

Plattsburgh Traction Co. purchased power from the Plattsburgh Gas & Electric Co. at 1.5 cents per car-mile operated, the kilowatt hours not being measured. The cost for the year was \$2,265.04.

Several other similar instances in the state could be cited.

Purchased power for operation of Pennsylvania Railroad suburban lines.—The Pennsylvania Railroad has announced that the contract for the electrical energy for the electrification of its lines between Broad Street Station and Paoli, and also between Broad Street Station and Chestnut Hill, has been made with the Philadelphia Electric Co. The contract is for five years. At the beginning the Pennsylvania Railroad will use about 5,000 horsepower, a minimum of 3,750 kilowatts, with a load factor of 25 per cent, being specified. The energy is to be furnished for the main line to Paoli and any addition or extension thereto, the railroad company reserving the right to call on the Philadelphia Electric Co. for any additional power that may be necessary for its general system from time to time. With the completion of the present work as planned, the Pennsylvania Railroad will have 32 miles of electrified lines in the Philadelphia suburban district. The cost of the energy to the railroad company for the Paoli line for the first year will be about \$150,000. The Philadelphia Electric Co. now feeds a load of 35,000 horsepower daily for the Philadelphia Rapid Transit Co.

Power rate for Puget Sound Railway.—The plans for the electrification of the Chicago, Milwaukee & Puget Sound Railway, from Harlowton, Mont., to Avery, Idaho, a distance of 440 miles, include the supply of wholesale power from the Great Falls Power Co., Great Falls, Mont., with plants at Rainbow Falls and Black Eagle Falls, on the Missouri River. The railway company agrees to electrify its line between Harlowton and Deer Lodge, Mont., a distance of 238 miles, before January 1, 1918, and also agrees to buy from the power company electric energy at the rate of 10,000 kilowatts, maximum demand, for the full period of the 99-year agreement, but two years' notice will be given the power company that delivery must commence. The railway company has several options for more power up to a total of 25,000 kilowatts, maximum demand, the agreement as to this additional demand being as follows: Not less than 4,000 kilowatts nor more than 8,000 kilowatts, if called for prior to January 1, 1923; not less than 3,500 kilowatts nor more than 7,000 kilowatts, if called for at any time between January 1, 1918, and January 1, 1928, and if at least 6,300 kilowatts additional has been called for prior to January 1, 1923. Additional energy, when once called for as above, will be supplied for the entire remaining term of the contract. Delivery of energy will be made to not more than five stations between Deer Lodge and Harlowton, at 50,000 volts or 100,000 volts, 3-phase, 60-cycle, alternating current. The railway substations are to contain suffi-

cient synchronous machinery to secure a power factor, leading or lagging, of at least 80 per cent. Twelve months' notice will be given the power company of the location of the delivery points. The power company will also have the right to install regulators in the substations for the operation of synchronous machinery in such manner as to receive any power factor between 80 per cent leading and 80 per cent lagging. The rate for energy will be 5.36 mills per kilowatt hour, subject to a minimum bill, after the first year of service, equivalent to 60 per cent of all the energy contracted for. The power company is also required to pay the Federal Government a tax of 5 mills per 1,000 kilowatt hours for all energy delivered over transmission lines crossing the public domain. This region is mountainous, embracing some very heavy grades, and it is estimated that electrical operation will result in large financial saving.

LINE CONSTRUCTION.

Line-construction features.—The subject of line construction has received increasing attention from street railway companies in recent years, and its treatment at the hands of the committee on power distribution of the American Electric Railway Association takes the shape of voluminous yearly reports which cover all branches of the work. In no department has the trend toward standardization been more strikingly manifested. A great many conditions are involved in the maintenance of overhead-line trolley service with relation to continuity of service; supply from power-transmission lines; joint use of poles; overhead crossings on steam railroad tracks or with other wire systems; nature of poles; use of concrete, lattice, or tubular metal poles; trolley guards; and numerous other features of the service. These could only be dealt with adequately by quoting in full the specifications of the American Electric Railway Association as to such items, constituting a formidable volume of specific data. It will be sufficient here to note some instances of modern practice under which the industry is operated.

Probably the most important feature of all is the safeguarding of lines which connect with outside sources of current supply, for within city limits the familiar methods of central poles, side brackets, and cross suspension seem to have become thoroughly standardized and accepted. One hears very little about them, and there is a notable absence of discussion of them in the technical press. There is a refinement of method in this field, rather than any radical change.

Transmission lines in Georgia.—An excellent example of work in the field of power-transmission service is furnished by the lines for the service of the Georgia Railway & Power Co. of Atlanta, Ga., from the famous Tallulah Falls. The energy from the Tallulah Falls station is transmitted over a steel-tower line from