

ment of that organization says that it "is not able to point to any co-operative plan in this country which has been a marked success," and adds that the plan does not seem to fit American customs as the great co-operative stores in England do in helping to meet the low-wage conditions there. The establishment of successful co-operative stores, therefore, will be an accomplishment of no small dimensions. If the electric railways are able to carry into effect what they are considering, they will reduce the cost of living for every employee and his family in such a way that the benefits will be plain from day to day.

PLANNING SHOP PRODUCTION

The pursuit of higher efficiency in the mechanical department of a modern street railway system depends for success upon many factors, but of these none is of greater importance than intelligent planning of work to be handled on a broad scale. In a typical instance 500 trucks were to be overhauled during one season of 120 working days. The magnitude of the task justified the careful preliminary study of methods of working, order of processes and disposition of men and materials, and the success of the program was unquestionably due in large manner to the systematic anticipation of every emergency. The capacity of the shops was limited, although no restriction was placed upon the number of necessary workmen who could be put upon the truck job. The general scheme adopted was to allow only two types of trucks to come into the shop during a given period. Two or three weeks in advance of the appearance of each type of truck, the shop notified the foremen of carhouses in various localities on the system as to the number and type of trucks required thus far ahead of the shopping date, so that the carhouse foremen had ample time to have the desired trucks ready for movement to the shop in due season.

The passing of trucks through the shop was also planned on the basis of a regular schedule. The general order was followed of running the truck into the building upon a single track, having it knocked down by two men who performed no other service and remained in a fixed position, and the subsequent movement to other departments of the trucks, which were handled by workmen in twos who specialized in every instance in one class of operations. Each truck passed six pairs of workmen on its way through the shop without doubling in its course, and in all cases the successive pairs remained in place, the work being passed from position to position in straightforward fashion. The success of the scheme depended, of course, upon trucks being in the shop yard in specified quantities and at stated times. Thus, a schedule of fifteen trucks per week of a certain type demanded an actual delivery of three trucks per day and not an average of three per day for the period. In this way not a moment was lost in securing a new truck to knock down, and the equipment moved uniformly through the shop from crew to crew. By putting the trucks through in this way it was found that they could be handled at less cost than on any other basis, for the reason that expenses are reduced when workmen have materials and tools on hand and work ahead to keep their full time occupied in specialized activity. Other advantages were a reduc-

tion in fatigue due to specialization, and a continuous supply of work, since lost motion in starting and stopping jobs was practically eliminated. Of course, the treatment of this problem was along well-known lines of industrial production, but in some railway shops the irregularities of the demands upon the force and equipment have tended to obscure the possibilities of such careful planning.

POWER CONTRACT FOR A TRUNK-LINE ELECTRIFICATION

We publish this week a brief account of the very interesting contract entered into between the Great Falls Power Company and the Chicago, Milwaukee & Puget Sound Railway for the electrification of part of the latter system. This contract has been more or less in the public eye on account of the difficulties of making suitable arrangements with the federal government for crossing the public domain. This difficulty having been settled, the contracting parties were free to go ahead, as the agreement with the government has insured a fifty-year right-of-way. The contract goes to a final possible limit of no less than 25,000 kw, with various options for lesser amounts.

The interesting features of the contract have to do chiefly with the provision for suitable delivery of the power and the price therefor. The railway company will receive the energy purchased on the high-tension line at either 50,000 volts or 100,000 volts, three-phase, 60 cycles, and will make its own provision for the transformation of the energy into such form as it may desire. The supply company, therefore, merely has to deliver its high-tension current and consider nothing further regarding its distribution or further uses. The energy delivered will be measured by watt-hour meters and curve-drawing wattmeters, and it is specified in particular that the railway substations must contain sufficient synchronous machinery to give a power factor of at least 80 per cent leading or lagging. To insure the carrying out of this provision the power company has the right to install automatic regulators on such synchronous machinery so as to hold the power factor at any point it may desire between the limits of power factor just noted. In other words, although the power is purchased on the high-tension circuits and transformed and distributed wholly by the purchaser, the power company yet reserves the right to control the power factor within a range of 20 per cent either way from unity. This is a somewhat unusual but very wise provision, considering the purposes for which the energy is sold.

The rate at which this energy is purchased is on its face extraordinarily low, amounting to 5.36 mills per kw-hr. only. This is probably much the lowest figure at which a large block of power has ever been sold at the end of a high-tension transmission line. What few cases of lower figures there are have been for relatively small quantities and under extraordinary conditions. It is a most striking comment on the condition of electrical power transmission when it is possible to make presumably at reasonable profit so low a figure as this. A saving clause, from the standpoint of the supply company, is that the minimum bill is put at 60 per cent of the energy contracted for. This means that the railway company in order to secure its whole sup-

ply of power at the rate just quoted must take very good care of its operating conditions; else, owing to the minimum-bill provision, the cost per kilowatt-hour of power actually delivered might run materially above the basic price of the contract. It would not be at all surprising if it did thus run high in the actual working out of the scheme of electrification. It is absolutely certain that the railway company could not generate its own power at anywhere near the price quoted, which assuredly is a feature of much encouragement toward electrification projects in general aside from the fact that the steam railroad's investment for electrification is materially reduced in any event.

AN EXAMPLE OF GOOD PUBLICITY

At the midyear meeting of the American Electric Railway Association there was renewed discussion of publicity, without which no gathering of electric railway men would be complete. True, there was not a great deal of publicity in evidence, but there was much talk about it, just as there has been before and will continue to be until publicity becomes a fact instead of something that is merely approved of but not accomplished.

In the meantime we see here and there examples of sporadic publicity which are the best evidence of what can be done in the way of educating the public into the intricacies, difficulties, possibilities and accomplishments of electric railroading. In New York there has been of late considerable criticism of surface railway service. This service has been better than usual; the criticisms were merely a familiar symptom of the newspaper mania which is periodically manifested in a desire to "make it hot for the railway company." But this time the railway company has answered back.

In our issue of Dec. 7, 1912, there was printed one of the statements issued by the New York Railways Company, dealing with various subjects of public complaint. Another statement, over the signature of Frank Hedley, vice-president and general manager of the company, appears in the *New York Sun* of Feb. 9. It is admirable in tone and substance. Prefaced by the statement that "it is apparent that many factors in the situation which are so thoroughly well known to railroad men as to seem trite and commonplace are not altogether understood by the general public," Mr. Hedley proceeds to give some details of the difficulties of surface operation in New York streets that can hardly fail to make the reader wonder that the service is as good as it really is.

He shows, for example, that the five-minute delays caused by track obstruction amounted in six months to 37,295 minutes, or 621 hours. He explains how cars become bunched by hold-ups at heavily traveled crossings where the traffic policeman's word is a higher law than railway schedules. He gives a count that was made of the 130,000 pedestrians and the 7000 vehicles, besides the cars, that cross Thirty-fourth Street at Broadway and Sixth Avenue every twelve hours. The work of the street inspectors and emergency department in keeping cars moving and of the tally men in supplying data for readjustment of schedules is described in a way that must convince reasonable men that the railway is trying, and trying hard and intelligently, to give good

service. Just as important is the proof this article affords that, try as it may, there are certain inevitable inconveniences connected with operation on crowded city streets, and that it is foolish to blame the company for these unavoidable inconveniences.

This is good publicity. Kickers we shall always have with us, but they will grow fewer in the degree that railways make their problems, and what is being done to solve them, understood. This applies to larger problems as well as to those every-day annoyances that make so many enemies. And with the annoyances or inconveniences explained or accounted for there are always fewer enemies and less hostility to overcome when the larger problems of rates, financing and franchises come up before public bodies for their adjudication.

TRANSPORTATION AT THE PANAMA EXPOSITION

In discussing the New York subway muddle, in which politics seems to be as large a factor as ever, we took occasion to refer to the difficulties which a company or an individual is likely to encounter in carrying on any public work when business must be done with a municipality. A similar condition exists in San Francisco, and the causes seem largely the same, namely, the desire of some politicians to pose as the champions of the people by opposing any grant to build railway extensions except on prohibitive terms. But the conditions in the two cities are somewhat different because in San Francisco the need for definite action is accentuated by the near approach of the international exposition and the grounds selected for this event are almost without any transportation facilities from the city, certainly without any which would be at all adequate for the demands to be made upon them. Nevertheless, the city is unwilling to allow any extensions to be built by the local railway company except under a franchise revocable at any time. Upon such a permit the company has declared that it cannot borrow the money necessary to finance the enterprise.

It is possible to understand, now that the city has embarked upon a policy of municipal railway operation, why it might not like to grant a number of long-term franchises without some provision for their recapture at the end of a term of years. The company has recognized this condition and has offered to build under an indeterminate franchise by which the city could at any time obtain the property so built at its actual value. Some of the members of the Board of Supervisors approve this plan, while others think the city should force the company to build under the revocable-permit plan already mentioned. In the meantime the directors of the exposition are in despair over the likelihood that nothing will be done until it is too late to make adequate provision for transportation to and from the exposition grounds. The city took the proper step when it engaged an expert to report on the proposition. He recommended an arrangement with the company, but this advice was not palatable and was not adopted. Nevertheless, the time at which the fair is advertised to open will not wait while the municipal authorities back and fill, and unless some action is reached soon the exposition gates will have to be swung back for visitors before the connecting tracks can be properly built and placed in operation.