken to avoid making changes or erasures in the body of a statement. Such a practice opens wide the floodgates of dispute. If the statement is not satisfactory to the witness, destroy it and rewrite it. The statement having been prepared to the entire satisfaction of the witness, have him affix his signature to attest the genuineness of the facts therein set forth. As an additional safeguard, whenever possible have this signature witnessed by some other person present.

PROGRESS IN REHABILITATION OF CHICAGO CITY RAILWAY

Mayor Busse, of Chicago, has just been furnished a statement of the progress which the Chicago City Railway Company has made in the work of rehabilitating its property. This statement is a copy of a report made by T. E. Mitten, president, to the executive committee of the Chicago City Railway. It should be understood that this is not the annual report, but one of progress. An abstract follows showing the result of the operation of the Chicago City Railway Company's property under the settlement ordinance for the first six months of the second year, being the period from Feb. 1 to July 31, 1908, inclusive, together with a resumé of the work of reconstruction during the first 18 months of the three-year rehabilitation period:

STATEMENT OF EARNINGS

The statement of earnings for the first six months of the present fiscal year on the lines of the Chicago City Railway is as follows:

Gross earnings—		
Passenger		$4,072,579.28
Chartered cars		1,180.31
Mail		12,453.85
Newspaper		1,100.00
Advertising		53,700.34
Rent of land and buildings		119.00
Rent of tracks		3,774.40
Rent of cars		2,006.04
Sale of power		7,160.89
Income from mail carriers		5,176.80
Miscellaneous		1,876.76
Total		$4,161,127.67
Operating expenses—		
Maintenance of way and structures	$258,224.90	
Maintenance of equipments	302,243.93	
Renewals	28,239.65	
Operation of power plants	523,432.73	
Operation of cars	1,340,753.54	
General expenses	387,846.09	
Taxes	72,000.00	
Total		$2,912,740.84
Excess of gross earnings over operating expenses		1,248,386.83
Fixed charges—		
Interest on investment	$751,832.71	
Interest on employee's deposits	69.33	
Total	$751,902.04	
Net earnings for six months	496,484.79	
Divisible as follows: Chicago City Railway, 45 per cent	223,418.16	
City of Chicago, 35 per cent	273,066.63	
Total	$496,484.79	

The gross earnings were, as shown, $4,161,127.67, an increase of but 2.55 per cent, as compared with the same period last year. This rate of increase, if continued, while not up to the expectations of the company, will mean that the gross earnings will very closely approximate the estimate of $8,424,000 for the year 1908, as contained in B. J. Arnold's report No. 6, made to the committee on local transportation of the City Council on November 8, 1905.

The passenger earnings show an increase of only 1.44 per cent, as compared with last year, the decreased patronage being due to the fact that many of our former patrons are without employment on account of the general business depression. While the use of temporary tracks at the side of the streets during reconstruction has done much to prevent the diverting of our regular business to competing lines, there is no doubt that the so-called "pleasure riding business" has suffered materially, due to the torn-up condition of streets where tracks are in course of reconstruction.

Advertising earnings for the period are $53,700.34, an increase of 186 per cent, as compared with last year. This results from the new advertising contract which became effective on January 1, 1908, whereby a minimum of $106,000 per annum is assured for a period of 10 years, with an increase of $100 per annum for each additional car operated over the number now in service. This advertising privilege is confined to the advertising racks, as provided by ordinance.

The former advertising contract, expiring Dec. 31, 1907, permitted not only the use of the advertising racks but also the display of signs upon the outside of cars and the use of billboards upon the company's buildings, returns to the company therefrom being only $37,500 per annum.

OPERATING EXPENSES

Seventy per cent of the gross earnings is set aside, as required by ordinance, to be used in the operation, maintenance and renewal of the property during the three-year rehabilitation period. During the past six months the operating expenses have been extraordinarily high, due to the extra cost incurred by diverting car lines and interruptions caused by the wholesale reconstruction of tracks.

Very little change is shown in the distribution of charges to the various operating accounts, there being a slight increase in the cost of operation of power plants and operation of cars, due to the increased service rendered, with a small decrease in general expenses, under which head are included the costs of the claim and fire insurance departments.

There has been a marked improvement in the accident account, when taking into consideration the large amount of reconstruction now going on, resulting in the torn-up condition of streets and the diverting of cars from their established routes. To effect this result it has been necessary to punish employees, where found careless, by suspension or discharge, although due credit should be given to the city administration for the co-operation of the police force in diverting team traffic from our tracks and in otherwise co-operating in improving the service. The fatal accidents were one to every 4,172,727 passengers carried, as against one to every 2,596,919 passengers carried during the same period last year.

The latest comparative statistics obtainable are contained in the thirty-seventh annual report of the Illinois Railroad & Warehouse Commission, which shows, for the year ending June 30, 1907, that upon the lines of 45 electric, elevated and surface companies operating in Illinois there was one fatality to every 2,602,393 passengers, and upon 147 steam railroads there was one fatality to every 600,407 passengers.

Accidents (other than fatal) show a decrease of 5.4 per cent to passengers carried, as compared with the same period last year, the pay-as-you-enter cars showing a decrease of 16.2 per cent, with almost the entire elimination of that class of accidents sustained in boarding or leaving the front platform.

The premium paid on fire insurance is, by the provisions of ordinance, charged as an operating expense. The insurance now carried protects the company against 100 per cent loss on $9,775,000 worth of property, at a premium of 60 cents per $100, this low rate being the direct result of the fireproof construction, represented by the buildings erected during the past 18 months, together with an improved inspection of the property.

The significance of this low rate may best be shown by

a comparison with the premium rate paid for insurance upon this company's property during three years past.

	Insurable property.	Insurance carried.	Rate.	Premium.
July, 1905.....	$5,300,000	$2,300,000	$2.22	$51,060
January, 1906.....	6,441,869	6,441,869	1.00	64,418
January, 1907.....	7,442,500	7,442,500	.82	60,864
October, 1907.....	9,660,000	9,660,000	.68	65,688
June, 1908.....	9,775,000	9,775,000	.60	58,650

As under the provisions of the ordinance of Feb. 11, 1907, the value of any property destroyed or damaged by fire is to be estimated by the Board of Supervising Engineers, and then made good by the company, it is imperatively necessary from the company's point of view that full insurance be carried at all times, but as the insurance premiums are paid out of the receipts of the partnership, the city is equally interested with the company in reducing the amount of the premiums paid to the minimum, consistent with proper protection being afforded the company. The Board of Supervising Engineers has, therefore, been supplied with a statement of the fire insurance carried by the company, together with the rate of premium paid, in order that it may pass both upon the cost as well as the adequacy of our insurance.

RECAPITULATION OF REHABILITATION

The following statement shows the reconstruction work completed (July 31, 1908,) as compared with the ordinance requirements during the three-year rehabilitation period:

	Per Cent Completed.
(1) To remove from the street all (35 miles) cable tracks, etc., completed; 23.5 miles have been removed	67
(2) To rebuild at least 60 miles electric (single) track; 35.5 miles have been reconstructed....	59
(3) To construct and equip system of distribution and substations:	
Trolley wire, 200 miles required; 72 miles reconstructed	36
Conduit, 2,225,000 duct ft. required; 1,894,866 duct ft. completed	85
Underground feeders, 145.3 miles of cable required; 49.9 miles of cable constructed...	34
Auxiliary returns, 79 miles of cable required; 44 miles of cable constructed	56
Substations, 5 required, capacity 44,900 kw; 4 constructed, capacity 26,400 kw	59
(4) To rebuild and re-equip its car houses, so as to enable it to properly clean and maintain its cars:	
Four new car houses required (capacity 1051); two new car houses constructed (capacity 675)	64
(5) To increase to at least 800 such (double-truck) cars; 805 double-truck cars now in service...	100
Average completion of work required in 3-year rehabilitation period now equals (exclusive of uncompleted reconstruction work)	62.22
Rehabilitation period expires three years after date of ordinance acceptance, or April, 1910. Percentage of time expired to July 31, 1908	44.44

CONSTRUCTION AND EQUIPMENT ACCOUNT

Original valuation as per ordinance	$21,000,000.00	
Additional property, June, 1906, to February, 1907	1,816,853.19	
		$22,816,853.19
Rehabilitation expenditures to July 31, 1908, as per Board of Supervising Engineers' certificate		9,920,472.05
Total purchase price		$32,737,325.24

DETAILS OF REHABILITATION

(1) To remove from the street all (35 miles) cable track. Of this 23.5 miles have been removed and electric track substituted therefor.

(2) To rebuild at least 60 miles electric (single) track. Of this 35.5 miles have been reconstructed.

In connection with the track reconstruction, approximately 255,343 sq. yd. of paving were laid in accordance with the specifications contained in the ordinance, this being done at great disadvantage, owing to the scarcity of the high quality of granite blocks required.

(3) To reconstruct and equip system of distribution and substations.

Trolley wire—200 miles are required, of which 72 miles have been constructed, the work following up as closely as may be the reconstruction of tracks. New poles have been installed on all streets where new pavement has been laid by the city.

Conduit—2,225,000 duct ft. are required, of which 1,894,866 duct ft. have been completed, this work being pushed ahead of track reconstruction and city paving.

Underground feeders—145.3 miles of cable are required, of which 49.9 miles have been constructed, the work following the taking down of overhead feeders in the district prescribed by ordinance, and substituting therefor insulated lead-covered distribution feeders in underground conduits.

Auxiliary returns—79 miles of cable are required, of which 44 miles have been constructed. The auxiliary return cables have been put in of a size ample to properly conduct the return current back to the various substations, the work itself of necessity following the reconstruction of tracks.

Substations—Five are required, capacity 44,900 kw, this being the estimated requirement necessary to supply electric current to the rehabilitated system. Four substations have been constructed, with a capacity of 26,400 kw, viz:

20th and Dearborn Streets	9,000 kw
42d Street and Wabash Avenue	8,000 kw
63d Street and Wentworth Avenue	7,000 kw
Plymouth Court	2,400 kw
Total	26,400 kw

(4) To rebuild and re-equip its car houses, so as to enable it to properly clean and maintain its cars.

Four new car houses required, capacity 1051.

Two new car houses have been constructed, capacity 675 cars, viz:

Division No. 3, 77th Street and Vincennes Road, capacity	450 cars
Division No. 1, 38th Street and Cottage Grove Avenue, capacity	225 cars

Car houses now in course of construction are as follows:

Division No. 2, Archer Avenue and Rockwell Street, capacity	210 cars
Division No. 4, 69th Street and Ashland Avenue, capacity	191 cars
These, when completed, will make a total capacity of	1,076 cars
As against the requirement of	1,051 cars

The land owned by the company will permit of the enlargement of these four car houses, so that their combined capacity may be increased to 1,276 cars.

The present car house at 69th Street and Emerald Avenue, having a capacity of 200 single-truck cars, will be used for the storage of single-truck open car bodies in the winter and single-truck closed car bodies in the summer, so long as the use of single-truck equipment is continued.

(5) To increase as rapidly as possible the number of double-truck cars until there shall be in operation at least 800 such cars:

805 double-truck cars are now in service, viz:
300 cars (pay-as-you-enter), purchased in 1907.
300 cars (not pay-as-you-enter), purchased in 1905-1906.

Twenty-nine of this number have been remodeled so as to permit of the introduction of the pay-as-you-enter feature, and 45 others are now in the shops being so remodeled, the remainder to follow as rapidly as the demands of the traffic will permit of their withdrawal from the service.

Of the 205 cars (not pay-as-you-enter) owned prior to 1905, 80 are now being remodeled so as to permit the use of the pay-as-you-enter feature. It is now expected that such an arrangement will be made with relation to the remaining 125 as will result in their being either remodeled or exchanged, so that the entire double-truck equipment will be of the pay-as-you-enter type by the end of the rehabilitation period.

PROGRAMS FOR THE ATLANTIC CITY CONVENTIONS

B. V. Swenson, secretary of the American Street & Interurban Railway Association, has issued the programs for the 1908 conventions of the affiliated Accountants', Claim Agents', Engineering and Transportation & Traffic associations. The conventions are to be held at Atlantic City, N. J., during the week beginning Oct. 12. The programs are as follows:

ACCOUNTANTS' ASSOCIATION

Tuesday, Oct. 13, 2 to 5 p. m.—Registration and badges.

Wednesday, Oct. 14, 9:30 a. m. to 12:30 p. m.—Convention called to order; annual address of president; annual report of executive committee; annual report of secretary-treasurer. Paper, "Organization of Accounting Department of Electric Railway & Light Company," by A. R. Paterson, general auditor, Savannah Electric Railway, Savannah, Ga. Report of committee on blanks and forms; appointment of convention committees; new business.

Wednesday, 1 p. m.—"Get Together" luncheon.

Thursday, Oct. 15, 9:30 a. m. to 12:30 p. m.—Paper, "Interline Accounting of Interurban Railways," by W. H. Forse, Jr., secretary and treasurer, Indiana Union Traction Company, Anderson, Ind.; paper, "Accounting Methods of a Holding Company," by P. S. Young, comptroller Public Service Railway Company, Newark, N. J.; report of committee on standard classification of accounts and form of report; report of committee on international form of report.

Friday, Oct. 16, 9:30 a. m. to 12:30 p. m.—Paper, "The Effect of Electrification on the Accounting Methods of Steam Railways," by A. B. Bierck, general auditor, Long Island Consolidated Electrical Companies, Long Island City, N. Y.; report of convention committees; election of officers; installation of officers; adjournment.

CLAIM AGENTS' ASSOCIATION

Monday, Oct. 12, 9:30 a. m. to 12:30 p. m.—Registration and badges.

Monday, Oct. 12, 2 p. m. to 5 p. m.—Convention called to order; annual address of the president; annual report of the executive committee; annual report of the secretary-treasurer; appointment of committees.

Tuesday, Oct. 13, 9:30 a. m. to 12:30 p. m.—Paper, "The Organization of a Claim Department for a Small or Moderately Large Company, Including a School of Instruction as a Means of Preventing Accident," by Francis J. Ryan, M.D., Syracuse Rapid Transit Railway, Syracuse, N. Y.; paper, "The Claim and Its Disposition," by Peter C. Nickel, claim agent, New York City Railway, New York.

Tuesday, Oct. 13, 2 p. m. to 5 p. m.—Paper, "Uniformity in Claim Department Records and Accounts," by John J. Reynolds, Boston Elevated Railway, Boston, Mass.; paper, "The Duties of Claim Agents and Other Officials of Quasi-Public Corporations to the Public," by Eugene R. Toberts, attorney, Knoxville Railway & Light Company, Knoxville, Tenn.

Tuesday, Oct. 13, 8 p. m.—Social smoker and entertainment.

Wednesday, Oct. 14, 9:30 a. m. to 12:30 p. m.—Question box; discussion, "The Medical Side of the Prevention of Accidents;" general business; reports of convention committees; report of nominating committee; election of officers; installation of officers; adjournment.

ENGINEERING ASSOCIATION

Tuesday, Oct. 13, 9:30 a. m. to 12:30 p. m.—Registration and badges.

Tuesday, Oct. 13, 2 p. m. to 5 p. m.—Convention called to order; address of the president; annual report of the executive committee; annual report of the secretary-treasurer; appointment of convention committees; new business; report of the committee on maintenance and inspection of electrical equipment.

Wednesday, Oct. 14, 9:30 a. m. to 12:30 p. m.—Report of committee on standardization; report of committee on power generation.

Wednesday, Oct. 14, 2 p. m. to 5 p. m.—Report of committee on control; report of committee on power distribution.

Thursday, Oct. 15, 9:30 a. m. to 12:30 p. m.—Inspection of exhibits.

Thursday, Oct. 15, 2 p. m. to 5 p. m.—Inspection of exhibits.

Friday, Oct. 16, 9:30 a. m. to 12:30 p. m.—Report of committee on car and car-house wiring; report of committee on operating and storage car-house designs; question box.

Friday, Oct. 16, 2 p. m. to 5 p. m.—Report of committee on way matters; report of committee on economical maintenance; general business; report of nominating committee; election of officers; installation of officers; adjournment.

TRANSPORTATION & TRAFFIC ASSOCIATION

Monday, Oct. 12, 9:30 a. m. to 12:30 p. m.—Registration and badges.

Monday, Oct. 12, 2 p. m. to 5 p. m.—Convention called to order; address by W. Caryl Ely; address of the president; report of organization meeting; annual report of the executive committee; annual report of the secretary-treasurer; appointment of convention committees; reports of special committees; paper, "How Can a Small Road Best Promote Traffic and Increase Its Revenue?" by Ernest Gonzenbach, general manager, Sheboygan Light, Power & Railway Company, Sheboygan, Wis.; report of committee on training of employees.

Tuesday, Oct. 13, 9:30 a. m. to 12:30 p. m.—Paper, "Carrying of United States Mail on Electric Railways, the Compensation Therefor, Its Advantages and Disadvantages," by C. H. Hile, assistant to vice-president, Boston Elevated Railway, Boston, Mass.; paper, "Progress to Date in Carrying Freight and Express Matter by Electric Roads—Some Mistakes that Have Been Made and Their Remedy," by C. V. Wood, general freight and passenger agent, New England Investment & Security Company, Boston, Mass.; report of committee on freight and express.

Wednesday, Oct. 14, 9:30 a. m. to 12:30 p. m.—Symposium, "The Possibility of a Well-conducted Publicity Department"; report of committee on interurban rules.

Thursday, Oct. 15, 9:30 a. m. to 12:30 p. m.—Paper, "The Operation of Multiple Car Trains on Interurban Roads," by D. F. Carver, Brooklyn, N. Y.; report of committee on passenger traffic; report of committee on rules for city operation; general business; report of nominating committee; election of officers; installation of officers; adjournment.

COAL ANALYSIS RECORDS AT MINNEAPOLIS

The engineering department in charge of the power stations of the Twin City Rapid Transit Company makes a very careful examination of the fuel purchased for its

	FOR MONTH				TO DATE		
MONTH	CARS	TONS	PRODUCT	AV. BTU.	TONS	PRODUCT	AV. BTU.
JAN.							
FEB.							
MAR.							
APR.							
MAY							
JUNE							
JULY							
AUG.							
SEPT.							
OCT.							
NOV.							
DEC.							
YEAR —							

Card Record of Coal Analysis

generating stations. Practically every car of coal received is sampled and analyzed. The samples from each car, however, are not analyzed singly, but a small quantity is taken from a number of cars from the same mine, and these small quantities are combined into a composite sample

which is analyzed and of which heat determinations are made. The company has its own chemical laboratory in its main generating station and employs a chemist and an assistant, a boy, to analyze the coal.

The accompanying form is a reproduction of the coal analysis blanks as used in the chemical laboratory. The original blank is 6 in. x 4 in. size printed on white paper and bound in blocks so that by the use of a carbon sheet duplicates may be made for reference and for filing. The nature of the coal analysis is shown in connection with the ruling of the blank.

The results of the coal determinations are kept in a card index so that they are available for immediate reference at any time. A sample card from this index is reproduced herewith. Each card, it will be noted, presents the total results of coal testing for the 12 months of the year for one kind of fuel. Opposite each month are entered the number of cars purchased, the tons, the product of the two, the average heat value of the product in British thermal units. This gives a true average of the heat value of the coal used during the month by giving proper recognition in averaging to the various amounts of coal represented by each analysis. Also, there are similarly recorded on the card the tons of coal purchased to date, the averaging product and the true average of the heat values in

Form 142 **T. C. R. T. CO. COAL ANALYSIS.** ORIGINAL

LAB. NO. 1757 190

KIND OF COAL .....
TOTAL POUNDS .....
CAR NOS. .....

PER CENT COMBUSTIBLE OF TOTAL .....
" MOISTURE " " .....
" ASH " " .....
Total.
PER CENT REFOSE OF TOTAL -

PER CENT VOLATILE OF ORY COAL .....
" FIXED CARBON " " .....
" SULPHUR " " .....
" ASH " " .....
Total.

B. T. U. PER LB. COMMERCIAL .....
" " ORY COAL .....
" " COMBUSTIBLE .....

PRICE PER TON .....
COST PER 1,000,000 B. T. U. .....

REMARKS: .....

SIGNED .....

Coal Analysis Report

British thermal units for all coal of that one kind analyzed since these records have been kept.

In this way with similar cards for coal from each mine it is possible, by reference at any time, to ascertain whether or not the coal supplied in any shipment is increasing or decreasing in heat value. The monthly averages are kept so that an accurate comparison may be made of the performance of the station for various months. While this company has no penalty clause in its coal contracts, there is a clause which says that the coal must not fall below a specified heat value. Thus, the true average of the heat value as obtained and recorded as more coal is received becomes valuable to the company in determining whether or not coal received from any locality is kept up to grade.

The Buffalo, Lockport & Rochester Railway, Rochester, N. Y., began operating cars upon schedule on Sept. 3, running for two days without carrying passengers. The company opened the line to the public on Saturday morning, Sept. 5, operating 39 trains between Rochester and Albion, N. Y., a distance of 30 miles, on an hourly schedule of 20 m.p.h., including stops. All trains were run according to schedule, with the exception of one annulled train, and nine trains running from 7 to 32 minutes late. The company estimates that it carried 3000 passengers.

ELECTRIC FREIGHT LOCOMOTIVE BUILT BY INDIANA UNION TRACTION COMPANY

The Indiana Union Traction Company has recently completed at the Anderson shops an electric locomotive, which is used for hauling coal and other freight cars about the power houses and shops of the company. As shown in the illustrations, the locomotive is of the sloping cab type. It

Indiana Union Traction Locomotive

is 28 ft. long over all, 7 ft. 3 in. wide, and 12 ft. high. The truck centers are 18 ft. The body is mounted on McGuire M. C. B. trucks, which carry four GE-57 motors geared 17:68. The braking equipment consists of Westinghouse automatic brakes, Christensen air compressor and a double pneumatic sander. The locomotive is also furnished with a pneumatic bell and a headlight for each end. The locomotive's weight on the drivers is 60 000 lb.

Locomotive Hauling Train of Freight Cars

The locomotive was built under the direction of R. C. Taylor, superintendent of motive power; Marion Skouden, superintendent of the shops, and H. A. Nicholl, general manager of the Indiana Union Traction Company.

The Twin City Rapid Transit Company, Minneapolis, is building at its Snelling Avenue shops 12 cars of new design fashioned after the pay-as-you-enter type of car. The cars of the company are equipped with two gates, but the new cars instead of having two gates will have three. Two of these gates, it is said, will be used for entrance while the other will be used for exit. A railing will separate the incoming from the outgoing passengers.

COMMUNICATIONS

FARES IN LARGE CITIES

Brooklyn Rapid Transit Company

Brooklyn, Sept. 5, 1908.

To the Editors:

I have been following with great interest your articles on the traction developments in Cleveland as I would any proposition of electric transportation which claims to carry a passenger more than 5 miles for a straight 5-cent fare and make the investment not only profitable, but secure. Without reference particularly to Cleveland, but to the transportation situation generally in our large cities, the question presents itself to my mind somewhat as follows:

Companies have been organized and consolidations subsequently effected between horse, electric and cable lines—good, bad and indifferent—where previously each had been owned and operated separately with separate fare. What resulted? Some of the promoters who sold their holdings at the right time have profited, but the greater number of the investors who still own or have since purchased the securities, are the interested parties at the present time. Up to date those who have gained and not lost by these consolidations are the people who use the cars, real estate owners, those who have invested their savings in small homes, patrons who have been moving from the densely populated parts of the city along with the extension of rapid and cheap transit between their homes and places of business, and last, but not least, the city which has thereby greatly increased its assessed valuation and its tax revenue; the latter one of the greatest beneficiaries.

Evolution in electric transportation has been gigantic. The old 12-ft. horse car and the small, imperfect electric car have been supplanted by a large, comfortable, well-ventilated and heated electric car that costs 10 times as much as the old horse car that carried the people a shorter distance for the same fare.

These consolidations have made possible connections between the tracks of the once separately operated companies, the laying of new tracks, rerouting and extension of car routes, thereby affording opportunity for the people to travel long distances without change and still at a single fare of 5 cents; in the case of Brooklyn by the use of transfers a distance of over 20 miles.

All this while—thanks to the transfer—the 5-cent piece has continued to grow smaller because of the increased distance traveled, while the ton-mile weight per passenger carried has increased year by year.

The price of labor and material has steadily increased and the margin between gross revenue and gross cost per passenger steadily decreased, until in many cases the difference is not sufficient to provide a fair return upon the exact cost or a conservative valuation of the property, to say nothing of the special taxes and other extra burdens imposed by the State and the municipality. This increased cost includes no provision for renewals, which increase each year as the property grows older.

There is nothing mysterious about city railway transportation. It is a plain business proposition, susceptible of careful analysis and founded on the same general principles that govern any other business. In the past it has afforded many opportunities to unscrupulous promoters, but in most cases they have fooled both themselves and the investor by over-estimating the values of franchises or privileges, and the possible earning power of these two factors.

The situation may be summed up in these three propositions, with which all the large traction companies of this country are to-day confronted:

(1) Have we reached the greatest factor of economy in operation? The largest element entering into the cost is the accommodation afforded the individual passenger.

(2) Do the companies receive sufficient revenue per passenger carried?

(3) Will not some co-operative and definite arrangement be necessary between the traction companies and the municipal authorities of our larger cities before private capital will be attracted to aid in the further development of our traction situation, in order to insure the investor the safety of his money and a fair return on same? In view of the past disastrous financial results in connection with traction investments in Greater New York and the present decreasing margin between cost and revenue received per passenger carried in all of our larger cities, a change is absolutely necessary in the fundamental factors that govern the traction relations with municipal requirements, especially here in New York, before any further large development can be had or new capital secured.

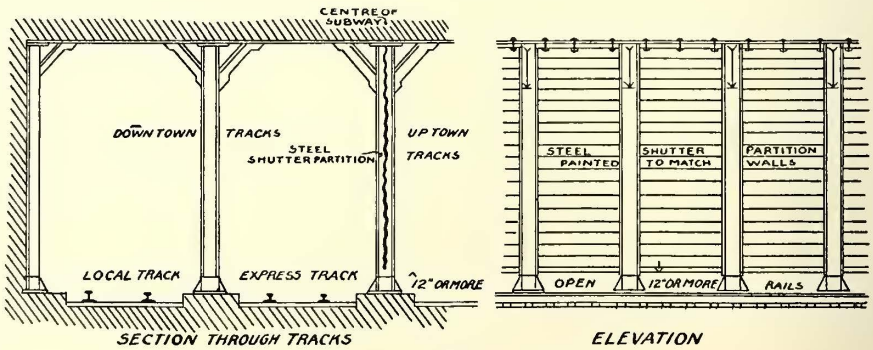
J. F. Calderwood,
Vice-president and General Manager.

COLD AIR CIRCULATION IN THE SUBWAY

New York, Sept. 1, 1908.

To the Editors:

The report of B. J. Arnold on improving the ventilation of the subway, as published in your issue of Aug. 29, recommends the construction of a wall of either terra cotta blocks or of concrete, at cost of either $76,000 or $130,000, between the track, but insists that this wall must be continuous to be effective. A cheaper and more satisfactory shield could be secured by the use of iron or steel shutters similar to the fireproof shutters used by large factories and wholesale stores after closing hours. These shutters would be built in sections no longer than the spacing between the iron columns, and would extend down within 1 ft. or even 2 ft. of the track grade. It is well known in mining ventilation that such partitions do not have to extend completely to the floor of a passage in order to insure continuous draught.

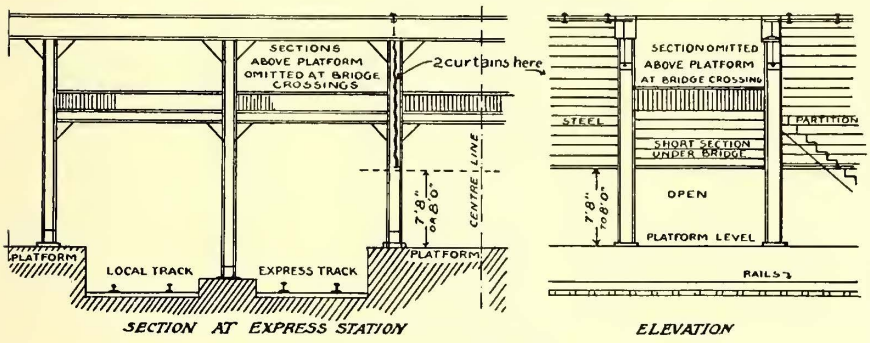


Curtain Between Express Tracks

At the express stations these curtains would not have to be extended to the platform, but have alternate sections

stop within 8 in. of head room, say 7 ft. 8 in. clear of the platform, and such sections could be so built as to permit of raising or lowering as repair or disarrangement of the system might require. In fact, this feature could be provided for in all the sections. This curtain should be installed, however, the entire length of all tunnel portions of the subway from 149th Street and Washington Heights to Flatbush Avenue, and in future underground work this feature should be incorporated in the building plans.

The construction of additional vents would be required only at a few points in addition to those now in place, and where large curves make a complete change in the direction of the moving currents of air powerful disk fans could be installed, as, for instance, at Grand Central Station, Times Square and at the 104th Street and Lenox Avenue curves under Central Park. A large suction blower about midway of the system, say between Times Square and Grand Central stations, might give additional volume and force to the currents in both directions, but I do not think them necessary, judging by the beneficial effect so noticeable after the present inadequate vents were placed.



Curtain at Station Platform

I have not figured in detail the cost of installation for such a curtain over the complete route, but think I am conservative when I say that such a curtain, including additional vents and fans, could be built for the same money that Mr. Arnold estimates building a concrete wall, namely, $130,000, which he extended merely from Brooklyn Bridge to 104th Street.

The advantages of such a steel curtain are obvious. Besides being cheaper, it occupies less space, can be taken down or set up readily in sections, facilitating repairs or changes to the structure, is equally cool, fireproof, and affords no resistance to the air currents. Its great advantage over concrete would be that it does not absorb moisture, and though to prevent rusting it would have to be kept painted, this would add to the lighting of the interior and be a positive advantage over its present gloomy aspect.

The accompanying sections and elevations show the idea in detail. A section, say from Fourteenth Street to Grand Central Station, could be put in operation for a few thousand dollars to study its operation, and would repay the outlay by demonstrating the success or failure of the principle involved at a less cost than Mr. Arnold's wall.

F. W. MOORE.

INTERCHANGE OF TRAFFIC WITH STEAM ROAD

TOLEDO & CHICAGO INTERURBAN RAILWAY

KENDALLVILLE, IND., Sept. 5, 1908.

To the Editors:

Much has been said regarding the interchange of traffic between steam and electric railways, and each year developments in this direction have increased steadily, until it has become noticeable that the tendency of many of the steam roads is to co-operate with instead of working against the electric railways.

The Toledo & Chicago Interurban Railway recently conducted an excursion from points on its line, viz., Fort Wayne, Huntertown, Garrett, Avilla, Kendallville, Auburn and Waterloo, Ind., to Wawasee Lake, about 30 miles west of Garrett, Ind., on the Baltimore & Ohio Railroad, which indicates the foregoing tendency.

The traffic officials of the interurban company made an arrangement with the traffic officials of the Baltimore & Ohio Railroad whereby passengers purchased their tickets through from points on the Toledo & Chicago interurban line to Wawasee Lake on the Baltimore & Ohio road, the Toledo & Chicago interurban company's agents simply selling their local tickets and the Baltimore & Ohio local tickets. A special train was also furnished by the Baltimore & Ohio road, enabling patrons to go and return at very convenient hours.

So successful were these excursions that the Toledo & Chicago Interurban Railway has received a letter of congratulation from the general passenger agent of the Baltimore & Ohio Railroad, with the recommendation that these excursions be continued another year.

This traffic will be developed by the officials of the Toledo & Chicago company, who cannot speak too highly of the courteous treatment and hearty co-operation of the Baltimore & Ohio Railroad officials. G. M. PATTERSON,

General Freight and Passenger Agent.

PLANS FOR MEXICAN CONSOLIDATION

The report of the plan to merge the Mexican Electric Tramways, Ltd., and the Mexican Light & Power Company has been confirmed by Dr. F. S. Pearson, who is interested in the tramway company. Dr. Pearson is quoted as saying:

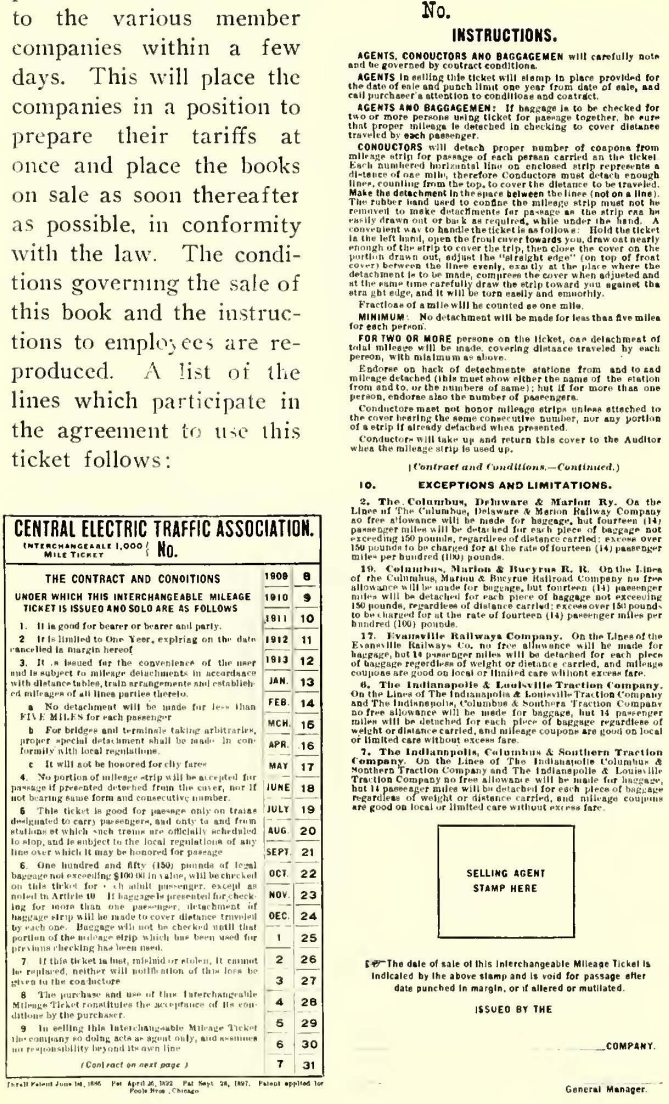
"The merger is under way now, and it will depend largely on the visit of our party to Mexico City whether it goes through or not. An entire agreement between the stockholders of both companies is necessary. The merger is probable, but not assured. If the companies are merged, the Mexican Light & Power Company will be operated under a lease by the Mexico Electric Tramways, and not by a holding company. No more securities will be issued. The capitalization of the Tramways Company is $6,000,000 in stock and $15,000,000 in bonds. That of the Mexican Light & Power Company is $12,000,000 in bonds, $6,000,000 in guaranteed bonds, $12,400,000 in preferred stock and about $13,500,000 in common stock."

The suit to appoint a receiver for the Tramways Company, brought in an English court, has been thrown out of court and none of the claim allowed, except that asking that the present lease on the property be annulled. This suit will probably come up in the fall term of court.

In a statement which has been prepared by the Public Service Commission of the First District of New York for submission to the Tax Department it is shown that the total amount of money the city has spent so far on subways is $54,802,944. Of this sum $48,017,374 has been expended on the Manhattan subway; $3,692,382 on the extension to Flatbush Avenue, in Brooklyn, and $3,093,187 on the Manhattan portion of the bridge loop subway which is now under construction.

INTERCHANGEABLE MILEAGE BOOK OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The new interchangeable mileage books of the Central Electric Traffic Association are now in the hands of the printers and will be sent to the various member companies within a few days. This will place the companies in a position to prepare their tariffs at once and place the books on sale as soon thereafter as possible, in conformity with the law. The conditions governing the sale of this book and the instructions to employees are reproduced. A list of the lines which participate in the agreement to use this ticket follows:



CENTRAL ELECTRIC TRAFFIC ASSOCIATION.
INTERCHANGEABLE 1,000 MILE TICKET No.

THE CONTRACT AND CONDITIONS UNDER WHICH THIS INTERCHANGEABLE MILEAGE TICKET IS ISSUED AND SOLD ARE AS FOLLOWS

1. It is good for bearer or bearer and party.
2. It is limited to One Year, expiring on the date cancelled in margin hereof.
3. It is issued for the convenience of the user and is subject to mileage detachments in accordance with distance tables, train arrangements and established mileages of all lines parties thereto.
a No detachment will be made for less than FIVE MILES for each passenger.
b For bridges and terminals taking arbitraries, proper special detachment shall be made in conformity with local regulations.
c It will not be honored for city fares.
4. No portion of mileage strip will be accepted for passage if presented detached from the cover, nor if not bearing same form and consecutive number.
5. This ticket is good for passage only on trains designated to carry passengers, and only to and from stations at which such trains are officially scheduled to stop, and is subject to the local regulations of any line over which it may be honored for passage.
6. One hundred and fifty (150) pounds of legal baggage not exceeding $100.00 in value, will be checked on this ticket for each adult passenger, except as noted in Article 10. If baggage is presented for checking for more than one passenger, detachment of baggage strip will be made to cover distance traveled by each one. Baggage will not be checked until that portion of the mileage strip which has been used for previous checking has been used.
7. If this ticket is lost, mislaid or stolen, it cannot be replaced, neither will notification of this loss be given to the conductors.
8. The purchase and use of this Interchangeable Mileage Ticket constitutes the acceptance of its conditions by the purchaser.
9. In selling this Interchangeable Mileage Ticket the company so doing acts as agent only, and assumes no responsibility beyond its own line.

(Contract on next page.)

1908	8
1910	9
1911	10
1912	11
1913	12
JAN.	13
FEB.	14
MCH.	15
APR.	16
MAY	17
JUNE	18
JULY	19
AUG.	20
SEPT.	21
OCT.	22
NOV.	23
DEC.	24
1	25
2	26
3	27
4	28
5	29
6	30
7	31

Patent Patent June 1st, 1896. Pat April 26, 1902. Pat Sept. 28, 1897. Patent applied for Poole Bros., Chicago

No.

INSTRUCTIONS.

AGENTS, CONDUCTORS AND BAGGAGEMEN will carefully note and be governed by contract conditions.

AGENTS in selling this ticket will stamp in place provided for the date of sale and punch limit one year from date of sale, and call purchaser's attention to conditions and contract.

AGENTS AND BAGGAGEMEN: If baggage is to be checked for two or more persons using ticket for passage together, be sure that proper mileage is detached in checking to cover distance traveled by each passenger.

CONDUCTORS will detach proper number of coupons from mileage strip for passage of each person carried on the ticket. Each numbered horizontal line on enclosed strip represents a distance of one mile, therefore Conductors must detach enough lines, counting from the top, to cover the distance to be traveled. Make the detachment in the space between the lines (not on a line). The rubber band used to confine the mileage strip must not be removed to make detachments for passage as the strip can be easily drawn out or back as required, while under the band. A convenient way to handle the ticket is as follows: Hold the ticket in the left hand, open the front cover towards you, draw out nearly enough of the strip to cover the trip, then close the cover on the portion drawn out, adjust the "straight edge" (on top of front cover) between the lines evenly, exactly at the place where the detachment is to be made, compress the cover when adjusted and at the same time carefully draw the strip toward you against the straight edge, and it will be torn easily and smoothly.

Fractions of a mile will be counted as one mile.

MINIMUM. No detachment will be made for less than five miles for each person.

FOR TWO OR MORE persons on the ticket, one detachment of total mileage will be made, covering distance traveled by each person, with minimum as above.

Endorse on back of detachments stations from and to and mileage detached (this must show either the name of the station from and to, or the numbers of same); but if for more than one person, endorse also the number of passengers.

Conductors must not honor mileage strips unless attached to the cover bearing the same consecutive number, nor any portion of a strip if already detached when presented.

Conductors will take up and return this cover to the Auditor when the mileage strip is used up.

(Contract and Conditions.—Continued.)

10. EXCEPTIONS AND LIMITATIONS.

2. The Columbus, Delaware & Marion Ry. On the Lines of The Columbus, Delaware & Marion Railway Company no free allowance will be made for baggage, but fourteen (14) passenger miles will be detached for each piece of baggage not exceeding 150 pounds, regardless of distance carried; excess over 150 pounds to be charged for at the rate of fourteen (14) passenger miles per hundred (100) pounds.

10. Columbus, Marion & Bucyrus R. R. On the Lines of the Columbus, Marion & Bucyrus Railroad Company no free allowance will be made for baggage, but fourteen (14) passenger miles will be detached for each piece of baggage not exceeding 150 pounds, regardless of distance carried; excess over 150 pounds, to be charged for at the rate of fourteen (14) passenger miles per hundred (100) pounds.

27. Evansville Railways Company. On the Lines of the Evansville Railways Co. no free allowance will be made for baggage, but 14 passenger miles will be detached for each piece of baggage regardless of weight or distance carried, and mileage coupons are good on local or limited care without excess fare.

6. The Indianapolis & Louisville Traction Company. On the Lines of The Indianapolis & Louisville Traction Company and The Indianapolis, Columbus & Southern Traction Company no free allowance will be made for baggage, but 14 passenger miles will be detached for each piece of baggage regardless of weight or distance carried, and mileage coupons are good on local or limited care without excess fare.

7. The Indianapolis, Columbus & Southern Traction Company. On the Lines of The Indianapolis Columbus & Southern Traction Company and The Indianapolis & Louisville Traction Company no free allowance will be made for baggage, but 14 passenger miles will be detached for each piece of baggage regardless of weight or distance carried, and mileage coupons are good on local or limited care without excess fare.

SELLING AGENT STAMP HERE

☞The date of sale of this Interchangeable Mileage Ticket is indicated by the above stamp and is void for passage after date punched in margin, or if altered or mutilated.

ISSUED BY THE

_____COMPANY.

General Manager.

Contract and Conditions Governing Mileage Book

No.	Name of Company.
3	Chicago, Lake Shore & South Bend Railway.
8	Chicago, South Bend & Northern Indiana Railway.
2	Columbus, Delaware & Marion Railway.
19	Columbus, Marion & Bucyrus Railroad.
21	Dayton & Troy Electric Railway.
14	Evansville & Southern Indiana Traction Company.
17	Evansville Railways Company.
9	Ft. Wayne & Wabash Valley Traction Company.
10	Ft. Wayne & Springfield Railway.
6	Indianapolis & Louisville Traction Company.
7	Indianapolis, Columbus & Southern Traction Company.
18	Indiana Union Traction Company.
13	Kokomo, Marion & Western Traction Company.
23	Lake Erie, Bowling Green & Napoleon Railway.
24	Lebanon & Thorntown Traction Company.
12	Marion, Bluffton & Eastern Traction Company.
20	Ohio Electric Railway.
4	Springfield, Troy & Piqua Railway.
22	Terre Haute, Indianapolis & Eastern Traction Company.
11	Toledo & Chicago Interurban Railway.
15	Toledo, Fostoria & Findlay Railway.
5	Toledo Urban & Interurban Railway.
1	Western Ohio Railway.
16	Winona Interurban Railway.

The numbers on the left side will be used to show which road sold the ticket, so that the auditors will know from whom to collect the value of mileage used.

In addition to the foregoing companies, the following are members of the Central Electric Railway Association:

Cincinnati, Lawrenceburg & Aurora Electric Railway.
Cleveland, Painesville & Eastern Railroad.
Cleveland Southwestern & Columbus Railway.
Dayton & Xenia Transit Company.
Grand Rapids, Holland & Chicago Railway.
Lake Shore Electric Railway.
Lebanon & Franklin Traction Company.
Muncie & Portland Traction Company.
Northern Ohio Traction & Light Company.
Ohio & Southern Traction Company.
Sandusky, Norwalk & Mansfield Railway.
Southeastern Ohio Railway, Light & Power Company.
Toledo & Indiana Railway.
Toledo, Port Clinton & Lakeside Railway.

A NEW AIR SANDER VALVE

The new "Universal" air sander valve, made by the Ohio Brass Company, of Mansfield, Ohio, as its name implies, may be used in connection with any standard engineer's brake valve without disturbing the latter in any way. This device used with the improved N-L sand trap makes a very efficient and economical sander equipment.

This valve ordinarily is operated by a removable handle (see Fig. 1) independent of the engineer's valve, but when

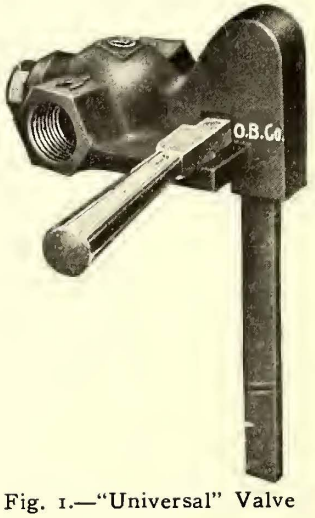


Fig. 1.—"Universal" Valve

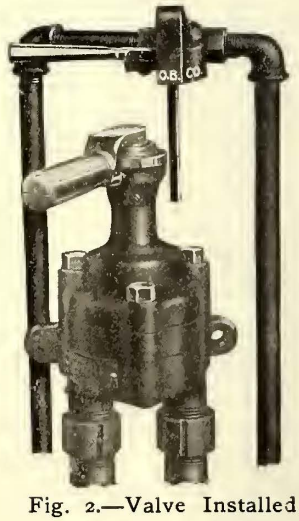


Fig. 2.—Valve Installed

the handle of the engineer's valve is thrown into the emergency position, it comes into contact with the emergency lever which projects downward (see Fig. 2) from the "Universal" valve and thus automatically applies sand at the precise moment it is most needed.

This device supersedes this maker's supplementary sander valves, and it has the advantage of the automatic emergency feature over its "Independent" sander valve. The new valve body and handle are made of high-grade bronze and the emergency lever of tool steel. The handle is removable so that in double end operation it may be taken from one end of the car to the other, and when it is removed, the emergency lever cannot open the valve.

The valve may be readily installed on the air pipe line and should be located in such a position over the engineer's valve (see Fig. 2) that when the handle of the brake valve is thrown into the emergency stop position it will come into contact with the emergency lever in the sander valve. The valve is very simple, and will not leak.

News of Electric Railways

Openings in Interstate Commerce Commission for Examiners of Accounts

The United States Civil Service Commission has announced an examination to be held on Oct. 7 and 8 for positions as examiner of accounts in the division of statistics and accounts, Interstate Commerce Commission. Examinations may be taken at various cities throughout the country. Other information in relation to these positions is given in the following extracts from the circular issued by the Civil Service Commission:

"The salaries will range from $1,800 to $3,000 per annum, and traveling expenses will be allowed when away from Washington or other official headquarters.

"It is expected that approximately 75 appointments will be made if sufficient high-grade eligibles result from this examination.

"The purpose of the examination is to establish registers of men with expert qualifications in the following fields of railway or other common-carrier accounting: 1. Steam roads: (a) General auditing. (b) Disbursements. (c) Freight. (d) Passenger. (e) Claims. 2. Electric railways. 3. Express service. 4. Steamship service. 5. Other common-carrier service.

"The examination will consist of the subjects mentioned below, weighted as indicated:

Subjects:	Weights
1. Commercial and railway geography	5
2. Arithmetic	5
3. Abstracting (a test in condensing a statement of about 400 words into a brief, concise and accurate abstract of 150 words or less)	5
4. Practical questions in general accounting and statistics	15
5. Practical questions in accounting of railway and other common-carrier service	25
6. Thesis on a transportation topic	15
7. General education, training and experience	10
8. Accounting and other technical experience along lines connected with railway and other common-carrier service	20
Total	100

"The first six subjects will be given in the examination room and will require at least two days. Age limits, 23 years to 48 years on the date of the examination.

"In connection with the above the following must be submitted with application Form 304 when filed:

"Subject 7. Furnish a sworn statement of your general education, training and experience, indicating (1) the names of the institutions at which you have studied; (2) the time spent in each; (3) the courses of study pursued; (4) the degrees conferred, if any, and (5) all the experience you have had along lines not particularly referred to under the eighth subject. If you have written or published any material referring to railway or other common-carrier accounting, auditing or disbursing, furnish copies of such articles. If you have written or published any material referring to accounting, auditing or disbursing in other than railway or other common-carrier business, furnish copies of such articles.

"Subject 8. Furnish a sworn statement showing fully and in detail all the work you have done in accounting and other technical experience that you may have had along lines connected with railway or other common-carrier service, stating (1) when, giving dates; (2) where, and (3) by whom employed, compensation received, and the exact character of the work in each case. Submit recommendations of at least three persons who have knowledge of your special experience and your fitness for the position for which this examination is held. It is essential that these recommendations should be from persons under whom you were employed or persons whose work is of an administrative or executive character. The value of these recommendations will necessarily depend upon the extent and nature of the recommender's acquaintance with you and your work, which must be stated in the recommendation.

"The applicant should be able to furnish bond with a reliable surety company to guarantee faithful service. Certifications will be made from those standing highest on the register without respect to the apportionment.

"This examination is open to all citizens of the United States who comply with the requirements.

"Applicants should at once apply to the United States Civil Service Commission, Washington, D. C., for application Form 304 and a copy of the federal act to regulate commerce. No application will be accepted unless properly executed and filed in complete form, with the material required, with the commission at Washington prior to the hour of closing business on Sept. 28, 1908. In applying for this examination the exact title, 'Examiner of Accounts, Interstate Commerce Commission,' should be used in the application."

Program of September Meeting of Public Utility Operators of Arkansas

The executive committee of the Arkansas Association of Public Utility Operators met recently in Little Rock, Ark., and outlined the program for the first meeting of the association, which is to take place at the Marion Hotel, Little Rock, on Sept. 17 and 18. Those who attended the meeting were: D. A. Hegarty, general manager, Little Rock Railway & Electric Company; Edward Hardin, superintendent, Hot Springs Street Railway; W. C. McGuire, general manager, Arkadelphia Electric Light Company; S. A. Stearns, general superintendent, Home Water Company, Little Rock, and J. E. Cowles, superintendent of the electric department, Hot Springs Water Company. The program will be substantially as follows:

FIRST DAY

Registration, 10 a.m.
Opening meeting, 11 a.m.
Reading of the minutes.
Application for membership.
Reports of committees.

AFTERNOON MEETING

Address of the president, D. A. Hegarty, Little Rock.
"Theft of Current, Water and Gas," D. A. Hegarty.
"Roadbed Construction and Pavement," Edward Hardin, Hot Springs.
"Advantages and Disadvantages of Tungsten Light to Central Stations," T. R. Phillips, Little Rock.
"Source of Water Supply for Municipalities," B. C. Fowles, Pine Bluff.
"The Gas Man—His Difficulties," R. C. Beach, Little Rock.
Question box.
Election of officers.
New business.
Adjournment.

SECOND DAY

The second day will be devoted to social affairs. The delegates to the meeting will be the guests of the Little Rock Board of Trade. Definite arrangements for that day have not been made, but it is proposed to give a banquet in the evening and a trolley ride in the day. All of the business meetings will be held in the Hotel Marion.

The Cleveland Situation

The Municipal Traction Company began on Sept. 1 to accept cash fares of 3 cents, provided conductors were tendered the exact change. This is the only stipulation and applies to one or more fares when paid in cash. A statement from the company is to the effect that when the 5-cent cash-fare plan was adopted it was not intended that a profit should be made, but that the public should be educated to buy the disks.

On Aug. 31 the City Council adopted a resolution providing for the widening of Euclid Avenue between East Twenty-second and East Fortieth Streets. The residents of the street will have to pay for the work of widening unless they give consent to the company to build tracks through the street. If they do give consent the company will do the work at its own expense. This is the portion of Euclid Avenue that has never had street railway tracks and from which the Municipal Traction Company was barred by injunction some months ago. An ordinance will be prepared to cover this matter.

On Sept. 5 the City Council, at a special session, passed a resolution authorizing the Mayor to set Oct. 22 as the date for voting on the security franchise granted the Cleveland Electric Railway as provided by the referendum law enacted last winter. This action came as a surprise, as many people felt that the vote would be delayed in the hope that people would get accustomed to the new order of things. Just what brought about the change of

feeling on the part of the Mayor can only be surmised, but it is believed that he wanted to clear up everything that is standing in the way of the sale of new stock and the fixing of a fare that will yield a proper return for the service. According to interviews given out, he states that he has had the best legal opinions obtainable on the Smith suits filed some time ago to annul the lease and test the constitutionality of the referendum law and that they are to the effect that the franchise and lease are legal and sound. For this reason he says that further delay in voting on the question is not necessary, as he feels confident that the people will sustain the new company and its policies.

Before the vote is taken the Municipal Traction Company will have been in operation six months and people should by that time be able to make up their minds whether the 3-cent system has been a success.

F. H. Goff, who acted as mediator in the settlement of the street-car matter, says that his position as president of the Cleveland Trust Company prevents him from taking an active part in the matter, but he believes that the lease of the property to the new company should be ratified. If the property is allowed to revert to the old company, he says that it would be a miscarriage of plans that were entered into honestly by both sides. He is quoted as follows:

"Because of the doubt cast upon the security grant by suits that have been brought, a great deal of distress has been caused to all parties engaged in the traction settlement. These suits have made it difficult to sell stock or bonds and have consequently delayed improvement to the property and in the minds of the people cast a doubt upon the whole enterprise. There are some of the conditions of the lease that I think should be changed in the interests of popular sentiment. I insist that the clause that permits the Municipal Traction Company to purchase the stock of the Cleveland Railway at 110 should be surrendered because it militates against the sale of the stock by putting a limit to its possibilities.

"I also think that it is the duty of the Municipal Traction Company to trustee its $10,000 capital stock in some form so that all of the people will be satisfied that it will always be held for their benefit."

The Cleveland Railway has a floating debt of $1,288,000 and the notes are held by Cleveland banks. It is said that the banks were willing to carry this for the old company because of the fact that its balances with them were always large. They also expressed a willingness to carry the debt for the new company for two years or more under the same conditions, but for various reasons the Municipal Traction Company has reduced its balances quite a little and the banks are said to have expressed themselves as seeing no reason why they should carry them longer. Some of this paper is in the shape of call notes and the remainder matures at certain dates not far distant. Should the banks decide to ask for payment of the notes there would be difficulty in meeting the demand. The Municipal Traction Company would be responsible for the conditions which would make it impossible to meet the payments. In addition, an issue of $2,026,000 Cleveland City Cable bonds must be met in July of next year. These obligations make it necessary that the company should be in position to sell its stock and this is what probably influenced the Mayor as much as anything else to risk a vote at this time.

Regarding the Smith suits to invalidate the lease and test the referendum law, it is said that the officers of the Municipal Traction Company will endeavor to arrive at some understanding with the Cleveland Railway as to giving a new lease in case the original should be declared illegal by the courts.

Attorney John A. Cline, representing James K. Farasey, an officer of the local branch of the street railway men's union, on Sept. 5 filed suit in Common Pleas Court, asking that the security grant to the Cleveland Electric Railway be declared null and void and that the lease of the property to the Municipal Traction Company be set aside. Fraud and financial interest are set forth as the basis for the suit. Mr. Cline asks that the Municipal Traction Company and the Cleveland Railway be enjoined from operating the cars under the franchise and that a receiver be appointed to take charge of the affairs of the Municipal Traction Company which, it is declared, is insolvent. The history of the street railway situation in Cleveland is reviewed and the Mayor is charged with organizing the various street railway companies and securing for them valuable grants, while he refused like grants to the Cleveland Electric Railway. In relation to the Forest City Railway Company, it is alleged that the Mayor guaranteed contracts made by the company, endorsed its notes and became owner of a large block of its stock. It is also alleged that he organized the Municipal Traction Company and selected the directors on condition that they allow him to direct and control the company.

The Municipal Traction Company has requested the Cleveland Railway to issue $500,000 new stock to be used in extensions and betterments of the property. As the lease requires that only 80 per cent of the cost of such improvements may be paid for from the sale of Cleveland Railway stock, it will be seen that the Municipal Traction company will be compelled to put up $125,000 of its own money if the amount of stock requested is sold. It is also said that the Cleveland Railway has the right under the law to offer this stock to its own stockholders before it can be sold to others. It is supposed that the officers of the Municipal Traction Company desire to sell the stock through their own exchange at par, but if the Cleveland Railway should sell it, the market value, at present around 90, would be received.

New Line Opened Between Woodbury and Waterbury, Conn.—The new electric railway connecting Waterbury and Woodbury, Conn., for which a charter was secured some time ago, was formally opened by the Connecticut Company on Sept. 1.

Storage of Cars on Streets in Trenton, N. J.—The Common Council of Trenton has passed the Wayman ordinance, which requires all electric railway companies to use both tracks of all double-track lines, the measure referring particularly to Liberty Street. On that street but one track has been used for regular traffic, and cars have been stored on the other.

Ohio Railroad Commission Inspecting Electric Railways.—The Railroad Commission of Ohio is now engaged in the second inspection of the electric railway systems of that State. The first inspection was made two years ago, with a view of securing information regarding the physical conditions of the companies. The present inspection has for its aim not so much the physical conditions of the roads as the absence of various public conveniences.

Wage Scale to Be Reopened on the Boston & Northern.—President P. F. Sullivan, of the Boston & Northern Street Railway, has notified the organizations of conductors and motormen on that road that he desires to have a conference relative to the present wage agreement. The agreement was made about two years ago for a four-year period, with the provision that either party may reopen the question of wages when due notice is given 30 days before Oct. 1 of any year.

Outing of Providence Employees.—Employees attached to the South Providence or Thurber Avenue barn of the Rhode Island Company, Providence, inaugurated on Sept. 2 the custom of holding an annual outing and field day, all the men who have been in the service of the company for five years or longer participating in the enjoyment of the field day program. A. T. Potter, vice-president; A. E. Potter, general manager, and R. R. Anderson, superintendent of transportation of the company, were in attendance.

Clarke Forfeiture Suit Involving New York City Railway Dismissed.—Supreme Court Justice Davis of New York has dismissed the complaint of Attorney-General Jackson against the New York City Railway for the forfeiture of the latter's charter on the ground that the corporation had been insolvent for more than one year prior to the bringing of the suit. Justice Davis not only dismissed the complaint, with costs, but vacated the State receivership of Melvin G. Palliser, Paul Fuller and J. Hampden Dougherty, who were appointed by Justice Seabury last November.

Ohio Electric Railway Branch Opened.—The Lima & Toledo branch of this system began regular operation into Toledo on Aug. 30, passengers being delivered to the local lines at South Street, pending the completion of the company's own terminals in the center of the business district. The local company is furnishing extra cars for the traffic from the new road. The Ohio Electric Railway now has lines in operation between Toledo and Dayton and Toledo and Springfield and within a short time through trains will be run between Toledo and Cincinnati.

Ordinance for Municipally Owned Elevated Introduced in Philadelphia Council.—An ordinance providing for an increase of the city's indebtedness, $4,000,000, with which to build an elevated railway from Front and Market Streets, Philadelphia, to the Torresdale Boulevard, has been introduced in Select Council and referred to the street railway committee. The ordinance authorizes the Mayor to enter into a contract for the construction of the railway from Front and Market Streets, northward on Front Street to Kensington Avenue, thence on that thoroughfare to Frankford Avenue, to Bustleton Avenue, to the terminal at the

Torresdale Boulevard and provides that the city shall lease the road to the highest bidder.

No Strike in New England.—Despite the fact that the executive board of the Amalgamated Association of Street and Electric Railway Employees of America declared itself in favor of a general strike of the members of the association in New England employed by the Connecticut Company, the Rhode Island Company and other companies controlled by the New York, New Haven & Hartford Railroad, the employees did not go out on Labor Day, as was proposed. The trouble is said to have been caused by the discharge by the Rhode Island Company of 54 of its employees some time ago because of breach of discipline. The men voted on the proposition to strike and decided for themselves that it would be better to seek an amicable adjustment directly through President Mellen, of the New York, New Haven & Hartford Railroad.

Conspiracy by Chester Employees to Destroy Company's Property Aired in Court.—Testimony given by an employee of the Chester Traction Company who gained the confidence of the union leaders and received from their lips confessions of a conspiracy to dynamite and destroy street railway property caused a sensation at the hearing on Sept. 1 of Patrick J. Shea, vice-president and national organizer of the Amalgamated Association of Street & Electric Railway Employees; William V. Lockhart, president of the Chester union, and 13 strikers, arraigned at Media. The employee spoke on the stand of each man in turn, told of confidence they had reposed in him, related how he had been taken along with a band of strikers who went out on a track-wrecking expedition, and, giving names and dates, related each specific confession which he alleged the strikers had made to him, believing him to be an ardent sympathizer with their cause. District Attorney McDade declared that a complete case had been established, and, although counsel for the prisoners pleaded for their discharge, they were all held for court.

Illinois Traction System for Co-operation.—William B. McKinley, president of the Illinois Traction System, has issued the following bulletin to the employees of the various lines controlled: "Champaign, Ill.—Trainmen of interurban lines: It has been called to my attention by some of the interurban men, who are particular friends of mine, that there is a feeling among some of the men operating interurban cars that it would be better for the men and for the company if the men had organization and dealt with the company through the organization instead of individually. I desire it to be specifically understood that the officers of the company have no objection whatever to an organization of this kind, and in order to bring about a clear understanding I take pleasure in inviting the interurban men to talk this over and arrange for a representative committee, consisting perhaps of one man from each operating division, to meet with the general manager and me at some early date mutually convenient, when the matter can be discussed and such action taken as will best conserve your interests and the interest of the company. I desire entirely to remove from the minds of the men connected with the company any belief that I have the slightest objection to organized labor."

Chicago Track Reconstruction.—Bion J. Arnold, chief engineer of the board of supervising engineers, Chicago Traction, has announced that within the near future work will be begun on the reconstruction of the street railway tracks in the business district of Chicago. For some time it has been urged that this part of the street railway systems of Chicago should be rehabilitated at once, but the board of supervising engineers has largely withheld the track reconstruction work in the downtown district pending more definite plans on the part of the city for the construction of the proposed subway. It is now stated that the new subways in Chicago cannot be considered in the near future, because of the time required for financing and preliminary engineering work. Therefore the rehabilitation of the surface tracks in the business district of Chicago will be begun shortly. The board of supervising engineers is now at work upon plans which include the relocation of the turning loops for the tracks of the two companies and the fixing of terminals for the stub-end lines. J. M. Roach, president of the Chicago Railways Company, is quoted as saying that his company contemplated the construction and reconstruction of more than 65 miles of track during the present year. Up to July 1 the schedule had been maintained, but the inability to get granite paving blocks now seems likely to cut down the season's mileage. Last year the Chicago Railways Company completed 20 miles of track reconstruction and 54 miles were laid out for this year. About 36 miles of this have been finished. In addition the company plans to build this year eight extensions and new lines, which will add materially to its traffic.

Financial and Corporate

New York Stock and Money Markets

SEPT. 9, 1908.

After the three days' holiday the stock market showed considerable strength on Tuesday, Sept. 8, with about the activity that has prevailed in recent weeks. As heretofore, the main strength is in the Harriman shares, in Steel common and in Reading, American Locomotive, Amalgamated and Erie. It does not require great experience in Wall Street to see that these issues are supported at present by strong interests. Advancing prices in Wall Street are due to purely professional causes rather than the result of public demand. The fact that the amount of stock coming into the market is small and that the men behind the upward movement have a command of funds that is practically unlimited makes their task easy. The strong interests are putting prices where they ought to be with prosperity returned. The temporary reactions caused by profit taking are bound to occur, but they mean little to the general trend of the movement.

The publication on Sept. 8 of the Government's crop report was the principal news feature of the week, but the figures, while satisfactory, were not particularly bullish. The condition of corn, for instance, was 79.4, as against a 10 years' average at the same period of 81. The yield, however, on this basis is figured out to be 2,598,000,000 bu, which, while it is 66,000,000 bu less than the indicated yield in August, is still well above that of the previous year. The return for spring wheat is 240,856,000 bu, which is 22,000,000 more than last year. The other crops are satisfactory, but not phenomenal.

Rates for money continue to be low. Call loans are quoted at 1@1¼ per cent and 90-day paper at 2@2¼ per cent. The demand continues light, although the last bank statement indicated a decrease of $5,714,000 in the surplus reserve, showing that there had been some movement toward the interior. A movement of funds to the interior is natural as the movement of crops starts in the various sections of the country. The demand for funds from mercantile borrowers, however, is larger, and will continue to increase from this time unless there are disquieting developments in the political situation.

Other Markets

Philadelphia Rapid Transit stock has been the active issue in the Philadelphia stock market for the past week. Transactions have been large in volume, but the price has advanced by slow stages. The closing trades on Sept. 8 were made at 14¼, which is only a fraction higher than the previous week. There was some trading in Union Traction at 48 to 48¼.

In the Boston market there was little dealing in traction securities. Massachusetts Electric preferred was the most active stock, a few shares changing hands at from 46½ to 47. The common stock was nominal at 9. Boston Elevated was quoted at 135, although no transactions were recorded at that figure.

In Baltimore the bonds of the United Railways continued to be the only issues in which there was any trading. The 4s sold at about 85¼ and the income 5s at 53⅞.

Chicago traction securities were dull, but few sales being recorded. A few shares of Subway sold at 21¼ and some small blocks of Chicago Railways 2d at 39½@40.

Quotations for various traction securities as compared with last week follow:

	Sept. 1.	Sept. 8.
American Railways Company, Philadelphia	45½	44½
Boston Elevated Railway	133½	135a
Brooklyn Rapid Transit Company	54½	54⅛
Chicago City Railway	a180	a180
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a69	a69
Consolidated Traction Company of New Jersey, 5 per cent bonds	a104	a104
Detroit United Railway	a40¾	40½
Interborough-Metropolitan Company	12	11½
Interborough-Metropolitan Company (preferred)	34¾	33½
Manhattan Railway	139	138
Massachusetts Electric Companies (common)	9	9
Massachusetts Electric Companies (preferred)	48	47
Metropolitan West Side Elevated Railway, Chicago (common)	a17	a15
Metropolitan West Side Elevated Railway, Chicago (preferred)	a43½	a46
Metropolitan Street Railway	29½	29½
North American Company	64	63½
Philadelphia Company, Pittsburg (common)	38¾	39
Philadelphia Company, Pittsburg (preferred)	40	40
Philadelphia Rapid Transit Company	14	14¼
Philadelphia Traction Company	89	89
Public Service Corporation, 5 per cent collateral notes	a97	a98
Public Service Corporation, certificates	a71	a71
Twin City Rapid Transit Company, Minneapolis (common)	a90	89½
Union Traction Company, Philadelphia	48⅝	48

a Asked.

Interborough Rapid Transit Company, New York

The Interborough Rapid Transit Company reports for the quarter and year ended June 30, 1908, including the Manhattan Railway and subway divisions, as follows:

Quarter ended June 30, 1908:		Increase
Gross	$6,248,244	$223,595
Expenses	2,796,102	196,893
Net	$3,452,142	$26,702
Other income	305,307	66,915
Total income	$3,757,449	$93,617
Interest and taxes	847,622	186,778
Rentals	2,025,485	35,262
Total charges	†$873,107	$222,040
Surplus	884,342	*128,423

*Decrease. †Include special franchise tax in 1908, $320,000; in 1907, $295,000.

From July 1, 1907, to June 30, 1908:		Increase
Gross	$24,059,299	$1,695,498
Expenses	10,722,695	1,129,365
Net	$13,336,604	$566,133
Other income	1,220,170	404,337
Total income	$14,556,774	$970,470
Charges	10,856,116	986,256
Surplus	$3,700,658	*$15,786

*Decrease.

The separate income accounts of the Manhattan Railway and subway divisions and the total of the two for the quarter and year ended June 30, 1908, show as follows:

Quarter ended June 30, 1908:	Manhattan	Subway	Total
Gross	$3,478,691	$2,769,553	$6,248,244
Expenses	1,634,771	1,161,332	2,796,102
Net	$1,843,920	$1,608,221	$3,452,142
Other income	135,054	170,254	305,303
Total income	$1,978,974	$1,778,475	$3,757,450
Interest and taxes	399,638	447,985	847,623
Rentals	1,504,164	*521,321	2,025,485
Total charges	$1,903,802	$969,306	$2,873,108
Surplus	$75,172	$809,169	$884,342
From July 1, 1907, to June 30, 1908:			
Gross	$14,038,761	$10,020,538	$24,059,299
Expenses	6,299,382	4,423,313	10,722,695
Net	$7,739,379	$5,597,225	$13,336,604
Other income	457,113	763,057	1,220,170
Total income	$8,196,492	$6,360,282	$14,556,774
Charges	7,546,607	3,309,510	10,856,116
Surplus	$649,885	$3,050,772	$3,700,658

*Rental due City of New York measured by interest and sinking fund on city bonds issued for construction.

Report of Chicago Railways for Five Months

The financial statement of the Chicago Railways for the five months ending June 30, based on the reports of the city comptroller, is as follows:

INCOME	
Passengers	$4,229,158
Chartered cars	987
Mail	13,154
Advertising	14,583
Rent and lands and buildings	4,555
Sale of power	7,461
Rent of equipment	15,704
Interest on deposits	3,679
Miscellaneous	28,777
Total	$4,318,058
EXPENSES	
Maintenance of way and structures	$215,974
Maintenance of equipment	346,226
Operation of power plants	401,562
Operation of cars	1,454,927
General expense	520,908
Taxes, estimated	83,044
Total expense	$3,022,641
Net earnings from operation	1,295,417
Less interest at 5 per cent on capital investment	685,334
Net income	$610,083
Divisible:	
City of Chicago, 55 per cent	335,545
Chicago Railways Company, 45 per cent	274,537
Total	$610,083

Boston (Mass.) Elevated Railway.—It is expected that the Boston Elevated Railway will petition the Massachusetts Railroad Commission for authority to issue about $8,000,000 in new stock. The commission will set the price at which this stock will be offered to shareholders. For about five years the company has confined its financing to the floating of 4 per cent bonds. The last stock issue was in 1902, when about 33,000 new shares were sold at approximately $155 each. Last year the company petitioned the Railroad Commission to permit the issuing of new stock to the extent of $8,000,000, but the petition was withdrawn.

Fulton Street Railroad, New York.—G. H. Montague, the receiver, has written the New York Public Service Commission, First District, that he cannot give the information sought by the commission because he has no money with which to make an investigation. The letter said further:

"I have not received and am unable to locate any funds, equipment or property of the Fulton Street company other than the books purporting to set forth operating transactions of the line and the rails laid on the streets. With these exceptions all the property of the Fulton Street road has been disposed of, torn out or commingled with the property of the Metropolitan system."

Houghton County Traction Company, Houghton, Mich.—Stone & Webster, Boston, have organized this company to take over the property, assets and franchises of the Houghton County Street Railway (the mortgage of which is closed) and to provide new funds for the extension of the system. The Houghton County Traction Company will have an authorized issue of $1,600,000 first-mortgage consolidated 5 per cent bonds, $750,000 of which will be reserved to retire a like amount of the Houghton County Street Railway 5 per cent first-mortgage bonds; $400,000 will be sold at once to cancel the floating debt and provide money for extension of the line to Mohawk and the remaining $450,000 will be held for future additions. The new bonds are dated Oct. 1, 1908, and will mature Jan. 1, 1937, but are subject to call from time to time for sinking fund and as a whole at any time after Oct. 1, 1911, at 105 and interest. They are of the denominations of $500 and $1,000, and the annual sinking fund of 1½ per cent of outstanding bonds is payable on and after March 1, 1910. The interest is payable Jan. 1 and July 1 at the office of the City Trust Company, Boston, trustee. Its capitalization is:

	Authorized	Issued
Common stock	$750,000	$750,000
Preferred stock, 6 p. c. cumulative	500,000	205,000
Houghton County Street Railway, first mortgage, 5's	1,600,000	400,000
First Consol. 5's	750,000	750,000

Illinois Traction Company, Champaign, Ill.—The Cairo (Ill.) Electric & Traction Company and the Cairo City Gas Company, owning all the street railways and lighting facilities in the city, have been acquired by the McKinley syndicate, possession being taken Sept. 1. The purchase price is unofficially given as $550,000.

Philadelphia, Bristol & Trenton Street Railway, Philadelphia, Pa.—Interest was defaulted Sept. 1 on the $650,000 first-mortgage bonds which are guaranteed, principal and interest, by the Holmesburg, Tacony & Frankford Railway, a subsidiary of the United Power & Transportation Company, which in turn is controlled by the Interstate Railways.

San Francisco, Oakland & San Jose Consolidated Railway, San Francisco, Cal.—This company has executed a mortgage covering all its properties to the Union Trust Company to secure that company in guaranteeing a bond issue of $7,500,000. The issue of 30-year 5 per cent bonds is designed to refund issues aggregating $4,500,000.

Tarrytown, White Plains & Mamaroneck Railway, New York.—Default occurred Sept. 1 in the payment of interest on the first-mortgage 5 per cent bonds due March 1, 1928. Sutro Brothers & Company, New York, urge the deposit with them of these bonds under a protective agreement.

Toledo, Ann Arbor & Detroit Electric Railway, Toledo, Ohio.—The property of the Toledo, Ann Arbor & Detroit Electric Railway is to be offered for sale by order of the special master in chancery under mortgage foreclosure decree on Oct. 12 at 11 a.m. in Monroe, Mich. It is expected that the road will pass into the hands of the bondholders.

Traffic and Transportation

The Philadelphia Transit Inquiry

The committee of the City Council of Philadelphia which has been studying street railway conditions in the United States and the terms under which companies operate in the principal cities had before it last week J. B. Parsons, president, Chas. Kruger, vice-president, and Mr. Bricker, superintendent of schedules of the company. The attitude of Mr. Parsons showed that he is in favor of an increase in fare, his plan being to establish a straight 5-cent fare, abolishing six for a quarter tickets and exchanges. Mr. Parsons complained about the burden of State and municipal taxation which the company is forced to bear. He said that this amounted to $1,400,000 a year, including the $500,000 paid to the city in lieu of paving streets occupied by the company's lines. Mr. Parsons said that the company has expended $18,000,000 in the last 13 years in paving. With the consent of the committee Councilman Lewis submitted to the company a list of 50 questions bearing upon its operation and general business. Mr. Parsons promised to make detailed replies to these as well as to a series propounded by the committee. The answers are to be made in time for incorporation in the report to be made to Councils on Sept. 17. This report will cover all the information obtained by the committee both in Philadelphia and elsewhere. Mr. Lewis's statement was as follows:

"It has been the policy of the committee not to discuss even among ourselves the matter of its final report. No man knows what the report of the committee will be, and I disclaim any desire or intention to say as yet what recommendations I think should be made by the committee. We will meet in executive session after the stenographer has compiled all the information which the committee has collected, and then the different members will suggest what conclusions should be arrived at.

"The committee met at the Dauphin Street office of the company and was received by Messrs. Parsons, Kruger and Bricker. Mr. Bricker is in charge of the schedules, and he very freely discussed the matter of speed of cars. The company regards the ordinance requiring all cars to come to a stop at each crossing as a wise and necessary safeguard of pedestrians and other travelers; the sentiment of the committee as to this ordinance, however, has not been expressed. The company also feels that no faster schedules can be put in effect. I am frank to say that I do not agree with this as to West Philadelphia, the company's arguments not having convinced me.

"As to fares, our examination was very thorough. We were given figures showing the loss in earnings caused by the sale of six tickets for a quarter, which began in 1906. The company also showed by its books that the average rate of fare has decreased considerably in the past few years and that this has been due to the increase in the number of transfer passengers and the sale of such six-for-a-quarter tickets. The use of these 4 1-6 cents tickets has decreased enormously the use of the exchange tickets. Mr. Parsons stated to us also, and showed by figures, that the cash fares were decreased considerably by these tickets. Recently the rule that no transfers would be given except with 5-cent cash fare went into effect, and this has lowered the number of free transfers used by about 5 per cent to 6 per cent, bringing that percentage of free transfer down to slightly over 14 per cent of the total passengers carried.

"The company says that the six-for-a-quarter tickets are abused by the conductors to a small extent, and that it is impossible to guard against the small percentage of dishonest employees who will sell tickets to themselves and substitute them for cash fares.

"A very decided objection was made by the company to the amount of taxes and impositions which are levied against it by the State and city laws, and the committee investigated these claims fully.

"The Transit Company officials say that at the present time 169 transfer points are maintained in Philadelphia and that from about one-fourth of these transfers are given in four directions, from another one-fourth transfers are given in three directions, and from others transfers in two directions or one direction.

"It can do no harm to say here that the Transit Company's president, Mr. Parsons, said that his company felt that it has for years been the victim of popular misunderstanding of its acts and from prejudice arising therefrom. He said that the directors recognized that a change had taken place in the attitude of public service corporations toward communities in which they operate and were desirous of affording every opportunity for the public to obtain all the information which was desired as to the company's conduct of its business and welcome investigation."

The committee declined to make public the list of questions which it asked. Mr. Lewis's supplementary list of queries was as follows:

What is the total net capitalization of the Philadelphia street railway system, including trust certificates, but excluding stocks of underlying companies owned by leased companies?

What is the total bonded indebtedness of the Philadelphia system, including underlying companies?

Capital stock of combined companies?

Miles of track operated (as single miles)?

Number of cars (all kinds)?

Number of cars in service?

State taxes?

City taxes and licenses?

Cost of railroad equipment?

Stock of other companies owned?

Real estate owned, value?

Longest ride for single fare?

Wages of motormen, per hour?

Wages of conductors, per hour?

Capitalization of system per mile?

Rate of fare?

Number of transfer points—(a) 1906? (b) 1907? (c) 1908?

Do you maintain a reserve for renewals?

Passenger car mileage?

Freight, mail and express car mileage?

Total car mileage?

Passenger car hours?

Freight, mail and express car hours?

Total car hours?

Fare passengers carried?

Transfer passengers carried?

Total passengers carried?

Average fare all passengers (including transfer passengers)?

Average fare revenue passengers?

Car earning, per car mile?

Miscellaneous earning per car mile?

Gross earning per car mile?

Operating expenses per car mile?

Operating expenses and taxes per car mile?

Operating expenses per car hour?

Operating expenses and taxes per car hour?

Operating expenses per cent of gross earnings?

Operating expenses and taxes per cent of gross earnings?

Average number of employees, including officials, during year?

Aggregate amount paid for salaries and wages?

Why do you maintain in summer the same schedule in West Philadelphia as used in winter, when cars are blocked by snow?

Hearing on Question of Joint Rates in New York City

The hearing in connection with the investigation to ascertain a fair joint rate for through transportation over the lines of the Metropolitan Street Railway and the Central Park, North & East River Railroad was continued by the New York Public Service Commission, First District, on Sept. 2. Henry W. Brown, auditor for the receivers of the Metropolitan system, was examined by Oliver C. Semple, for the commission. Mr. Brown presented the following statement showing the operating cost per car-mile for both the underground electric lines and the horse-car lines for the year ended June 30, 1907, and the period from Sept. 25, 1907, to June 30, 1908:

	Underground trolley lines	Horse lines
Sept. 25, 1907, to June 30, 1908.....	23.41	31.13
Year ended June 30, 1907.....	19.01	26.96

Mr. Brown corrected the figure which he gave at the previous hearing as to the amount of gross earnings set aside for injuries and damages. He found that the correct percentage was 10.166 per cent of the gross earnings instead of 10.186 per cent, as testified by him from memory at the previous hearing. When asked whether any separation was made of these charges according to the various lines, Mr. Brown said that the company had never kept the expense in that way because of the large amount of general expense which it would be difficult to divide on an equitable basis. The claims and judgments are kept separately. Mr. Brown was asked whether he had any idea how much of the 10 per cent represented claims or judgments and how much represented the general expenses. He said he would ascertain the facts and let the commission know.

Douglas Robinson, one of the receivers of the Metropolitan Street Railway, appeared before the commission on Sept. 8. He said that the traction problem in New York City

could not be solved properly until there had been a conservative reorganization of the properties. In answering questions Mr. Robinson said:

"I think the public is as much interested in the future as in the present of the transit system, if not more so. Before the best service can be given there must be a reorganization of the entire transportation system. That reorganization must be fixed upon a conservative basis, and must not be a speculative reorganization by speculative financiers. The capital of the companies must not be impaired by haphazard and frequent issues of stocks and bonds."

Transfers Now Charged for by Newton.—The new arrangement, recently approved by the Railroad Commissioners, whereby 1 cent additional fare is charged for all transfers issued by the Newton Street Railway, went into effect on Sept. 1.

Accounts of Boston Conductors Unsatisfactory.—The Boston Elevated Railway has dismissed 92 conductors whose accounts have been found unsatisfactory. The discharge was not made on account of dishonesty, but partly on account of the inability of some of the men to keep accurate records of their transactions.

Pay-as-You-Enter Cars for Columbus, Ohio.—The Columbus (Ohio) Railway & Light Company, under license from the Pay-as-You-Enter Car Company, has ordered from the Kuhlman Car Company, Cleveland, Ohio, 10 cars of the pay-as-you-enter type. The cars will probably be placed in service in November.

Veterans Use Electric Railway in Ohio.—Because the steam railways refused to reduce the fare to the national encampment of the Grand Army of the Republic at Toledo last week, 60 members of the Old Guard at Columbus chartered a car of the Ohio Electric Railway and made the trip by way of Springfield, Bellefontaine and Lima. The time required was about seven hours, as the car was forced to go south quite a distance before turning north to Toledo. Other electric railways also did considerable extra business to Toledo on account of this encampment.

Speed Test in Philadelphia.—The Philadelphia Rapid Transit Company put into effect on Sept. 3 a test to furnish a committee of the City Council with information as to the possibility of maintaining a faster schedule. On Sept. 4 a faster schedule went into effect on the line centering on Chestnut Street. Beginning at 6:30 o'clock p.m. on Sept. 3 the cars on all lines operated on the schedule used on Sundays. This continued until the night schedule went into effect after midnight. Reports will be made to the officials covering the movement on every line, and the tests will be continued until definite conclusions can be reached. The average rate of speed on all lines within the city has been 8.35 miles per hour during the week. On Sundays the speed averages about 10 miles.

New Rules for Traction Employees.—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, has issued a new book of rules to be put in effect Sept. 14. Special stress is laid on the demeanor of employees when representing the company in contact with the public and when off duty. Swearing, drinking and smoking are prohibited and those who frequent saloons will be discharged. Gambling in any form is also prohibited. No newspapers, letters or other matter likely to occupy their attention are to be read by employees while on duty. In a list of "Don'ts" is the carrying of letters or packages for any one not having business with the company. All employees must have watches of standard make and compare their time with that of the train dispatcher before going out on a run. Several pages of instruction on caring for persons shocked by electricity or injured while traveling upon the cars are included.

Court Grants Pennsylvania Company Permission to Increase Fare.—After examining all the papers in the case, including the earnings and expenditures of the Wilkesbarre & Hazleton Railway, Judge Fuller has handed down a decision in which he restrains the county of Luzerne from bringing suit against the company for violation of the 2-cent rate law. The company did not violate the law. On the contrary, it lowered its rates to 2 cents as soon as the law went into effect. It was in anticipation of a suit being brought in case it restored the old rates that the suit was brought in equity against the County Commissioners to restrain them from prosecuting the plaintiff. Judge Fuller says he is satisfied that the contention of the company that the 2-cent rate makes the passenger business of the road unprofitable is correct. In justice to its stockholders, therefore, it is entitled to charge a higher rate. In concluding his opinion, Judge Fuller says: "We have no concern with the wisdom of the legislative act or the judicial decision which nullifies its enforcement, but on the authority of the decision the plaintiff is entitled to relief."

Personal Mention

Mr. Thomas H. Bowlus has been elected a director and treasurer of the Kansas Southern Electric Railroad, Iola, Kan., to succeed Mr. George A. Bowlus, deceased.

Mr. George R. Morse, formerly master mechanic of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, has been appointed master mechanic of the Pensacola (Fla.) Electric Company.

Mr. Charles W. Lamb, who for the last two years has been publicity manager for the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has resigned to become connected with the Clark Engraving Company.

Mr. W. C. Franz has been appointed general manager of the International Transit Company, with headquarters at Sault Ste. Marie, Mich. The position of acting manager has been abolished and Mr. J. S. Wynn has resumed the duties of general auditor.

Mr. Wm. E. Rolston, heretofore master mechanic of the Cleveland, Southwestern & Columbus Railway, Cleveland, has been appointed superintendent of power and shops of that company, assuming the duties of Mr. E. G. Hindert, heretofore superintendent of power, resigned.

Mr. J. B. White, who for the past two years has been assistant to the superintendent of railways of the Dallas (Tex.) Consolidated Electric Street Railway, has accepted a position with the El Paso (Tex.) Electric Company. Mr. W. W. Loomis, formerly purchasing agent, has succeeded Mr. White and Mr. P. A. Pitcher, of the accounting department, succeeds Mr. Loomis as purchasing agent.

Mr. W. H. Evans, master mechanic of the International Railway, Buffalo, N. Y., read a paper, entitled "Electric Traction vs. Steam Railroad Operation," before the Central Railway Club on Sept. 11. Mr. Evans reviewed briefly the history of electric traction and took up the subject of the demand for the operation of trains by electricity. Mr. Evans says the mechanical end of electric railroading appears to be a most inviting field for ambitious young men.

Mr. Malcolm McIntyre, assistant division superintendent of the Detroit (Mich.) United Railways, has been appointed general manager of the San Francisco, Vallejo & Napa Valley Railway, with headquarters in San Francisco. Mr. McIntyre came from Los Angeles, Cal., in 1902 and entered the employ of the United Railways at its station at Algonac. He was soon transferred to Detroit and eventually became car house foreman. About 14 months ago he was appointed assistant division superintendent in charge of the Orchard Lake interurban line at Pontiac.

Mr. Leavenworth Wheeler, who has resigned as general manager of the Berkshire Street Railway, Pittsfield, Mass., to become engineer of maintenance with the New England Security & Investment Company, with headquarters in Springfield, began his street railway career in 1888 when he completed the construction of the West End Street Railway, Boston, from Bowdoin to Harvard Square and later to Arlington, and operated the property for the Thomson-Houston Company for six months. In the winter of 1889-1890 Mr. Wheeler was superintendent of construction of the railway department, Northwest, of the Thomson-Houston Company, St. Paul, and for two years was in charge of construction in St. Paul and Minneapolis and through to the coast, covering lines in Helena and Great Falls, Mont., Spokane, Wash., and Portland, Ore. He built the Alameda, Oakland & Piedmont Electric Railway and operated it for three years. Coming East in 1896, Mr. Wheeler became connected with the Consolidated Railway, Pittsburg, Pa., during the change of motive power on the line from cable to electricity. Mr. Wheeler also superintended the construction of the Worcester & Southbridge Street Railway and managed it for three years. When the Worcester & Southbridge and the Berkshire Street Railways came under the same control in September, 1905, he was transferred to Pittsfield as general manager of the consolidated properties.

The trackless trolley system seems to be very much in evidence at present in various parts of Great Britain and following the example of Dundee, which sent a deputation some time ago to the Continent to investigate this system, a deputation from Manchester recently departed for the Continent for the same purpose. Such systems have been common on the Continent for several years without any very wide adoption. Though it is quite true that a large amount of capital can be saved, yet the operating expenses of cars running on the ordinary road instead of on rails have been proved to be excessive. In the meantime, Dundee has decided to intimate to the board of trade that it proposes to introduce the system on certain routes.

Construction News

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

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

FRANCHISES

Stoughton, Mich.—The Cincinnati Construction Company has applied to the City Council of Stoughton for a franchise to build a line through Stoughton.

Newark, N. Y.—The Board of Trustees has granted the Geneva, Phelps & Newark Electric Railway an extension of its franchise for one year from Aug. 20, 1908. [S. R. J., Aug. 17, '07.]

***Medford, Ore.**—F. J. Blakeley has applied to the City Council for a franchise to operate a street railway in the city of Medford.

Dallas, Tex.—The Dallas Interurban Electric Railway has accepted the terms of the resolution of the Dallas County Commissioners' Court granting authority to build a railway along the West Dallas pike, thence along Beckley road to the northern limits of the city.

***Marshall, Tex.**—Marvin Turney, of Marshall, at the last meeting of the City Council made an application for a franchise to build an electric street railway in Marshall. Mr. Turney guarantees to build 1¾ miles of track, to operate the same within the first 18 months and within two years to build and operate 2½ miles.

Salt Lake City, Utah.—The Utah Light & Railway Company has sent a communication to the Murray City Council stating that it desires a renewal of the present franchise for the purpose of reconstructing its entire line from Salt Lake City to Murray. The company has also submitted a draft of a new franchise for the consideration of the Council. An ordinance was read for a franchise and right of way on State Street in the city of Murray and was referred to the committee on ordinances.

Lake Geneva, Wis.—The Milwaukee Light, Heat & Traction Company has filed a petition with the railroad commission at Madison asking for a certificate of necessity and convenience for the construction of its electric railway from Waterford to Lake Geneva.

RECENT INCORPORATIONS

***Chicago, Wheaton & Western Railway, Chicago, Ill.**—This company has just been incorporated to construct an electric railway which will tap the region north of Wheaton, Ill., and will connect the Aurora, Elgin & Chicago Railroad with West Chicago. General offices, Chicago. Capital stock, $10,000. Incorporators: J. Sydney Condit, J. Percy Strickland, D. W. Peters, R. B. Tabor and H. C. Wood, all of Chicago.

***Evansville & Eastern Railway, Evansville, Ind.**—This company has been incorporated to construct an electric railway from Rockport, Ind., to New Albany, Ind., and thence to Louisville across the Ohio River. Capital stock, $10,000. Incorporators: John C. Lake, of Lake, Ind.; Marcus S. Sonntag, W. H. McCurdy, Albert F. Karges, William A. Koch and C. H. Battin, of Evansville.

***Logansport, Frankfort & Indianapolis Traction Company, Indianapolis, Ind.**—This company has been incorporated to build an electric interurban railroad from Frankfort to Logansport. Capital stock, $25,000. Incorporators: Samuel H. Blakeslee and Allen G. Barone, of Cleveland, Ohio, and Fred Cook, of Indianapolis, Ind.

Kansas-Colorado Railroad, Topeka, Kan.—This company has been incorporated to build an electric railway system from Canon City, Colo., along the Arkansas River to Dodge City, Kan. Capital stock, $5,000,000. The original company was chartered under the laws of Colorado and its headquarters are at Pueblo. Officers: President, S. H. Atwater, Canon City, Colo.; vice-president, A. H. Warner, Garden City, Kan.; secretary, E. W. Palmer, Pueblo, Colo.; assistant secretary, L. M. Markham, Lamar, Colo.; treasurer, W. O. Bourne, Pueblo, Colo. [E. R. J., Sept. 5, '08.]

North Jersey Rapid Transit Company, Paterson, N. J.—This company has been incorporated in New Jersey to construct and operate an electric railroad 14.3 miles long from Paterson to Suffern, N. Y. Capital stock, $1,000,000. Headquarters, Colt Building, Paterson, N. J. Incorporators: Thomas J. Maloney, Jersey City; Henry M. Parmaled, Herbert Bogart, Charles D. Cook and Guy H. Pierce, all of Paterson; M. R. McAdoo, Montclair, and George H. Dunlap, Spring Valley, N. Y. [E. R. J., Sept. 5, '08.]

***Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.**—This company has been incorporated with a capital stock of $10,000 by Barclay W. Rowland, Charles L. Scott, Charles F. Branson, William T. Perry, John F. Kennedy and G. W. Grissinger. Headquarters, Cadiz, Ohio.

***Oklahoma, Missouri & Kansas Interurban Railway, Miami, Okla.**—This company has been incorporated to build a line from Miami to Lincolnville. Capital stock, $100,000. Incorporators: D. W. Cooter, Franklin M. Smith, John Hall, R. H. Holton and F. O. Freeman.

***Carrick & Baldwin Street Railway, Harrisburg, Pa.**—This company has been incorporated to build a street railway between the borough of Carrick, Allegheny County, and a point in Baldwin township. The line will only be about one-third of a mile in length. Directors: F. K. Martin, Pittsburg, president; J. C. Bily, F. K. Martin, J. G. Evans, S. T. Tone and W. B. Carson.

***Unaka Traction Company, Unaka Springs, Tenn.**—This company has been incorporated to build a street railway from Erwin to Johnson City, through Unaka Springs. Capital stock, $10,000. Incorporators: Isaac Love, W. B. McNabb, A. M. White, F. B. Vines and J. A. Johnson.

***Spokane, Columbia & Western Railway, Spokane, Wash.**—This company has been incorporated in Washington to build a line from Spokane to the mouth of the Spokane River near Miles, 75 miles, from which point it is reported the road will be extended northward along the Columbia River on the boundary of Ferry and Stevens counties, 100 miles. Surveyors are in the field and it is expected part of the line will be constructed this year. The road will be operated by power from the Nine Mile plant, owned by the Spokane & Inland Empire Electric Railway. Capital stock, $3,000,000. Incorporators: Clyde M. Graves, Waldo G. Paine, W. G. Davidson, H. B. Ferris and Will G. Graves.

***Idaho Railway & Navigation Company, Spokane, Wash.**—This company has been incorporated in Washington to build an electric railway from Deadman's Creek in the northern part of Garfield County through Asotin County and around the Blue Mountain range to the Seven Devils mining district in Idaho, 77 miles. The single-phase system will be installed. The power station will be erected on Snake River and, together with the distributing stations, will cost $64,000. Capital stock, $100,000. Incorporators: D. Van Arsdale, president; Samuel L. Tate, secretary; C. W. Hadley, general manager; M. Wood, engineer; Lester P. Edge and Fred Larson.

TRACK AND ROADWAY

Central California Traction Company, Lodi, Cal.—It is reported that this company will soon extend its system from Lodi to Acampo, thence in a northeasterly direction through the rich Christian Colony, a distance of about 10 miles. Eventually the line will be continued on to Sacramento.

Los Angeles-Pacific Railway, Los Angeles, Cal.—It is stated that in less than six months' time the bore of the Hill Street tunnel of this company will be completed, and the entire system of interurban lines radiating from Hill and Fourth Streets will be standardized as to gage. The length of the tunnel to Temple Street, where the line crosses at grade, is 900 ft. The second section of the tunnel from Temple to First Street, is 400 ft. in length. All the lines have been made standard gage, with the exception of the stretch between the station on Hill Street and the portal of the tunnel at First Street, and out to Hollywood and Colegrove. Immediately following the completion of the Hill Street tunnel, the company will begin work on the subway from the station between Fourth and Fifth Streets on Hill.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will build an extension to its system in Pasadena. The line will start at the junction of Fair Oaks Avenue and Lincoln Avenue and will continue to the city limits.

Anderson, Ind.—Interest has been revived in the proposed construction of an electric railway between Anderson and Lebanon by way of Noblesville by a company incorporated some time ago by Wallace B. Campbell, of Anderson, and R. H. Beaton, Frank Humphreys and William Knight, of Columbus, Ohio. These men are interested in the construction of a power plant at Noblesville and it is proposed to secure the power from this plant. [S. R. J., Dec. 1, '06.]

Fort Wayne & Springfield Railway, Decatur, Ind.—This company has just awarded contracts to the Electric Traction Supply Company for all overhead construction material for a 12-mile extension to its system. This line is one of the earliest 6600-volt, a.c., single-phase lines built in this country. The type of construction adopted is of special bracket design with porcelain insulation to withstand the high voltage.

Terre Haute, Indianapolis & Eastern Traction Company, Richmond, Ind.—This company is rebuilding its entire

track system in Richmond and making other improvements. In the northern portion of the city all wooden poles have been displaced by reinforced concrete poles. The poles have stood the test for a year and will likely be used extensively by the company in this vicinity.

Iowa & Omaha Short Line, Council Bluffs, Ia.—Preliminary surveys are reported made and rights of way secured by this company, recently organized in Iowa with $1,000,000 capital stock to build an electric railway from Omaha, Neb., east to Des Moines, Ia., 125 miles. The projected route is from Omaha east via Council Bluffs, Ia.; Treynor, Carson, Oakland, Walnut, Elkhorn, Exira, Panora and Dallas Center to Des Moines. Officers: G. W. Adams, president, Walnut; C. L. Kirkwood, vice-president, North Branch; A. L. Ingram, treasurer, and P. Kathmann, secretary, both of Treynor, Ia. [E. R. J., Aug. 22, '08.]

***Omaha, Council Bluffs & Des Moines Railway, Des Moines, Ia.**—The finance committee of this proposed electric railway between Omaha and Des Moines met in Des Moines last week with a New York financial agent and completed arrangements for the financing of the road. The line as proposed will run from Omaha across to Council Bluffs, northeast through Shelby to Harlan and then east midway between the lines of the Milwaukee and Rock Island through Audubon, Guthrie Center, Dale, Redfield, Adel and into Des Moines. Officers have been elected and articles of incorporation will be filed this week. Officers: President, J. W. Russell, Adel; vice-president, F. M. Hopkins, Guthrie Center; secretary, M. H. Miller, Fort Dodge; treasurer, E. L. Lockwood.

Compania de Tranvias, Luz y Fuerza de Guadalajara, Mex.—This company has just completed surveys and is preparing plans for an extension of its railway system from Guadalajara and the town of Chapala, on the northern shore of Lake Chapala. It is believed that a Federal as well as a State subsidy can be secured, and if other financial arrangements can be made the construction of the line will be commenced after the close of the present rainy season. Tomas Torres, general manager.

***Redwood Falls, Minn.**—R. F. Wherland, manager of the Aberdeen Engineering Company, Aberdeen, S. D., is reported to be interested in a plan to build an electric railway north of Redwood to Walnut Grove.

Twin City Rapid Transit Company, St. Paul, Minn.—This company is said to be considering the construction of a crosstown line through the Hill district, likewise an additional line for Dayton's Bluff.

Kansas City, Ozarks & Southern Mansfield Railway, Kansas City, Mo.—Track laying was begun on Aug. 24 on this proposed electric railway, that will extend from Mansfield to Ava, in Douglas County. Mansfield celebrated the event by driving a gold spike and holding a general jollification. This celebration marked the beginning of laying of steel on the first railroad in Missouri operated by electricity generated by water power. It is expected that the line will be completed the latter part of October. The promoters of the road hope to be able to extend it to a number of Northern Arkansas towns early next spring. J. B. Quigley, of Sedalia, Mo., promoter. [E. R. J., July 8, '08.]

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has awarded a contract to the Arnold Company, 181 La Salle Street, Chicago, for the electrification of its line, which extends from Kansas City to Olathe, Kan., a distance of about 19 miles. This line has been in operation for a year or two, Strang gasoline-electric cars having been in service. Decision was recently made to electrify the line. The work contemplated in the immediate future consists of construction of pole line and overhead trolley, power plant, storage battery substation, together with the purchase of new interurban cars for the operation of the road. Contracts for the entire equipment have already been let, and construction work has been started. The work of electrification of the line, covering the items above enumerated, is being handled by the Arnold Company, who have a contract covering the design and construction of the entire installation.

Springfield (Mo.) Traction Company.—Stockholders of this company are reported to be interested in a proposed electric railway about 50 miles or 60 miles long and which will connect Springfield and Carthage, Mo., and intermediate points. The estimated cost is $2,000,000. George E. Macomber, president, and W. A. Bixby, general manager of the Springfield Traction Company, are mentioned in connection with the enterprise.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has awarded to Peter B. Colgan, of Dunkirk, N. Y., the contract for excavating and clearing the roadbed for the extension from Cassity's woods to Sheridan to connect with the main line from the belt line system. Several large fills are along the route. A force of 100 men and 40 teams will be engaged to push the contract and have the work finished for laying of rails by Nov. 1.

***Gouverneur, N. Y.**—Anson A. Potter, of Gouverneur, writes that he is at work securing the right of way for an electric railway to be about 100 miles in length. Engineers will be sent out shortly to go over the route and make maps of the same. As yet no company has been organized or given a name.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—It is announced that this company will build a bridge over the Welland River, which will enable the line to enter Welland. The bridge will be completed in two months.

Clatskanie & Nehalem Valley Electric Railway, Clatskanie, Ore.—It is officially announced that this company will let construction contracts within the next 60 days. The line will extend from Clatskanie through the Nehalem Valley for a distance of about 30 miles. Surveys are now being completed. There will be a 4000-ft. tunnel. A. B. Kurtz, president, Clatskanie, Ore.; J. H. Abbott, Portland, chief engineer. [E. R. J., Aug. 22, '08.]

Woonsocket (R. I.) Street Railway.—This company is engaged in making a number of improvements on its Manville line. New rails and ties are being laid from the city line, where Woonsocket joins Cumberland, back to the Cumberland Street bridge near St. Ann's Church. Some changes are also being made on the North Main Street line. F. H. Brown, superintendent.

Cleburne, Tex.—J. H. Ransom, promoter of the proposed street railway in Cleburne, states that contracts for the steel rails will be awarded shortly. It is expected that construction work on the proposed system will begin in 60 days. [E. R. J., Aug. 15, '08.]

Abilene (Tex.) Street Railway.—O. P. Thomas, secretary of the Abilene Twenty-five Thousand Club, states that work is progressing rapidly on the Abilene Street Railway, track having been laid on three-fourths of the entire line, wires are up, and prospects are that cars will be running in about 15 days or 20 days.

Nooksack Valley Traction Company, Bellingham, Wash.—This company is reported to have completed the final location survey for its line between Bellingham and Ferndale. J. W. Rose, an active promoter of the road, states that work will be commenced on the construction as soon as the engineer in charge submits his report and the profiles are prepared. The preliminary surveys are now finished. It is said that the right-of-way will be all ready for the contractors within a few days.

Washington Water Power Company, Spokane, Wash.—This company is said to be considering the building of a 20-mile standard-gage line from Springdale, Wash., south to the junction of the Chamokane Creek and the Spokane River. It is said that work will begin within 30 days.

Pacific Traction Company, Tacoma, Wash.—It is announced that this company will make a number of improvements on its lines already in operation. This work will include the completion of the Steilacoom line, the double-tracking of the present line as far as the ball park and the building of the Point Defiance line. T. G. Seixas, manager, states that this work will be done at once.

SHOPS AND BUILDINGS

Connecticut Company, Willimantic, Conn.—This company has secured land for the erection of a car house for the new line which is now in progress of construction between Willimantic City and South Coventry. The land purchased consists of a tract of about four acres.

Terre Haute, Indianapolis & Eastern Traction Company, Richmond, Ind.—This company will enter upon the work of building and equipping an up-to-date passenger and freight station in Richmond in a few days.

Hanover & McSherrystown Street Railway, Hanover, Pa.—This company has begun work on the erection of a car house at the West End in Hanover opposite its present structures. The building will be 20 ft. x 45 ft., built of brick with three tracks, which will hold from 16 cars to 18 cars. This step has been made necessary by the increased number of cars which will be in use on the Littlestown extension. The new structure will contain every facility for repairing and cleaning of the rolling stock.

Lake View Traction Company, Memphis, Tenn.—This company, which proposes to build an interurban electric railway from Memphis to Clarksdale, Miss., via Lakeview, has secured a 60-day option on the old Y. M. C. A. Building on Union Avenue for a site for its passenger station. The company has been negotiating for the purchase of this property for some time. [E. R. J., Aug. 15, '08.]

Manufactures & Supplies

ROLLING STOCK

Municipal Traction Company, Cleveland, Ohio, has ordered a sample pay-as-you-enter car from the St. Louis Car Company and a similar car from the Cincinnati Car Company.

Nashville & Interurban Railway, Nashville, Tenn., has ordered three double-truck cars from the Danville Car Company.

McGuire-Cummings Manufacturing Company, Chicago, Ill., is asking prices on specialties for two combination passenger and baggage cars.

TRADE NOTES

S. K. Elliott, Cleveland, announces the incorporation of the business formerly conducted by him personally as the Elliott Brothers Electric Company under the name of the S. K. Elliott Electric Company, which with increased equipment is in position to handle with greater dispatch repairs and supplies for electric railways, central stations and isolated plants, and all correspondence hereafter should be addressed to the S. K. Elliott Electric Company, at 322, 324 and 328 Champlain Avenue, N. W., Cleveland, Ohio. The officers of the company are: S. K. Elliott, president and general manager; L. L. Myers, vice-president; C. P. Billings, secretary; C. W. Elliott, treasurer.

The International Register Company, Chicago, announces that its case for infringement of patent No. 559,321 brought against the Michigan Traction Company has been decided in its favor in the Circuit Court for the Southern division, Western District of Michigan, and that the decision was affirmed in the United States Circuit Court of Appeals for the Sixth Circuit. The International Register Company states that while the suit was nominally directed against the Michigan Traction Company, it was defended by the Sterling Meeker Company and that every annoyance to the Traction Company was studiously avoided by the complainants. The claims in the patent held to have been infringed were 9-14, 20-25 and 32-34.

Crocker-Wheeler Company, Ampere, N. J., in order to facilitate handling its increasing volume of mail at the Ampere post office, has built a brick and cement post office building on its grounds. The architecture is of a modern classical style which might be termed "federal." Upon the pediment above the main entrance is an eagle and United States shield in high relief. The interior of the building is finished in quartered oak and the floor is of mosaic tile. Upon the walls hang a facsimile of the Declaration of Independence, with the coats of arms of the various States, a constitution of the United States and an autograph letter and portrait of A. M. Ampere (1775-1836), after whom Ampere is named. The new building will still further beautify the grounds of the Crocker-Wheeler Company.

ADVERTISING LITERATURE

F. Bissell Company, Toledo, Ohio.—This company has issued its calendar card for September, entitled "It's for the Sole." The idea expressed is that the calendars are sent to impress upon those who get them that when they think of anything electrical they think of Bissell.

Colonial Sign & Insulator Company, Akron, Ohio.—This company has issued a booklet which describes a number of different porcelain specialties which the company manufactures. One of the company's leading specialties is a third-rail insulator made of clear porcelain and porcelain and other materials, making it semi-porcelain. The company also makes a line of porcelain sign letters adapted to park use.

The Raymond Concrete Pile Company, New York and Chicago.—This company has issued a new catalogue describing the Raymond system of concrete piling. The catalogue is of the standard size recommended by the American Society of Mechanical Engineers, 6x9 in., and contains 22 pages of text. The preface considers the points in favor of concrete piles as opposed to wood piles, and more particularly the superiority of Raymond concrete piles. The following chapters take up the method of making this company's piles, the influence of the shell upon the permanence of the piles, the advantages of the tapering shape of these piles, the economies, placement, reinforcement, carrying capacity, cost, standard sizes and specifications. These chapters are illustrated with a photograph showing a Raymond pile core and shell, as well as drawings illustrating its relative economy as compared with a wood pile. The last two pages contain a list of some users of this concrete pile.

Stromberg, Allen & Company, Chicago, Ill.—This company has just issued a complete catalog covering its line of supplies carried especially for railroad, office and station use. The articles described include ticket cases of various sizes and designs, tariff files, holder racks, punches, receptacle punches, dies for punchers, ticket daters, year wheels, dies for dating stamps, badges for employees, breast badges, uniform badges and checks. Many of the ticket cases described are adaptable for use by interurban railways, and the ticket punches are suitable to the requirements of both interurban and city railroads. The large stock of ticket punches and daters illustrated and described is supplemented by a complete line of general office supplies, which the company has illustrated in another catalog. The publication also calls attention to the facilities of the company for printing railroad tickets, passenger and freight tariffs, folders and booklets. Four departments handle each of the distinctly different yet closely allied features of the company's business.

Bristol Company, Waterbury, Conn.—This company, with whose name recording instruments have become synonymous, is now sending out bulletins Nos. 91 and 93 dealing respectively with recording thermometers, Class 1 for atmospheric temperature ranges to 250 deg. Fahr. and Class 3 for working ranges from 40 deg. to 800 deg. Fahr. These two bulletins together with No. 92 cover the list of Bristol's recording thermometers for all temperatures up to 800 deg. Fahr. and are believed to represent the most extensive list of recording thermometers in the world. As a result of the consolidation of this company with W. H. Bristol the Bristol Company will now manufacture the W. H. Bristol electric pyrometers in addition to the other instruments described. The bulletins mentioned contain detailed description of the instruments together with colored sample records and price lists. The record thermometers can be furnished with an electrical attachment for giving an alarm when the temperature arises above or falls below specified limits. The company has also issued a neat little folder showing some of its electrical recording instruments.

Gifford-Wood Company, Arlington, Mass.—This company has just issued Catalog D, in which its elevating and conveying machinery ice tools are described. Of especial interest to street railway managers is the perfection street ice leveler which is in use by a number of street railways. This machine weighs 250 lb. and is fitted with the company's patent Eureka teeth. It is fully described in a special circular which will be sent upon request. An announcement of importance is that the company is now making the designing and manufacturing of elevators and conveyors for handling coal a special feature. The company's engineering force has lately been largely augmented by experts experienced in the various means of handling coal whose services are subject to the requirements of those interested in lessening their operating expenses. This branch of the company has issued a special coal machinery catalog which may be had upon request. Large stocks of the company's products are carried by its representatives in Boston, New York, Philadelphia, Pittsburg, Detroit, St. Louis, Minneapolis, Omaha, Denver, Butte, San Francisco, Atlanta, Chicago and other cities, where they can be examined by prospective customers.

Andresen-Evans Company, Chicago, Ill.—This company has just issued a general catalog of its conveying machinery and grab buckets. The types of buckets described are the clam shell, the orange peel and the general grab buckets. In the Andresen-Evans grab, the closing chains are so arranged that the pulling on them is practically parallel to the line of resistance offered by the cutting edges, but at the same time far enough away to keep the chains out of the material. The power wheel is mounted on a separate frame beneath the shafts to which the scoops are pivoted, thereby obtaining large lever arms through which this force is applied. This gives a powerful leverage for closing at all points of the stroke. The grab buckets are built in two types, the two line type, called type A, and the three line type, called type B, which are in two different weights for each size. The lighter is designated as a coal digging grab and is designed for handling coal and other light materials and the heavier is designated for ore digging and is for handling heavier material or for difficult excavation work. A table of capacities and dimensions is given for each of the several types. The company's patented conveying bridge is illustrated by means of a line drawing, which shows a bridge with 500 ft. span with a 14-ton B ore digging grab bucket. The Andresen-Evans unloading and storage plant is also described.

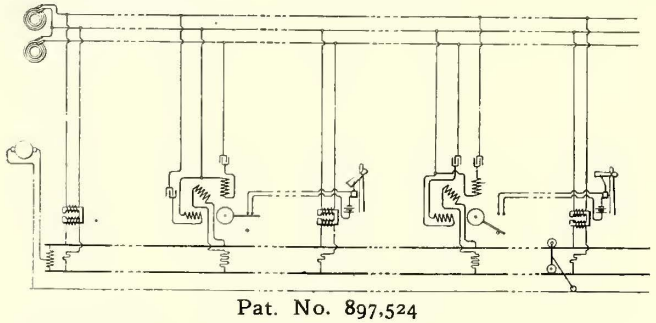
ELECTRIC RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockridge, patent attorneys, 41 Park Row, New York.]

UNITED STATES PATENTS ISSUED SEPT. 1, 1908.

Trolley-Catcher, 897,273; Michael G. Delaney, of Detroit, Mich. App. filed Aug. 30, 1907. A device for preventing the pole from rising when the wheel slips off the wire. The usual cord is held by a spring reel, which is engaged by a magnetically displaced detent, the magnet of which is in the car circuit.

Continuous Track-Light and Automatic Signal, 897,304;



Pat. No. 897,524

John M. Pitney, Jr., Lorain, Ohio. App. filed May 11, 1908. The tail-light of a train is pivoted and has a connection with the trucks so as to be properly directed when the train is passing a curve.

Rail-Stay, 897,307; John M. Scott, Racine, Wis. App. filed Sept. 25, 1907. The rail is clamped to the ties by hook-shaped castings, which are bolted together and extend downward on the side edges of the ties.

Electric Locomotive, 897,312; Elmer E. Sperry, of Brooklyn, N. Y. App. filed Feb. 7, 1908. A means for shortening the wheel base of trucks to permit the grouping of the drivers as closely as is possible with the proper arrangement of braking appliances. Includes a form of yielding transmission between the motors and the car axles.

Street-Car Fender, 897,345; David Hartwell Bazil and Alexander Bazil, Montgomery, Ala. App. filed Sept. 16, 1907. A plow is normally kept elevated, but is dropped into a position to deflect objects away from the wheels when tripped by a depending lever at the front of the car.

Electric Block-Signaling System, 897,355; John W. Davis, Los Angeles, Cal. App. filed Sept. 20, 1907. A block-signaling system including complete electrical and mechanical features. Has contact rails adjacent the usual track rails, and engaging brushes depending from the locomotive.

Operating Mechanism for Fare Registers, 897,391; John F. Ohmer and Frank G. Colby, Dayton, Ohio. App. filed July 10, 1907. Has two register mechanisms and flexible means consisting of a pull rope connected with the mechanisms of both registers, whereby one or the other may be operated, and means of preventing the operation of one mechanism while the other mechanism is being operated.

Electric Signaling System, 897,401; Harry C. Reagan, Butler, Pa. App. filed May 27, 1907. A signaling system having a safety stop-bar operated through a signal wire for drawing the trolley pole downward to disconnect it from the source of power in case of danger conditions.

Trolley Finder, 897,402; Joseph P. Reed, Muncie, Ind. App. filed May 4, 1908. Includes a pair of arms pivoted coaxial with the trolley wheel, adapted to swing upward to guide the wheel onto the wire.

Pneumatic Control System, 897,484; Philipp Pforr, Berlin, Germany. App. filed April 19, 1907. An air-brake system having main reservoirs on a plurality of cars, a reservoir pipe for equalizing the pressures in the several reservoirs, contact devices in the motor circuits, and pneumatically operated actuating means therefor connected to said reservoir pipe.

Automatic Tramway Switch, 897,511; Emil L. Anderson, Philadelphia, Pa. App. filed Feb. 17, 1908. Includes a roller mounted on a frame on car trucks so as to be depressible to engage a tappet adjacent to the usual track rails, and which moves the switch point.

Power-Applying Apparatus for Operating Switches, Signals and Other Devices, 897,516; Walter J. Bell, Los Angeles, Cal. App. filed Aug. 7, 1905. Has a liquid means for control of the pneumatic means. Includes a particular construction of valve for controlling the liquid and the air pressure.

Block-Signal System, 897,524; Fred B. Corey, Schenectady, N. Y. App. filed Nov. 2, 1906. A signal controlling relay having one winding connected to the track rails and a plurality of windings supplied with current from a plurality of different circuits carrying currents of different frequencies and co-operating with the track-winding to control the signal.

Block-Signal System, 897,531; Laurence A. Hawkins, Schenectady, N. Y. App. filed Feb. 19, 1908. An overlap block signal system for trolley roads, having alternating current connections with the ends of the blocks, and relays connected to the rails at the center of the blocks.

Stringer and Tie, 897,592; John W. Cooper, Boston, Mass. App. filed Aug. 24, 1907. Patentee has a form of rail adapted to dovetail into an engagement with a supporting stringer.

Controller Regulator, 897,602; Frederick M. DuBois, Syracuse, N.Y. App. filed Jan. 2, 1906. The controller handle has a detent which depends into a zigzag groove so as to prevent a too abrupt movement of the controller.

Automatic Calling-on Signal, 897,607; William H. Elliott, New York, N. Y. App. filed Dec. 24, 1907. Has a means whereby a special signal is displayed under certain conditions at the entrance to a block so as to permit a train to pass the regular danger signal.

Recording Device for Block-Signal Systems, 897,618; Timothy Haley, Xenia, Ohio. App. filed Jan. 27, 1907. Has a mechanically depressed tappet at the entrance to a block which is connected to recording mechanism to indicate the passage of a train at such point.

Tramway Switch, 897,627; Frank J. Kendrick, Schenectady, N. Y. App. filed Oct. 25, 1907. A roller mounted on a laterally swinging arm can be moved into a position where it vertically depresses a tappet in the roadbed to throw the switch point.

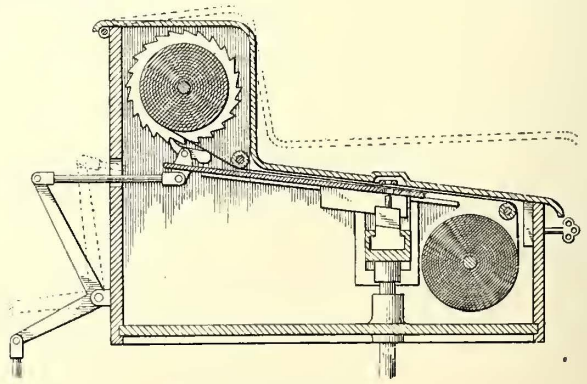
Electric and Pneumatic Governor, 897,657; William K. Rankin, Philadelphia, Pa. App. filed Dec. 11, 1907. A form of pneumatically operated circuit-breaker for air compressors. The circuit-breaker switch arm is clutched in engagement with the motor shaft by the movement of a diaphragm.

Trolley Wheel, 897,667; Edward P. Sharp, Buffalo, N. Y. App. filed Dec. 26, 1905. A trolley wheel built up of a central tread portion, and removable flange portions secured to the tread portion by riveted over-portions of the hub.

Car Replacer, 897,673; Berry Strickland, Compass Lake, Fla. App. filed April 20, 1908. A car replacer, including a plurality of short rails which are clamped adjacent to the usual track rails by straps.

Electric Signal System, 897,702; Anthony A. Barbera, Philadelphia, Pa. App. filed Feb. 28, 1908. A signal system including contacts supported by wires disposed adjacent to the usual track rails, which are engaged by brushes on the locomotive.

Rail Splice, 897,707; George W. Blanchard, of St. Louis, Mo. App. filed March 29, 1907. In place of the usual joint, patentee has rails with rabbet ends which are transversely bolted together. The bases of the rails are enclosed in a rigid boxlike casting.



Pat. No. 897,618

Amusement Apparatus, 897,710; Peter Braen and John Braen, North Paterson, N. J. App. filed Jan. 24, 1908. An amusement device analogous to a ferris-wheel, but having a spiral track so that the car ascends and descends from the wheel by its rotation.

Rail-Joint Chair and Fastening, 897,751; Modeste Lachance, St. Johnsbury, Vt. App. filed June 6, 1907. A form of fish-plate having an underhanging ledge so as to entirely embrace the base of the rail.

Rail Fastener, 897,828; Oliver A. Hall, Omaha, Neb. App. filed Nov. 14, 1907. In place of spikes, patentee has clamping blocks with a plurality of ribs, which engage a fixed block forming part of a concrete tie.