tory very few idle machines are seen. They have to work or get out to make place for more useful tools. There is no reason why the same principle cannot be applied on electric railways even more than it has. All that is needed is a little system. Some time ago we described how the New York State Railways, Rochester Lines, kept track of the movement of their line trucks. This work was done by the telephone operators in the chief engineer's office. It would make an interesting duty for some clerk in each main department to follow the same procedure in connection with all important equipment on the track or the line, and in some cases even in the shops. A graphical record of performance, such as is kept in power plants and substations, would be very instructive in this connection.

Competition and Monopoly

COMPETITION is an industrial stimulus and an antidote for stagnation in development when considered from a certain standpoint and history shows that competition was the cause of developments which led to the monopoly operation of public utilities.

The railway industry is essentially best administered as a monopoly in each transportation district, but competition is never eliminated by theoretical statements. The successful monopoly must advance and develop at such a rate as to ward off and anticipate competition and, in the event of a new invention, must use it in a constructive manner to better its situation as a monopoly furnishing public service.

The Bell system did not give up when the automatic telephone was introduced; it developed the automatic instead of condemning it and adopted the policy of owning it and trying it out. Having been proved practicable, it is being put into operation and will gradually replace the older types as the existing installations depreciate. This organization meets competition and increases its monopoly control by doing its own inventing and developing in telephony and at the same time furnishes service with its existing equipment and protects its capital investment. It maintains itself by being so progressive that competition has no chance to exist.

The street railways were forced to compete with the steam roads and stages in their early history in order to exist. They did not suffer under such a handicap, but developed into our existing systems. Now the street railways are faced with a new competitive situation due to the development of the automobile and the motor bus. The railways cannot solve this situation by using destructive criticism, but they can master the situation, as they have mastered many previous situations, by using constructive methods. They hold the key to the problem in that they know and have experience in transportation.

If the motor bus is a coming transportation agency the street railways should own and develop it; if the street can be redesigned to meet any better the present and growing traffic changes the street railways should do it; if trackless trolleys have a place, the street railways should find it. There never was a time more auspicious for development in transportation through constructive measures, and we look for the street railways to show the same type of progressive management in the handling of competition in transportation as is exhibited by the Bell system in the telephone field.

Power Economy Outside the Power House

AN ELECTRIC railway system is a complex organization at best and departmental heads are apt to grow so that they view their own functions in the organization with a distorted and sometimes narrow perspective. The power department in such an organization is probably the most independent in its operations and furnishes examples to illustrate the complexity of a railway manager's duties. We recall an incident in which a railway power house superintendent had the temerity to request the management to adjust train schedules so as to operate the power units at maximum economy. But this man is no more open to criticism than many railway managers who forget all about the power department after it is once organized.

Economical power production is a managerial rather than a design function. There are no fixed constants in power production, and the purchase and installation of modern equipment under the direction of a competent inside power house operator will not relieve the railway manager of all power responsibilities. The power-house expert can be depended upon to get the most out of the fuel delivered to him when used in connection with the installed equipment, but there is an inherent tendency for him to view his job with the internal operating perspective of the combustion and equipment engineer. Often more money loss occurs before fuel reaches the power house, or after the electrical energy leaves the power house, than all internal economies will save. It is in the broader field of purchase of fuel and use of the power that the touch of the manager should be felt.

A great opportunity for economy and one requiring great attention is that of fuel purchase. We hope to see the day when fuel will be more largely purchased on a B.t.u. basis, and when all purchasing agents will discover that all is not coal that is black. In general, railway power producers pay too much for coal and too little for B.t.u. This subject was discussed more in detail in the issue of Oct. 9, page 701.

Then again the wrong kind or size of coal may be purchased. An equipment in the power house designed for a certain size and type of coal for efficient operation labors under a heavy handicap when any and all kinds and sizes of coal are used. If the coal is too large, air holes and thin spots may occur in the fuel bed; if the coal lumps are too small, the draft apparatus may be too limited; if clinkering or coking coal is used, then other troubles may arise. Power-house equipment and labor both operate inefficiently when variable types and sizes of coal are used to produce power. A close cooperation between the power-house superintendent and the purchasing agent is essential to efficient operation.

There is also room for managerial activity in regard to the use of power after it has been produced. The St. Paul electrification furnishes a startling innovation in this respect—the train dispatcher modifies schedules to control peak demands of power. Of course the inducement for such a policy is the financial clause in the power contract, but it stands to reason that the power company would not offer the inducement unless it saved money. This idea applies in detail only to specific cases, but modern power plants are so numerous that questions of peak load power transfer arrangements, supplementary stations, feeder size and location and schedules offer a fruitful field for economies in power entirely aside from internal economies in the local power plant.