Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, April 19, 1919 *Number* 16

Where Is the Economic Limit in Reclamation Work?

MUCH credit is due the master mechanics and engineers who have kept the electric railways going with little of new materials during the past few years. Repairing has become a real art with them, and the scrap heap has yielded many a repair part that in palmier days would have been sold to the junk man. The possibilities of this reclamation work are so great that there is danger of overlooking the economical limit to which it can be carried. Such a limit obviously exists, although it has probably not yet been approached in most cases. A few months ago it would have been useless to raise this point, for the question would have been settled at once by reference to the impossibility of obtaining any money with which to buy replacement parts or new equipment. As business returns to a more stable basis this condition should not prevail, certainly not to the same extent as during war times.

If the "powers that be," including the public utility commissions, get the notion that railways can be maintained indefinitely by reclamation work they will not feel the urgency of providing new money for betterments. The engineers should, of course, make the most of their ability to repair track, rolling stock, motors, etc., but they should analyze their costs carefully so as to be able to demonstrate the unwisdom of carrying a good principle too far. Good engineering consists in making the dollar go as far as possible in producing results in technical lines. The engineers have performed wonders recently. They cannot be expected to do the impossible.

Mr. Ford's New Car May Be a Wonder, But——

HENRY FORD'S success with the automobile that bears his name compels one to grant attention to anything new he may project, even though we may be most skeptical of his ability to produce a gas-driven car which will compete with a modern electric car in weight per seated passenger or in all-day operating cost.

This idea, of course, is not new. Indeed, the subject of displacement of the electric motor by the gasoline engine has been under vigorous discussion for five years, especially by those who are so close to the marvels of our most-recently developed prime-mover that they lose their sense of perspective. Reasons favoring the gasoline drive are, briefly, a very low first cost and a fairly low weight when compared to electric car equipment. Reasons against gasoline are a prohibitively high cost of energy and, to some extent, difficulty and expense in maintenance.

Neglecting the two minor reasons pro and con, one is impressed that there may be two possible fields for the gasoline-driven street car; on steam railroad feeder lines of light traffic and—more important—on city surface systems for use only as an adjunct to handle peak loads. The curse of a short rush hour is one of the worst burdens of the industry and almost anything would be acceptable if it would reduce fixed charges on equipment used only for two hours of the day. During the peak load, also, electric power is expensive, and this goes to offset the high cost of gasoline fuel.

During the off-peak hours, however, the exact reverse is the case. Gasoline for the average day's work of a surface car, costs about four times as much as electric power, under the most favorable circumstances. A 70-ton car making three stops per mile should run 4 miles per gallon of gas, which would make the fuel cost at least 4 cents per car-mile. The same car, electrically operated, would cost about 1 cent for power, and hence the substitution of gasoline-driven units of equivalent size would involve an increase of the order of 3 cents per car-mile. Can any surface railway operator imagine benefits from the gasoline drive sufficient to offset an increase of 3 cents per car-mile in the cost of all-day operation, and also to carry the overhead charges of the equipment discarded? In consequence we don't expect a revolution in the industry, though we acknowledge we are glad to find that Mr. Ford recognizes that city passenger traffic must be carried on rails and not on rubber tires. If he can come through with a substantial, thirty-seat car at about $2,000, it might help to solve our rush-hour problem.

For the solution of that problem and others even worse we are sure that Mr. Ford can rely upon the cooperation of the progressive safety car equipment manufacturers and operators who have done so much in recent years to accomplish electrically what Mr. Ford believes can be done with an internal combustion engine. Let Mr. Ford see what he can do provided he pays the bills for the experiment.

Securing Both Unity and Diversity in Engineering Association Work

THERE are three aspects of the work of the American Electric Railway Engineering Association which demand attention, both during the year and at the annual convention. There are, first, the details of each subdivision of the engineering field; second, the more general engineering problems in which all subdivisions are more or less concerned, and, third, the relation of the engineering departments to the whole transportation business. Engineers, like everybody else, are apt to "keep their noses too close to the grindstone," and have in many cases not proved as widely useful to their employers as they might. One function of the Engineering Association is to prevent this, to give its members a wide outlook. Obviously, if engineers are to rise to managerial positions, for which their train-

ing well fits them, it will be necessary for them constantly to be applying in their own departments and outside, where possible, the principles which make for good service to the public. Here is one place, among others, where the association fits in by suggesting how best this can be done.

Much of the committee activity of a technical society must be devoted to routine work—monotonous and boring to anyone but the specialist. Who but he cares whether a $\frac{5}{8}$-in. or a $\frac{3}{4}$-in. stud is used in a suspension insulator (except as this affects maintenance costs), or whether two or three strands more or less are used in a copper or steel cable? These things are vastly important but they do not conduce to enthusiasm and inspiration. In the case of the Engineering Association they form only the groundwork of its activities. Much more interesting are such matters as automatic substations, wood preservation, use of hand and power tools in track construction, how the welding processes are aiding in reducing maintenance costs, etc. It is extremely important that engineers be wide awake as to developments like these because the management naturally looks to them at least to recommend every possible improvement in the service. In many cases recently the technical men have pointed out conservation possibilities that have greatly helped in keeping the wheels turning when these same wheels showed a marked tendency to stop.

At the coming convention of the American Association the engineers will have before them a great opportunity for holding a meeting unprecedented for interest and helpfulness. This can be brought about by choosing a few live, very live, topics for discussion, and getting men especially well qualified to discuss them. Let's keep detail in the background, arranging if necessary for the specialists to get together in groups to go over matters which affect only their respective selves.

Returning Soldiers and Sailors Should Make Good Railroad Men

RAILWAY companies should not overlook the opportunity now offered of recruiting their forces from the returning soldiers and sailors. Figures of the United States Employment Service show that of those mustered out about 35 per cent are without immediate prospect of positions, yet the training which they have received has been such as to fit them excellently for the semi-military duties and discipline of electric railway employment. They are used to being on time and carrying out instructions, and to be prompt in emergencies, particular in their personal appearance and deportment and conscientious in their execution of work assigned to them. Moreover, each man, before entering government service, had to pass a rigorous physical and mental test. All of these qualifications apply equally well to military and to railway employment. Even for many of the disabled men, railway service affords many openings, as for street inspection, in the shops and substations and sometimes, perhaps, on the platform. The Federal Board of Vocational Training looks out particularly for the disabled men and can explain what provision the government makes for them, while the general subject of securing employment for the returning soldiers and sailors is in charge of the United States Employment Service. Each of these organizations has branch offices in the principal cities in this country. In addition, many of the returning divisions have appointed committees to help the men from their own division and locality to get back into industry. As a matter of patriotic duty as well as of self-interest the subject should appeal to electric railway companies.

Rising Costs in Conducting Transportation Offset by Real Engineering

WE HAVE more than once referred to the necessity for railway management to see to it that their engineering staffs are adequately paid. The columns of this paper are almost constantly reporting ways and means devised by engineers, which have resulted in exceptionally large savings in maintenance costs. Such accomplishments are not and cannot be wholly the result of extraordinary talent so much as they are the result of a combination of ability and long training in what is now a rather highly specialized field. It is no longer true that almost any man can successfully maintain the equipment, power houses, overhead work and track of an electric railway. Neither the ability nor the length of service for the training so requisite can be had unless the salaries and inducements for advancement are sufficient to secure and hold competent men.

We may be asked why we are referring to this subject at a time when wages in general are soaring. It is because engineering salaries in the electric railway field have not kept pace with wages in other departments of railway service or in other branches of engineering, and because we feel that there is need for careful consideration of the matter by the managements if really competent engineers are to be retained.

The recent presentation of a proposed new salary scale for railway engineers to the government railroad administration by the American Association of Engineers plainly shows that something must be done to provide engineers with salaries at least commensurate with the wages received by mere brawn, if we are not to have wholesale desertions from the railroad engineering ranks in favor of jobs in more lucrative fields. The railway engineer may well ask "Why continue as an engineer when the freight conductor gets the fatter pay envelope?" Mere professional pride will not long offset the high cost of everything which affects the engineer just as much as the freight conductor.

While discussing this matter recently we were asked point blank to explain how the engineers could stop the wage increase for platform men. The answer was ready. We stated that while the engineer could not stop wage increases he could, in many cases, if allowed to have more say or if some of his schemes for savings were earnestly tried, be able to save enough in reduced expense to offset the wage increase. We have in mind a case where a maintenance engineer was permitted to try out one of his theories and the net result was that along one line of effort alone, he effected a saving in maintenance expense which amounted to two-thirds of a $300,000 wage increase for platform men. We also recall the article in our March 22 issue by W. R. Dunham on rail conservation which gave concrete proof of the fact that the engineers are contributing their full share to keep the industry off the rocks.

The time is ripe for a fuller appreciation of what the engineers in charge of the various phases of electric railway maintenance are doing, and a part of that appreciation should be given through the medium of more adequate salaries.

Reasons for Thinking Prices Will Remain High

THERE are many reasons for believing there is to be no material decrease in the prices of material and labor at an early date and, indeed, that we are on a definite higher-price level. We have already quoted the opinion in favor of this view of Prof. Irving Fisher, who pointed out, in his address at the White House conference on March 3, that our gold reserve is now three times as large as in 1914 and that our credit instruments, in the form of demand deposits and notes, have increased about twofold during the same period. In addition, it is urged that labor will not be satisfied with a reduction in wages, and as the cost of labor is the greatest factor in the cost of all material produced, there is no reason to expect any material change in current prices.

This testimony is strikingly confirmed in a paper on "Prices, Yesterday, To-day and To-morrow," read at the Editorial Conference in New York on April 11 by O. P. Austin, statistician National City Bank of New York. Briefly, Mr. Austin attributes the present increase in prices to the inflation of the world's currency, coupled with the "scarcity demand" and the consequent increase in labor costs. He sees no immediate outlook for a reduction in either factor, so that no general reduction in prices may be expected, in the near future at all events.

If this is the case, it is important in its bearing upon public utilities. There is no use of either a company or the public postponing action on rate cases, hoping, like Mr. Macawber that something will turn up to help matters or that there is some Aladdin who can rub a magic lamp and in some unaccountable way change the situation.

The public is beginning already to think automatically of the present level of prices for most of the commodities which it buys, and the sooner the minds of everybody act in the same way about railway fares, the better. Actually, of course, viewed from the standpoint of the purchasing power of money, electric railway companies are not asking for any higher fares than they had before the war. This is because when measured in commodities and labor, 8 cents or so to-day are worth no more than the nickel was in 1914. The public should be brought to understand, therefore, that railway companies' pleas are not for fares of a higher value than formerly, only that their fares shall not be cut down because of the war.

A previous but exaggerated example of the present situation is the condition in the California mining towns during the gold rush days of '49. Then, according to report, a plate of ham and eggs cost $5, a pair of boots $75, carpenters' wages were $50 a day, and so on through the whole list. The reason for this was just that which exists to-day, namely, a relatively large supply of currency, a relatively small supply of goods or commodities, and a great need of commodities. We are not on the California gold rush basis but we are nearer it than in 1914. There may have been some decreases in price during the past six months in certain of the distinctively "war" materials, like steel and copper, but, on the other hand, there is no evidence of any reduction in the cost of labor which constitutes by far the largest item of expense in electric railway operation. In fact, the demands are for still greater pay and for shorter hours.

All-in-all, the lesson which must be drawn from the present situation is that the sooner we adjust all of our business, including our public utility rates, to existing conditions the better. There is no longer any excuse for living in the fool's paradise of expectations of an early return to pre-war prices.

Getting Shop Forces Back on a Satisfactory Working Basis

FOREMEN and shop superintendents find the conditions confronting them now in many respects quite as trying as those encountered during the war. While we were actually in the conflict the public was willing to put up with some inconveniences, and it was not over-critical regarding transportation facilities or such incidental matters as the appearance of cars. Department heads had to be satisfied with unskilled labor. Women, old men and boys constituted the bulk of the working forces, and much time was spent devising new methods for using this class of workers to advantage and for training them to fulfill the requirements. Now the traveling public expects the service to be equal or superior to that of pre-war times. Satisfactory service requires efficient maintenance, and this in turn can be accomplished only with skilled labor.

The problem for the employer is first to find a way to offer sufficient inducement to attract the skilled employee, and second to make conditions and surroundings sufficiently agreeable so that the employees will remain. To accomplish this, wages must be kept on a level with the market, and working conditions must be better than the average. The underlying motive for all labor is a desire for gain. All workers must have the necessities of life and all desire some of the comforts. Ambition should be stimulated and if good performance is followed by promotion and higher pay, the laborer is given something to work for which the old dead-level wage system discouraged. There must also be a certain amount of flexibility in rates of wages in order to get the most economical results. The plan of "hiring" men when work is plentiful and "firing" them when work is slack should be replaced by a carefully worked out system of schedules which will spread the work out uniformly over the entire year and so give all-year-round employment. The slack season will thus disappear and the work will be performed better by a smaller force of skilled workmen. For example, if painting schedules are co-ordinated with those for overhauling the equipment, cars can be returned to service in much shorter time and considerable duplication of work can be avoided.

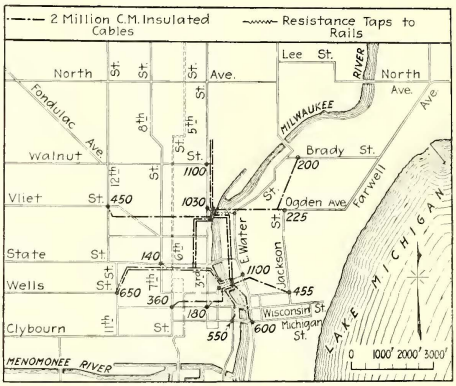
Modern working methods instill confidence in the workmen, make the work more attractive and prevent accidents. Working conditions must be agreeable if the quality of labor is to be kept high. The type of labor needed by electric railways comprises men who can think for themselves and who will remedy troubles because they know from what these troubles result. Supervision must be intelligent if the efficiency of labor is to be increased. Co-operation of managers, foremen and workers with frequent meetings to perfect and work out plans for improvement will raise the standard of the working forces and increase the efficiency of all departments. Such a correlation may prove to be the best first step toward getting the working forces back to a satisfactory basis.

Bureau of Standards Studies Return Circuit Conditions in Milwaukee

Report Recently Completed Is the First Prepared at the Request of a Public Service Commission

BY E. R. SHEPARD
Electrical Engineer of the Bureau of Standards

DURING the summer of 1918 the Bureau of Standards supervised an electrolysis survey in the city of Milwaukee. The survey was made at the request and under the authority of the Wisconsin Railroad Commission, following an appeal by the Milwaukee Electric Railway & Light Company to the commission for an investigation as to the adequacy of the protective measures provided by the company for preventing interference with service furnished by public utilities using sub-surface metallic structures. Following the usual practice of the bureau in conducting surveys, a temporary electrolysis committee was organized. This was composed of representatives of several interested utility companies and city departments, and an engineer of the commission who acted as chairman of the committee was also appointed. The members of this committee acted for their respective companies in all matters pertaining to the survey and jointly supplied such labor, material and transportation as were required. Several technical assistants were furnished by the railway company and the Wisconsin Telephone Company, and through the employment office of the former additional help was secured. The railway company and the telephone company each furnished a motor truck for the work and the other companies, when called upon, supplied help to aid in making measurements on their particular systems. An engineer of the commission was detailed to the work. He devoted practically his entire time to the investigation, which was in progress for about seven weeks.



LAYOUT OF INSULATED RETURN FEEDERS

Several meetings of the committee were held at which the progress of the work was reviewed and plans for improving conditions were discussed. These meetings were of an informal nature, and they were not confined to the committee members. The large attendance and active discussion at these meetings was evidence of the importance which the companies attached to the subject of electrolysis investigation.

About 120 pairs of wires were loaned by the Wisconsin Telephone Company for the period of the survey and these were used as pilot wires for making overall and potential gradient measurements on the tracks. An accompanying illustration shows the installation of one of these pilot wires across a wood-block pavement to its point of connection to the track. Various methods were employed to protect the wires where they crossed paved streets. The wires were usually buried between wood or stone blocks or laid in a narrow trench cut in asphalt pavement. These pilot wires, which were connected at practically all important intersections on the track network, were trunked through to a terminal board in the Grand Exchange of the telephone company. A map of the traction lines was mounted on the terminal board and the pilot wires were terminated in binding posts attached to the map at the points corresponding to the field connections. This arrangement greatly facilitated the making of measurements and afforded considerable interest to lay visitors as well as to engineers. In an illustration on page 772 is shown the test board with five Bristol, smoke-chart, recording voltmeters connected for track gradient measurements.

The following observations were made with recording voltmeters: Twenty-one over-all potential measurements on the tracks; 172 track gradient measurements; 230 potential difference measurements between water hydrants and tracks; thirty-five measurements of current flow on insulated negative feeders; fourteen measurements of current flow on water pipes.

Indicating instruments were used to make potential measurements between cable systems and other structures as follows: Wisconsin Telephone Company's cables, 190 locations; the Milwaukee Electric Railway & Light Company's cable, ninety-four locations; city cables, seventy locations.

A number of miscellaneous measurements and observations were made in addition to those enumerated. The Western Union and Postal Telegraph Companies made the records of their annual surveys available to the bureau, so that additional measurements on these systems were considered unnecessary.

Following is a brief resumé of the facts as brought out in the report of the Bureau of Standards to the Wisconsin Railroad Commission.

Considerable electrolysis of water and gas mains and services occurred in early years, principally in the vicinity of the Oneida Street station which for a time was the only source of railway current in the city. This trouble was somewhat mitigated by bonding the watermains to the return circuit at a number of points. Damage to underground structures has continued, but in recent years has been much less severe than formerly. Gas service pipes have been damaged in some locations by discharge of current to drained cable systems with which they come in close proximity.

The number of supply stations has been increased to five within the limits of the city proper and a large amount of negative copper has been installed for the sole purpose of reducing electrolysis. Between 1900 and 1912, the railway company installed upward of 350,000 lb. of bare, negative cables to supplement the rail return. This copper was connected in parallel with the tracks and was very effective in increasing the conductivity of the return circuit and in shunting open rail joints. Electrolysis conditions were greatly improved by the installation of this copper, although equally good results could have been secured with greater economy by the use of insulated negative feeders and good track bonding.

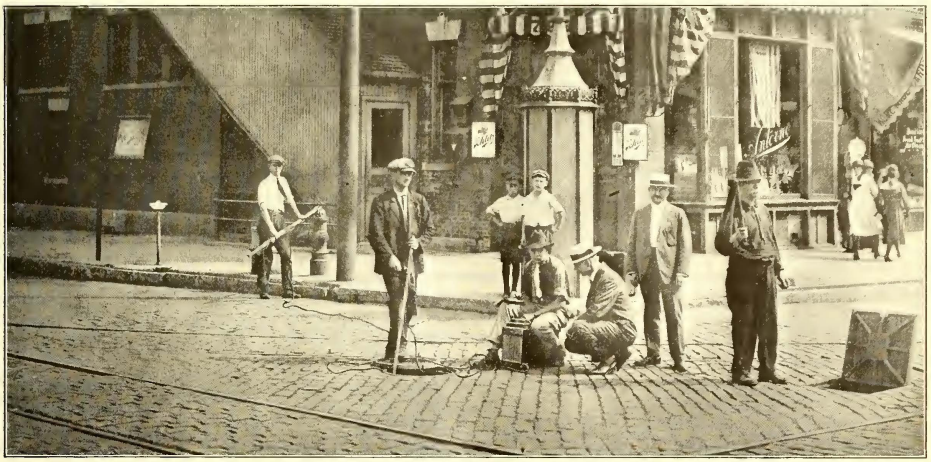
Since 1912 the railway company has installed about 420,000 lb. of copper as insulated negative feeders, most of which is in the form of lead-covered cables in ducts. This installation is said to have cost more than $114,000. A large part of this copper was installed in 1916 and 1917, and some feeders were not installed until September, 1918. In 1917 the Twentieth Street substation was converted for three-wire operation and has since been operated in that manner during the morning and evening peaks.

These various mitigative measures, together with some supplementary pipe and cable drainage, have greatly improved electrolysis conditions in all areas. Track gradients and overall potentials have been reduced to reasonably low values, and the additional protection required for the pipes in some districts can be secured by minor and auxiliary improvements.

Larger Part of Current Returns over Insulated Feeders

The insulated negative feeder system in the central district of the city is shown in the accompanying map. It will be noted that two power stations operate in this territory, but as they are close together and their negative buses are connected by heavy tie lines they must be considered as a single station from the standpoint of return current. The total average load on these two stations is 7065 amp. of which 4935 amp., or 70 per cent, is returned by the insulated feeders and 30 per cent by the resistance taps to the tracks immediately adjacent to the stations. In the three other substation districts the percentages of the toal loads returned by the insulated feeders are 71.5, 62.7 and 63.5 respectively. In the central district there is in use 35,400 lb. of copper per 1000 amp. of average load in the form of insulated negative feeders and for the five stations combined the value is approximately 32,700 lb. per 1000 amp. In St. Paul, Minn., where the Bureau of Standards made a similar study in 1917 and where a fairly adequate insulated negative feeder system is in use, the corresponding figure for the entire city was found to be approximately 35,700 lb. per 1000 amp. of load.

The average value of the twenty-one overall track potential measurements was 5.6 volts, and three exceeded 10 volts. Similar measurements made in Omaha in 1916 gave an average value of 10 volts for the thirty-three "overalls" taken, seventeen of which exceeded 10 volts. No insulated feeders were employed in Omaha at that time and these values have since been very greatly

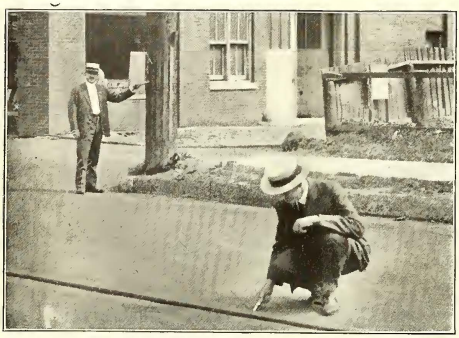


TESTING FORCE IN ACTION

reduced by the adoption of three-wire operation. In 1917, twenty-three overall measurements were made in St. Paul, the average being 6.2 volts, with four exceeding 10 volts.

Pipes Positive in Rails in Many Cases

Of the 230 potential difference measurements between water hydrants and tracks, seventy-seven showed the pipes to be positive to the rails. In thirty locations the pipes were positive by more than 0.5 volt and in seven locations by more than 1 volt, all quantities being average values.



PILOT WIRES INSTALLED IN WOOD-BLOCK PAVEMENT

The recommendations embodied in the report do not call for a further extension of the insulated negative feeder system, although some minor changes in the existing system are suggested. Electrolysis conditions during the three-wire operation in the Twentieth Street district were found to be greatly improved, and this form of operation is recommended for the Clinton Street substation district in the southern part of the city. It is strongly recommended that all rail joints having resistances in excess of 10 or 12 ft. of adjacent rail be repaired as rapidly as conditions permit and maintained to that standard.

In locations where the pipes are found to be positive to the tracks by more than 0.5 volt after other improvements are carried out, restricted and supervised pipe drainage is recommended to take care of the residual potential. Some of the drainage connections which were made years ago are still in service but the currents carried by them have been greatly reduced by the installation of negative return feeders. One of these for which records are available connects an 8-in. cast-iron water main at Third and Poplar Streets to the negative bus at the Commerce Street station. In 1911 this cable carried 308 amp.; in 1912, 133 amp. and in 1918, 29.7 amp. This is an excellent example of the difference between pipe drainage as a primary and as a secondary means of electrolysis mitigation. General and specific recommendations for the protection of the various lead cable systems are included in the report.

The need for a permanent electrolysis committee is emphasized in the following concluding paragraph of the report:

"If the full benefits of this investigation are to be attained, it is of the greatest importance that steps be taken to establish some kind of a permanent organization through which the various interested companies and city departments can co-operate to maintain adequate electrolysis protection. The recommendations contained in this report are, in some instances, necessarily indefinite and conditional, and their adoption will require co-operation on the part of the several companies. Extensions of underground structures and changes in the railway negative circuit will call for partial surveys and additional mitigative measures from time to time. All of these matters make it imperative that a continuing committee be established if future, as well as present, protection is to be secured."

Such a committee was organized on Jan. 6, 1919, and arrangements were made for quarterly meetings. Following is the personnel of the committee: R. B. Brown, general manager, Milwaukee Gas Light Company, chairman; G. G. Post, electrical engineer, The Milwaukee Electric Railway & Light Company, secretary; H. P. Bohman, superintendent Milwaukee Water Department, treasurer; W. D. Hobbins, engineer Wisconsin Telephone Company; C. H. Jones, electrical engineer Chicago, North Shore & Milwaukee Railroad; F. W. Walker, general manager Milwaukee Northern Railway, and E. F. Jeffrey, engineer Western Union Telegraph Company. In addition to the above a representative of the Wisconsin Railroad Commission is to be present at each meeting, but he will be a non-voting member.

The cost of the survey, which totaled $3,165, was divided among the several interested companies. A large part of this was entailed in connection with the installation of the pilot wires and did not represent a cash outlay as the work was performed by regular field crews of the telephone and railway companies which took care of it in addition to their regular duties. Only the field service of the bureau engineer was charged to the job, the report being prepared at Washington at the expense of the bureau.

TEST BOARD AND RECORDING INSTRUMENTS IN TELEPHONE EXCHANGE

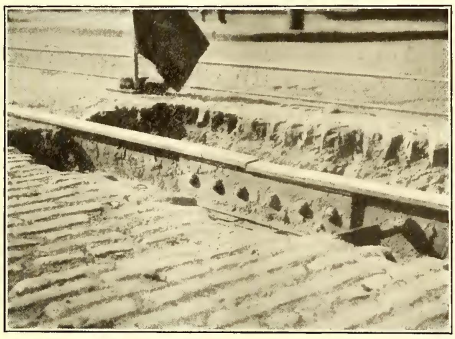
The Birmingham Railway Light & Power Company, Birmingham, Ala., has started operating its new brass foundry. From now on, brass parts necessary for replacements and for the repair of cars will be cast in the company's own shop.

The Reclamation of Electric Railway Track By Welding and Grinding*

In This Article the Virtues of Various Types of Welding and Grinding Equipment Used by The Connecticut Company Are Discussed and Their Adaptability to Various Requirements Is Pointed Out

BY H. JACKSON TIPPETT
Assistant Engineer The Connecticut Company

IN 1914 the management of The Connecticut Company approved a request of its engineering department for the purchase of power tools and equipment, for the purpose primarily of using them in arresting the rapid deterioration of the rail joints in general and of those in paved streets in particular. In the perfect track structure in city streets, the life of the whole track is determined by the life of the rail, and the life of the rail itself by that portion most liable to injury, namely, the rail end. It will probably never be known how many have been the attempts to solve the problem of constructing a perfect rail-to-rail connection. Recognizing the fact that the rail connections are the weakest points in the track structure, efforts have continuously been made to increase the length of rails and thus to decrease the number of joints. The economical limit has for the present been reached at 62 ft. What must have been the anxiety of the track maintenance man when the rails as originally laid were 3 ft. long or twenty times as numerous as at present?



A BADLY-CUPPED T-RAIL JOINT

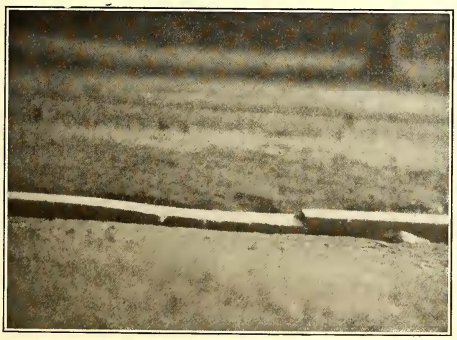
Before the introduction of rail-grinding machines there was no satisfactory way of overcoming the distortion of the rail head at the rail end. Every effort was made to arrest it by the use of better foundation, better rail support on the tie and better mechanical rail fastenings. Hardening the rail steel itself by increasing the carbon content was also resorted to. Investigation into the cause of rail failures showed that rails from the same mills, of the same section and weight and rolled at the same time, were often not exactly the same in height and head dimensions. The difference was so slight that many considered it negligible but therein lay the root of rail joint trouble when a joint otherwise perfect had been made.

GRINDING MACHINES HELP ELIMINATE THE TROUBLE

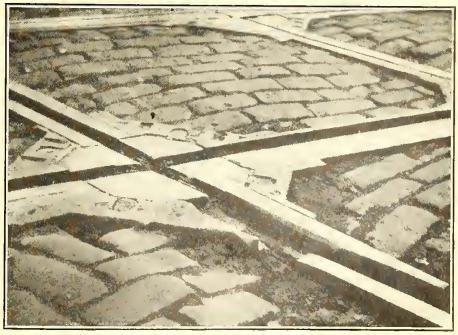
Once the importance of this fact became fully recognized among engineers, means of removing this inequality in rail heads by grinding were adopted throughout the country. Many engineers now grind new rail ends as soon as possible after they are connected up and paved in. This grinding is, of course, of a very light nature and is purely a preventive measure, but its value cannot be overestimated.

The purchase of a Reciprocating grinder was author-

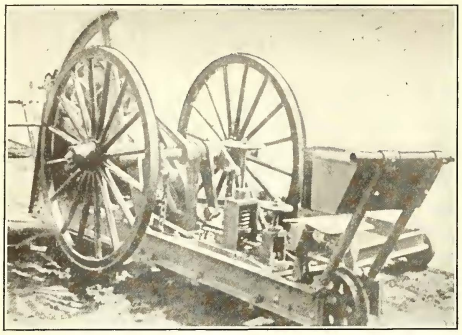
*Abstract of paper read before the Connecticut Society of Civil Engineers of New Haven, Feb. 18, 1919.



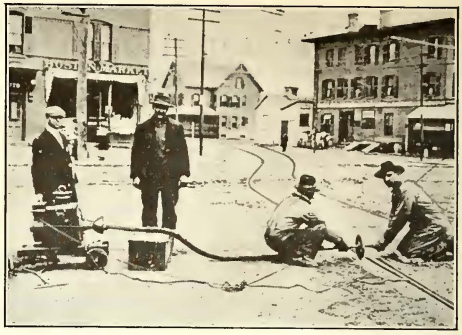
BROKEN JOINT ON NEW BRITAIN AVENUE, HARTFORD



BROKEN RAIL HEAD IN CROSSING FROG



RECIPROCATING TYPE OF GRINDER



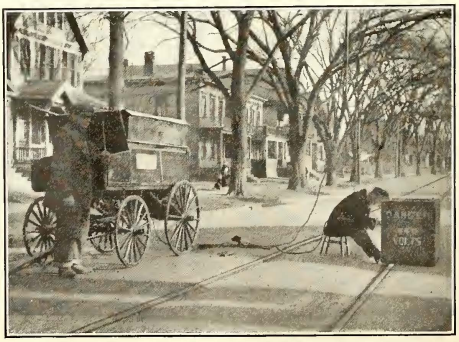
GRINDING A GROOVE IN SPECIAL WORK

ized in December, 1912, for use in the New Haven Division of this company. This machine is eminently suitable for "preventive" grinding work on new track. It is a grinder of the planing or scrubbing type. The mechanical arrangement for producing the planing action consists of a crosshead and block holder, which slides bodily in guides and is driven by a simple crank motion and connecting rod from a 3½-hp. motor taking its power from the trolley wire. The larger hand wheel shown in the illustration of this machine regulates the pressure of the grinding blocks on the rail, while the smaller wheel holds the blocks to prevent end play and adjusts them for vertical wear. The length of the grinding surface is 17½ in., the stroke is 5½ in. and the speed is 350 strokes per minute. This machine is the largest and most expensive of those used by this company, which has now five of these machines with two more on order. More than 20,000 ft. of rail was ground with this type of grinder in Bridgeport alone in 1918.

There is another type of rail failure that can be successfully reduced by the use of this machine, that is rail corrugation or the breaking down of the steel in the rail head into a series of regular waves. This creates a condition of rail which is often more widespread in its damage to pavement and rolling stock and more annoying from the noise caused than bad joints are. It is a noteworthy fact that corrugation is much more in evidence on grooved rail than on T-rail.

The Stow grinder shown in another illustration has been used for many years for grinding in a small way. Its particular field of usefulness, owing to its flexibility, is around special work where grinding in the groove is required. A new method of track reclamation appeared late in 1912, with the advent of the electric arc welder. To J. M. Yount, master mechanic United Railroads of San Francisco, must be given the credit for developing and adapting the process of electric arc welding with the use of the metal electrode to general repairs on electric railways. Of the various arc-welding processes, this method has at present the widest use. The purchase of the first Indianapolis arc welders by The Connecticut Company was authorized in 1914 for use on the Hartford division. Since that time similar welders have been furnished to four other divisions. In an accompanying illustration from a picture taken on Park Avenue, Bridgeport, the welder is seen mounted on four wheels. It consists of a battery of resistance grids. The current is drawn from the trolley wire at about 600 volts and the voltage is reduced by the resistance to about 250 across the arc. The metal rod in the hands of the operator forms one electrode and the rail forms the other. The rod acts as electrode and filler at the same time, automatically attaining the melting temperature and being deposited in a molten state at the point of contact with the rail. The operator wears a hood to protect his face, and colored glasses to neutralize the ultra-violet rays and prevent damage to his eyes. The work is screened from the view of the public for the same reason.

A cupped rail should not be surface welded if there is any vertical movement between the rail ends. The first operation necessary before welding is to tighten up the joint. If the plates are badly worn, mere rebolting will not prove effective for long. This has led to the expedient of first welding the old plates to the rail after they have been cleaned off and bolted up as tightly as possible. A fourth illustration shows a badly cupped T-rail joint on Grand Avenue, New Haven. Prior to the use of the arc-welding process the repair of such a joint would have necessitated cutting in a new piece of rail, usually about 4 ft. long. While this would allay the trouble temporarily, it left the job with two joints to be cared for in future in place of one. A broken rail, on New Britain Avenue, Hartford, is shown in another illustration. This joint was welded in 1911 by the Lorain method. The joint bars held perfectly, as is



REPAIRING A BAD JOINT BY WELDING, ON PARK AVENUE, BRIDGEPORT

invariably the case, but the rail head broke above the bar. The repair was effected by welding in another piece of steel between the under side of the rail head and the top of the bar. In another case the break occurred around one end of the Lorain bar. To connect the two broken rail ends an old fishplate was cut to fit around the Lorain bar over the break and the plate was welded around its edges to the rail. There is at present no practical method of testing the strength of arc-welded rail joints in the field. The conductivity can be tested, which is an indication of electrical soundness, but high conductivity is not a proof of mechanical soundness. However, sample joints can be made in the shop or yard to which tests for porosity, soundness and strength can be applied.

GRINDING A WELDED JOINT WITH A ROTARY GRINDER

Much valuable surface-welding work has been done on the open-hearth steel in special track intersections. A photograph is reproduced to show a piece broken out of the rail head in a crossing frog in Bridgeport. If the break in the web of the rail is not too low in the surrounding casting, it can be built up by welding and the missing fragment can be replaced with new steel to avoid the renewal of the whole piece. At present the bulk of welding in special work lies more especially in building up the cups in open-hearth rail, which occur most noticeably on the "leaving" side of the manganese hard centers.

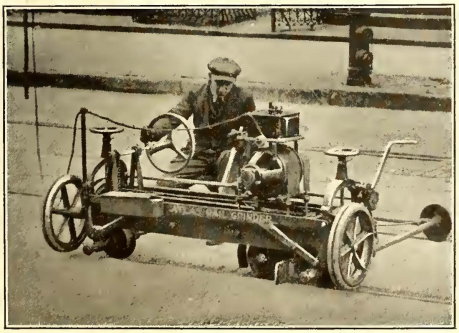
Welding Manganese Centers Was Not Successful

Attempts to surface-weld such alloys as manganese steel centers in switches, mates and frogs by the bare-metal-electrode method have not been successful. Since the chief characteristics of manganese steel are due to its heat treatment and manganese content, any action tending to disturb the effects of the heat treatment or burn up the manganese is detrimental. The welding of manganese centers, if done at all by this method, should only be carried out as a last resort in an attempt to secure a temporary repair until a new center is received. In using the welding method, the welded metal on the top of the rail is left a little high and requires grinding down to a fine surface. The machine which we use to do the bulk of this work is the Seymour grinder as shown herewith.

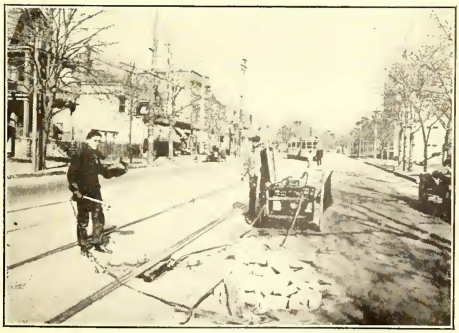
The rotary grindstone of this is driven by a 3-hp. motor at a speed of 2500 r.p.m. Before the method of surface-welding cupped rails became general this machine proved valuable for grinding out the cup or depression. This, in reality, was merely spreading the low spot over a greater length of rail. It was done by first placing the rotary stone at the bottom of the depression and then offsetting the two wheels eccentrically on each side. Then by passing the stone back and forth over the depression the shoulders were ground off to a regular vertical curve of long radius.

The first of these machines was bought in 1914 and there are now five distributed over the various divisions of our line. The operator of this grinder wears eye protectors as a safety-first protection against steel and emery dust. The wheel used is 9 in. in diameter, 3 in. wide and of Grade Q corundum. The grinding bricks and wheels used on the various machines for different classes of work are standardized, six grades and shapes having been selected as the most suitable.

Practice has shown that when making surface welds the Indianapolis welder can work faster than the grinder can follow it up. In order to get the maximum efficiency out of the welder, therefore, additional grinders have been purchased recently. The Atlas grinder is shown on this page. Its field is similar to that of the Seymour grinder but the mechanical method of doing the grinding is somewhat different since the main carriage remains stationary and the grinding parts move back and forth on guides and are controlled by the wheel and lever in the hands of the operator. The main weight of the machine is on the grinding side and it is readily derailed by lowering the derailing wheels and raising the light side. The first of these machines was re-



ANOTHER TYPE OF ROTARY GRINDER AT WORK



A RAIL JOINT READY FOR WELDING

ceived last year and there are three more on order at the present time.

Up to this point particular reference has been made to general repair work with the Indianapolis welder, the great field of usefulness of which lies in its ability to do quick and satisfactory surface welding and other emergency work. In 1917 the question of securing rail with which to carry out necessary paving work became more difficult than ever, and a number of instances occurred where work was authorized to proceed but no new rail was available. It was therefore necessary to accept the situation and continue to use the existing rail by making such repairs as were necessary by welding. As the Indianapolis welders were required on regular repairs, and to take them off such maintenance work for the sake of construction would have been to take a step backward, the management approved the recommendation of the engineering department for the purchase of additional welders to take care of this reconstruction work.

New Atlantic welders made by the Lincoln Bonding Company were purchased and received in June, 1918, and immediately put to work. One of the illustrations shows the portability of this apparatus. In the picture the joint is ready for welding the plates to the rail, and the operator is about to put on his hood and commence work. This welder differs from the Indianapolis welder in construction. It consists of a mounted dynamotor, with a control over the amperage and the voltage, designed to give the best results with either the carbon or metal electrode. Less responsibility is thus thrown on the operator to secure good work. This machine can also be adapted to surface welding work. The Connecticut Company now has these welders in Bridgeport, New Haven and Hartford. The work done since the first of all this equipment was received in 1913 to the end of 1918 shows that corrugation has been removed from some fourteen miles of rail. Also approximately 55,000 joints have received some attention from the welding and grinding gangs. Since there are about 250,000 joints on the company's system the number of joints that have received attention represents about 22 per cent of the total. In addition to this a large number of repairs of all kinds have been made to special work. The reduction in the cost of making repairs to broken rails and faulty joints by welding as compared with the old methods of cutting in a new piece of rail is conservatively placed at 75 per cent. The greatest savings lie in repairs to rail joints where there is still considerable life in the rail head. Many years of life are thereby added to the track.

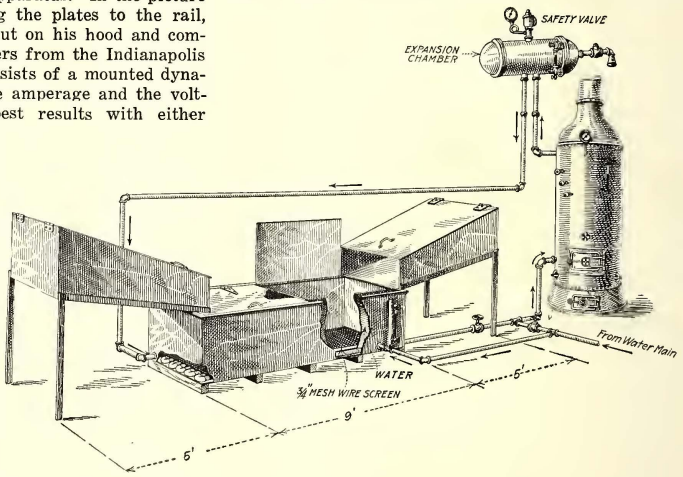
In the case of the repairs to special work the life of each piece varies so greatly that even after repairs have been made the added life is difficult to estimate. The savings effected by the use of this equipment have resulted in a reduction of operating cost of the road and a postponement in capital outlay due to the increased life of the track.

Centralizing the Cleaning and Saturating of Waste

Union Traction Company of Indiana Uses Original Device in These Operations and Saves 50 Per Cent in Waste and Labor

BY INSTALLING, at its Anderson shops, equipment for washing and saturating with oil all of the waste used at its six division shops, the Union Traction Company of Indiana has made a 50 per cent saving in waste and labor used in this work. At each shop are three waste cans. Two of these are kept full of clean, saturated waste and the third is used for dirty waste removed from the cars. When the third can is full it is sent to Anderson where the waste is washed and resaturated with hot oil. Thus waste can be used three or four times before it is fit only to be discarded.

The particular feature of interest in the equipment is the saturating outfit, which is represented diagrammatically in the accompanying sketch. This was built in the local shops. It consists of a double sheet-steel tank, two draining tables and a water heater. The tank is made of two boxes, one within the other, leaving



water-jacket space between. In the bottom, between the two is a pipe radiator through which hot water from the heater, installed for the purpose, is circulated. The water in the jacket is thus heated.

The tank is divided into two equal parts by a vertical partition, one side being used for saturating new and the other for cleaning and saturating old waste. The tanks are filled with oil which is maintained at a temperature of from 90 to 100 deg. Fahr.

At each end of the tank is an inclined, covered draining table, also made of sheet steel.

M. F. Skouden, superintendent of motive power of the company, states that one man cleans and saturates all of the waste for the system, which comprises more than 450 miles of track and more than 350 cars. New waste can be saturated in two hours and all waste is allowed to drain for two hours. About every ten days the old oil is run through a filtering plant and is thus reclaimed.

Manufacturers' Tests of Railway Motors*

The Various Detail Parts with Materials Used in Their Manufacture Are Given in a Chart Which Presents an Intelligible Perspective of the Tests Necessary

BY J. S. DEAN
Railway Engineering Department, Westinghouse Electric & Manufacturing Company

THE problem of the manufacturer of railway motors is to put on the market a piece of apparatus that has an evenly balanced electrical and mechanical design, restricted in size by definite space limitations, rigid in construction, light in weight, attractive in general appearance, competitive in price, and that will develop a specified brake-horsepower with a liberal factor of safety to meet the emergencies of railway operating conditions to which this class of apparatus is subjected in service.

Electrically railway motors must develop a specified brake-horsepower without undue heating of the windings, they must commutate all working currents with minimum sparking at brushes, and have ample insulation to prevent grounding of windings under normal operating conditions. The mechanical design, while light, must be of such proportions as to withstand the stresses set up by the high peripheral armature speed, the vibrations due to the rigid mounting on the trucks, and the shocks and hammer blows resulting from the high speed operation over all conditions of tracks, and roadbed.

In order to fulfill these requirements in the most economical and efficient manner, it is found advisable during the course of building a railway motor to make a succession of tests of the materials and detail parts that go to make up the assembled motor. It is also necessary to subject the completed motor to a series of tests to check the calculations of the designing en-

*This is the first of a series of articles to be published in the ELECTRIC RAILWAY JOURNAL, dealing with the testing of railway motor parts and materials by manufacturers.

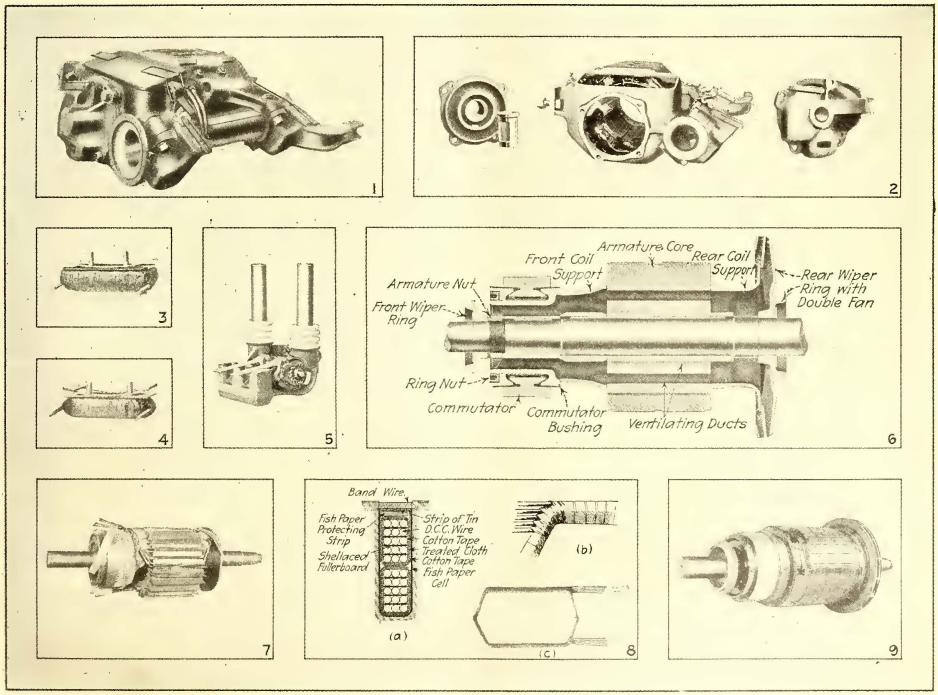


Fig. 1—A typical 50-hp., 600-volt box-frame commutating pole railway motor. Fig. 2—Motor frame complete with armature bearing housing removed. Fig. 3—Main field coil and pole. Fig. 4—Commutating coil and pole. Fig. 5—Brushholder. Fig. 6—Cross-section showing parts as they are mounted on the armature shaft. Fig. 7—Armature partly wound. Fig. 8—Armature coils; (a) cross-section of coils; (b) taping between leads prevents short-circuits; (c) wire-wound coil. Fig. 9—Armature banding.

VARIOUS DETAIL PARTS COMPRISING A RAILWAY MOTOR

Railway Motor Material Chart

Grouping of Motor Parts to Show Details Necessary and Materials Required in Construction

Motor	Frame	Main casting	Metal	Cast steel
		Pole pieces	Metal	Elec. sheet steel Steel plate Hot rolled steel
		Coils	Metal	Copper wire Copper strap
			Insulation	Cotton tape Treated linen Fishpaper Asbestos paper Impregnating gum Plastic insulator Amber insulator Insulating varnish
		Coil springs	Metal	Spring steel
		Coil washers	Metal	Sheet steel Cast brass Sheet steel
		Brush holder	Metal	Spring steel Copper braid Copper strap
			Insulation	Porcelain Micarta
		B.H. clamps	Metal	Hot rolled steel
		Fittings	Metal	Copper cable
			Insulation	Rubber bushings Torpedo twine
		Covers	Metal	Malleable iron Sheet steel Crushed coke
		Brushes	Carbons	Graphite Pitch
	Housings		Metal	Malleable iron Cast steel Malleable iron
	Armature bearings		Metal	Bronze Babbitt
	Axle caps		Metal	Cast steel Malleable iron
	Axle bearings		Metal	Bronze Babbitt Steel
	Bolts, nuts and lock washers		Metal	Spring steel
	Armature	Shaft	Metal	Axle steel Special alloy steel
		Core — Spider	Metal	Cast steel Malleable iron
		Core — Coil support	Metal	Malleable iron
		Core — Lamination	Metal	Elec. sheet steel
		Core — Finger plate	Metal	Sheet steel
		Core — Armature nuts	Metal	Forged steel
		Fans	Metal	Sheet steel Malleable iron
		Commutator — Bushings	Metal	Malleable iron Cast steel
			Insulation	Micarta Mica Malleable iron
		Commutator — V-rings	Metal	Cast steel Forged steel
			Insulation	Mica
		Commutator — Segments	Metal	Hard-drawn copper
			Insulation	Mica
		Commutator — Nut	Metal	Cast steel Forged steel
		Coils	Metal	Copper wire Copper ribbon Copper strap
			Insulation	Cotton tape Treated linen Mica tape Fishpaper Fishpaper and mica Fullerboard Plastic insulation Amber insulation Asphaltum varnish
		Keys	Metal	Cold-rolled steel
		Bands	Metal	Steel wire Strip tin Tin solder
		Solder	Metal	Half and half Tin
		Insulating material	Insulation	Treated linen Jute rope Torpedo twine Friction tape Treated duck Fullerboard Fishpaper Cement Cement paper Surgical braid Fishpaper and mica Drilling Linen twine Mica Insulating varnish Shellac
Accessories	Pinion		Metal	Forged steel
	Gears		Metal	Cast steel Rolled steel
	Dust shields		Metal	Sheet steel Malleable iron
	Axle collars		Metal	Malleable iron Cast steel Forged steel
	Gear cases		Metal	Malleable iron Sheet steel

gineer in the case of a new motor, and to see that stock motors of a standard approved design pass the rigid inspection requirements. In some few cases the contracts of customers specify special witness tests of materials and of the completed motors, which call for additional testing facilities to comply with requirements of their specifications.

Large Amount of Testing Apparatus Is Necessary

All of this work requires a large variety of expensive, complicated and delicate testing apparatus, as well as a trained force of engineers and expert workmen who are skilled in their respective lines to supervise and conduct these tests in order to eliminate all defective materials, and to insure a finished product that will measure up to all requirements as approved by the engineer of tests.

In presenting this subject for the benefit of railway men, some of the most important details will be treated under the following subdivisions:

1. Railway Motor Material Chart.
2. Metals and Alloy Testing.
3. Testing the Insulating Materials.
4. Carbon Brush Testing.
5. Tests of Detail Parts of Motors.
6. Testing the Assembled Motor.

To get an intelligent perspective of the various detail parts and corresponding materials that are required in the make-up of a railway motor, the accompanying layout of a railway motor material chart and detail photographs are given to aid in the further presentation and better understanding of this subject matter.

By reviewing the material chart, one is impressed with the great variety of metals and insulating materials that enter into the make-up of a railway motor. This fact tends to complicate the manufacturer's problem, as all materials must be covered by a purchasing department specification, setting forth the requirements they must meet before being approved and accepted by the raw material inspection department.

To facilitate the work of this department and to insure that only approved materials enter into the completed motors, well-equipped laboratories and testing departments are at their disposal for making the required tests. Some of the most important of these tests will be outlined and described later under their respective headings as given in the subdivisions previously mentioned.

Steel Trolley Wire Being Substituted for Copper in Los Angeles

THE substitution of steel trolley wire for copper wire has just been begun by the Los Angeles Railway Company. Officials of the company state that they have been unable to obtain a sufficient supply of copper wire to care for their maintenance needs and that the price of copper wire is so high as to be practically prohibitive. They feel that steel wire is not nearly as good and as it is much heavier it requires several times as many men in its installation. Also there is no doubt that it will prove more injurious to trolley wheels than did the copper wire. Twenty-six miles of steel wire has already been received and will be installed as rapidly as possible. More of this steel wire is on the way.

Experts Talk to Business Editors

Addresses Before New York Editorial Conference Indicate Maintenance of Present High Prices and Need for Real Co-operation of Capital With Labor

UNDOUBTEDLY the three foremost questions in these days of readjustment have to do with (1) the stabilization of industry through proper understanding of and attention to post-war price tendencies and other financial problems; (2) the attainment of better co-operation between capital and labor through their mutual adherence to enlightened principles, and (3) the extension of foreign trade.

With the desire of securing for themselves and passing on to their readers the latest information on such points, the editors of the New York Business Publishers Association on April 11 held an industrial conference which was addressed by men qualified to speak authoritatively. The full remarks of the eight speakers cannot be presented here, but an effort will be made to give a sufficient summary to indicate the vital importance of their utterances.

Enormous Inflation in Currency

The addresses on the financial aspects of reconstruction were of two sorts. One, by Francis H. Sisson, vice-president Guaranty Trust Company, New York, N. Y., was a general survey of various post-war financial problems. The others, by O. P. Austin, chief statistician National City Bank, New York, N. Y., and Irving Fisher, professor of economics, Yale University, were confined to the question of price trends and control.

Mr. Sisson expressed the conviction that this country is awakening to a realization that its prosperity depends upon increased production and that consequently foreign markets need to be expanded. The United States now holds, however, more than one-third of the world's reserve of gold coin and bullion and is already creditor to other nations to the extent of $12,000,000,000. The remaining low stock of foreign gold cannot with safety be drained away, and anyway the "unpegging" of sterling and franc exchange has raised an invisible tariff wall, so that as long as the dollar remains at a premium this country will be a good one to sell in but a poor one to buy from. The way out of the difficulty seems to be the purchase here of foreign securities, although the government must actively protect the property rights acquired.

In regard to the steam railroad situation under government operation Mr. Sisson said:

> Experience has proved that the economies effected have been negligible in comparison with the expense added; and that, on the whole, less efficient service—less satisfactory to the public and less promising for future needs—has been rendered at a largely increased cost to the shipper and the taxpayer. By July 1 more than $500,000,000 must be provided to meet maturing railway obligations, and Congress must appropriate at least $1,250,000,000 to maintain these essential properties.
>
> The lack of public understanding of the factors entering into the railroad problem has been responsible for most of the difficulty of its solution. If the war has served to increase that understanding and to save the country from a more disastrous experiment in government ownership and control, the immediate expense will have been worth while. We may find, in spite of its colossal cost in service and convenience, that the experiment has been a blessing in disguise, because it offers a most conclusive demonstration of the failure of the theory of state socialism in this country, when subjected to a practical test.

In discussing prices Mr. Austin, who is one of the foremost financial statisticians of this country and was formerly chief of the government statistical department at Washington, averred that the principal causes of price advances during the war were (1) "scarcity demand," (2) the advance in wages and (3) "inflation." Chronologically, the first cause of the advance seems to have been the "scarcity demand" for war materials, food, clothing, manufactures, manufacturing materials and the labor required for their prompt production. This was quickly followed, however, by an enormous world inflation, in which paper money with a face value of $36,000,000,000 was emitted by the printing presses of the countries at war. The legal tender circulating medium of the world was thus advanced from $15,000,000,000 in 1913 to more than $45,000,000,000 in 1918, most of the gold formerly in circulation passing into the vaults of the governments and their great banks as a partial basis for this greatly enlarged paper currency.

The face value of the paper currency issued in the four years of the war was greater than the value of all the gold and all the silver mined in all the world since the discovery of America. Meantime, the national debts of the world advanced from $40,000,000,000 in 1913 to $220,000,000,000 in 1919 and the annual interest charge from $1,750,000,000 to $10,500,000,000. This quintupling of governmental promises to pay had also an important bearing upon the world finances, while the fact that bank deposits in the fifteen principal countries of the world grew from about $25,000,000,000 in 1913 to approximately $75,000,000,000 in 1919 still further increased the currency supply, especially in countries like the United States, in which the check plays so important a part in current business transactions.

This enormous inflation, coupled with the continued "scarcity demand" for food, manufactures, manufacturing material and the labor required for their production, was accompanied by great advances in prices first in the materials for the war. The advances gradually extended to other articles which their respective producers had to exchange for those in which the advance had already occurred, and this made the advance in prices world-wide, applying to all classes of articles irrespective of their immediate relation to the requirements of the war.

In discussing the relative weights of the three price-increase factors mentioned above, Mr. Austin made the following statements:

> It appears on close analysis that the "scarcity demand" created by the war was not so great in food, clothing or manufacturing materials as has been pictured, while the fact that fifteen million men are still under arms minimizes the reduction in military demands which had been expected.
>
> The fact that the increase in compensation of labor was

in most cases given because of the fact that the cost of living had already advanced at least somewhat minimizes the relative importance of this factor in attempting to discover the real causes of the general world-wide advance in prices. And it must also be remembered that several million persons who had not been engaged in the industrial and business world came to the assistance of those engaged in these duties during the war.

Where then shall we turn in the search for the principal cause of the general advance in prices? The most prominent among the possible or probable causes is the theory advanced or accepted by the historians, economists, statisticians and financiers of the world that inflation in currency is usually accompanied or closely followed by an advance in prices. As high an authority as a member of the present Federal Reserve Board, Professor A. C. Miller, recently declared that "the abundance of money must be credited with at least an equal influence in explaining the high prices which have prevailed."

Prices Will Not Decline Rapidly

If such are the causes of the advance in prices, what prospect is there for an early removal of any or all of the causes? Mr. Austin answered this question in part as follows:

Although the demand for war material has terminated, the other features of the "scarcity demand" will continue at least in a somewhat modified form in the immediate future, especially as relates to world requirements of food, manufacturing material and manufactures. Moreover, developments thus far do not point to an early reduction in labor costs.

That part of the price advance caused by inflation can only be cured by deflation, by a reduction in the enormous stocks of currency which has trebled during the war while that other form of slowly moving currency, governmental obligations, has quintupled. Is it probable that these two forms of currency can be or at least will be reduced in the near future?

Present indications are that the governments of the world will be compelled to collect in taxes about $1,000,000,000 a week as compared to $1,000,000,000 a month before the war, and this does not include anything for "sinking funds" or other provision for reduction of outstanding debts. If this be true, is it probable that the governments in those countries which have greatly increased their circulation and must now demand such enormous increases in annual payment of taxes will find it advisable or possible to reduce materially the amounts of currency available for such payments?

If the governments which have been the chief participants in the world increase of currency should fail to reduce materially that excessive supply, and if the world's demand for food, manufacturing material and manufactures is to continue at the present rate, are we justified in expecting a general reduction in prices in the near future? The question answers itself. There will, of course, be instances in which there will be material reductions, but in general terms the outlook for marked or rapid decline, at least in the near future, does not seem encouraging.

Stabilizing the Dollar

Professor Fisher outlined his plan to substitute a "goods-dollar" for the gold dollar as the standard of value. This proposal finds its justification in the fact that great price fluctuations are chiefly due to money conditions. Since a descending value of gold cannot lower the price of gold it must raise the prices of other things in terms of gold; and since an ascending value of gold cannot raise the price of gold, it lowers the prices of other things in terms of gold. The fluctuating prices produce industrial instability, financial crises and social injustice.

Professor Fisher's plan, in general, may be summarized in the following way:

(1) To abolish gold coins and convert the present gold certificates into "gold-dollar certificates" entitling the holder to dollars of gold bullion of such weight as may be officially declared from time to time.

(2) To retain the virtual "free coinage"—that is, deposit—of gold and the free redemption of gold-dollar certificates.

(3) To designate an ideal composite goods-dollar consisting of a representative assortment of commodities, worth a dollar at the outset, and to establish an index number for recording, at stated intervals, the market price of this composite dollar in terms of the gold dollar.

(4) To adjust the weight of the gold-bullion dollar at stated intervals, each adjustment to be proportioned to the recorded deviation of the index number from par.

(5) To impose a small "brassage" fee not to exceed any one change in the gold dollar's weight.

The crux of the plan lies in the rule by which the index number regulates the dollar's weight. Its significance is, that to keep the gold dollar from shrinking in value the weight is increased, it being thus recognized that a depreciated dollar is a short-weight dollar. Reversely, to keep the dollar from growing in value the weight is shrunk, for an appreciated dollar is an overweight dollar.

The plan outlined has received the approval of a large number of economists and business men of influence, including President Hadley, Yale University; a committee of economists appointed to consider the purchasing power of money in relation to the war (consisting of Royal Meeker, United States Commissioner of Labor Statistics; Prof. Wesley Clair Mitchell, Columbia University; Prof. E. W. Kemmerer, Princeton University; Prof. Warren M. Persons, Colorado College; Prof. B. M. Anderson, Jr., Harvard University); Frank A. Vanderlip, president National City Bank, New York; George Foster Peabody, New York; John Perrin, federal reserve agent, San Francisco; Henry L. Higginson, Boston; Roger W. Babson, statistican; John Hays Hammond, mining engineer; John V. Farwell, Chicago; United States Senator Robert L. Owen; the late Senator Newlands; and Sir David Barbour, one of the originators of the Indian gold exchange standard.

What Industrial Co-operation Means

The capital-labor phase of readjustment was discussed by Charles P. Steinmetz, consulting engineer General Electric Company; John Calder, formerly general manager Remington Typewriter Company and during the war active head of important manufacturing work for the government; V. Everit Macy, president National Civic Federation and appointee of President Wilson as chairman of committee on adjusting wages in private shipbuilding plants; and Dr. Charles A. Eaton, who recently resigned his Fifth Avenue pastorate in New York City to devote himself to problems of industrial reconstruction.

According to Mr. Steinmetz, the interests of capital and labor are the same in some respects but the opposite in others. In general, in any industry, those interests which have to do with industry on the outside, customers, etc., are identical. Within the industry concerned the interests of employer and employees are often opposite to each other.

The initiative in adjusting differences should lie with the employer. Co-operation of capital and labor should be the aim, but this implies two parties working together, not one settling the matter and telling the other "you must do this and that and then we will co-operate." Unfortunately, Mr. Steinmetz said, most of the serious efforts made in this direction have been of this character—the employer has worked out plans and then asked the employees to co-operate on those plans. Very often those plans have been good, and the whole scheme

would have been satisfactory if it could have been worked out jointly.

Mr. Steinmetz criticized welfare work which is based on paternalism. As for the bonus system, this has the disadvantage of giving a share in the profit but not in management. The English shop committee system presents the difficulty that labor unions may look upon the institution of such committees as a move to eliminate the unions. A better way to secure co-operation is through the wage dividend, which Mr. Steinmetz described as follows:

Capital is entitled to a fair rate of interest on the money invested, and labor is entitled to a fair rate of wages for the work done. All profits beyond that belong to capital and labor. These should be divided into dividends on capital stock and the balance into dividends on labor stock as determined by yearly wages. This system is in operation in a number of corporations, in electric utilities companies and others.

It lacks provision for share in the management. We could carry it further and recognize labor as equivalent to capital and give the labor stockholder the same right as the capital stockholder in the management. This does not set up rival administration, but brings about joint control by evolution and not by revolution.

How far should employees be recognized as stockholders? There are many things that show that only those who have been with the organization for a number of years should be recognized as wage stockholders. We could set the limit at ten years. The labor stockholders would not be many and would not make any radical change in industry, and every year or so we could change the minimum, going down to six or five years. This would eliminate any opposition except from the extreme socialists who refuse to recognize capital at all.

Raising Supervisory Standards

Mr. Calder expressed the conviction that only through enlightened and energized employers and their foremen in industry will a permanent advance be made. Individual organizations sincerely aiming at democracy in their industrial relations must insure that their foremen are instructed and willing co-operators, and the particular technical competence for which they were originally selected is no guarantee of this. The standard of executive intelligence and sympathy must be raised.

On the subject of "Organization in the Settlement of Industrial Disputes," Mr. Macy said in part:

It is of the utmost importance for the peaceful and productive development of industry that both employers and employees should be thoroughly organized in order that trade agreements may be worked out between them. Before this can be successfully accomplished, however, employers must place in the hands of broad-minded, experienced men the responsibility of formulating and carrying out their labor policies. Such men might be called labor advisers, administrators, or engineers.

A group of such men representing the manufacturers of an industry should meet with the international presidents of the unions employed and in conference reach an agreement covering the questions of wages and hours for the entire industry or for districts. Local boards, on which the employers and the employees should have equal representation, should then be set up for the purpose of establishing local, or district, working conditions and of interpreting the detailed application of the wage scale to individual plants.

I wish especially to emphasize the fact that the establishment of such committees must in no way be taken as an alternative or as a counter weapon against agreements with the regularly constituted trade unions, for no plant committee can make agreements covering competing firms, nor do they have the responsibility of an organization behind them. Above all, they cannot have the advantage of being guided and controlled by men of national experience.

Dr. Eaton declared that the principles of representation in industry, if properly applied, will make a new era in industrial relations. This does not mean that the workers are to manage industry, but the management will no longer represent only capital. It will represent labor as well. Dr. Eaton sees a marked willingness on the part of employers to consider plans for eliminating autocracy in their business.

The subject of foreign trade problems was covered by G. A. O'Reilly, foreign trade expert Irving National Bank, New York, N. Y. He stated that the tendency of manufacturers and salesmen to force their views and wares upon foreign buyers had fortunately been largely checked, and the American view had been broadened. He emphasized the fact, however, that remaining problems need to be solved without delay.

Causes and Prevention of Corrosion of Pipe Carrying Hot Water

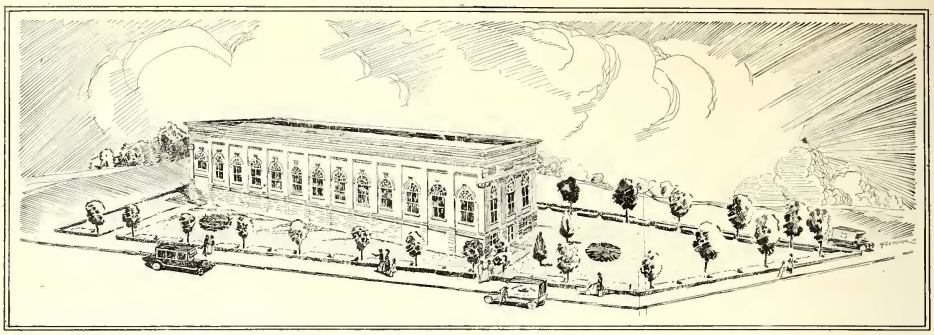
By a Process of "Deactivation" Even Water Which Has Considerable Acidity May Be Rendered Nearly Non-Corrosive

A STUDY of the causes of corrosion of pipe carrying hot water led to the development of the Speller system of "deactivating" water by the removal of oxygen. This was mentioned briefly in the issue of this paper for March 8, page 454. Essentially this system, in which the National Tube Company is interested, consists in bringing the water under pressure in contact with large iron surfaces on which the corroding action takes place and the corroding ability of the water is virtually destroyed.

The company has reprinted a paper read before the American Society of Heating and Ventilating Engineers last year, which gives details of the process and also explains in simple language the chemistry involved. The authors show that any water may be distinguished by the terms "active" and "inactive," the quality of activity being dependent upon certain substances which modify the universal tendency of even the purest water to initiate the corrosion process. The inherent tendency of pure water to attack metal may be greatly aided when gases are dissolved in it. An inactive water is one that does not appreciably corrode iron. It has been demonstrated that an inactive water after a few minutes aëration becomes capable of doing great damage to iron.

Every metal when placed in water is subjected to a certain fixed tendency to go in the solution, and the initial reaction in corrosion is analogous to solution in acids. Water exists in the liquid state not only in the form of its molecule but also as ions, which are formed by the breaking up of the molecule. These are called the hydrogen and the hydroxyl ions. The concentration of the former in the water determines its ability to attack iron. The ability of acids to attack iron is due to their greater tendency to ionize.

While the tendency of iron to corrode depends to a certain degree upon the amount of acids present in the surrounding water, corrosion may be arrested even in distinctly acid water by deactivation. Experiments with this process of deactivation have been carried on now for several years and the process has proved to be quite effective. The development of the process illustrates the value of theory in its application to practical problems.



PLANTING SCHEME FOR GROUNDS AROUND DOCK STREET SUBSTATION, SCHENECTADY (N. Y.) RAILWAY

Planting the Grounds Around the Shop or Substation

A Commendable Practice, Carried Out at Small Cost, Illustrated from the Experience of the Schenectady (N. Y.) Railway

THE Dock Street substation of the Schenectady Railway is not situated in the most beautiful part of the city, but F. Palmatier, superintendent of power, has made its grounds very attractive by the use of a simple planting scheme. The sketch reproduced shows the idea which Mr. Palmatier had in view and the photographs indicate how he was able to carry out his idea at very small expense. The photographs were taken after the foliage had begun to fall, but sufficient remained to indicate the extent to which it had been possible to carry out the plan in 1918.

For the back hedge 100 American arbor vitæ plants were set 24 in. apart. These cost 14 cents each. The front hedge was of Japanese barberry planted 14 in. apart. Four hundred plants were required at a cost of 9 cents each. In the hedges, at intervals of 25 ft. Catalpa Bungeii trees, grafted on 6-ft. stems were placed. They cost $1.25 each.

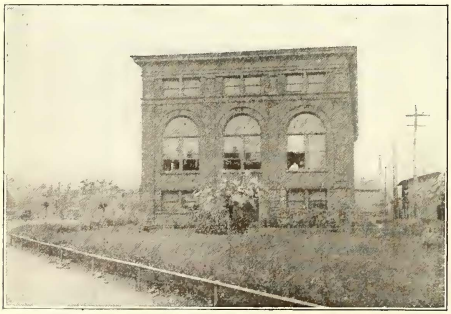
Along the long side of the building are hardy hydrangeas, 4 ft. apart, with salvia between. The hydrangeas cost 12 cents each. At the front entrance forty roses, costing 25 cents each, were placed on 2-ft. spacing, and blue spruce trees (Kosteriana), costing $5 each, were planted in the lawn. Around the whole plot are small beds, 3 ft. x 7 ft., thirty-six in number, which are now planted with 100 tulips each for early spring bloom. The total cost of these was $36. The center bed, on the entrance side, contains 600 Darwin tulips, for early spring bloom, and it cost $12. This bed is 12 ft. in diameter.

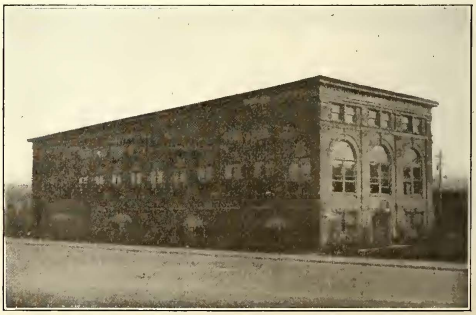
After the tulips cease blooming the bulbs will be lifted and brought indoors for curing. The center bed will then be filled with cannas, placed 12 in. apart, with a row of salvia similarly spaced. This bed will be set off with a row of dusty miller. The small beds will contain annuals, such as asters, sweet peas, etc., with one peony bush in each bed.

The first planting of the Dock Street substation ground cost about $155. As hot beds are maintained behind the station the cost of the small annual plants will be only that of the seeds. All labor is furnished by the regular power department force.

Safety Cars Satisfactory in Mansfield

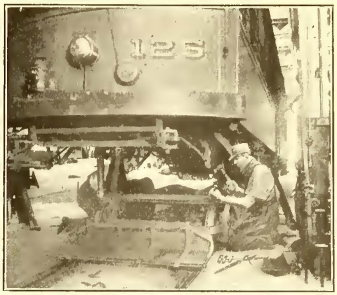
H. A. Cowgill, superintendent Mansfield Public Service & Utility Company, Mansfield, Ohio, states that the safety cars operated by this company have given great satisfaction to all parties concerned. There is a growing desire on the part of the trainmen to operate the new cars, not only on account of the slightly greater wage rate but because the men find themselves less tired at night than they did when operating the larger cars. Several men entitled by seniority to day runs prefer night runs on safety cars.





APPEARANCE OF THE DOCK STREET SUBSTATION GROUNDS LAST FALL

Some Mysterious Car Ailments



Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

A Commutator of an Interpole Motor That Insisted on Developing Flat Spots

A FEW DAYS after the motors on a car operating in city service in the Middle West had been overhauled the commutator of one of the motors developed a bad flat spot. The armature of this motor had been changed when the motor was overhauled and a newly-rewound armature had been installed. The flat spot was removed by turning the commutator down and the armature was again put back into the motor and the car was returned to service. After two weeks' time the car again came into the shop with a bad flat spot which covered from five to six bars of the commutator. As it seemed probable that a mistake had been made in winding the armature this was removed and the original armature was reinstalled in its place. The connections and throw of the leads for the newly-rewound armature were checked over carefully but no trouble was found. After another two weeks' service of the car the original armature came back with a very bad flat commutator. The commutation of the motor was watched while it was in service and this appeared to be sparkless but in starting there appeared to be a heavy drag so that the motor would start hard with a heavy pull on the line. It was then decided that there must be a defect in the field or in the connections to them, although both the shop foreman and master mechanic were certain that the fields had been reconnected as they were before overhauling. However, the polarity of the field coils was tested and it was found that one of the interpole fields was reversed. The coil was changed to give the desired polarity and the car again returned to service. No further trouble was experienced with flat spots so it was evident that the remedy was effective.

How a Balky Car Was Cured

A HIGH-SPEED interurban car operating on a railway line in the Central Western States was reported for irregular action of the control equipment. This car was equipped with automatic battery type control and a 14-volt storage battery was used to supply the operating current. The trouble as reported was that sometimes the control equipment would notch up only to the second series resistance point, while at other times the equipment would operate satisfactorily. A representative of the control manufacturer inspected the equipment for a possible defect. At that time, however, the control equipment was working satisfactorily, and nothing unusual was found. The equipment continued to operate properly for nearly a month after this inspection. Then it went back to its old tricks. The master mechanic of the road took the case under his special supervision and rode on the car for two days in service before anything unusual occurred. He decided that there must be a loose connection somewhere and accordingly had the car shopped for detailed investigation. A careful inspection was made of all terminals and connections, but all appeared to be tight. He was just getting ready to have the car rewired as a last resort when his attention was called to a connection which was tapped onto the lead running to No. 2 line switch. He removed the tape from the connection and found it loose, so that it could be moved back and forth on the wire from which the insulation was removed. By operating the control equipment with this connection removed, it was found that it would notch up only to the second point, while with the wire connected firmly to the exposed wire the control equipment would notch up to its proper position. The wires were cleaned carefully and again resoldered and the trouble of the erratic action was overcome.

Exceptional Causes for Hot Armature Bearings

HOT armature bearings, aside from the annoyance they cause, are the most costly of all equipment troubles, since they usually result in excessive damage to the armatures through rubbing the pole faces. One large railway experienced a large amount of trouble from this source on some new motors which had just been placed in service. Engineers from the manufacturer and railway company at first thought that the trouble might be caused by improper packing of the bearings or the use of inferior waste. Accordingly, all bearings were repacked carefully by an experienced man and the highest grade of waste only was used, but the trouble still continued.

In checking some of the new bearings for clearance before they were placed in service it was discovered that the bearings were not round. The bearings were intended to be 0.006 in. larger than the shaft. When measured across one axis proper clearance was found

but when measured on an axis at right angles to this there was no clearance at all. It was also discovered that the bore of the bearings was not true with the housing fit, so that there was a tendency for the bearings to bind on the shaft. The diameter of the bearings at the two ends was also not the same. These inaccuracies and imperfect machining had resulted from the jigs in which the bearings were machined, allowing the bearings to spring out of shape somewhat due to the strain of machining. All bearings were accordingly removed from the motors and carefully rebored and the trouble from hot armature bearings entirely disappeared.

Use As Incubators Does Not Improve Air Brake Equipment

A VERY uncommon freak accident occurred on an electric railway which puzzled the mechanical department for some time. A motorman operating one of the cars had a collision which was very serious and did considerable damage. He insisted that at the time of the accident he was operating his car very carefully and that he had applied the brake in sufficient time to have enabled him to make the desired stop without accident, but that the brakes apparently did not operate properly. The air brakes on the car were subjected to a very careful inspection; the piston travel was measured, all adjustments carefully tested, and everything was found in satisfactory condition. The car was returned to service and continued to operate satisfactorily for several weeks, when again it had an accident similar to the one just described. It was then decided that all air-brake apparatus on the car should be dismantled in an endeavor to locate the cause for the trouble. Accordingly, the entire air-brake apparatus was removed from the car and taken apart.

In one of the passages of the triple valve there was found a collection of eggs which had been deposited there by an insect and were developing. As they spread out and grew larger, the air passing through the passage blew them into one of the ports of the triple valve. This became choked and caused the slow application of the brakes. The action of releasing the brakes, or of another application cleared the obstruction so that the equipment operated properly. Operation continued to be satisfactory until additional eggs were developed so as again to choke the port of the triple valve and prevent the passage of air.

Motormen Are Not Always to Blame for Rough Operation

THE jerks and inconvenience to passengers from the sudden starting or stopping of cars are most commonly blamed on the motorman by the traveling public. Some of these are caused by faulty condition of the equipment as appears from the following experiences:

On returning to the terminal with his car a motorman reported that he could not get any braking effect from a service application of the brakes and had continually to move his brake handle into emergency position to stop the car. This resulted in exceedingly rough operation and caused severe criticism from the passengers. The trouble was eventually located in the motorman's brake valve and on removing this from the car and taking it apart a small piece of rubber from a gasket was found stopping up a port on the seat of the valve. This piece had been pinched off the gasket by careless assembling of the valve and was the cause of the trouble.

Another case of air-brake failure caused in a similar manner as the preceding was due to the air-brake inspector, in assembling a hose, allowing the end of the hose connection to cut the inner lining so that this in turn completely closed the end. Owing to its unusual character, the location of this defect baffled the inspectors for a considerable time.

Considerable trouble was experienced on a large railway property with stiff, or hard-working, brake valves. But a short time would elapse after they were lubricated before they would be reported again for being stiff. Tests of various lubricants were made but it was not until one of the workmen suggested olive oil that the desired results were obtained. This might be considered as an expensive lubricant to use but with the small amount of oil required and the freedom from troubles, the results easily justified its use.

Why Manufacturer's Test-Stand Results Did Not Apply on the Line

AN ELECTRIC railway that was just placing some newly equipped cars in service experienced considerable trouble due to the motors flashing over. These motors were of a late interpole type with tapped-field control and the flashing occurred during the operation of the tapped-field position. The manufacturer's engineers were severely puzzled to account for the trouble as the motors had showed exceptional overload capacity on test at the manufacturer's plant. The operation of the equipment in service was watched carefully and tests were made to determine the maximum temperature rise of the motors while in service. All appeared normal and the temperature rise was not excessive.

Meters were then installed in some of the principal circuits and readings of current and voltage were taken during operation. These readings showed that there was an abnormal current swing in passing from the full-field to the tapped-field position of the control. The resistance of the two parts of the fields was then taken and it was found that instead of cutting out 40 per cent and leaving 60 per cent in circuit on the tapped-field position as was intended, 60 per cent was being cut out. A mistake had been made in the permanent wiring of the switch group at the manufacturer's plant. All connections had been made according to the wiring diagram but this did not indicate which were the large and which the small portions of the fields. The trouble was corrected by interchanging the two outside leads to the motor fields. The motor leads were disconnected from the car wiring and were pulled back through the motor bushings to the inside of the motors. After interchanging the two outside field leads they were again pulled back and reconnected to the leads running to the switch group. This produced a change in the direction of rotation of the motors so that the car moved in the opposite direction from that indicated by the master controller and to correct this the leads from the master controller to the reverser were exchanged. After the necessary changes had been made the equipments operated satisfactorily.

Handling Cars with Broken Axles

Detroit United Railway Has a Pony Truck That Does the Work of an Auto Wrecking Car Always Ready for an Emergency Call

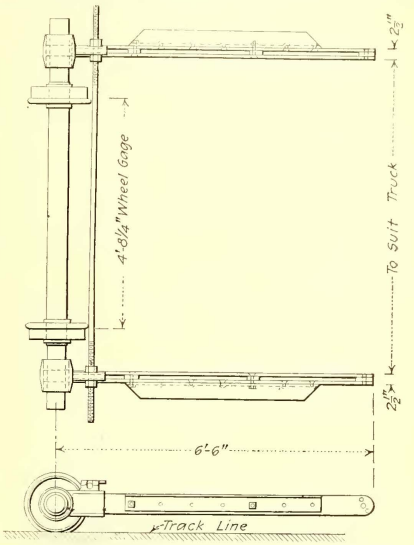
BROKEN axles are something which, as the saying goes, "happen in the best of regulated families" or in this case, on the best electric railway systems. For years studies have been made of this subject but the problem still remains to build an axle of efficient weight that is positively immune against breakage. Careful watching and periodical tests make it possible to remove from service the greater number of imperfect axles before an actual breakage occurs, but as it is sometimes impossible to detect the weakness which later results in an emergency call for assistance or a "pull in," most railways find it advisable to provide themselves with some form of equipment to be used when the necessity arises.

The Detroit United Railway has developed a pony truck which will fit any type of electric car truck, without the use of any bolts for fastening it, and which enables a car with a broken axle to proceed to the shops under its own power with a minimum of delay to traffic.

The first device developed was a skid, but this has now been replaced by the pony truck outfit shown in the accompanying figures. Each side arm is made up of two plates separated by a filler plate, riveted in place. A chain hook slips between these plates at the free end of the side arms and a chain passing over the car truck and fastened on either side by the chain hooks supports the arms. To the opposite end of the side arms are riveted heavy journal castings, 8 in. in length, and having inserted from each end brass bushings 2½ in. long, which leaves a 3-in. oil well between the bushings. This oil well is packed with oily waste to insure perfect lubrication. The journals of a 5-in. axle, fitted with 14-in. pony wheels, fit into these journal boxes. To eliminate some weight and provide a simple means of handling this truck, the axle is bored hollow 2¾ in. in diameter and to a depth of 15 in. To keep the side arms at proper distance a spacing rod is set in a socket just behind the pony wheels.

This pony truck outfit is carried assembled on the automobile wrecking cars for the city lines, and on the interurban lines the outfit is carried on the motor cars of work trains.

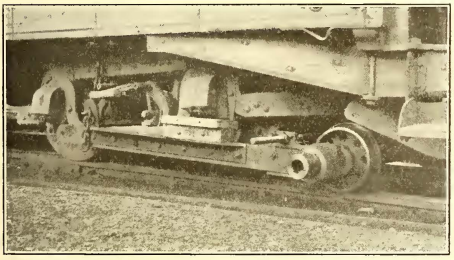
The operation of placing the pony truck in position under the car truck is simple and takes about five minutes for two men. The spacing rod is first removed. The side arms are then taken off by releasing one tail nut on each. The short bar is used on each end of the pony axle to lift it, and place it in position either behind or ahead of the damaged car truck. The car truck is jacked up, the side arms adjusted with chains and wooden blocks, the spacing rod is snapped in place, the jacks are removed, and the car is taken under its own power to the shops.



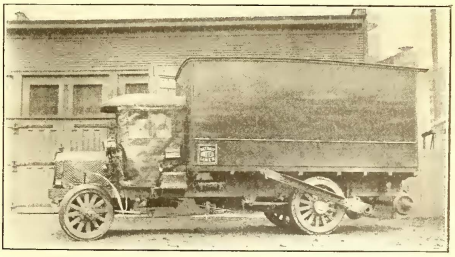
ASSEMBLY DESIGN OF PONY TRUCK FOR BROKEN AXLES

Before this device was developed, a trolley wrecking car had to be called, and the damaged car was pulled to the nearest wye. Here the car was jacked up and a new truck put under it. This meant a considerable delay to traffic and consumed a great deal to time. Aside from the saving in traffic tie-up, it is estimated there is a saving of at least $20 per car in labor cost for each emergency case of this kind.

Not the least important feature in dealing with such emergencies is the wrecking equipment. A trolley wrecking car is subject to much delay in arriving at the scene of trouble, having to make a greater mileage



METHOD OF ADJUSTING PONY TRUCK TO CAR TRUCK WITH A BROKEN AXLE



DETROIT AUTOMOBILE WRECKING CAR WITH PONY TRUCK ATTACHED

and having to come to a stop perhaps 1000 ft. or more from the wreck, because of the line up of cars between it and the wreck. This then makes it necessary to drag the pony wheels and wrecking apparatus this additional distance by hand.

For this purpose the Detroit United Railway has an automobile wrecking car, the body of which was built in the railway company's shops and placed on a 5-ton Packard chassis. The chassis cost $4,500, the body $350, and the wrecking equipment and tools with which it is furnished cost $1,350. The equipment consists of one set of pony trucks for carrying broken axles, three each of three types of jacks, four sets of replacing frogs, two sets of block and tackle, 500 ft. of 1⅜-in. rope, and 500 ft. of 1-in. rope, wound on two reels suspended at the front of the body, together with the usual complement of small equipment, such as lanterns, crowbars, splice bars, chains, picks, shovels, rubber coats and boots and carbic hand lights. This same equipment is also carried on motor cars of work trains on interurban lines.

The company has three automobile wrecking outfits, two of which are lighter than the one described. These cars are used for all kinds of emergencies. For the car described there are two competent wrecking men always on duty. There are two shifts of twelve hours each, so the truck is available for service on a moment's notice.

The cost of the pony truck outfit is approximately $200, and a patent on it has been applied for.

Is the Core of Stranded Wire Disproportionately Stressed?

Actual Stretch of Outside Wires Is Greater but Due to Their Increased Length the Per Cent Stretch Is the Same

BY PAUL A. B. SAHM
Associate Electrical Engineer United States Bureau of Standards

IN AN article entitled "Details of Line Construction with Special Reference to Guying and Anchors" by Charles R. Harte, on page 868 of the ELECTRIC RAILWAY JOURNAL for Nov. 16, 1918, the assumpton is made that the center wire of a seven-wire strand takes all the load at first and breaks long before the others, and that it should, therefore, not be counted in determining the strength of the entire strand. The following is given in the hope that it will clear up a misunderstanding seemingly quite common among engineers regarding the behavior of stranded wires in tension.

The above assumption is not warranted even if the strand is loosely wrapped. If it is closely wrapped from the start so that the ratio of length of outside to inside wire remains constant, all wires will take their proper portion of the load.

Because it is difficult for the manufacturer to make up a long strand without a splice in any one wire, most specifications for guy strand require that not more than one wire be spliced in a given length of wire. This splice does not, of course, develop the full strength of the wire, and in order to "play safe" some companies specify that the guy strand with one wire broken shall meet the desired rating. This, however, is no reason for "picking on" the center wire.

Assume a seven-wire strand of 100 in. length clamped so that the wires cannot change their relative positions at the clamps and stretch the entire strand 1 per cent. Assume the outside wires wrapped close and 1 per cent longer than the inside wire (0.97 per cent listed by American Steel & Wire Company).

Let L_{si} = stretched length of inside wire.

L_{so} = stretched length of outside wire.

L_{oi} = original length of inside wire.

L_{oo} = original length of outside wire.

Then the stretch of the inside wire is

$$L_{si} - L_{oi} = 101 - 100 = 1 \text{ in.} = 1 \text{ per cent.}$$

The stretch of each outside wire is

$$L_{so} - L_{oo} = 101 \times 1.01 - 100 \times 1.01$$

$$= 102.01 - 101 = 1.01 \text{ in.}, \frac{1.01}{101} =$$

1 per cent of its original length.

It is seen that although the actual stretch is greater for the outside wires the per cent stretch is the same for all wires when wrapped close, and it is also evident that this will hold for any amount of stretch. If the wires will all stand the same total per cent of elongation they must all be equally near the breaking point and will break at the same time, even if of different diameters.

Assume now a similar strand with outside wires wrapped loosely and 1.2 per cent longer than the inside wire when slack and 1 per cent longer when under tension. Stretching the strand 1 per cent will give a stretch of the inside wire of 1 per cent (evidently) and a stretch of the outside wires of

$$= 102.01 - 101.2 = 0.81 \text{ in.}$$

$$L_{so} - L_{oo} = 101 \times 1.05 - 100 \times 1.012$$

$$\frac{0.81}{101.2} = 0.8 \text{ per cent of its original length.}$$

Up to this point the inside wire has stretched 25 per cent more than the outside wires and is, therefore, nearer the breaking point, but this condition changes as the strand is stretched further as may be seen from the following:

Stretching the strand 5 per cent will give a stretch of the inside wire of 5 per cent (evidently) and a stretch of the outside wires of

$$L_{so} - L_{oo} = 101 \times 1.05 = 100 \times 1.012$$

$$= 106.05 - 101.2 = 4.85 \text{ in.}$$

$$= \frac{4.85}{101.2} = 4.8 \text{ per cent of its original length.}$$

At this point the inside wire has stretched only 4.2 per cent more than the outside wires as compared with 25 per cent in the previous case.

The permissible ultimate elongation of the component wires of the strand will vary over a much wider range than this so that there is no reason for expecting the center or any other wire to break sooner than the others and the center wire will carry only its proportion of the total load.

The above is for practical conditions and shows that even for loose strands the inside wire is only very slightly ahead of the outside wires as regards breaking and its strength certainly cannot be neglected. When testing stranded wire to the breaking point all wires are found to break at the same instant every time and this is also found in the field, except, of course, when the wires are corroded to different extents or are not solidly attached at the ends.

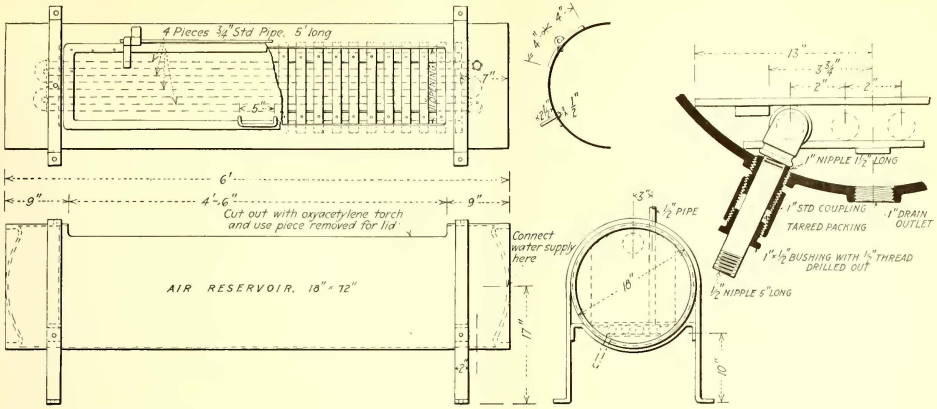


FIG. 1—DETAILS OF CONSTRUCTION OF PINION HEATING TANK USED IN SHOPS OF UNITED RAILWAYS COMPANY

Pinion Heating in Shops and Carhouses

United Railways of St. Louis Builds Simple Equipment for Heating All Pinions Before Installation

WHEN pinions were made of softer materials there did not seem to be the same need for heating them before placing them on the motor axles as now exists with the harder heat-treated pinions. This has been the experience at the shops of the United Railways of St. Louis, where it has been found that the present grade of pinion when placed cold on the axle will often work loose.

All pinions are now heated by this company before being placed on the axles. To accomplish this the equipment, shown in Figs. 1 and 2, has been installed in the main shop. This heater was formerly an 18-in. x 72-in. high-pressure air storage tank. A section 11 in. x 54 in. has been cut out of one side with an oxy-acetylene torch and this, furnished with hinges, a handle and overlapping strips, forms a door in the top of the tank.

A steam coil lies in the bottom of the tank under a wire grating and is connected to a main steam line with a pressure of 150 lb. A gage, a ¾-in. safety valve and a check valve are also provided. The tank is further equipped with a cold water inlet and a drain and steam trap, and is mounted as shown in Figs. 1 and 2.

There is a space of 12 in. above the grating for the water, which is heated to a temperature of 212 deg. Fahr. In this water pinions enough for the day's work are placed each morning and removed as needed by means of the hooks seen behind the tank in Fig. 2.

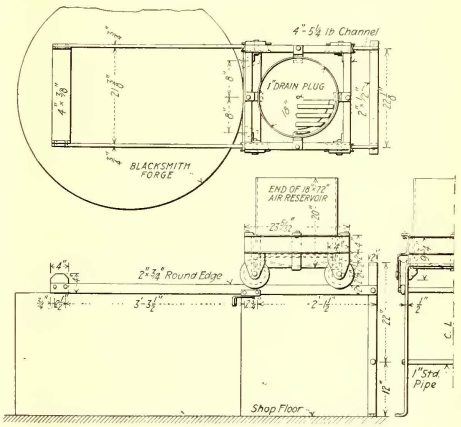


FIG. 3—DETAILS OF PINION HEATING TANK USED IN CAR HOUSES OF SAME COMPANY

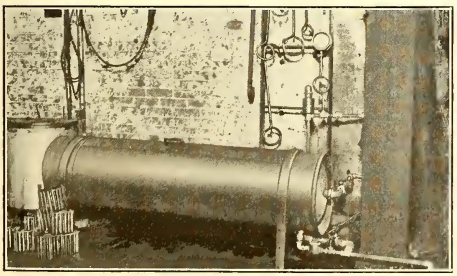


FIG. 2—PINION HEATING TANK DETAILED IN FIG. 1

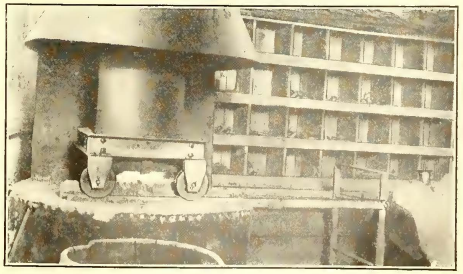


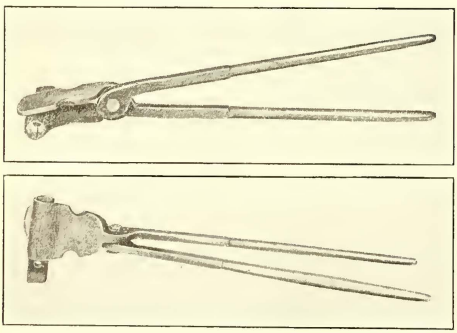
FIG. 4—PINION HEATING TANK OVER FORGE

A considerable amount of pinion changing is done at the outlying carhouses and as these in the summer are not provided with steam some other method of heating the pinions was essential. All of the carhouses are equipped with tools for making minor repairs and with a blacksmith shop so the heating equipment shown in detail in Fig. 3 and by photograph in Fig. 4, was arranged to heat the pinions over the forge.

This equipment, of which seven outfits are being built, consists of 20 in. cut from the end of an 18-in. x 72-in. air storage tank by means of an oxy-acetylene torch and mounted open end up on a truck built as shown in Fig. 3. This little pinion heating car, as it might be called, operates on a short track attached to the forge so that when the latter is needed for other purposes the car can be pushed to one side for a few moments. Pinions sufficient for the day's needs are placed in the tank each morning and removed as needed.

Unique Soldering Tongs Save Much Time in Soldering Connectors to Motor Leads

THE use of a knuckle-joint or screw-type connector to connect the motor leads to the car-body leads of electric cars is universal practice. These connectors are usually provided with a saw cut along the side. In order to solder these connectors to the leads they are filled with solder and the lead is inserted. To prevent the solder from running out the usual method is to wrap the connectors with friction tape and leave this in place during soldering and then remove it again after the soldering has been completed. To do away with the necessity for taping up these connectors the soldering tongs shown in the accompanying illustration have been devised by Fred Koebrich, foreman of the East New York surface shop of the Brooklyn Rapid Transit Company. These tongs are provided with a long jaw on one side which fits the connector very closely and provides a tight joint along the saw



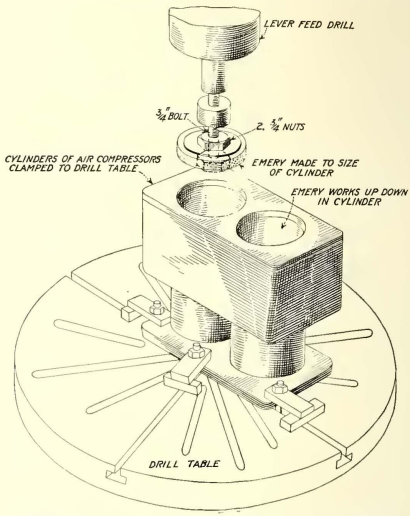
TONGS FOR SOLDERING CONNECTORS TO MOTOR LEADS

cut where the solder usually runs out. By using these tongs the terminal can be quickly inserted and the soldering completed without applying tape to the terminal. The handles of the tongs are made exceptionally long in order that there may be no danger of their becoming hot while soldering. Where connectors have become burned or have a rough surface a layer of friction tape laid inside the tongs will fit over the rough places and provide a tight joint.

Satisfactory Method of Finishing Welded Air Compressor Cylinders

By J. D. Pride
Master Mechanic Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S.

DURING the cold weather of the past winter we had the misfortune of having our Gardner Rix motor-driven air compressor cylinders cracked by frost. This compressor was used at our quarries for furnishing the air necessary in drilling rock. The cracks were in the cylinder proper and did not extend to the outside of the water jackets. Owing to the design of the



ARRANGEMENT FOR FINISHING AND SMOOTHING WELDED AIR COMPRESSOR CYLINDERS

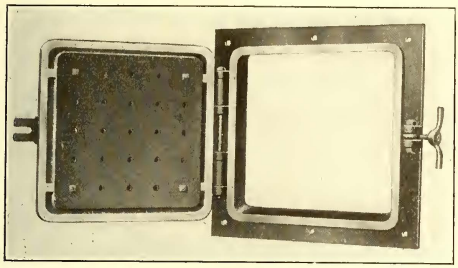
cylinder it was impossible to weld from the outside, so this work had to be done with the acetylene process on the inside. After the welding operations were finished, we gave the cylinder a gas test by plugging all openings, and by connecting the water inlet of the water jacket to a gas jet by means of a rubber tube. A lighted candle was then passed over the welds, which proved their tightness.

The machining and smoothing off of the rough surface left by the welds inside the cylinders, without changing or losing the piston size, proved a greater problem than we had anticipated. We first tried to machine the cylinders by using a drill press with a boring bar, but owing to hard spots in the weld and the high speed at which it was necessary to operate, this method proved unsatisfactory. We then secured an old emery wheel and ground and dressed it down to the exact size of the cylinder bore. A mandrel for the emery wheel was made out of a ¾-in. bolt. By putting this through the hole in the wheel, and by screwing a nut on either side to hold it in place, the compressor cylinder was clamped to the table of the drill press and by means of the hand-speed spindle the emery wheel was worked up and down over the rough spots till they were smooth, and the cylinders were in as good condition as when received from the factory.

New Type Airtight Ash-pit Door

THE American Steam Conveyor Corporation, Chicago, and New York, has produced a new type of ash-pit door as the result of careful tests and study, covering all points essential to successful operation and durability.

An ash-pit door should be of ample size to allow easy removal of the ashes from the pit, but should not be unnecessarily large. If too large, it is impossible to keep the door from warping and thus leaking air, and it is also too heavy to be handled easily. A 24-in. x 36-in. door is ample for the largest pit and this is the size recommended for ordinary use. Three other sizes of doors are also built of the same general design. These are in size, 18 in. x 18 in., 22 in. x 26 in. and 24 in. x 24 in. The frame of the American ash-pit door is of cast iron with the hinge and locking lugs cast on. The frame is of an angle design and sets well back into the setting. It is easily fastened into the pit wall by four bolts, one in each corner. The door itself is of heavy cast iron and is provided with a heavy ventilated cast-iron liner to prevent contact with the hot ashes and consequent warping. The bearing surface of the door and frame is carefully machined to make an airtight joint.



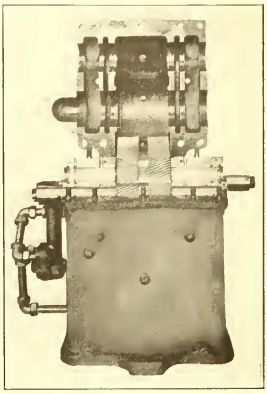
AIRTIGHT ASH-PIT DOOR

Reduction Gearing for Turbine Users

TERRY reduction gears, manufactured by the Terry Steam Turbine Company of Hartford, Conn., are again on the market, not having been obtainable during the last year, due to the concentration of this company almost entirely on turbines for the destroyers. Although made primarily for use with Terry turbines, the gears alone are available as a separate speed-reducing mechanism.

The Terry gears and pinion are of the stub-tooth, double-helical type, generated to true form. A well-ribbed, double-walled, box-like structure, extending the full depth of the case, forms a rigid support for each pair of bearings. The space between the walls acts as a water jacket for cooling the oil. The ribs between the walls act both as stiffening members and water baffles. The central part of the case, directly under the gears, forms an oil reservoir which contains sufficient oil to supply not only the gears, but also the turbine. The bearings are split horizontally to permit their replacement without removing the couplings.

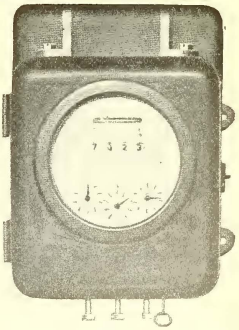
Oiling is provided for by a forced feed system, the ring oiling system having been found unsatisfactory for turbine reduction gear bearings. The oil pump is located well below the oil level in the reservoir, to avoid suction lift. The oil is pumped from the reservoir through short, direct, brass piping to a self-cleaning strainer, thence through distributing passages to large, annular oil pockets around each bearing shell, and through the spray pipe from which the oil is sprayed, for lubrication of the gear teeth. The oil pressure gage is located in one of the above-mentioned annular oil pockets at the most distant point from the oil pump. The pump and its bevel gear drive make a complete unit without stuffing boxes, or exposed running parts. The pump gears may be removed for inspection without disturbing the driving mechanism or oil piping, and the bevel gears may also be inspected by removing a small cover. The gears may be furnished for either direction of rotation, the only change being location of the oil spray piping to lubricate the gears above or below the contact point.



NEW TYPE OF REDUCTION GEARING

Equipment Inspection on a Kilowatt-Hour Basis

THE use of energy meters in connection with inspection of equipment was discussed by W. C. Bolt, Bay State Street Railway, in the issue of this paper for March 22. For convenience in quickly applying for this purpose the Economy railway meters already in use a card was devised to be placed over the lower part of the meter dial face, on which were printed the readings corresponding to inspection periods. Since the Bay State adopted this plan of car inspection the new meters which are hereafter sold to be used for equipment inspection purposes as well as a means for inducing economical car operation, are to be equipped with the set-back indicating dials, as shown in the accompanying illustration. A meter may have one, two or three of these inspection dials, as the plan of inspection for any property may require. On each dial are two pointers, a black one which rotates with the consumption of energy by the car, and a red one which is



ENERGY METER EQUIPPED WITH MECHANISM FOR USE IN CONNECTION WITH EQUIPMENT INSPECTION

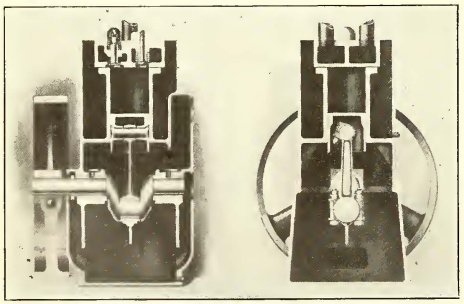
set at the value of energy consumption corresponding to which an inspection is to be made.

The inspection dial hands are, of course, geared in with the meter driving mechanism, but they can be reset to zero by means of reset rods with knurled heads projecting from the bottom of the case. These rods are ordinarily locked but can be released by use of a key. They are pushed upward to engage the spindle carrying the hands. The red hands are set by opening the front cover of the meter; hence cannot be tampered with by an unauthorized person. With this scheme of inspection all that is necessary is to tell the carhouse forces to hold a car in for inspection when the black hand reaches the red hand.

The plan of inspecting equipment on a kilowatt-hour basis is adaptable to any electric car or locomotive, alternating or direct current. On one large property it is estimated that if the present daily brake and controller inspections were put on this basis it would be possible to reduce by 50 per cent the present number of inspections without changing the present factor of safety. This plan for car inspection has been developed by the engineering staff of the Economy Electric Devices Company, general sales agents for the Economy railway meter.

New Line of Small Air Compressors for Shop Use

THE Ingersoll-Rand Company of New York has recently placed on the market four sizes of Imperial Fourteen compressors. The capacity of these compressors runs from 3 to 45 cu.ft. per minute, at pressures up to 100 lb. per square inch. The small compressors can, however, be used for pressure requirements up to 200 lb. per square inch. They are single-acting machines of the vertical type built for belt drive. Where



LONGITUDINAL AND CROSS-SECTIONS OF SMALL WATER-JACKETED AIR COMPRESSOR

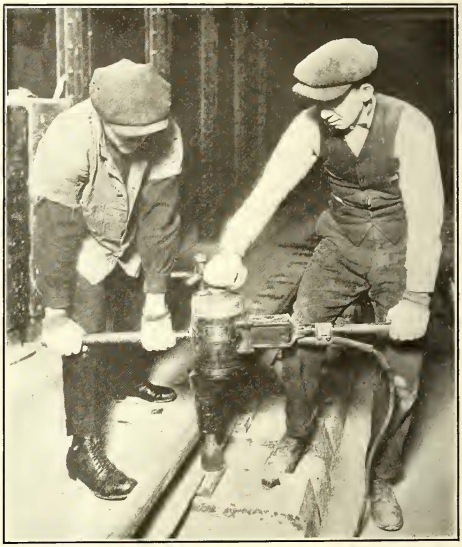
it is desired to drive them from a line shaft, both tight and loose pulleys are supplied. Where the use of independent motors is desired they can be furnished as a complete unit with the motor.

The compressor in the small sizes is built with a ribbed cylinder for air cooling, for use where the service is intermittent, and with water-cooled cylinders of the reservoir type for continuous operation. Larger machines are water-cooled only.

The general appearance of these compressors resembles somewhat an automobile engine. The crankshaft and connecting rod are of drop forgings, and automatic splash lubrication is provided. Their construction is illustrated in the accompanying cross-section views.

Portable Electric Drill Used for Tightening Bolts

THE accompanying illustration shows a method that was used in the New York subway for tightening track bolts and screw spikes. A portable electric drill manufactured by the Van Dorn Electric Tool Company,



TIGHTENING A SCREW SPIKE WITH AN ELECTRIC DRILL

Cleveland, Ohio, was used to furnish the power. A socket wrench, inserted in the tool head fits over the head of the bolt and is driven in the same manner that a drill would be ordinarily. This provides a very efficient and rapid method for doing this work.

Tool Tempering by Electric Heat

FOR the purpose of tempering tools the Westinghouse Electric & Manufacturing Company is using at its South Philadelphia Works an electric furnace in which a mixture of barium chloride and salt is kept in a fused condition and at any desired temperature by means of electric current. The furnace consists of a cast-iron cylinder about 3 ft. high and 3½ ft. in diameter packed with firebrick, with layers of asbestos. The central reservoir is 12 in. in diameter and 14 in. deep. The electrodes are set in the walls of the reservoir and the circuit is completed at starting by means of carbon sticks placed between them. Salt is fed into the reservoir and when it is fused it acts as a conductor and completes the circuit. The carbon sticks are then taken out and a mixture of barium chloride and salt is fed in, the final proportions being about 60 per cent barium chloride. The furnace throws off very little heat. It operates on a 16- to 30-volt a.c. circuit.

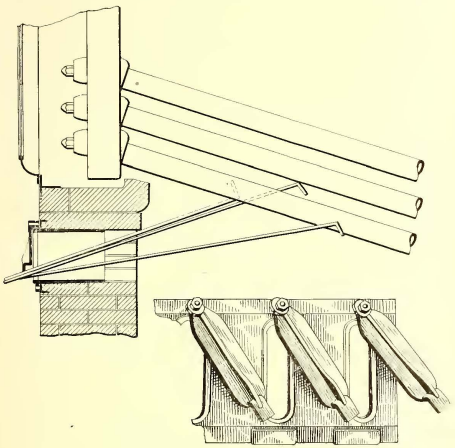
Scraping of Boiler Tubes in the Boiler Setting

A Casting with Openings in Front or Rear Wall of a Boiler Setting Gives Access for Scraping Off Cinder Deposit from Tubes

IN THE average boiler plant it is usual to operate the boilers at considerably above their rated or nominal capacity. High ratings are obtained by high air pressure under the grates, the effect of which is to lift small particles of incandescent coke and ash from the grates which are carried through the boiler in the furnace gases. A certain proportion of this coke or ash adheres to the bottom and sides of the tubes in the bottom row immediately above the fire.

A gradual building up of this cinder occurs which cannot be dislodged by the usual soot blowers or tube blowers, nor by the older hand lance method, and the only recourse is to cut the boiler out of service and scrape the cinder from the tubes after cooling down the furnace. This is an expensive operation and would be entirely unnecessary if means were provided so that it would be possible to scrape this cinder off the tubes while the boiler is in service.

The usual tube-dusting doors provided in horizontal water-tube boiler settings do not give access to the under side of the bottom row of tubes. To meet this condition the Combustion Engineering Corporation offers a tube scraping device illustrated herewith, the purpose of which is to provide openings in the front or rear wall of a boiler setting through which a light hook may be used for scraping the cinder from the bottom and sides of the lowest row of boiler tubes.



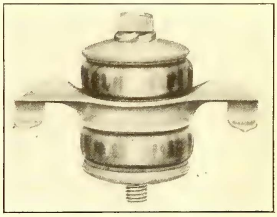
BOILER SETTING WITH TUBE SCRAPING DEVICE INSTALLED

These boxes are made in sections of three, four and five doors which are spaced the same distance apart as the boiler tubes in the boiler in which they are installed. Two or more sections are bolted on angles or Z-bars along the top and bottom sides providing one opening or door for each space between tubes. The castings are of sufficient strength to support the brick wall above them and they will, when placed under the rear header of a horizontal water-tube boiler of the Heine type, support the weight of the boiler also. The boxes are about 12 in. deep and heavily ribbed vertically between the doors or openings. When installed, the brickwork is so laid that the boxes are protected from radiant heat, and being in short sections of 21 in. to 35 in. in length will not warp and twist or loosen the brickwork above and below. Each opening is covered by a swinging door or cover, also of cast iron, the lower end of which passes behind a tapered spring catch which can be adjusted by a light blow of a hammer to hold the door tightly against the box.

When cleaning the tubes the attendant used a rod about $\frac{5}{8}$ in. diameter and 10 ft. to 12 ft. long, of the same shape as an ordinary fire hook with one prong about 5 in. long.

Trolley Wire Suspension with Grid Resistor Insulators

A NEW trolley wire insulator has recently been introduced by the General Electric Company of Schenectady, N. Y. This is called type P-2, and consists of two duplicate porcelain insulators, a malleable iron yoke, a stud bolt, together with insulating and locking washers. The particular feature is the renewable porcelain insulation, which replaces the usual molded insulating material. Many electric railways using G. E. equipment are already using these porcelain insulators for supporting the grid resistors underneath electric cars. For such roads there may be a certain economy effected by carrying the insulator in stock for more than the one purpose. The malleable iron yoke has reinforced lugs for holding the span wire, and is reversible, so that it may be used with the lugs turned either up or down, as preferred. The stud bolt passes down through the center of the insulator. By rotating this, the ear will be drawn up tight against the bottom of the suspension, with the ear properly aligned with the trolley wire, regardless of its angle with the cross-span wire. A lock washer under the head of the stud prevents the same from loosening and backing out. All metal parts are protected against corrosion by electric oven sherardizing.



NEW TROLLEY WIRE SUSPENSION

Cuban Engineers Organize

On Feb. 21, 1919, there was formed in Cuba, with headquarters at Havana, an "Association of Members of American National Engineering Societies." The society has been incorporated, and it will include members of engineering societies within reach of headquarters. It is planned to meet about four times each year at a dinner or breakfast, or on an excursion, the idea being to emphasize the social rather than the technical side of the engineer's life. About thirty men from Havana and vicinity attended the organization meeting and a larger attendance is expected at the first regular meeting to be held soon.

Committee on Public Utilities Organizes

U. S. Chamber of Commerce Names Individuals to Report on Utility Question—Committee Meets and Adopts Program

THE Chamber of Commerce of the United States has created a committee on public utilities, which had its first session, for organization purposes, at the headquarters of the national chamber in Washington on April 16. The committee is composed of eleven members as follows:

Lewis E. Pierson, Irving National Bank, New York, (chairman); Henry G. Bradlee, president, Stone & Webster Management Corporation, Boston, Mass.; Arthur W. Brady, president, Union Traction Company, of Indiana, Anderson, Ind.; F. B. DeBerard, director of research, Merchants' Association, New York; P. H. Gadsden, vice-president, United Gas Improvement Company, Washington, D. C.; E. K. Hall, Electric Bond & Share Company, New York; Albert W. Harris, president Harris Trust & Savings Bank, Chicago; Charles L. Harrison, Chief of Ordnance, Cincinnati District, Cincinnati, Ohio; J. W. Lieb, vice-president, New York Edison Company, New York; P. W. Myers, president, St. Paul Association of Public and Business Affairs, St. Paul, Minn.; James S. Havens, Eastman Kodak Company, Rochester, N. Y.

The Washington representative of the ELECTRIC RAILWAY JOURNAL reports that after the meeting it was evident that the committee was very much alive to the public utility situation in the country, particularly as it affects the electric railway companies and the power companies affiliated with them. A very elaborate program for assisting the public utilities of the country was laid out by the committee, although its details cannot be published until the committee frames its report, which is to be made to the directors of the national chamber. Nevertheless, it is stated that the committee plans to call speakers of national prominence to the coming annual convention of the national chamber in St. Louis, at which a public utility section will be established, as the committee fully realizes that the problems of the public utilities are among the most serious of the reconstruction period of the nation, and require immediate consideration and solution.

PUBLIC UTILITY DATA TO BE COMPILED

At the St. Louis convention it is expected that the committee will have speakers representing the banking interests, the views of labor, representatives of municipal leagues, mayors of cities and others. After the convention, the committee purposes to compile authoritative data on public utility matters, so that material for a referendum may be sent to the national chamber's membership. Then, it is planned, a report will be formulated by the committee, to be forwarded to each chamber of commerce throughout the United States, particularly to local chambers of commerce, to enlist the interest of all who desire to work out various phases of public utility problems.

The committee, it was informally stated, came more or less to the conclusion or belief, in general, that mere increases in fares will not solve public utility problems, and that it will be necessary to obtain relief from taxes, such as paving taxes and other local taxes, to get public opinion in support of skip stops, and to work out other economies which, it is believed, are not always possible now under the control of public utility commissions.

A Portable Dispatcher's Office at Youngstown

A New Plan for Facilitating the Handling of Fare Boxes and Car Records Was Inaugurated on March 1

ON THE Youngstown, Ohio, city lines until recently a condition existed which made it necessary for the company to devise a movable dispatcher's or fare-box office. The circumstances were these: It was formerly the custom to remove the Cleveland fare boxes from the cars at the Public Square where the used boxes were placed in the treasury of the Youngstown Municipal Railway and empty boxes were supplied to the cars. The cars have some little distance to go before reaching the operating yards and carhouses where they are stored and on the way they take in a number of fares. The cars thus reach the yards with some money in the fare boxes, and it proved very difficult to prevent theft of this money. Although the yards are well patroled for general purposes the supervision could not be close enough to prevent the robbing of the boxes.

FARE-BOX CAR CONSTRUCTED

To overcome the above difficulty, and also to facilitate the handling of records on the cars, a new plan was put into effect on March 1 which involves the use of a portable dispatcher's or fare-box car stationed at the Haselton operating carhouse from which all Youngstown cars operate. This car is placed on the first track off the main line at the entrance to the carhouse when the cars are coming in during the evening and early night. All inbound cars stop at the fare-box car, and the fare boxes, car reports, trip sheets and time cards are removed by the dispatcher and placed in the car. This is furnished with fare-box racks along the side and a desk for the dispatcher. The car is an old single-truck car from which the seats were removed. On receiving the fare boxes the dispatcher gives the conductors receipts for them.

When all the runs are in, about 2.30 a.m., the fare-box car is run to the Public Square, where the loaded cash boxes are delivered to the accounting room of the treasury department and empty cash boxes are received and placed in the fare boxes. The car is then run to the operating yard, about 1000 ft. west from its first location, where it is placed on the No. 1 track off the main line. All cars operating out of the yards and carhouse in the morning pass this point and receive empty fare boxes and fresh trip sheets for the day's operation. Each conductor gives a receipt for his empty fare box.

The question might be raised as to why a fixed office would not have served the same purpose as the car. It could not be used in this case because all cars operate into one carhouse and out of both the carhouse and the yard. Hence portability was necessary. It might be mentioned also that between the time of the last run in and the first car out the dispatcher uses his time in checking time slips, car report cards and fare boxes. Obviously with this plan no thieving is possible and an excellent opportunity is afforded for casual inspection of the fare boxes. The plan described was worked out by R. Moses, assistant general superintendent of the company, which is a subsidiary of the Mahoning & Shenango Railway & Light Company.

LETTERS TO THE EDITORS

Mr. Schaddelee Defends His Plan

UNITED LIGHT & RAILWAYS COMPANY

GRAND RAPIDS, MICH., April 16, 1919.

To the Editors:

In your issue of April 12, on page 747, there is an article signed "Traffic Engineer." This article is a comment on my proposed plan of charging for street car fares.

If you had republished my entire article, so that "Traffic Engineer" could have read it, he would know that in my article I called attention to the injustice of charging the same fare to the short-distance rider as to the long-distance rider. The paragraphs I refer to are as follows:

> The inherent injustice and inequity of any straight fare schedule is that it charges the same fare to all passengers, regardless of the distance they ride and regardless of the number of times they ride per year or month. There has been some deviation from a straight fare basis by the sale of six tickets for a quarter, etc., but these deviations have been few and have not removed the inherent injustice of the straight fare schedule. Theoretically and as a matter of equity and justice, the prices charged for street car service should be based upon two factors, viz.—first, the distance that the passenger rides, and second, the number of times the passenger rides per year or per month. The unfairness of charging a passenger the same fare for riding half a mile as for riding from 5 to 8 miles is readily appreciated and understood by everyone. For that reason there has always been much earnest discussion in regard to ways and means to eliminate this injustice, or at least reduce it, and as a result we have the zone system.
>
> It is not my purpose to discuss this injustice of the fixed fare in connection with the distance of the ride, as this injustice cannot be solved apparently without the zone system, with its undesirable results in causing a congestion of population. The much greater injustice, to my mind, is the injustice of the fixed fare as applied to a passenger who uses the street car service say five or ten times per month, and the passenger who uses it from 40 to 100 times a month.

I believe "Traffic Engineer" and a good many other railway men have attributed decreases in riding to increased fares, when in many cases the decreased riding was due to other causes, and only a small portion of it due to the increased fare. In Cedar Rapids, Iowa, our company was voted a 6-cent fare by a direct vote of the people, yet for January, the first month when the increase was in effect, our total passenger revenue increased 26 per cent, and the number of passengers carried increased 9.4 per cent. In February, 1919, as compared to February, 1918, the increase in total passenger revenue was 23 per cent, and the number of revenue passengers carried increased 1.4 per cent, yet during these same two months we had other street railway companies, where the fare had not been increased at all, showing decreases in number of passengers carried.

My plan, as outlined in my article, is proposed in lieu of a straight 7-cent fare and provides for increases in the fares collected from every passenger. The casual rider will pay 10 cents just as easily as he will 5 cents, when it becomes necessary or convenient for him to use the street car, but the regular rider, especially the regular short-distance rider, is very apt to discontinue riding if he has to pay 7 cents every time he rides.

Under my plan the total increase to the regular rider would be 50 cents per month, no matter how many times he rode. The large majority of the people who ride during the peak hours are daily riders who ride to and from their residence to their place of occupation. These people are not responsible for the fact that as a rule all places of employment start work at practically the same time, and I can certainly see no justice in penalizing them because they ride during the peak hour, as they cannot help themselves in that regard.

My plan was not offered as a cure-all, or as an absolutely perfect system of charging for street car transportation. I merely offered it as an improvement over the old straight fare plan.

"Traffic Engineer" seems to think that I do not appreciate the wrong principle of the flat fare as applied to long and short-distance riders. As I have stated before, if he had read my whole article he would know better. I know of no other way of getting rid of this injustice except by the institution of a zone system, which is impracticable in its application in the smaller towns, and which in fact is very objectionable in big cities also, first, because it congests population, and second, because it would cause a lot of opposition on the part of wage earning and salaried employees who have bought homes in the outlying districts of these cities where they can buy, build and live cheaply, and which action they took on the expectation that the straight nickel fare, having been in use for many years, would not be changed.

"Traffic Engineer" should know that the great majority of casual riders ride between the peak hours, and if he will make a check of the number of passengers riding and the number of passengers carried per car between the peak hours, he will find that the only reason that these riders are desirable at all is because the companies have to run these street cars in accordance with franchise regulations, regardless of profit, and that the only reason that the company can afford to run these cars during these hours is due entirely to the fact that during the peak hours the cars are loaded.

Heretofore the street car companies have followed the senseless method of giving low fares during the peak hours, by issuing school children's and workingmen's tickets, good only during the rush hours. Under my plan the passenger who rides the oftenest gets the lowest fare, no matter at what time of the day he rides.

"Traffic Engineer" is also mistaken, in my opinion, as to the discouragement of the casual rider by increasing his fare. Now-a-days the casual riders are very largely composed of visitors to a city, including traveling men, and the people owning automobiles, who use the street car when the weather is very inclement, when the streets are impassable, or when their automobile is out of commission. These people will pay 10 cents just as quickly as they will a nickel, for many of them are willing to take a taxi which will cost them ten to twenty times as much as a 10-cent street car fare. The street car companies need additional net revenue, and if they can obtain it, it does not make any difference whether there is an increase or a decrease in the number of passengers carried. Depreciation, interest and dividends can be paid only from what is left of the gross revenue after the operating expenses and taxes have been taken care of.

"Traffic Engineer" states that: "A successful fare increase must have two elemental qualifications; it must app'y to a sufficient number of patrons to provide an

appreciable gain in gross revenues despite the inevitable decreases in patronage, and it must conserve net earnings by affording a minimum of discouragement to the most profitable classes of patrons." I claim that my plan includes both of these qualifications. There are two other vital considerations to be considered, namely, the plan must provide for the minimum of trouble, delay and inconvenience to the passengers and to the conductors, so as not to slow up the headway of the cars. My plan also provides for these qualifications.

"Traffic Engineer" and all street railway operators must remember that the public authorities and the public in general have their own ideas in regard to street car fares, and that we as street car operators cannot simply fix these fares in accordance with our own notions. At any rate, even the increase of a straight 5-cent fare to 6 cents, does not necessarily mean a loss in riding as is shown by our experience in Cedar Rapids, Iowa. The amount of riding is determined by the frequency of service, and the quality and comfort of the cars, rather than by the question of whether the rider has to pay 5 or 6 cents for his ride.

I am sure the great majority of automobile owners would not use the street cars daily, even if they were carried for nothing, and certainly no one would claim that it is cheaper for people to drive to and from work in an automobile, even as compared to a straight 10-cent fare. I know many automobile owners here drive their cars down in the morning and back at night, and they have to pay 20 cents a day for parking privileges.

R. SCHADDELEE, Vice-President.

Mr. Ford Ought to Have a Heart

NEW YORK CITY, April 15, 1919.

To the Editors:

Henry Ford's promised novelty in surface car design may prove to be a wonderful boon to the electric railway operators, but pending its commercialization I wish that Henry would quit knocking the industry. We who are connected with electric railways must admit that at present we are down, if not out, and while our noses are rubbing the resin, it isn't fair for Mr. Ford to slam us with a lot of phoney statistics such as were used to bolster up the erstwhile crusade of the gallant young jitney bus against the old and wicked electric car.

Mr. Ford reproves the electric railways, through an ELECTRIC RAILWAY JOURNAL interview, for their absurd practice of carrying around ten times as much car weight as passenger weight—such as would be the case, I presume, with a 12,000-lb. one-man car accommodating fifty rush-hour passengers. This works out (unless I, also, have become a little loose in my methods of thought) to 240 lb. per passenger, which, incidentally, is just about what Mr. Ford's own automobile (the one that he sells; not the one he drives) will weigh per passenger, unless someone rides a-straddle on the radiator. Be that as it may, Mr. Ford's accusation of 10:1 ratio leaves us on the horns of a dilemma; either Mr. Ford has used the wrong scale on his slide rule or else he figures rush-hour patrons at 24 lb. each! Or perhaps he was referring to our worst mistakes in city car design which were built so long ago that we are almost ashamed to acknowledge remembrance of the weight of 46,000 lb. Here the capacity of 100 and the aforesaid 10:1 ratio would give us a weight for our rush-hour patrons of exactly 46 lb. apiece.

Part of our foolish practice in this regard, according to Mr. Ford, is due to our error in adhering to 5-in. axles when a 2-in. diameter in Mr. Ford's new steel would be sufficient. A word on this new steel is warranted. The antiquated metal called for by our Association standards has an elastic limit reaching up to 60,000 lb. The beam strength of circular cross-sections varies as the cube of the diameter, and the cube of 5 is fifteen times the cube of 2; so that the metal in Mr. Ford's new 2-in. axle, which surely is to be as strong as our out-of-date 5-in. monstrosity, evidently will have an elastic limit of 900,000 lb. per square inch. Some steel! It's too bad that the industry didn't know about this steel before. And with that admission of error we hope that Mr. Ford will be satisfied.

Seriously, all of us would like the new venture to succeed. The industry might benefit by it. But its success won't be made more likely if Mr. Ford closes his eyes to a lot of facts that the electric railways have been learning during the past thirty years. If gasoline at seven times the cost of electricity can be shown to be good for the industry, the industry will change its motive power. But the industry has been told this same thing once before when the jitney bus came forward with its historic glass crash. Now the industry wants to be *shown!*

F. KINGSLEY.

AMERICAN ASSOCIATION NEWS

Chief Engineer Sanborn Addresses Rhode Island Section

AT THE MEETING of the Rhode Island Company section, held at Providence on March 4, J. H. Sanborn, chief engineer of the company, discussed the topic, "Way and Structures." He traced the development of this part of the electric railway from early days as it kept pace with the evolution of traffic. The company orchestra furnished music during the evening. A house committee was appointed with F. A. LaVoice of the claim department as chairman. This committee served a simple luncheon at the meeting and also served in promoting sociability. An incident was the first meeting of two employees of the company who had conversed over the telephone for a period of twenty years. The meeting was attended by 140 members.

C. K. Savery has been appointed by the executive council of the Connecticut Company Section to fill the vacancy in the office of secretary created by the resignation of W. E. Jones. Mr. Jones has resigned his position with the company to take one with the Rhode Island Company at Providence.

In the report of the Milwaukee meeting of the Wisconsin Electrical Association, in the issues of this paper for March 29 and April 5, John St. John, assistant general manager Milwaukee Northern Railway, was inadvertently referred to as the retiring president of the association, instead of John St. John, vice-president and general manager Madison Gas & Electric Company.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

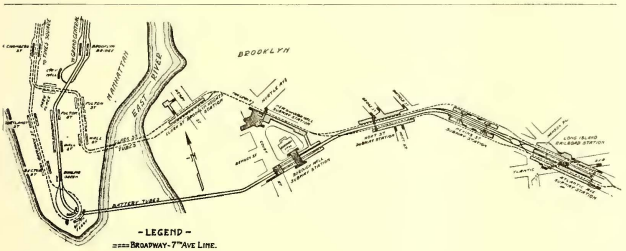
Another River Tunnel

Both East Side and West Side Rapid Transit Lines in New York Operating to Brooklyn

Beginning Tuesday morning, April 15, at one minute after midnight the new Clark Street tunnel under the East River connecting the Wall and William Street station in Manhattan, with the Borough Hall subway station, in Brooklyn, was put into use by the Interborough Rapid Transit Company.

East Side Lines Use Old Tube

The Fourth and Lexington Avenue (East Side) Interborough lines have been going through the old Battery tunnel to Brooklyn and will continue to do so. The Seventh Avenue Interborough lines, however, have heretofore had their terminus in lower Manhattan at Wall and William Streets. The Broadway-Seventh Avenue (West Side) trains, under the new arrangement, go to Brooklyn, but use the new Clark Street tunnel.



ROUTES OF INTERBOROUGH TUBES UNDER EAST RIVER

Tracks through the two tunnels come together at Borough Hall, Brooklyn, and make a four-track route in Brooklyn between Borough Hall and Atlantic Avenue.

Test Runs April 8

With the opening of the Clark Street tunnel, passengers from Brooklyn have a through direct express service to either the East Side or the West Side of Manhattan and to the Bronx, without change of cars at Rector or Wall Street, or change to the Forty-second Street shuttle.

The power was turned into the cables and third-rail for the first formal tests of the new Clark Street tunnel at 10 o'clock on the forenoon of April 8. The first test train was operated at 1.30 p. m. Tests were made not only of power facilities, but of signal system and safety appliances, track alignment, clearance of cars, both as to ceilings and edges of station platforms, etc. Trial operation of trains proceeded each day until the line was opened to the public. The Times Square station at Forty-second Street, being in the heart of the theater district, the new line makes available to Brooklyn riders a service that promises to be very attractive.

20 Miles for Five Cents

The longest ride available on a single fare will be from Atlantic Avenue to East 241st Street in the Bronx, on the White Plains Avenue line, a distance of 20.23 miles. On the steam railroads, at 3 cents a mile, the regular rate, the fare (exclusive of war tax) would be 61 cents.

The distance between Atlantic Avenue and Van Cortlandt Park on the West Side line is 16.85 miles, and for a steam railroad ride of that length the fare (exclusive of war tax) would be 51 cents. The Interborough lines have averaged in cost more than $4,000,000 a mile.

Cost About $7,500,000

The new line has been under construction since 1914 and cost, completed, between $7,000,000 and $8,000,000. The tunnel line consists of twin tubes, which enter the river in the vicinity of Old Slip, Manhattan, and cross to the Brooklyn side, extending down Clark Street to Fulton Street and thence to a junction with the existing Interborough lines in Brooklyn, at Borough Hall. It has been constructed under the direction of the engineers of the Public Service Commission, and directly in charge of Clifford M. Holland, the commission's tunnel engineer. The opening was attended with very little confusion to the public.

Public Utility Triangle

A Very Interesting Statement of the Case by British Columbia General Manager

George Kidd, general manager of the British Columbia Electric Railway, Vancouver, B. C., has explained to the employees of the company through their own magazine how the public utility executive behind the mahogany desk must try to secure an even measure of justice to the public, the employees and the investors. Mr. Kidd said in part:

I suppose lots of you who have worries must feel that it would be fine to be a general manager. I cannot speak for a private business, but I know that it is not altogether an enviable position in a public utility business.

Triangular Relationship Explained

In a public utility there is a triangular relationship between public, employees and investors. The shareholders have an equal duty to public and employees; the public has an equal duty to allow the employees and the shareholders fair wages; and the employees similarly have an equal responsibility to public and investors.

For a time, two of the three sides of the triangle may get more than their share, at the expense of the third; or one may get ahead of the other two; eventually there must be a readjustment.

The service we give the public is our estimate of the public's needs, commensurate with our resources, but in order to keep abreast with the public we ask for complaints and suggestions. Similarly, the management tries to learn the employees' needs and meet them.

The public is, unfortunately, not well acquainted with the investor. There are over 10,000 investors in British Columbia who have put their savings into securities of this company. Everybody acknowledges that saving money is a virtue, but as soon as the economical man or woman invests it he or she seems to be turned into a capitalist, with all the odium that the word conveys. The thousands of savings bank depositors in Vancouver are no different from the small investors in this company.

The employee is entitled to fair remuneration. Wages come from the public. The rates charged for service must be sufficient to pay the employees and the shareholders fair remuneration, the one for their work, the other for the use of their money. There is nothing to be ashamed of about capital. If we expect interest from the savings bank we should give investors in a company like this a fair return on their money.

The Investor Is Regulated

Do the employees understand the investors and the public rightly? Neither the investor nor the employee can expect the public to pay anything they may ask. The investor already has submitted to regulation by the public in the form of the public utilities commissions, and has had the return on his investment restricted.

Similarly, employees cannot expect the public to think well of them if they ask the public to pay any wages they may demand, for wages affect rates.

I like to think of a company such as this as a trustee for the public. Our duty is not solely to pay a fair return on capital, but to fulfill our trust to the public in furnishing the best possible service at the lowest possible cost, while paying good wages to our employees and maintaining our fair share of the cost of government.

I am afraid capitalists of old would turn in their graves should they hear this open discussion of a company's business with its employees, but such is the trend of relationships between employer and employee to-day. We invite the public to investigate our business from their point of view, and as one of the other members of the triangle the employees have a similar privilege.

Third Buffalo Arbitrator

Former President of Chamber of Commerce on Board with Messrs. Richey and Allison

Orson E. Yeager, lumberman and former president of the Chamber of Commerce of Buffalo, N. Y., has been selected as the third member of the board of arbitration which will determine the amount on which the International Railway will be allowed a return in any service-at-cost agreement that may be entered into between the city of Buffalo and the railway. Albert S Richey is the city's representative on the board and James E. Allison, Jr., St. Louis, is the representative of the company.

The three arbiters held their first conference on April 15. The taking of testimony in the valuation proceedings will start within a week or ten days. The city and the company both have the right to reject the final report of the arbiters. The board will not fix the rate of return the company may eventually receive or the fare to be charged.

The bill permitting the city and the company to enter into a contract along the lines of the service-at-cost plan of Cleveland has been passed by the Legislature at Albany and a hearing will be held on it by the Mayor. The bill practically nullifies the 5-cent fare agreement embodied in the company's franchise. Whatever agreement is made will be subject to a mandatory referendum. There is a general feeling it will be overwhelmingly defeated by the voters again.

An agreement has been reached between the International and its union platform employees whereby the $225,000 due the men as back pay and which was awarded them by the War Labor Board will be paid in installments. The money was due on April 1. After a series of conferences with E. G. Connette, president of the International Railway, the men have agreed to accept the sum in installments. The first payment of $50,000 will be made on April 28; the second payment of $50,000, on Nov. 14, 1919; the third payment of $25,000 on Dec. 21, 1919, and the remaining $100,000 on Jan. 28, 1920.

Absence of Snow Helps

The New York *Times* has been figuring the saving that has accrued to the city, the public utility corporations and to individuals on account of the recent mild winter, with its almost total absence of snow. In discussing the matter from the standpoint of the electric railways the *Times* said:

Anything less than 2 in. of snow is not considered a storm by the electric railway companies. It was estimated by a railroad man that for each additional inch of snow above 2 in. the cost to each company is approximately $5,000 an inch. In zero weather this is increased because the work proceeds slower, the wear and tear on equipment is greater, and more labor is required. The nearest approach to snow fighting this year was in the last storm when snow sweepers were held in readiness to be sent out. The cost of sending out a sweeper or a plow was estimated at about 30 cents a mile, this being greater according to the depth of the fall.

The cost of snow removal to the New York Railways in recent years was: 1913, $42,324; 1914, $188,509; 1915, $53,957; 1916, $149,022; 1917, $73,478, and 1918, $127,522. To the advantages of a mild winter must also be added the saving that comes in approximating schedules, for disorganized operation means a loss in efficiency of the service.

Here is a comparative table of snow removal costs:

Lines.	1916-1917.	1917-1918.
Third Avenue	$92,000	$99,000
New York Railways...	74,478	127,522
Brooklyn Rapid Transit	83,245	103,103
New York & Queens County Railway	2,790	6,043

Ford vs. Birney

W. P. Strandborg of the Portland Railway, Light & Power Company, Portland, Ore., demands attention with "Picking on the Little Fellows," in *Watt's Watt* for April 11. Mr. Strandborg says:

Once upon a time, Henry the Ford, now High Lord of Lizzieland, was a young blacksmith in a small town entirely surrounded by Michigan. And, one night a fool setting hen flew in from the village chestnut tree that stood in front of his door and located herself on a pile of scrap near the glowing forge. In due time she finished her task and there was a nice little gasoline cootie running around the place. Whereupon Henry the Ford threw a monkey-wrench at it and christened it "Flivver."

To-day, the entire civilized world will bear witness of the truth of this strange miracle. Uncle Sam is going to spend $23,000,000 in the next three years to give more elbow-room to the "Flivvers." That's why we build more highways, these days.

HAVE HAD LOTS OF FUN

It came to pass that all the world chuckled and smiled as Henry the Ford's little Lizzie began to cover the earth like seventeen-year locusts or a smelt run up the Sandy, but history fails to record that anybody refused to buy one if he had the price or ride in one if he had the chance.

But the jury writers and the comic papers and cartoonists had a pleasant spell while Lizzie was learning the ropes. And, Lizzie had too many good points to be kidded off the map—this is not a paid adv.

The arrival in our midst of the cute little Birney safety cars has been greeted with the same joyous and happy abandon. It has been the same in the many cities where the busy little Birneys have won their way into general popularity and where they have never been replaced after once being adopted.

UNCLE SAM LIKES THEM

Not only have private street railway companies without number inaugurated Birney car service, but Uncle Sam, when he was brought face to face with the greatest war the world has ever known, was obliged to step in and solve the transportation situation in a score or more of great war-working industrial centers and shipyard cities. Uncle Sam built nothing but Birney safety cars, because they were the type of equipment that would best fill the bill, all things considered.

Our company was allotted twenty-five of these cars and they have been placed in operation on two of our lines—Irvington-Jefferson and Williams Avenue. Except in the case of a small handful of persons, the car riders on these lines have accepted the new type of car with marked approval.

Patrons on other lines have asked us when we were going to be able to extend our Birney car service to their districts. It is a peculiar fact that those who have expressed themselves real peevishly about the little "tanks," have not (and there is not a single exception) based their complaint on any defect in either service or equipment or on any condition of operation that would not, with equal force, apply to any other type of car.

SAFETY DEVICES OVERLOOKED

The objectors, conscientious or otherwise, have overlooked the specific advantages that the Birney car possesses over other types of equipment, particularly in the matter of safety.

Most of the kickers, too, overlook the distinct improvement in service through the use of the Birney car whereby we are able to give more frequent service than we could with any other kind.

Put Labor on the Board

Bridgeport Manufacturer and New Haven Director Sounds Note of New Industrial Democracy

Walter B. Lasher is one of the big business builders of Bridgeport, Conn. He has many corporation interests, but he also has many civic interests. He knows labor, its hopes and its aspirations. One of Mr. Lasher's jobs has been chairman of the Bridgeport Traffic Commission. In that post he has made a study of electric railway problems that has convinced him that a number of features of operation as at present followed need correcting. This has led him to suggest that labor be represented on the board of directors of the Connecticut Company or its local successors in Bridgeport if the segregation of the properties there is brought about. Mr. Lasher's views are highly interesting. They are interesting in themselves as such and also because they have evoked favorable reception from the local press. Mr. Lasher is quoted as follows:

If more boards of directors included in their make-up the men who had the grime of toil in their fingernails, everybody would be better off. Every community is full of the examples of successful men who have had to fight their way from the bottom—who have learned their business from the ground up. It's true of the trolley company, and it's true of every company.

A concern that employs as many workers as the Connecticut Company has a hidden capital of brains and executive ability in its men. Bring this ability to the top—give it an outlet.

I have a lot of faith in the men behind the controller and at the end of the trolley rope. Treat them like men—give them a chance. Why, at present, they are not treated like human beings at all, but simply like cogs in a machine. They are not known by their names, but by their numbers, like so many convicts.

Give them a chance to take a pride in their own ability. Put up their names in the trolley car: "This car operated by Motorman John Smith and Conductor Sam Jones," so that the passengers can know the operators and say "Good morning, Mr. Jones," when they get on, instead of seeing merely a number on a man's hat.

Municipal Properties Subject to Commission Control

In a decision handed down by the Illinois Supreme Court on April 15 in the case of the Springfield Gas & Electric Company against the city of Springfield, the court held as unconstitutional the clause in section 10 of the public utilities act exempting municipally owned public utilities from the operation of the act. The court said:

The persons who use the products or service of public utilities are entitled to the benefits of the public utilities act and are entitled to its protection against extortion, discrimination and inferior service by whomsoever furnished. If a customer is oppressed by extortionate charges or discriminated against by wrongful rate or inferior service the wrong is the same whether done by a municipal corporation or a private corporation.

The fact that this section of the act is declared void does not affect the validity of the remaining sections. However, the ruling is likely to act as a damper on the ardor of certain Chicago Aldermen who claimed, in advocating municipal ownership, that the control of service would be removed from the jurisdiction of the State commission.

Detroit Attacks Railway Problem Again

The defeat of municipal ownership at the recent election in Detroit, Mich., blasted the hope of the Street Railway Commission in finding relief from transit ills by this means, but it has not served to deter the commission from seeking elsewhere for possible help. At its meeting on April 11 the commission decided to invite Henry Ford to explain to the commission his plan for providing transportation by self-contained vehicles, and the members also concluded to proceed at once to examine into the details of the Tayler plan of operation as in use in Cleveland.

One thing seems certain, there will be no piecemeal construction of railway lines to compete with the Detroit United Railway. The commission has again gone on record to this effect. The reasons for this remain as strong as ever. They have been set forth before by the commission and were reviewed in the ELECTRIC RAILWAY JOURNAL for March 29, page 659.

In connection with the inquiry of the commission into the Tayler plan of operation Edward T. Fitzgerald, secretary of the commission, has been instructed to communicate with Fielder Sanders, street railway commissioner of Cleveland, and ask him for a comprehensive report on the plan, especially with respect to the valuation of the physical property. The members of the commission will probably visit Cleveland after they have had an opportunity to digest Mr. Sanders' reply.

Mr. Ford Plans Experimental Road

Henry Ford, the automobile manufacturer, who last fall made application for a franchise to connect the blast furnace and shipyard at his plant with Michigan Avenue, is now applying for franchises on Fort Street, Boulevard and South Dearborn Road and running through Oakwood, Ecorse Township and Dearborn. The rate of fare specified in the franchise is a maximum of 2½ cents per mile with a minimum fare of 5 cents. It is over this proposed road evidently that Mr. Ford proposes to operate his new gasoline street car, about which he was interviewed in the ELECTRIC RAILWAY JOURNAL for April 12. In a statement attributed to him on April 11, Mr. Ford reiterated some of the points brought out by him in the previous interview. He is quoted as follows:

> Gas-driven street cars seem to be the logical successors to the electrically driven cars and I am going to lend my efforts to building and operating the first one in this city.
>
> If it proves itself by far the superior car, and there is no doubt about it in my mind, I will be willing to work out a system with Mayor Couzens or any private concern which is willing to take the manufacture over with the end in view of bettering transportation facilities.
>
> We will build the first car this summer and operate on the streets. I have no personal interest in building this car aside from making it possible to offer Detroit and the rest of the country a modern means of transportation. There are about 125,000 street cars in operation in this country to-day and there is need for about 500,000. If the car we build is what is wanted we will be glad to offer it to some one to manufacture.
>
> The main trouble with transportation everywhere is the high fare. When this problem is solved transportation will be greatly improved. The gas-driven cars will make this possible. The public will get better service and the people operating the transportation system will make more money, because more people will travel.

Court Upholds Receiver's Labor Attitude

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, remains firm in his decision to deal with nothing but committees of the employees themselves. The recently organized union carried its case to the Mayor in the hope of having Mr. Garrison recede from the stand which he has announced, and, failing in this attempt, carried the matter to Federal Judge Julius M. Mayer, by whom Mr. Garrison was appointed.

The conference before Judge Mayer was held on April 16. He upheld Mr. Garrison in his refusal to recognize the Amalgamated Association. Judge Mayer asserted, however, that the unionists had misunderstood the receiver's position. He suggested that the men obtain their representation through a general election by the entire body of Brooklyn Rapid Transit employees.

In this connection he suggested that a committee so prominent in the community that its integrity would be beyond dispute be selected to aid the employees in chosing their representatives. He made the point plain, however, that the entire body of employees should be represented. He said that he wanted it understood that the receiver was ready at any time to hear any and all grievances which the employees might desire to present, but that grievances which he declared of the first class—namely, matters of general application as distinguished from specific cases of some wrong claimed to have been done to an individual person—should be presented by all the employees of the system and not by a part of the employees.

The union representatives reported back to the men at a meeting on the night of April 17 and the men voted to postpone the strike indefinitely. At that meeting a telegram was read from Governor Smith in which he expressed the hope that the organizers would delay action "until we have had an opportunity to talk it over." Union leaders promptly arranged for a conference with the Governor at Albany on April 18.

During April 17 the company announced that the tower and signal men had been granted an increase in wages. In a letter to Judge Mayer, Mr. Garrison said that no man would be discharged who did not deserve discharge by a breach of discipline. No man would be discharged because he chose to join a labor or other organization. Mr. Garrison said he had also arranged for proper settlement of any personal grievances presented by employees. It seemed to him that this met the situation in a rational way and assured justice and fairness to all concerned.

Appeals Against Wage Reductions

Union employees are already taking steps to guard against a reduction in the wage scales established by the War Labor Board. The Amalgamated Association, through its president, sent letters on April 11 to the Governor of Illinois, the Mayor of Chicago, the State Public Utilities Commission of Illinois and the management of the Chicago Surface Lines, appealing for protection against a wage reduction.

The Chicago Surface Lines contract, which became effective on June 1, 1917, does not expire until June 1, 1920. A wage scale of 30 cents to 39 cents over a five-year period was in force when the War Labor Board set a standard wage of from 43 cents to 48 cents last August. The Surface Lines appealed to the State commission for relief in the way of a higher fare which has not yet been granted, and the employees are fearful lest the company exercise its option of returning to the contract scale of wages when the War Labor Board award expires with the official declaration of peace. This is said to be one of the few companies, affected by the War Labor Board ruling, which has a contract to fall back upon with the end of the war. The management of the company has not stated its position with reference to the action to be taken when this time comes.

Illinois Public Utilities Act Satisfactory

The Illinois Senate committee on public utilities recently held a hearing on all bills affecting the public utilities act, and representatives of the Illinois Electric Railways Association appeared with representatives from the Illinois State Electric Association, the Independent Telephone Association and the Bell interests to protest against any change in the present law. About 190 representatives of the various interests met at luncheon in Springfield, and the effect of the proposed legislation was explained in detail by attorneys representing the utilities' interests, by a representative of the Chicago Association of Commerce, and by a representative of the Investment Bankers' Association of America.

At the hearing before the Senate committee some twenty speakers, including representatives of the public, the investors and the utility interests, addressed the committee in behalf of their respective organizations. It was the unanimous opinion that this meeting was very successful, and at the present time indications are that there will be no drastic changes made in the public utilities law.

News Notes

Railway Accepts Franchise Renewal.—The directors of the Cleveland (Ohio) Railway, have accepted the city's renewal of the Tayler grant until 1944.

Soldiers First in Des Moines.—Emil G. Schmidt, president of the Des Moines (Ia.) City Railway and the Interurban Railway, has ordered all heads of departments to give all returning soldiers and sailors preference in filling positions on these systems.

City Loses Traction Appeal.—The Court of Appeals has upheld the dismissal by the lower courts of the action of New York City against the Brooklyn, Queens County & Suburban Railroad to recover about $800,000 in percentages of gross receipts under the railroad law.

Governor's Commission Plan Accepted.—The Senate of New York, on April 15 without debate, and on a short roll call, unanimously adopted the plan of Governor Smith for the reorganization of the Public Service Commission in New York city. The new plan calls for a new regulatory commissioner and a commissioner in charge of construction.

Wage Arbitration in Scranton.—By a unanimous vote the union of employees of the Scranton (Pa.) Railway on April 7 agreed to the arbitration of their demands for increased wages and time and one-half for overtime. Several other minor items in the demands for a new agreement are also to be arbitrated. The motion to accept arbitration also included provision for the acceptance of the concessions made by the company on other demands.

Would Fix Strike Costs.—Fred Robertson, Federal District Attorney for the Kansas district, has filed in Topeka, Kan., a motion to tax the costs of the protection of the Kansas City Railway during the strike last winter. The total cost up to April 1 was $29,722, of which the railway paid $14,522 on order from Judge Pollock. In making his restraining order last winter Judge Pollock reserved the right to assess the costs of the protection against any of the parties, the city, the railway, and the Amalgamated Association. This petition is to ascertain upon whom the rest of the costs shall be placed.

Louisville Judge Rules War Is Over.—Judge Walter Evans of the United States District Court at Louisville, Ky., recently rendered a decision of interest in connection with awards of the War Labor Board. Judge Evans upheld the contentions of a well-posted attorney representing a client in the local court. It was held that the war was over, the decision being based on an address of President Wilson before a joint session of Congress just after the signing of the armistice, when the President stated that the war was over and reiterated the statement. The President as Commander in Chief of the Army has this right.

Powers of Iowa Commission Increased.—A bill which will work to the advantage of the electric railways of Iowa was passed in the Senate of the Iowa Legislature during the week ended April 12. The bill increases the powers of the present State Railroad Commission and authorizes that body to regulate rates and services of the electric railways. The present situation of the Des Moines City Railway was considered in the debate which preceded the passing of the bill. A number of the strongest members of the Senate defended the bill. The vote was nearly two to one in favor of its adoption.

Transit Bills for Philadelphia Advanced.—The Senate committee on appropriations on April 9 voted to report favorably two transit bills introduced by Senator Daix, one of which would empower the Public Service Commission to order the Philadelphia (Pa.) Rapid Transit Company to make extensions and improvements to its lines. The other bill, identical in its text and purpose to the Salus measure, which was defeated in the House at the last session, would obligate the Philadelphia Rapid Transit Company, under the discretion of the Public Service Commission, to establish transfer points and joint rates of fare with other companies to permit through routing of trains and cars.

So the Company May Know and Profit.—The Portland Railway, Light & Power Company, Portland, Ore., has inaugurated an "Employment Record Department" in charge of Mr. Warner. The purpose is to facilitate inter-organization promotions—*i.e.*, to use talent in the company's own ranks that might otherwise not become known at the time the men were needed. The plan includes new as well as old employees. The department will not employ men, but will prescribe forms of records for all employees and see that they are filled out and kept in convenient shape. Mr. Warner will spend six weeks in a study of employment management at Reed College, after which he will develop the plan more fully.

Wage Increase in New Albany.—A voluntary average wage increase of 5 cents an hour has been granted to the employees of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, as well as the men on the city lines at New Albany and Jeffersonville, Ind. This action was made following an announcement of the Inter-State Commerce Commission granting a 2-cent increase, to 7 cents, between Louisville and Jeffersonville and Louisville and New Albany. Interurban men will receive from 38 cents to 44 cents an hour. City conductors will receive 29 cents to 33 cents an hour, and motormen 32½ to 41½ cents. The new agreement holds for one year, or until it is renewed.

Conciliation Fails in New Jersey.—Union leaders in Newark, N. J., are drawing up a petition to the War Labor Board in view of their failure to reach an agreement with the Public Service Railway on the question of a nine-hour day with ten hours' pay. The conference on April 14 ended in a deadlock. The company said it would grant everything except the nine-hour day, but the union officials, insisting on this point, demanded its submission to the War Board for consideration. The company then announced that all the other points would have to be passed on by the War Labor Board. The present proceedings are in accordance with the terms under which the recent strike on the lines of the Public Service Railway in Newark was settled.

Wants Interurbans Built Now.—The Board of Commissioners of the city of Dallas, Tex., has called on the holders of the railway franchise granted by the city and of the interurban franchise between the city and C. W. Hobson to appear before the board to show cause why these interests should not proceed at once to carry out their agreement to build and operate two interurban lines out of Dallas. Under the terms of the franchises granted during the administration of Mayor Lindsley these two interurban lines, each at least 30 miles in length, were to have been built and in operation within a period of three years. Due to the war this time was extended, but now that the war is over and business conditions are fast becoming normal the city authorities feel that the railway interests should proceed to carry out their agreement, for which they are under bond to the city. The original agreement was that the two interurban lines should be under construction within six months after Oct. 1, 1917. The Dallas Railway and the Texas Electric Railway are the holders of the franchises.

Program of Meetings

Chamber of Commerce of the United States

The program for the seventh annual meeting of the Chamber of Commerce of the United States, to be held in St. Louis, Mo., April 28 to May 1, has just been published. The headquarters will be at the Statler Hotel. On the afternoon of Monday, April 28, there will be a meeting of the National Councillors, and in the evening a meeting of the Advisory Council of the War Service Committees. The first general session will be held at the Coliseum on the morning of April 29, with a second general session in the evening and group meetings in the afternoon. The same program will be followed on April 30, and on May 1 there will be two general sessions, together with two sessions of organization secretaries. The speakers will include the Secretary of the Treasury, the Secretary of Commerce, the Chairman of the United States Shipping Board, the Railroad Administrator, and others prominent in business and government circles.

Financial and Corporate

Receiver in St. Louis

Tottering for Many Months, United Railways Joins Long List of Roads Now in Courts' Hands

Rolla Wells, former Mayor of St. Louis, Mo., and recently Governor of the Eighth Federal Reserve District, St. Louis, on April 12 was appointed receiver of the United Railways Company, which operates all the local St. Louis lines. The appointment was made by United States District Judge Dyer as the result of a petition entered in the court on April 11 by a New York stockholder in which the railway company joined.

Judge Lamm Special Master

Judge Dyer also announced that before the time came for the settlement of claims by the receiver he would appoint Judge Henry Lamm of Sedalia as special master to hear the representations of the various claimants and pass on the receiver's report. Judge Lamm has been serving as special master in the original receivership suit brought by John W. Seaman, New York, a stockholder.

Former Judge Henry S. Priest, chief counsel for the United Railways, and Charles W. Bates, former city counsellor, who was one of the attorneys in the Seaman receivership suit, were appointed by Judge Dyer as attorneys to the receiver.

The appointment of a receiver was due to the inability of the company to meet a loan of $3,235,000 from the War Finance Corporation. Samuel W. Adler, who made the application for a receiver, is the holder of $135,000 of underlying bonds of the St. Louis Transit Company. The naming of Mr. Wells forestalls the suit of John W. Seaman, a stockholder, who some time ago started an action to have an accounting, with the ultimate view of having the courts take charge of the properties. The railway joined in the application on which the appointment was made. The petition to the court stated that action was taken for the purpose of preventing the dismemberment of the system.

War Finance Loan Not Renewed

The loan granted by the War Finance Corporation in June, 1918, was for six months and has never been formally extended. An issue of $3,500,000 of Union Depot Railroad 6s, an underlying issue, matured on June 1, 1918. To meet this issue, the railway borrowed from the War Finance Corporation, and $3,487,000 of the bonds were retired, leaving a total of $13,000 still outstanding.

A plan to pay off the War Finance Corporation loan was under way when the receiver was appointed. The company had an application before the Missouri Public Service Commission to issue $2,160,000 of one-year 8 per cent notes. This, with treasury cash and Liberty bonds, would have enabled the company to pay the loan. To do this, it was purposed to deliver the $3,487,000 Union Depot bonds to the trustee of the first general gold 4s who in return would deliver a like amount of the 4s still unissued. These bonds, it was planned, were to be deposited as collateral for the new note issue.

Following the admission of insolvency by the United Railways it was announced that the two committees formed for the protection of the company's general mortgage 4 per cent bonds, due in 1934, will hereafter work together in the interests of these bonds only.

Breckinridge Jones, president of the Mississippi Valley Trust Company, St. Louis, is chairman of one committee, and N. A. McMillan, chairman of the board of the St. Louis Union Trust Company, is chairman of the other bondholders' committee.

The other members of the committee headed by Mr. Jones are David R. Francis, Jr., of Francis Bros. & Company, St. Louis; A. G. Hoyt, of the National City Company, New York; A. H. S. Post, president of the Mercantile Trust & Deposit Company, Baltimore, and F. H. Ecker, treasurer of the Metropolitan Life Insurance Company, of New York.

Arkansas Company Extends Operations

The Arkansas Light & Power Company, Arkadelphia, Ark., has acquired in fee the property of the Arkansas Public Service Company, which owns franchises and transmission lines in the great rice belt of eastern Arkansas, the property in fee of the Denning Coal Company, the controlling interest in the Pine Bluff Company, at Pine Bluff, Ark., operating 9.5 miles of electric railway, and the controlling interest in the Missouri & Southeastern Utilities Company.

The company has effected a permanent financing of this purchase by the sale to bankers of bonds and stock, and the floating debt of the company has been paid. The bonds are secured by a first mortgage on all of the company's property, with the exception of a small underlying mortgage on one of the plants, which is being reduced annually.

In order to provide for its future power needs the company has started construction of a transmission line from England through Little Rock to the coal fields near Russellville, where it will build a central power plant.

The mortgage provides for the issuance of $5,000,000 bonds. Of this amount $1,824,000 has been issued. The capital stock outstanding consists of $2,440,000 common and $1,500,000 7 per cent cumulative preferred.

Lehigh Transit Loses

War Conditions and Heavier Taxes Cause Twenty-three Per Cent Reduction in Net Income

The gross earnings of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Nov. 30, 1918, showed a gain of $445,071 on 15.5 per cent as compared to the preceding fiscal year. The total operating expenses and taxes, however, rose $593,200 or 32.2 per cent. As a result the net income finally suffered a loss of $105,281 or 23.2 per cent.

COMPARATIVE INCOME STATEMENT OF LEHIGH VALLEY TRANSIT COMPANY FOR YEARS ENDED NOV. 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross earnings	$3,320,145	100.0	$2,875,073	100.0
Operating expenses and taxes	2,433,620	73.3	1,840,419	64.0
Net earnings from operation	$886,525	26.7	$1,034,654	36.0
Non-operating income	142,834	4.3	144,755	5.0
Gross income	$1,029,359	31.0	$1,179,409	41.0
Depreciation allowance	43,761	1.3	141,146	4.9
Interest on funded debt	563,319	17.0	554,602	19.3
Interest on floating debt	50,499	1.6	9,347	0.3
Debt discount and expense	23,523	0.7	0,777	0.7
Net income	$348,256	10.4	$453,537	15.8

The year's decline was the direct result of war conditions and heavier taxes. The company's annual report does not present any subdivisions of earnings or operating expenses and taxes, so that only the general showing can be indicated. Owing to the smaller net income in 1918, the preferred dividends were discontinued.

The depreciation allowance for 1918 was $43,760 as compared to $141,145 in 1917. The accrued depreciation reserve, which has been accumulated from the balances left each year since 1911 from an amount equal to 22 per cent of gross railway earnings after the payment of maintenance and renewal expenses, was $284,352 on Nov. 30, 1918. The year before this balance was $312,279.

The surplus earnings of the allied Easton Consolidated Electric Company for the last year were $101,756. This sum resulted in a profit of $46,304 on the investment for the Lehigh Valley Transit Company.

Schedule in Bankruptcy Filed

Schedules in bankruptcy of the Interborough Consolidated Corporation, the holding company of the Interborough Rapid Transit and the New York Railways, were filed in the Federal Court at New York on April 14 by the receiver, James R. Sheffield. They are incomplete for the reason that the bankrupt is the owner of stock in other corporations the value of which is problematical. For the purposes of the schedules the stock is placed at par value.

Its largest liability is the half-yearly interest due on April 1 on approximately $67,825,600 of 4½ per cent bonds on which the company defaulted. The interest due, about $1,500,000, is cumulative. The bonds are secured by $33,912,800 of the capital stock of the subsidiary Interborough Rapid Transit Company.

The total liabilities, according to the schedules, amount to $69,685,264. A list of about 2500 bondholders accompanied the schedules.

Among the assets are promissory notes of the Interborough Rapid Transit Company, $1,300,000; unliquidated claims, $124,291, consisting of interest due on Interborough-Metropolitan collateral trust bonds; deposits in banks, $544,967; loan to the Interborough Rapid Transit Company, $500,000; one year 6 per cent notes of the Interborough Rapid Transit Company, $800,000, and demand notes of the Rapid Transit Subway Company, a subsidiary of the Interborough Rapid Transit Company, $1,000,000.

The bankrupt company holds 96.89 per cent of the $35,000,000 capital stock of the Interborough Rapid Transit Company, $15,061,600 of the $17,495,000 capital stock of the New York Railways and $1,035,741 of the total capital stock of $2,350,000 of the New York Transportation Company, commonly known as the Fifth Avenue Bus Company.

Receiver Sheffield has reduced the expenses of running the bankrupt company from $41,534 a year to $3,721.

Want Foreclosure Sale Set Aside

Decision was reserved by Justice Charles B. Sears of the Supreme Court at Batavia, N. Y., on April 14 on the show-cause order argued before him in connection with the sale of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y. The order asked why the sale of the road on March 12 for $500,000 should not be set aside. The property was bought by Willis A. Matson and William F. Foster, Rochester, acting for a bondholders' committee and a new corporation, the Rochester, Lockport & Buffalo Railroad Corporation.

The action was brought by W. Crawford Ramsdell and Samuel T. Church, Albion, N. Y., bondholders and stockholders of the original company. It is claimed by them that the property was worth more than $500,000 and that, in fact, an expert has stated that the road could be junked and sold, exclusive of right-of-way, for $963,000. Proof was offered that on a resale bids would be made for at least $640,000. Moreover, it was claimed that $174,000 cash in the possession of the Buffalo, Lockport & Rochester Railway went with the property, so that the buyers really bought the road for $325,000. It was said that the $174,000, had it been used to pay the interest on the bonded indebtedness of $2,799,000, would have made the foreclosure sale on March 12 unnecessary.

Collusion between some of the incorporators of the new Rochester, Lockport & Buffalo Company, the Lincoln Trust Company, New York, trustee of the mortgage, and some of the officers of the Buffalo, Lockport & Rochester company was charged. It was claimed that the fact that the railway had on hand $174,000 was not made known to prospective bidders until the time of the sale.

Messrs. Ramsdell and Church own $4,000 of bonds, $7,755 of preferred stock and $9,025 of common stock of the Buffalo, Lockport & Rochester Railway. They were represented at the show-cause proceeding by Fluhrer, Reed, Wage & White, Albion. Gerard, Scott & Bowers, New York, appeared for the Lincoln Trust Company and William Osgood Morgan, New York, for the bondholders' committee comprising R. Holmes Smith, Frederick Nichols and D. B. Manna, Toronto. Harris, Beach Harris & Matson, Rochester, appeared for Willis A. Matson and the Rochester, Lockport & Buffalo Company, which has already applied to the Public Service Commission for permission to issue $3,700,000 of stock.

New York Tax Law Needs Change

In a recent paper prepared for the National Tax Association by M. H. Hunter, of the University of Illinois, in regard to the taxation of public utilities in the State of New York, it is stated that the laws are too complex. Furthermore, there is no way of comparing tax burdens on different classes of property.

In Professor Hunter's opinion, the addition of the special franchise tax has no justification, and its attempted administration has filled the courts with litigation and has failed to bring justice and satisfaction. From the difficulties experienced under the present system, it would seem advisable to follow the example of some other states and adopt some unit method of taxation, either the earnings or the ad valorem basis.

If this were done it would be comparatively easy to extend the system to mitigate the present outstanding inequalities and injustices of local assessments. Finally, it is believed that utility property should be taxed at about the same rate as other property, "unless it be desired that the users of public utilities should bear especially heavy or light tax burdens."

Financial News Notes

No Offer for Bowling Green Lines.—Pursuant to an order issued by the Court of Appeals the property of the Southern Traction Company, Bowling Green, Ky., was offered for sale on April 7, with a provision that it was to be operated. The minimum bid of $21,000, set by the court, was not received, however, and the property will now probably be offered for sale as junk.

Receiver for Chattanooga Company.—John Graham, Philadelphia, and Percy Warner, Nashville, were appointed receivers of the Chattanooga Railway & Light Company, Chattanooga, Tenn., on April 17 by Federal Judge Sanford. The action was taken on the petition of the Commercial Trust Company, Philadelphia, Pa., representing the holders of $2,790,000 of the company's first mortgage bonds.

Common Stock Dividend Increased.—Henry L. Doherty & Company, New York, N. Y., announce that the monthly distribution on Cities Service Company bankers' shares, payable on May 1 to shares of record of April 15, will be 41.1 cents on each share. This compares with a monthly disbursement of 39.6 cents on April 1 and is equivalent to an income return of approximately 13¾ per cent annually on bankers' shares at their present market price.

Common Stock Dividend Resumed.—The directors of the Pacific Gas & Electric Company, San Francisco, Cal., have resumed dividends on the common stock at the rate of 1¼ per cent quarterly. An initial quarterly cash dividend of 1¼ per cent on the common stock was paid in April, 1912, and continued to April, 1913, when it was passed. The dividend was resumed in March, 1916, and paid to October, 1917, when discontinued.

Successor Interurban Organizes.—The Rochester, Lockport & Buffalo Railroad Corporation, organized as the successor to the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., sold under foreclosure recently, has organized as follows: E. R. Wood, president; A. S. Muirhead, vice-president, and W. W. Foster, secretary, treasurer and general manager. Directors: E. R. Wood, F. Nicholls, R. Home Smith, D. B. Hanna, A. S. Muirhead, F. W. Zoller, W. A. Matson, W. W. Foster and D. M. Beach.

Worcester Bonds Extended.—On petition of the Worcester (Mass.) Consolidated Street Railway for approval of an agreement for an extension for a period of two years of the company's twenty-year first mortgage bonds to the amount of $115,000, the Massachusetts Public Service Commission has approved an agreement made between

the railway and the American Trust Company, trustee, whereby the maturity of the bonds is extended two years from Jan. 1, 1919, and the interest on the bonds is increased from 5 per cent to 7 per cent per annum.

Governor Signs Gross Receipts Tax.—The Morgan bill re-enacting the gross receipts tax on utility corporations, which was recently signed by Governor Edge of New Jersey, provides for a tax upon the gross receipts of these concerns rather than upon the taxable gross receipts as contained in last year's act, thereby producing 12 to 15 per cent more revenue. The reason for a re-enactment rather than an amendment, it is stated, is because the act passed by the last Legislature was approved prior to the general tax act and there was a question as to whether the general tax act did not complicate or repeal the provisions of the gross receipts tax act.

Unfavorable Report on Successor Company.—Acting on the unfavorable report of the committee on incorporation the Connecticut House has rejected the bill authorizing the Somers Electric Company to buy the property of the Hartford & Springfield Street Railway and conduct the railway in South Windsor, East Windsor, Windsor Locks, Enfield and Somers. Advocates of the bill claimed that the organization of the Somers Electric Company was merely a "preparedness" measure in order that some corporation might be in a position to acquire the railway in case reorganization or change in ownership became necessary. The Hartford & Springfield Street Railway is now in the hands of a receiver.

An Echo of the Lorimer Failure.—The claim of the Lorimer-Gallagher Construction Company, Chicago, Ill., against the Southern Traction Company, East St. Louis, Ill., for $850,000 was allowed by Federal Judge English in a decree filed at Danville, Ill., on March 30. However, it recognizes the priority of claims totaling $110,000 for right-of-way and other expenses incurred before the road was built. The road is ordered sold, but no date is fixed. The same decree provides that the La Salle Street Bank, Chicago, Ill., also one of former Senator Lorimer's enterprises, which is in the hands of a receiver, must surrender to the construction company $1,200,000 of the traction company's bonds, which it has been carrying as "book assets" of the bank. The litigation was begun five years ago by J. Y. Sanders on a note for $100,000 against the traction company, turned over to Sanders by C. B. Munday, who was sentenced to five years' imprisonment for wrecking the La Salle Street Bank, of which he was vice-president.

Would Issue $1,054,000 of Bonds.—The Hudson & Manhattan Railroad, New York, N. Y., which operates under the Hudson River between New York and New Jersey, has applied to the Public Service Commission for the First District of New York for an order to permit the company to issue $1,054,000 of 5 per cent bonds under the company's first lien and refunding mortgage. The company states that the principal will be used for the reimbursement of its treasury for expenditures made for additions and betterments to its property, and in part for paying obligations incurred by the company for the purchase of rolling stock. The application, states that of the whole amount applied for $308,500 face value is on account of expenditures for betterments and improvements amounting to $246,800. The larger amount is needed to cover this sum, because the bonds will be sold at 80. The sum remaining under the application — namely, $745,000, face value—is on account of expenditures amounting to $188,500 for retiring underlying mortgages and $460,000 for payments for rolling stock.

Financial Clouds Hang Over Washington.—During the past four months, under the 5-cent rate, the City & Suburban Railway, included in the system of the Washington Railway & Electric Company, Washington, D. C., it is stated, has failed by $15,522 to meet its fixed charges. In any event the company is now running at a loss and means have not been devised for replacing all the cars damaged in the recent fire. Report that the Washington & Great Falls Railway & Power Company, which operates a line through Maryland to Great Falls, would discontinue operations on account of lack of funds was denied by its officials. Arrangements have been made to carry it along temporarily, at least. This concern rents both power and cars from the Washington Railway & Electric Company.

Seattle Sells Railway Bonds.—The city of Seattle, Wash., has finally sold $400,000 of bonds for new construction. They are now being offered for subscription. On Aug. 10, 1918, the City Council passed an ordinance adopting a plan for additions, betterments and extensions to the existing municipal railway system. The plan adopted called for the construction, equipment, maintenance and operation of a single or double-track railway from East Eighty-fifth Street and Tenth Avenue Northeast; also on East Marginal Way, also on West Spokane Street to Admiral Way, being three distinct additions to the municipal railway lines as they then existed. The estimated cost of these improvements was placed at $1,200,000. Early in January, 1919, the Council issued a call for bids for $400,000 of the bonds to be applied to the payment of construction costs. No bids for these bonds were received on the opening day, Feb. 1. Recently R. M. Grant & Company, New York, and the Oscar P. Dix Company, Seattle, submitted a joint bid for $400,000 of the bonds, which was accepted. The bonds bear interest at 5½ per cent per annum, and are payable in twenty years. They are an obligation dependent upon railway earnings.

Electric Railway Monthly Earnings

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$10,850	$10,599	$251	$458	†$207
1m., Feb., '18	8,261	11,696	†3,435	422	†4,857

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

1m., Feb., '19	$81,841	*$54,110	$27,731	$20,645	$7,086
1m., Feb., '18	67,485	*51,493	15,992	19,942	†3,950
12m., Feb., '19	942,247	*606,873	335,374	240,445	94,929
12m., Feb., '18	887,921	*520,282	367,639	230,385	137,254

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Feb., '19	$142,147	*$109,326	$32,821	$21,273	$11,548
1m., Feb., '18	137,791	*106,144	31,647	30,565	1,082
12m., Feb., '19	1,858,986	*1,446,404	412,582	285,866	126,716
12m., Feb., '18	1,422,833	*1,211,754	211,079	361,669	†150,590

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Feb., '19	$2,036,430	*$1,314,916	$721,514	$540,602	$180,912
1m., Feb., '18	1,619,202	*1,154,493	464,709	478,854	†14,145
12m., Feb., '19	22,784,373	*15,155,763	7,628,610	6,159,414	1,469,196
12m., Feb., '18	19,894,954	*12,893,881	7,001,073	5,382,618	1,618,455

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Feb., '19	$198,998	*$143,811	$55,187	$56,657	†$1,470
1m., Feb., '18	211,037	*188,824	22,213	70,702	†48,489
12m., Feb., '19	3,198,977	*2,200,296	998,681	830,883	167,798
12m., Feb., '18	3,068,576	*2,216,916	941,660	829,466	112,194

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$338,383	*$278,572	$59,811	$69,946	$†10,135
1m., Feb., '18	311,063	*224,992	86,071	66,648	19,423
12m., Feb., '19	4,309,937	*3,392,686	917,251	819,869	97,342
12m., Feb., '18	3,742,457	*2,602,427	1,140,030	789,726	350,380

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH

1m., Jan., '19	$24,455	*$19,133	$5,322	$5,041	$281
1m., Jan., '18	29,422	*20,554	8,868	5,075	3,793
12m., Jan., '19	315,099	*214,066	101,033	60,237	40,796
12m., Jan., '18	343,802	*218,322	125,480	61,150	64,330

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Feb., '19	$252,993	*$180,479	$72,514	$39,879	$32,635
1m., Feb., '18	198,928	*127,155	71,773	40,626	31,147
12m., Feb., '19	2,988,074	*2,009,660	978,414	479,812	498,602
12m., Feb., '18	2,454,308	*1,596,230	858,078	489,526	368,552

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Jan., '19	$703,547	*††$445,902	$257,645	$186,811	$70,834
1m., Jan., '18	589,787	*††344,825	244,962	178,895	66,067
12m., Jan., '19	7,780,890	*††5,228,113	2,552,777	2,226,103	326,674
12m., Jan., '18	6,123,067	*††3,661,231	2,461,836	2,148,609	313,227

* Includes taxes. † Deficit. †† In January, 1919, $21,106; January, 1918, $17,571; twelve months, 1919, $542,925; twelve months, 1918, $198,278, included for depreciation.

Traffic and Transportation

Domestication As a Solution

Bridgeport Man Wants Local Lines Controlled Locally, with Manager and Employees as Directors

W. B. Lasher, chairman of the Traffic Commission of Bridgeport, Conn., has replied in the Bridgeport *Standard Telegram* to the question propounded by it, "What to your mind is the best way to get the 5-cent trolley fare in Bridgeport, secure adequate service and transform a trolley failure into a trolley success?" Mr. Lasher's reply outlines a complete program for the operation of Bridgeport's lines for Bridgeport's benefit. Mr. Lasher advocates:

Formation of a Bridgeport corporation to lease from the Connecticut Company all rights for the tracks, wire, power and material for the operation of the trolley service in the city of Bridgeport.

Purchase of 100 Birney one-man safety cars.

Reduction of the fare within the city limits to 5 cents.

Control of the Bridgeport lines to be put in the hands of a board of directors so selected as to assure operation of these lines for the best interest of all concerned. This board to be made up of five men, as follows:

1. A representative of the trolley men—the actual operators of the line in question.

2. A representative of the Common Council of Bridgeport—say, the chairman of the streets and sidewalks committee.

3. A representative of the investors who furnish the new capital for the proper equipment and operation of the Bridgeport lines.

4. The local trustee of the Connecticut Company (Charles E. Sanford), to represent the lessors of the rails and operating rights.

5. The manager of the local traction lines.

Mr. Lasher explains:

> Understand that this is only a rough outline, but I believe it embodies a workable plan and can be put into effect without further decree of the United States courts, or other complications which make for doubt and delay.
>
> The basic ideas are twofold. They are:
>
> 1. To give the people the service to which they are entitled at the 5-cent fare, justifying this fare by improvements in equipment and economies of operation which will assure a fair return to the investors.
>
> 2. To restore the old feeling of confidence and co-operation between the city's most important utility and the community which it serves by separating the Bridgeport lines and putting them under a control that is democratic and representative.
>
> That to my mind, having a representative of the trolleymen act as one of the five controlling directors, is one of the most important factors in the whole plan.
>
> We must recognize the fact that no element in the success of a great utility is more important than the human element—the people who actually perform the work of operation. The man behind the controller box must have a voice in the operation and direction of the company he serves.
>
> Finally, the manager of the local lines should be included as a director, for obvious reasons. He, with the men under him, shares the responsibility for the practical operation of the lines. And like the men under him, he gets his orders from the top too often without having a chance to voice the results of his own ability and practical experience.
>
> The five directors would then represent all the interests having a stake in the operation of the lines and should be able to bring about that condition of mutual confidence, helpfulness and responsibility which means so much in the operation of a public utility.
>
> This situation, in a company backed by local capital, responsive to local wishes, alert to the changing demands of service, should make the present trolley troubles vanish like mist on the horizon.

Everybody Pays in Seattle

Those Who Expected Era of Free Rides to Be Ushered in Keenly Disappointed

The time-honored custom of extending free transportation on city railway lines in Seattle to patrolmen, detectives, firemen and city employees ended at midnight on April 8, by order of Thomas F. Murphine, Superintendent of Public Utilities and head of the municipal traction system. The only exceptions to the straight nickel fare are the student conductors and motormen on observation trips, and municipal railway employees when their duty requires them to be on the cars.

MR. MURPHINE BACKED BY LAW

It has developed that Mr. Murphine is backed in his fight to abolish free fares by a city ordinance passed last July fixing fares on the municipal railway. The ordinance provides that the fare shall be 5 cents and no authority is given any city employee to ride free.

An order abolishing tickets has also been announced, and all commutation tickets issued by the Puget Sound Traction and the municipal traction lines will be redeemed.

Mr. Murphine also proposes to abolish school tickets as soon as the present supply is exhausted, and substitute a metal disk. He states "tickets are an economic waste, and a nuisance. The new school disks will go into the fare box just like a nickel."

The police department is leading in the campaign against the edict of Mr. Murphine abolishing free fares. Chief of Police Warren asserts that he was promised by Mayor Hanson that if the department would work for the municipal purchase, he would see that none of the privileges enjoyed by the police were disturbed. Chief Warren also asserts that the efficiency of the police department will be materially affected, as many of the patrolmen will walk to and from their beats, rather than pay fare, causing loss of much time.

Jersey Fare Hearings

Commission Has Before It Plea for Seven-Cent Fare, Pending Conclusion of Zone Inquiry

At the time of the order of the Board of Public Utility Commissioners of New Jersey to the Public Service Railway to restore the 6-cent fare, the question of the future rates for the company was left with the hearing on the application for a 7-cent fare set for April 7 and the hearing on the proposed zone plan set for April 14. Thus they are entirely separate proceedings, both of which are still in progress.

PROFESSOR ANDERSON QUESTIONED

On April 7 Prof. Henry C. Anderson, head of the mechanical engineering department of the University of Michigan, under Dean Mortimer E. Cooley, a company witness, was unavoidably absent and an adjournment was granted by the commission to April 14. On that date Professor Anderson testified that the physical valuation of the company's property was $99,417,442, or at the rate of $117,000 a mile of track, exclusive of power houses. He believed the figures he gave as an appraisal were fair, for rate-making purposes, and said that a company must get a fair return for what it actually possessed or else returns on the original investment must be increased when the cost to reproduce showed itself to be higher in successive years. He explained at considerable length the details under which the inquiry to establish the appraisal value had been conducted. Professor Anderson also testified as to the cost of reproducing the physical properties of the railway based on labor and material costs between 1911-1915, 1914-1918 and for 1918, the totals rising from $113,504,471 for the first period to $163,648,707 for 1918.

In the matter of the other fare proceeding before the board, postponement of one week was granted on April 14 to the several municipalities concerned in which to gather their evidence for presentation in opposition to the restoration of the 7-cent fare asked by the railway pending the adoption of the proposed zoning plan.

NO LONG POSTPONEMENT

City Counsel Congleton and other municipal representatives urged that a postponement of three weeks be granted. Vice-President Wakelee of the railway stated the company was entirely willing to submit to an investigation of its affairs, but he felt that the 7-cent fare should be restored at once, pending the board's decision on the zoning plan. He said:

> The facts justify the application, and show the necessity for it. The company is facing insolvency as the result of a mounting deficit and this board might just as well say no to our application as to grant an adjournment of three weeks. Our treasury is empty, there is a huge deficit. The company wants to do business. Facts as to our operating expenses stand and no amount of investigation will controvert these facts.

Milwaukee Increase Denied

Commission's Estimate of Future Revenues and Expenses Leads It to Refuse Relief

The Wisconsin Railroad Commission on April 5 handed down a decision denying the petition of the Milwaukee Electric Railway & Light Company for increased fares in Milwaukee and the suburban districts. The general attitude of the commission was that its hopeful estimates of the company's future revenues and expenses afforded it no ground for granting rate increases which would result in giving more than a fair return.

In connection with ordering a changed accounting method under which the property of a strictly railway character will be kept apart from properties of other sorts, the commission used substantially the valuation found in other cases but rearranged it. It found that the value of the strictly railway property in the single fare area was $15,991,305, including $500,000 for materials and supplies. Similar totals for the suburban railway property would be $1,320,698 without materials and supplies and $1,363,198 with an allowance for these items. The interurban property was valued at $5,425,444. The power property of all the company's utilities was segregated, amounting to $11,318,752, and fixed charges on such property appear among the expenses of the railway department as a portion of the cost of power. The total value of all the properties of the company, excluding materials and supplies, was placed at $45,603,154 as of Dec. 31, 1918, except for additions to the Milwaukee Light, Heat & Traction property since 1914.

In considering the company's revenues and expenses, the commission stated that the last six months of 1918 included the period of highest operating costs, and that reductions rather than further increases were likely to come. Moreover, it believed that gains would be made in the revenues, which had been held down by the influenza epidemic and other causes. It therefore laid aside the actual revenue and expense figures for the last half of 1918 and compiled a statement of what it believed would be "normal revenues and expenses at present price levels for materials and labor and with revenues on the present basis for a future half-year period." This estimate of the commission would lead to an amount of $671,684 available to meet a return of 7½ per cent or $599,674 on the railway property in the single-fare area.

A similar estimate for the suburban-fare-area revenues and expenses showed a deficit of $8,849 for the six months, which would fall short $59,969 of a 7½ per cent return on the suburban railway property. The consolidated statement for both single-fare and suburban areas, however, would show a margin of about $13,000 per half year above a 7½ per cent return.

In regard to the rate of return, the commission said that, while in many cases it had indicated that 7½ per cent return on fair value was not under the circumstances in the cases decided an unreasonable return, these holdings were not to be taken as necessarily meaning that the earning of such a return should be provided at all times under all conditions for all utilities or for all departments of utilities. Nor is the failure to earn 7½ per cent a proof that rates may be advanced.

The commission added that for some time it had noticed an inadequacy of car supply leading to actual loss of revenue, and it could not neglect this fact in a rate case. It estimated that seventy-one new cars are needed under its modified service standard. Before making any final order directing such a purchase, however, it offered to the company an opportunity to present helpful data.

Omaha Company Appeals

Carries Its Fare Case to Supreme Court on the Ground of Confiscation Under Present Rates

The Omaha & Council Bluffs Street Railway has filed in the Nebraska Supreme Court an appeal brief from the findings and judgment of the State Railway Commission of Nebraska in connection with the company's petition to charge a 7-cent fare on its lines within the city of Omaha.

The case will be called for hearing on May 5. After a recent extensive hearing before the commission that body issued an order to the effect that the company had not made a full and complete showing as to operating revenues, and expenses and fixed charges, properly chargeable to the Nebraska property. The company refutes that statement. The commission further ruled that the case should be continued for the taking of additional testimony, and directed its engineering department to check physical valuation, and its accounting department to check books and records of the company during its entire life.

Company Claims Confiscation

The company, in its brief just filed with the Supreme Court, says that the 5-cent fare has become not only unreasonable but confiscatory. It asks for an emergency rate increase.

Among the financial statements shown in the brief are the following:

Company's valuation figures	$19,755,400
Valuation by commission's expert	20,948,038
Outstanding bonds	9,619,000
Outstanding stock	8,990,000
Maintenance and operation, 1914	1,608,231
Maintenance and operation, 1918	2,467,000
Estimated increase of maintenance and operation for 1919, compared with 1914	1,321,518
Fixed charges per year	480,950

Unless the present 5-cent fare is increased, the company figures that earnings for 1919 will fall short by $422,600 of the amount necessary to pay interest on the bonds. The company sets forth that a large item of increased expenditure was due to increase of wages to motormen and conductors which became effective on June 1, 1918, and another increased scale of wages effective on July 17, 1918.

Six Cents in Spokane

Companies Sought Seven Cents and Concessions from City Looking Toward Consolidation

Following the hearing in Spokane, Wash., before the Public Service Commission on April 2, on the application of the Spokane Traction Company and the Spokane & Inland Empire Railroad for 7-cent fares the commission, as noted very briefly in the ELECTRIC RAILWAY JOURNAL for April 12, page 761, issued an order making a 6-cent fare effective immediately for a ninety-day period. The new rate was set to go into effect on all lines on April 6. No change in the present transfer or school-ticket system is made. It was proposed to supply conductors with strips of five tickets to be sold for 30 cents, as an accommodation to those not wanting to handle pennies.

Wage Increase Announced

Officials of the railways conferred after the fare decision had been handed down and announced a wage increase to platform men of 6 cents an hour, effective the same time that the 6-cent fare went into effect.

The hearing opened on April 2, with the cross-examination of Mayor Fassett by the attorneys for the railways.

The Mayor contended that the figures of the Spokane Traction Company for maintenance were too high.

Will G. Graves, attorney for the Traction Company, read into the record the War Labor Board recommendation for increased wages for traction employees.

D. L. Huntington, president, recalled in rebuttal, protested against using the increased revenue figures for the first of this year as a basis for figuring income. He said:

> We cannot prognosticate the future by a few days' spurt one way or the other. For instance, the figures of increased traffic for the first twenty-one days in March are not borne out by the remaining days of the month, although weather conditions were ideal.

Concessions to Railways

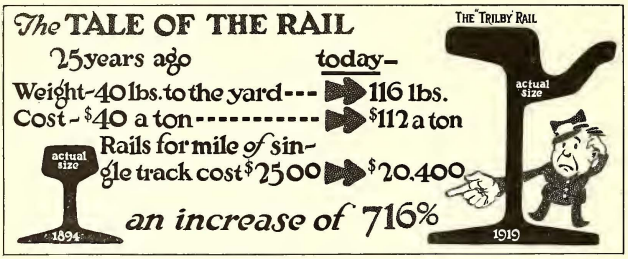
On the eve of the hearing before the commission, the City Council offered its first concessions to the railways when it passed a resolution favoring consolidation of the two lines and agreeing to submit to the people amendments to the city charter which would assist in bringing about the merger. The concessions which the Council proposes in the charter amendments are:

> Relief from the car mileage tax.
> Abrogation of all paving burdens, excepting those necessarily imposed upon the streets by the railways themselves.
> Suspension of all charges for the use of bridges.
> Elimination in the franchise of competitive lines which would be torn up after the consolidation.

Officials of the railways declare that they will immediately take steps to bring about the consolidation of the railways within the ninety-day period set by the Public Service Commission. They see no reason why the company and the city should not know exactly where they stand in ninety days if both sides act with diligence.

Attractive Los Angeles Posters

The first two of a series of cards being placed on the cars of the Los Angeles (Cal.) Railway are reproduced in the accompanying engravings. The cards are printed on both sides and placed in the upper bulkhead windows, so they may be easily read from both inside and outside sections. No comment of any kind, outside of a direct statement of the fact, will appear on any of the cards. The cards have been received in a spirit of good-will by patrons, and apparently have excited increased interest in the general problem confronting the railway. They are unusually attractive from a typographical standpoint, much of which merit is necessarily lost in reproduction and in reduction in size from the original.



A STUDY IN RAIL SIZES AND COSTS, LOS ANGELES RAILWAY

Dallas Company Keeps Its Promise

Under the head of "Keeping Faith with the People," the Dallas (Tex.) Railway is running a five-column advertisement in the Dallas newspapers setting forth in detailed form the improvements promised under the service-at-cost franchise granted by the city and the progress made on these improvements to date. The introduction to the advertisement follows:

As a public utility, with a whole city to serve, the Dallas Railway recognizes that it has a public trust to discharge. It realizes that while the company and the public have mutual obligations, the rights of the public must come first.

The company is proud of the property as it stands to-day. It thinks the public should be proud of its railway. So that the public may judge for itself, the company purposes to give an account of its stewardship.

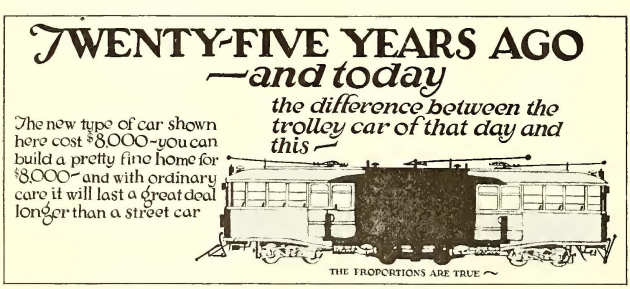
And every man who is open-minded and fair will approve this determination to rout ill will with candor, to confront prejudice with facts and in the friendliest spirit to discuss problems which only cordial co-operation can solve.

When the citizens of Dallas granted the present management the railway franchise, certain promises were made to make certain extensions and improvements on the Dallas Railway. In order that our people may know what extensions and improvements were promised, and the progress made as of this date, we are itemizing them below.

At this point in the advertisement there appears a list giving in detail the work being carried out. As the individual items of which it is composed are not of general interest elsewhere than in Dallas it has accordingly not been included here. The advertisement concludes as follows:

You will observe that the Dallas Railway is "keeping faith with the people." The above improvements represent an actual outlay in dollars and cents of $860,550. Every part of the material represented by the above has been ordered. This is your railway and you are entitled to know what we are doing, and what we intend to do in the future toward bettering the railway service in this city. We are firm believers in the open door. Our cards are on the table, face up. Your interests are our interests. We want the people of the city of Dallas to know the facts about the Dallas Railway

Could anything be fairer?



A STUDY IN CAR SIZES AND COSTS, LOS ANGELES RAILWAY

I. T. S. Preparing for Summer

Officials of the Illinois Traction System, Peoria, Ill., are arranging the summer time card. It will become effective on or about May 1.

Transportation News Notes

Six Cents in Paducah.—An agreement was reached on April 2 between the City Commissioners and the Paducah (Ky.) Traction Company, whereby fares will go to 6 cents. For the past six months a 7-cent fare has been effective. The company is now in the hands of a receiver.

Terre Haute-Indianapolis Increase Authorized.—On application filed by the Terre Haute, Indianapolis & Eastern Railway, Indianapolis, Ind., the Interstate Commerce Commission on April 14 authorized the company to increase fares for the purpose of increasing revenues to meet advanced material and operating costs.

Wants a Ten-Cent Fare.—The Massachusetts Northeastern Street Railway, Haverhill, Mass., has filed notice with the Public Service Commission of Massachusetts of an increase of single passenger fares from 6 cents to 10 cents, effective May 7. However, five tickets can still be bought at the old rate, or five for 30 cents.

Interurban Increases Fare.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has increased the fares from 2½ cents to 2¾ cents a mile, following an order of the Public Service Commission of Indiana. No decision has been made yet in reference to the increase in city fares. The company asked for an increase of 1 cent on the city lines.

Referendum Asked at Akron.—Opponents of the city ordinance providing for an increase in fares to 6 cents in Akron, Ohio, on the lines of the Northern Ohio Traction & Light Company late on April 8 filed petitions for a referendum signed by more than 8000 voters. City officials said that the referendum would be submitted at a special election not later than May 20.

Seven-Cent Fares at Worcester.—The Public Service Commission of Massachusetts issued an order on April 14 establishing a cash fare of 7 cents in place of the former 6-cent unit on the Worcester Consolidated Street Railway. Tickets are to be sold by conductors in strips of ten for 65 cents. An increase of approximately 33⅓ per cent is ordered in workingmen's tickets, and pupils' tickets are to be sold at the rate of ten for 35 cents.

Yonkers Increase on April 18.—The Yonkers (N. Y.) Railroad has formally accepted the conditions of the ordinance passed by the Aldermen recently and granting the company the right for a period of two years to charge a 5-cent fare on the cars within the city limits and an additional fare on the cars that cross the city line in either direction. The acceptance, dated April 6, makes it

possible for the railroad to put the new fare plan into effect on April 18, as under the terms of the ordinance it becomes operative ten days after being accepted by the company.

Canadian Fare Increase.—The City Council of London, Ont., on April 7 adopted by a vote of six to five a resolution to grant increased fares to the London Street Railway on condition that the company improve the service in respect to time and speed. The measure, City Solicitor T. G. Meredith advised, will require the assent of the Legislature, and if opposition is offered it is possible that the franchise act will be invoked to compel a vote of the people before the scheme becomes effective. The present fares are 5 cents cash, seven regular tickets or nine workingmen's tickets for a quarter.

Sees Hope in One-Man Cars.—One-man cars are being urged by A. D. Mackie, general manager of the Springfield (Ill.) Consolidated Railway. Mr. Mackie does not favor an increase in fare beyond the present 6-cent rate. It is his opinion that the falling off in patronage that would follow a further fare increase would more than offset the additional revenue secured. The only alternative is a reduction of operating expenses. A principal means to this end would be the elimination of the conductor on the cars. The plan of the company would be to introduce one-man cars gradually.

Transfers Discontinued.—The hearing on the complaint of Jamestown against the Warren & Jamestown Street Railway and the Jamestown Street Railway before the Public Service Commission for the Second District of New York over the proposed discontinuance of transfers on April 15 was adjourned by the commission on April 8 at the request of the city and companies. The answer of the Jamestown Street Railway alleges that "it is under no obligation imposed by statute, franchise or otherwise to issue transfers to or honor transfers from the Warren & Jamestown Street Railway line," an arrangement which it proposed to discontinue on April 15 because of a substantial loss of traffic and revenue.

Wants Class Freight Rates Revised.—The Indiana Railways & Light Company, Kokomo, Ind., has filed a petition with the Public Service Commission of Indiana asking for a revision of class freight rates on interline shipments. The petition sets forth that shippers are complaining that the interurban rates for hauls more than 80 miles are more than steam road rates and that considerable long-haul business is being lost by the electric railways because of this difference in rates in favor of steam roads. A letter accompanying the petition says that it was filed in accordance with an understanding reached in an informal meeting with Public Service Commissioners Lewis and Edwards on March 28 and that no action is to be taken on the petition until the other electric railways have filed similiar petitions.

Legal Notes

ALABAMA—*Ordinance to Transport Police Officers Construed.*

An ordinance of the city of Montgomery requiring the traction company to furnish free transportation to police officers when in uniform was construed to entitle a plain clothes man wearing only a badge to free transportation. (Montgomery Light & Traction Co., *vs.* Avant, 80 Southern Rep., 497.)

ILLINOIS—*Where There Was No Grant, There Need Be No Performance.*

Where a street railway, upon obtaining its franchise, obligated itself to a park board, having jurisdiction of streets, to pave certain street intersections not required to be paved by its franchise from the city, the contract was *nudum pactum*, since the company derived its right to operate on the streets from the City Council, and the park board had granted nothing. (South Park Commissioners *vs.* Chicago City Ry., 122 Northeastern Rep., 89.)

INDIANA—*There Are No Degrees of Negligence.*

As a matter of law there can be no degrees of negligence, and hence no degrees of duty. Hence, the use of such terms as "slight care," "great care," "highest degree of care," or other like expressions in instructions, as indicating the quantum of care the law exacts under special conditions and circumstances is misleading and constitutes an invasion of the province of the jury. (Union Traction Company of Indiana *vs.* Berry, 121 Northeastern Rep., 655.)

KENTUCKY—*Responsibility of Master for Improper Use of Appliances.*

The rule requiring the master to exercise a proper degree of care to guard dangerous instrumentalities owned by him applies only where the instrumentality is dangerous in itself and not where it becomes dangerous from improper use.

Where the employees of an electric company, instead of putting wire used for repair in a safe place, connected it with a high-voltage wire with the avowed intention of injuring thieves, it was held that they were not acting within the scope of their employment so as to render the employer liable to trespassers who came in contact with the wires. (Craig's Administratrix *vs.* Kentucky Utilities Co. Craig *vs.* Same. —209 Southwestern Rep., 33.)

MASSACHUSETTS—*Violation of Rules Constitute Negligence.*

That a street car went fast past another car going in the opposite direction after a stop, and that the motorman did not sound the gong, both violations of the street railway's rules, was negligence, in an action for injuries to a boy struck by the car. (Prendergast *vs.* Boston Elevated Ry., 122 Northeastern Rep., 318.)

MASSACHUSETTS—*Person Injured Crossing Through One Car to Reach Another.*

A person on the platform of an elevated railway attempted to pass through a car to reach the other side of platform to take her train and was caught in the door of the first car and injured. She was held to be at most a licensee, to whom the railroad owed no duty except to refrain from wanton misconduct. (Rhodes *vs.* Boston Elevated Ry., 122 Northeastern Rep., 194.)

MICHIGAN — *Conflicting Jurisdiction Over Fares of State and Federal Court.*

Where a street railway filed a bill in a federal district court attacking a city ordinance fixing maximum fares, the State court did not then have jurisdiction of a bill filed by the city to secure an injunction restraining the street railway from collecting any fares in excess of those specified in the ordinance. (Detroit United Ry. *vs.* Dingman, 170 Northwestern Rep., 641.)

NEW JERSEY—*Cost Where Municipal Contractors in Street Were Unnecessarily Slow.*

Where contractors adopted a method of constructing a sewer which unnecessarily interrupted travel for eight months on a street railway line, the actual cost of taking up the tracks, laying temporary tracks, and restoring the situation, should be paid by the contractors, under P. L. 1903, page 164, Sec. 7, and P. L. 1907, page 29, Sec. 5. (Public Service Ry. *vs.* Frazer, et al. 105 Atlantic Rep., 387.)

New Publications

Boiler Water Treatment

Reprint of Engineering Bulletin No. 3 prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Bureau of Mines Technical Paper, No. 218. Copies may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., five cents per copy.

Opportunity Monographs

Vocational Rehabilitation pamphlets for disabled soldiers, sailors and marines to aid them in choosing a vocation. Prepared by the Federal Board for Vocational Education and issued in co-operation with the War and Navy Departments. Government Printing Office, Washington, D. C.

The Engineering Experiment Station of the University of Illinois.

Bulletins Nos. 13 and 19 issued by the University.

These illustrated bulletins cover the present technical facilities of the experiment station and the university and also include plans for the future.

The Earning Power of Railroads

By Floyd W. Mundy. James H. Oliphant & Company, 61 Broadway, New York, N. Y. 422 pages.

This 1918-1919 edition continues the compiler's policy of presenting important statistics relating to the earning power and securities of steam railroads in the United States and Canada.

Railway Statistics of the United States of America for 1917

By Slaton Thompson. Bureau of Railway News & Statistics, Chicago, Ill.

This publication is the fifteenth of a series dealing with steam railroad statistics. It presents the statistics for the year ended Dec. 31, 1917, as compared with the official reports for 1915, and it also gives recent statistics of foreign railways.

Steam Engines

By E. M. Shealy, associate professor of steam engineering, University of Wisconsin McGraw-Hill Book Company, Inc., New York, N. Y. 290 pages. Illustrated, cloth. $2.50 net.

This is part of the engineering education series prepared in the Extension Division of the University of Wisconsin and intended to be used as a text-book for correspondence students. It is the third of a series of three books for students pursuing a general course in steam engineering, the other two being "Steam Boilers" and "Heat." The book is practically non-mathematical in character and covers the range of topics usual in books of this class. A few pages at the end are given to the subject of steam turbines. As is necessary in a book intended for education by correspondence, the language is simple and the points made are illustrated by means of diagrams and numerical problems wherever possible.

Rest Periods for Industrial Workers and A Case of Federal Propaganda in Our Public Schools

Two publications by the National Industrial Conference Board, 15 Beacon Street, Boston, Mass.

The first of these pamphlets constitutes Research Report No. 13 and was issued in January. It reports the experience of leading American establishments with rest pauses for the workers, especially for women, with a view of giving some idea of the extent to which systematic recesses in the day's work have been practiced in this country and also to determine broadly how far such pauses are desirable from the standpoint of health and of industrial efficiency.

The second pamphlet, which was issued in February, contains criticisms of three pamphlets issued by the United States Bureau of Education for the intermediate and upper grades of elementary schools and for high school use, entitled "Lessons in Community and National Life." Ostensibly, these lessons are for use in the presentation of social and political economics in the public schools and for casual reading by older readers, but they are held to contain bad economic reasoning and to be partisan in their character.

Personal Mention

Milwaukee Changes

The engineering and operating divisions of the way and structures department of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., have recently been consolidated. These were formerly operated as separate divisions. With this change E. J. Archambault has been made assistant engineer of way and structures. Mr. Archambault has been in the engineering department of the Milwaukee Company for the last seven years in charge of the civil engineering force. Mr. Charles Lederer, formerly city roadmaster, becames assistant superintendent of way.

Col. Joseph H. Alexander, who recently returned from France, has been elected vice-president of the Cleveland (Ohio) Railway.

W. E. Jones has resigned from the Connecticut Company, New Haven, Conn., to accept a position in the accounting department of the Rhode Island Company, Providence, R. I.

H. C. Eddy, senior inspector of traffic of the Board of Public Utility Commissioners of New Jersey, recently gave an illustrated lecture, "Development of the Electric Railway," before the Engineers' Club of Trenton.

James S. Sayers, Wilmington, Del., has been appointed chief engineer for the Trenton & Mercer County Traction Corporation, Trenton, N. J. He was connected with the Trenton company some years ago, but left to accept a position in Wilmington.

Mrs. W. T. Waters, who became publicity manager of the Georgia Railway & Power Company, Atlanta, Ga., and assistant editor of *Here We Are*, published by that company, when her husband left for training camp in August, 1917, returns to peace-time life, her husband having returned ready to resume his work for the company.

Joseph A. Kellogg, Glens Falls, N. Y., has been nominated by Governor Smith for member of the Public Service Commission for the Second District to succeed Jerome L. Cheney, now a Deputy Attorney-General. Mr. Kellogg, is a former Supreme Court Justice. He conducted Governor Smith's campaign from the Syracuse headquarters of the Democratic Committee last fall.

J. G. Huntoon, general manager of the Tri-City Railway, Davenport, Iowa, has contributed an interesting and well-written article to the Davenport *Times* analyzing the part which the automobile has played in the reduced revenues of electric railways. Mr. Huntoon shows that the development of electric railway and interurban lines is at a standstill in most parts of the United States and sums up his presentation of the subject with the statement that either increased revenues or decreased expenses must accrue to the companies if they are to provide a fair return to the investor.

R. W. Belcher has been elected secretary of the war service executive committee of the Chamber of Commerce of the United States, of which Joseph H. Defrees, Chicago, is chairman. Mr. Belcher takes up the work which was inaugurated by W. H. Manss at the great reconstruction conference, held under the auspices of the National Chamber at Atlantic City last year. For the last year and a half Mr. Belcher has been a captain in the Ordnance Department. He was secretary of the Civil Service Commission of the city of New York during the administration of Mayor Mitchel, and also served for a period as the secretary of the National Civil Service Reform League. His headquarters are at Riggs Building, Washington, D. C.

Paul Shoup, San Francisco, Cal., who had been serving as a director of the Southern Pacific Company during the unexpired term of William Sproule, now with the Railroad Administration, has been elected to the board of directors of the Southern Pacific Company for a full term. On July 11, last, Mr. Shoup was elected a director and vice-president and assistant to the president of the Southern Pacific Company. He had formerly been president of the Pacific Electric Railway. Mr. Shoup did not sever his connection with the Pacific Electric Railway, however, for he is the executive representative of the Southern Pacific Company on the Pacific Coast, with general supervision over the Pacific Electric Railway.

Edmond S. Gillette, mechanical and electrical engineer of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., has resigned to become associated with the Lyon-Metallic Company at Montgomery as service engineer. Mr. Gillette has been with the Aurora, Elgin & Chicago Railroad for six years, in charge of the operating and maintenance departments. He has served as a member of the power distribution committee of the American Electric Railway Engineering Association, and chairman of the electrical engineering committee of the Illinois Electric Railway Association. He is a member of the Master Car Builders' Association. Mr. Gillette became connected with the Aurora, Elgin & Chicago Railroad following his graduation from the University of Wisconsin, where he won national honors in athletic events.

Eugene C. Clarke has resigned from the position of superintendent of instruction and efficiency of the Tacoma Railway & Power Company, Tacoma, Wash., to become associated with John

A. Beeler, consulting engineer, with New York City as headquarters. Mr. Clarke has been very successful in handling transportation department employees and securing voluntary co-operation on the part of the men. He was formerly connected with the Brooklyn Rapid Transit Company as supervisor of instruction, but his activities in Brooklyn were much wider than his title there indicated. He was one of the electric railway pioneers in the field of accident prevention. His educational work in Brooklyn in this connection attracted wide attention and was liberally drawn upon for use on other systems.

Rolla Wells, who has been appointed receiver of the United Railways, St. Louis, Mo., has long been identified with business interests in that city. Mr. Wells' father, the late Erastus Wells, operated the first city railway in St. Louis, which incidentally is said to have been the first street railway west of the Mississippi River. It was a horse car line and operated on Olive Street, from Fourth Street to about Seventeenth Street. Rolla Wells was employed by the Missouri Railway on this line, becoming assistant superintendent and later general manager. He resigned in 1879. Mr. Wells is sixty-three years old. He holds large financial interests. He served as Mayor of St. Louis from 1901 to 1908. He was chosen governor of the Federal Reserve Bank for the Eighth (St. Louis) District in 1914 and served until Jan. 1, 1919. He was graduated from Princeton University. Mr. Wells was treasurer of the Democratic National Committee during the campaign of 1912.

Nicholas J. Cunningham, for the last sixteen years executive secretary of the Springfield Gas & Electric Company and the Springfield Traction Company, Springfield, Mo., on April 8 tendered his resignation in order that he might devote himself more fully to the development of extensive holdings of oil land in McCulloch County, Tex., where he owns a large acreage. Mr. Cunningham will remain in Springfield, however, until fully relieved of his responsibilities. Notwithstanding his close application to the duties of the position which he has held with the public utility corporation, Mr. Cunningham has found time to organize and operate a number of other very successful business enterprises. Two of the city's most popular amusement places were established by Mr. Cunningham. Mr. Cunningham entered the public utility field with the Peoria Gas & Electric Company. In 1903 he went to Springfield as secretary of the Springfield Gas & Electric Company. In 1906 he brought about the consolidation of this company with the Springfield Traction Company. Since that time he has been executive secretary of both companies. Mr. Cunningham assisted in the organization of the Missouri Association of Public Utilities and was secretary of the association for six years. He was born in Peoria, Ill., and was educated there and at St. Victurs Academy, near Kankakee, Ill.

Obituary

A. B. du Pont Dead

Antoine B. du Pont, electric railway expert, inventor, engineer and the man who first managed the street railway system in Cleveland, Ohio, under the 3-cent fare plan of the late Mayor Tom L. Johnson, died of pneumonia on April 11 at his residence in Cleveland, Ohio.

Mr. du Pont is perhaps best remembered in Ohio as the close associate of Tom Johnson in Cleveland. This was because there attached to Mr. du Pont's work in this connection much that was spectacular, necessarily so but not because Mr. du Pont would have had it so. However, his Cleveland experience played only a small part in Mr. du Pont's career in the electric railway field, in which he early earned for himself a reputation for ability. Thus among his notable works were his many patents, among them the du Pont truck, and the task he performed as a member of the Traction Valuation Commission, which fixed the valuation of the Chicago railway properties for the 1907 settlement ordinances.

Mr. du Pont was born in Louisville, Ky., on April 20, 1865. His uncle, A. V. du Pont, was the chief owner of the old Louisville Railway, and his father, Bidermann du Pont, was largely interested there. Mr. du Pont was graduated from the Rensselaer Polytechnic Institute at Troy, N. Y., at twenty-one. He first tried his hand as a coal mine engineer, but wanted to get into railroading. He then returned to Louisville and worked in the track department of the Louisville Railway on construction and maintenance. Later he was invited to join forces with Tom L. Johnson in Brooklyn, N. Y. Subsequently he rejoined Mr. Johnson in Detroit and electrified one of Detroit's systems. When all the lines in Detroit were consolidated Mr. du Pont became general manager. Mr. du Pont's reputation for getting things done had now been firmly established, and he was invited to St. Louis. As vice-president and general manager of the St. Louis Transit Company he tore out the cable lines and put in electricity. While he was engaged in this work he found time to design and install the great terminals to handle the world's fair crowds. He went to Cleveland as a volunteer and plunged into the struggle in the 3-cent fare fight. A characteristic remark attributed to him was to the effect that there was more music to his ears in the fare register than there was in the stock ticker. To him, it was the folks who pay the fares, not the brokers, that made street railroads.

His wife, who was Miss Elizabeth C. Hibbs, assistant secretary to Tom L. Johnson, three daughters and a son survive him. Mr. du Pont also is survived by two brothers, T. Coleman du Pont, New York, former president of the E. I. du Pont de Nemours Powder Company, Wilmington, Del., and E. M. du Pont, president of the Johnstown (Pa.) Traction Company.

Col. Robert Andrews, president of the Safety Car Heating & Lighting Company, New York, N. Y., from 1889 to 1908, died on April 7 at the age of eighty-four years.

Col. James I. Baird, eighty-nine years old, civil engineer of national note, died at Detroit, Mich., on April 6. Colonel Baird supervised the construction of the Lake Street Elevated Railroad, Chicago, now known as the Chicago & Oak Park Elevated Railway.

H. E. Crawford, president of the Windsor, Essex & Lake Shore Rapid Railway, Kingville, Ont., is dead. He had been in poor health for some time. Before removing to Chatham in 1915 Mr. Crawford was in the store business in Tilbury for many years.

Favors M. O. on Reasonable Basis

Roger Mills, secretary and manager of the Sioux Falls (S. D.) Traction System, which is owned and controlled by the Mills family, is one of those aware of the unmistakable tendency toward cities extending their sphere of influence over utilities and other activities that affect directly the life and habits of the vast majority of the people. He even sees in municipal ownership of street railways a greater means of growth and prosperity for cities than through the city owning any other utility. The *Daily Argus Leader*, Sioux Falls, S. D., quotes Mr. Mills in part as follows:

> In a great many ways city ownership of the electric railway would mean more to the growth and prosperity of the city than the owning of any other utility. It is only natural that conflicts should arise between the city and the corporation over how the streets are to be used and maintained. The city can go ahead with a street paving program and not expect the electric railway to put thousands of dollars into paving which is really a detriment to business, decreases the patronage and causes high maintenance and renewal charges. Under city ownership there would be no conflict over paving questions. When a street was ordered paved, the car tracks could be paved at the same time, by the same contractor and in any manner that the property owners desired.
>
> There is a crying need in Sioux Falls right now for new lines. With the present prospects of heavy pavement charges it is doubtful if we could undertake to build any of these lines. Failure to extend is going to hamper the growth and development of the city, but it is unfair to ask or expect us to construct these additional lines and then be forced to pay $10,000 or $12,000 a mile to pave them. I say to you frankly that we are not contemplating any new lines or extensions.
>
> In addition to building more lines it would be possible under city ownership to give more frequent service, as there would be no difficulty in the city securing ample funds for this purpose and at a lower interest charge than we are compelled to pay. Rates of fare could also be lowered and placed on a service-at-cost basis, if though desirable, which would greatly increase the patronage.
>
> We do not have to sell or turn the road over to the city unless we want to. If the city is going to try to take away from us something we have created without giving just compensation, then we are opposed to and will try and obstruct city ownership of the electric railway. On the other hand, if it is for the best interests of the city to own the road, and the city will treat fairly with us, making satisfactory allowance for the unexpired time under the franchise, then we would be willing to negotiate.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Coal Stocks Low Under Short Production

Accumulation of Stocks During Summer by Power Companies Would Help Relieve Shortage Which Will Appear This Fall

The coal market at the present time shows little activity. Production of bituminous coal is now approximately 25 per cent below the production of the corresponding week of 1918, and production of anthracite coal is approximately 50 per cent below that of the same period last year. Anthracite producers are operating two and three days a week. Stocks of coal above ground are not very great. Buyers are holding off, individual stocks are diminishing and everybody seems to be waiting for something to happen. The result will be, coal interests believe, that when buying starts it will start with a bang and the fortunate ones will be those whose orders are filled, while the rest wait for stocks to build up sufficient in size to supply them.

The railroads take approximately 25 per cent of the coal mined per year for locomotive use. Power stations for utility purposes take approximately the same amount. Hence the importance of the railway power house in the coal market. Utility companies had laid in considerable stock of coal under rather high prices and some of that stock is still reported on hand. In some cases this coal is being used with no measure for restocking for reserve purposes. Again, other utilities' operators are leaving their old stocks as reserve and are purchasing from month to month merely sufficient quantities to carry them through. Small quantities, sufficient to carry many a company for a month, may be purchased for about 50 cents per ton under the price set by the Fuel Administration. This price can as a rule, however, be obtained from only the smaller coal producers. The large producers are holding practically to the price set by the Fuel Administration, although that body really passed out of control early this year.

The price of anthracite coal will increase 10 cents a ton per month from now on till 50 cents is added, but there is no indication as to what the price may be when the rush of buying is under way. This rush is sure to come, following the procedure of the buying public in holding off with its orders. The state of the coal market next fall will be the answer to the present quiet condition of that market. Many coal operators claim there will be a runaway coal market this fall and winter unless more interest than at present is shown in summer stocking.

Bids on the supply of coal for the season are being witheld on account of the uncertain market and the basing of prices on federal regulations in effect last fall. Coal operators believe they will have labor troubles when the present wage agreement runs out, and are refusing long contracts except at top prices. After 1919, anthracite miners will have a documentary claim on a demand for higher wages, but as to whether or not they will have a moral claim remains to be seen. The Department of Labor is not making any easier any possibility of a reduction in wages, and any attempt on the part of operators to that end is liable to lead to serious difficulties.

Bituminous mines are on a forty-eight hour basis, and there is evidence in the wind of an effort to be made to reduce those hours to five days of six hours each. The pay would not only be the same for some of those affected by this proposed week of thirty hours but further effort would be made to even increase this wage on the part of a certain class of the men.

From one region, however, there is a report that the executive of the state in which that region is located has set himself against any reduction in wages. A meeting of the miners provides the information that were it not for this assurance given them in the upholding of their wages, there might have been a division in their ranks when the question of a reduction should come up. This is merely one evidence of a possible susceptibility on the part of some miners to accept a possible reduction.

A short time ago the price of coal nearly underwent a further increase of 50 cents. Had this been accomplished there would now be more possibility of looking for a reduction. A considerable deterrent to an increase in price the last of this year will be brought into play if more attention is paid to the increasing of stocks this summer.

Trolley Wire Market Showing Slightly Increased Activity

There is an increased movement in bare trolley wire noted in some sections of the country. This movement, however, is practically only for replacements and repair. In certain cases where particularly heavy traffic conditions and mechanical strains are more apparent, cable of a different fabrication than bare copper is finding considerable activity in lengths of about a mile and slightly over. This is true especially in the Southern cities.

Activity in Special Work Renewals

Fred Bland, Director of Tramway Department of Edgar Allen & Company, Sees Active Business Ahead

In a discussion on special track work conditions in the United Kingdom on Feb. 21 at the plant of Edgar Allen & Company, Ltd., Sheffield, England, Fred Bland, director of the tramway department, expressed himself in optimistic vein on the future of electric railway special work. During the preceding week, Mr. Bland said, more worth-while inquiries had come in than during any single week since the opening of the war. If the tramways realized that there was no prospect of an early reduction in the cost of manganese track work in sight, orders would soon be brisk. There was no likelihood that solid manganese would decline in popularity although a few undertakings were using cast steel and others were considering built up work, and even considering the return of short switches because of the cost, still the demand for manganese would be the same in some form or other. Manchester and Glasgow were the two large cities where insert construction was a standard along with manganese, which, however, was becoming the greater of the two. He certainly would favor a cut in prices if that were possible, but labor was higher than ever, and manganese was going up instead of going down.

During the war, hardly one-fifth of the tramways department staff had remained with the company, while the government had requisitioned the buildings used for assembling and fitting pieces before shipment. Now, as the track specialists were drifting back from war service and their facilities in manufacture were being restored, Mr. Bland said that his company was ready for anything. Even if the company had been permitted to keep its full staff, it would have been of no avail because for a long time no tramway was allowed to order any track work without a permit, at first from the Ministry of Munitions (Priority Department) and later by the Tramways (Board of Trade) Committee testifying that such work was necessary. Now this committee has finished, and orders are free to come along, and priority of ordering would be an important feature in delivery promises.

It was obvious therefore, that the need for replacements was urgent. Outside the oxy-acetylene welding little

else had been done by the tramways themselves to keep going, concluded Mr. Bland.

Sale of the British Westinghouse Holdings

Chairman Tripp, Returning from England, Announces Sale of Interests and New Commercial Alliance

Gen. Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, returned to New York recently from a trip to England. He said that the British interests have practically been sold.

"Subject to the successful accomplishment of certain legal details in Europe, which, however, may be waived by the Westinghouse company if thought desirable," said General Tripp, "an agreement has been reached with certain important British interests under which the Westinghouse company sells for cash its British holdings and enters into a commercial alliance looking to the development of export business.

"The commercial plan will be instituted immediately upon the assumption that the whole deal will be consummated on one of the bases above indicated. No further details can be given out at this time."

General Tripp believes that foreign trade prospects depend on the successful outcome of the peace conference. Some method of international financing to provide for the obligations growing out of the war must be formed, he declared, before normal commercial conditions can be expected.

Rolling Stock

Quincy (Ill.) Railway expects to install a number of new cars of the latest type and one rotary snow sweeper. The service also will be improved and better schedules arranged.

Washington Railway & Electric Company, Washington, D. C., which lost thirty-one cars and its Eckington carhouse in a fire, as noted in these columns of March 1, is holding up the replacement of these cars, it is reported. It is probable that this is due to the considerable outlay necessary for this replacement.

Springfield (Ill.) Consolidated Railway, through A. D. Mackie, general manager, has notified the City Commission that the operation of one-man cars will be a necessity in order to keep the company out of the hands of a receiver. The company has had its fare increased from 5 cents to 6 cents and says that further increases are out of the question.

Franchises

Detroit, Mich.—Henry Ford has applied for franchises to establish a system of street railways in the townships of Springwells, Ecorse and Dearborn and the village of Oakwood, connecting the Ford blast furnaces, shipyard and tractor plant.

East St. Louis, Ill.—The East St. Louis & Interurban Electric Railway has asked the City Council of East St. Louis for a franchise to construct a line and operate cars in East St. Louis. The proposed route of the line will extend from Tenth and Market Streets to the Free Bridge.

Track and Roadway

Fort Madison (Iowa) Street Railway.—This company reports that it will reconstruct approximately 3300 ft. of single track.

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has begun to dismantle its 7-mile line between Lanesboro and Cheshire, which has been closed to traffic since early in January, 1918.

Kansas City (Mo.) Railways.—Plans are being contemplated for the construction of an extension of the Independence cross-town line of the Kansas City Railways from the present northern terminous at Liberty and Moore Streets to Sugar Creek, about 2½ miles, this summer. P. J. Kealy, president of the company, has accepted a proposition of the business men of Independence to loan the company $50,000 for ten years at 6 per cent interest, the proceeds of the loan to be used in building the new line.

Interborough Rapid Transit Company, New York, N. Y.—Operation of trains through the new Clark Street tunnel has been begun by the Interborough Rapid Transit Company. The new service enables passengers on the West Side line to travel direct to Brooklyn without changing to the shuttle or transferring.

NEW YORK METAL MARKET PRICES

	Apr. 3	Apr. 17
Copper, ingots, cents per lb.	15 50	15 37½
Copper wire base, cents per lb.	17.25 to 18.00	17.25 to 18.00
Lead, cents per lb	5 25	5 00
Nickel, cents per lb.	40	40 00
Spelter, cents per lb.	6.62½	6 45
Tin, cents per lb.	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb.	30.00	31 00

† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	Apr. 3	Apr. 17
Heavy copper, cents per lb.	13 00 to 13.25	13 50 to 13 75
Light copper, cents per lb.	10 50 to 11 00	11.00 to 11 25
Heavy brass, cents per lb.	7.25 to 7.50	7.50 to 8.00
Zinc, cents per lb.	5.25 to 5 50	5.25 to 5 50
Yellow brass, cents per lb.	6.00 to 6 50	6.50 to 7 00
Lead, heavy, cents per lb.	4 25 to 4 50	4.00 to 4 25
Steel car axles, Chicago, per net ton.	$26 00 to $28 00	$26.00 to $28 00
Old carwheels, Chicago, per gross ton.	$22 00 to $23 00	$22.00 to $23 00
Steel rails (scrap), Chicago, per gross ton	$17 00 to $17 50	$17.00 to $17 50
Steel rails (relaying), Chicago, gross ton.	$16 50 to $17 00	$17.00 to $17.50
Machine shop turnings, Chicago, net ton	$6 50 to $6 00	$7.50 to $7 00

ELECTRIC RAILWAY MATERIAL PRICES

	Apr. 3	Apr. 17
Rubber-covered wire base, New York, cents per lb	20	20
Weatherproof wire (100 lb. lots), cents per lb., New York	24 25	23 00
Weatherproof wire (100 lb. lots), cents per lb., Chicago	23 75 to 37 35	23 75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$49 00 to $51 00	49 00 to 51 00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47 00 to $49 00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45 00 to $47 00	45.00 to 47.00
T rail, high (Shanghai), cents per lb.	3	3
Rails, girder (grooved), cents per lb.	3.75	3.75
Wire nails, Pittsburgh, cents per lb.	3½	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb.	3 25	3.25
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb	2.75	2 75
Tie plates (brace type), cents per lb	2.75	2 75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3	3
Angle plates, cents per lb.	2.75	2.75
Angle bars, cents per lb	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4 35	4.35
Steel bars, Pittsburgh, cents per lb	2 35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4 20	4 20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5 25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb.	4 10	4.10
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb.	14 to 17	14 to 17
Waste cotton (100 lb. bale) cents per lb.	8 to 13½	8 to 13½
Asphalt, hot (150 tons minimum) per ton delivered	. . .	. . . . .
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	. . .	. . . .
Asphalt filler, per ton	. . . . .	. . . . .
Cement (carload lots), New York, per bbl.	$2.90	$2.90
Cement (carload lots), Chicago, per bbl.	$3.05	$3.05
Cement (carload lots), Seattle, per bbl.	$3.13	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.53	$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.60	$1 63
White lead (100 lb. keg), New York, cents per lb.	13	13
Turpentine (bbl. lots), New York, cents per gal.	69½	78

† These prices are f. o. b. works, with boxing charges extra.

New York State Railways, Rochester, N. Y.—Construction will be begun soon by the New York State Railways on an extension from Dominick Street, Rome, through Carey Street to the Y. M. C. A. building at the Rome Brass & Copper Company's plant.

Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.—The Public Service Commission for the Second District of New York today passed an order directing the Geneva, Seneca Falls & Auburn Railroad to extend its track from its present terminus in Cayuga Lake Park 150 ft. easterly and that it erect at the new terminus a suitable shelter for waiting passengers. The company is also to provide and maintain a safe and convenient pathway from the new terminus to the Lake road at the foot of the hill on the shore of Cayuga Lake, properly lighted when cars are operated during the night.

Tulsa (Okla.) Street Railway.—Double tracking is now being laid by the Tulsa Street Railway from North Main and Cameron to North Cheyenne and Duluth Streets.

St. Thomas (Ont.) Municipal Street Railway.—The ratepayers of St. Thomas will be asked to vote on a by-law for the issue of debentures for $50,000 for street railway improvements, including the reconstruction of the Talbot Street line, improving the carhouse, remodeling of cars and the purchase of new equipment.

Portland & Oregon City Railway, Portland, Ore.—It is reported that the Portland & Oregon City Railway will construct a 12-mile extension of its line to tap the Sand-Hayden and Cornwell timber tracts.

Dallas (Tex.) Railway.—The City Commissioners of Dallas have passed an order directing the Dallas Railway to begin at an early date the construction of a new single track line on Myrtle Street from Colonial Avenue to the Oakland Cemetery south of Dallas. Prior to the passage of the order, J. F. Strickland, president of the company, signed an agreement with the City Commission to begin work on this extension by Sept. 1, 1919, and to complete the line by Jan. 1, 1920.

Houston (Tex.) Electric Company.—The City Council of Houston has issued an order directing the Houston Electric Company to lower its tracks on Washington Avenue between Bethne Street and Houston Heights Boulevard. The order also directs the company to pave that portion of the street under and between its tracks. The work will cost approximately $60,000.

Richmond & Ashland Railway, Richmond Va.—Announcement has been made by Oliver J. Sands, head of a citizens' committee, that he and his associates have accepted the offer of George Taylor, representative of the Gould interests, to sell the property of the Richmond & Chesapeake Railway from Richmond to Ashland. It is understood that service will be resumed at once.

Seattle (Wash.) Municipal Street Railway.—Thos. F. Murphine, Superintendent of Public Utilities, in a recent communication to the city utilities committee, asked authority to spend approximately $200,000 in betterments to the municipal street railway system. The work contemplated will connect the recently acquired traction system and the other municipal lines, and facilitate the handling of traffic in the congested districts. The proposed betterments include: connection of Division A with traction line at Third Avenue and Pine Street, 15th Avenue bridge connections, connection of the two systems at 24th Avenue N. W. and West 67th Street, connection of Division A and Westlake Avenue lines, connection of Division A and North Seattle car barns, Leary Avenue construction, Ballard Avenue and Market Street lines, and Avalon Way double tracks.

Power Houses, Shops and Buildings

Quincy (Ill.) Railway.—New machinery will be installed by the Quincy Railway at its power house to permit the use of Keokuk power and to permit the steam plant to stand idle, ready for emergencies. Four new feed wires will be run from the power house to various parts of the system.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—A new one-story and two-story car repair shop, 60 ft. x 190 ft. will be constructed by the Terre Haute, Indianapolis & Eastern Traction Company on East Wabash Avenue, Terre Haute.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has closed a contract with the officers of the New York Catholic Protectory under which the Commission will obtain for a consideration of $75,000 a plot of approximately 12 acres between the foot of Herschel Street and Westchester Creek, Unionport, to be used as a storage yard for the Pelham Bay Park branch of the Lexington Avenue Subway. It is hoped to close title shortly so that construction of the yard can begin at an early date, and be completed by or about the time the elevated portion of the Pelham Bay Park branch, for which bids were received by the Commission a few days ago, is completed. The site is estimated as sufficient to accommodate more than thirty trains of Interborough Rapid Transit Company's steel cars. Space will also be provided for the storage of materials.

Kansas City, Mo.—The Halpin Dwyer Construction Company has begun grading the site of the new interurban terminal at Tenth and McGee Streets.

Lima Electric Railway & Light Company, Lima, Ohio.—It is reported that the Lima Electric Railway & Light Company, which is controlled by the Ohio Electric Railway, plans the construction of a large power plant.

Trade Notes

J. F. Davis, Chicago, Ill., has recently purchased and is offering for resale a large number of boilers from the Du Pont Powder Company's plant. The aggregate cost is said to be in the neighborhood of $500,000.

Chicago (Ill.) Pneumatic Tool Company has moved its Milwaukee office from Room 1305 Majestic Building to Room 1418 in the same building, where more convenient quarters which are necessitated by the constantly growing business of the company in this district have been obtained.

Bailey Meter Company, Cleveland, Ohio, will move its main office and works from Boston, Mass., to Cleveland, Ohio, effective May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

Economy Electric Devices Company, Chicago, Ill., reports that the Seattle Municipal Railway has ordered 251 more Economy power saving railway meters. This order is in addition to the present equipment, installed last summer on the one-man cars of the Municipal Railway. This last order was placed through the Burton R. Stare Company, Seattle agent for the Economy Electric Devices Company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Changes.—Capt. N. H. Callard, who has been discharged from government service is appointed to the railway sales department in the capacity of commercial engineer. W. Keith McAfee has been transferred to the service department as railway engineer. F. D. Kennedy is appointed superintendent of the railway department of the works.

Liberty Steel Products Company Inc., Chicago, Ill., announces the appointment of J. M. Borrowdale as sales representative in the railroad department with office at 1901 McCormick Building, Chicago. Mr. Borrowdale was formerly superintendent of car department of the Illinois Central Railroad and for the past two years has been connected with Johns-Manville Company as sales representative in their railroad department.

Daniel T. Pierce, formerly assistant to the president of the General Asphalt Company, and at one time assistant to the president of the Philadelphia Rapid Transit Company, has just returned from more than a year's service with the Red Cross in France. Mr. Pierce is located temporarily at Room 1031, 120 Broadway, New York, and will represent in this country important Franco-Italian interests as well as act for American manufacturers seeking business in France and other European countries.