Electric Railways.

industry has more keenly felt the ef- tor makes possible the use of polyphase motive or car. of electric traction, yet a careful anal- system. able significance.

starting of work on the electrification of pose of developing the rectifier-locomo-ply is 725 volts, direct current. two engine divisions of the Chicago, tive equipment for the Pennsylvania The Salt Lake & Utah Railroad runness conditions were at their worst. this instance was to secure in the readi- is employed. Not only did the announcement of the est manner possible railroad operation. During the year the Pittsburgh & company indicate its confidence in the with an equipment of substantial size. Butler Street Railway operating beimmediate return of better conditions. This car was first tried out on the tween the two cities was changed from but a noticeable improvement in condi- Westinghouse Company's test track single phase to 1,200 volts direct curtions in other lines followed.

for propulsion will be furnished at 3,000 age to the rectifier, while the extremely diating from Dallas. description of this project appeared in both alternating-current and direct-cur- be 92 miles long.

fects of the European war than the field motors with single-phase distributing

ysis of the progress during 1914 dis- Another significant development has adelphia by the Pennsylvania Railroad. closes the fact that substantial gains been the use of a mercury-arc rectifier. The initial step provides for the electrihave been made in many directions. Of equipment in a locomotive operating on fication from Philadelphia to Paoli. course there have been fewer new proj- a branch of the New Haven Road. The Suburban traffic only will be handled. ects than in late years and several con- equipment consisted of a transformer Standard steel coaches will be used. templated extensions had to be tempor- for lowering the alternating-current line Single-phase system will be used. arily abandoned, but in general the voltage from 11,000 to about 1,200, with In the field of interurban and suburfinancial returns for 1914 will compare secondary taps for use in varying the ban traffic several important developfavorably with the preceding year and voltage; two single-phase rectifiers, one ments have taken place. The Mesaba there have been also several important for service and one for reserve; four di- Railway was completed and placed in engineering developments of consider- rect-current motors of 1,000-horsepower operation during the year. This is a

near Pittsburgh.

line and driving motors to change sin- fiers in substations will be a solution of equipment. In Chicago the results of gle-phase to polyphase current. It is the railway problem. However, at high- the merger of all elevated lines has not a motor-generator set but a straight voltage direct current (2,400 volts or proven very satisfactory and considerinduction motor run as a single-phase higher) the rectifier does not modify the able congestion of traffic relieved. Steel motor with additional windings so in- serious part of the problem in any way. cars are being used to a greater extent terconnected that polyphase current can It simply takes the place of the motor- than ever before. be supplied to the traction motors, generator or rotary converter. It there- Surface lines made the usual progress · This motor is kept running continuously fore might cheapen the cost of electrifi- during the year and many new shops, and power supplied to polyphase motors cation, to a slight extent, but would not barns, and power houses were erected. only when the car is operated. The poly- change the nature of the problem itself. A consolidation of all surface lines in phase induction motor, because of its However, on locomotive, the rectifier Chicago was effected, which makes the simplicity and ruggedness and the pos- changes the nature of the whole prob- combined interests the largest surface sibility of regeneration of power, pos- lem, and before very long, the problem electric railway system, in gross earnsesses ideal characteristics for heavy of rectifier locomotives will become a ings, in the world. electric traction. The chief disadvan- very active one. The experience with The annual convention of the Ameritage is the complex distributing system the New Haven equipment, above re- can Electric Railway Association was necessary and the trouble in collecting ferred to, has proven very definitely the again held in Atlantic City, October 12

Perhaps no branch of the electrical current. The use of the split-phase mo- practicability of the rectifier on a loco-

General progress is being made in the plans for terminal electrification at Phil-

combined capacity, and the necessary 35-mile line devoted exclusively to pas-From every standpoint the most im- control apparatus, rectifier exciter, etc. senger traffic in the Minnesota iron disportant happening of the year was the This demonstration was for the pur-trict north of Duluth. The power sup-

Milwaukee & Puget Sound Railway. In Railroad, and it is installed on a com- ning between Salt Lake City and Provo. the first place the contracts for this bination baggage and passenger car fur- a distance of 48.5 miles, was opened work involving over \$3,000,000 were let nished by that railroad. The reason for during the year and has proven very early in November, at a time when busi- installing the equipment on a car in successful. Direct current at 1,500 volts

rent.

This electrification is without doubt. It is said that this rectifier car devel- Additions were made to the system of the most important and extensive ever opment will eventually prove to be far the Portland, Eugene & Eastern Railundertaken in the United States. The reaching. By it, the advantages of high-way, comprising 109 miles of 1,500-volt initial electrification of 113 miles is the voltage single-phase transmission to the direct-current track. In Texas a 151first step toward the electrification of locomotive is retained. On the locomo- mile 1,200-volt direct-current system four engine divisions covering a dis- tive itself, economical speed control is known as the Southern Traction Comtance of 440 miles and involving an out- obtainable over any range whatever by pany was completed and adds another lay of approximately \$12,000,000. Power alternating-current control of the volt- link to the chain of interurban lines ra-

volts direct current, the total supply be- sturdy qualities of the direct-current. Substantial progress must be reported ing obtained from the Montana Power motor are obtained. For mixed alter- on work for the new 2400-volt Kalama-Company. The locomotives will be the nating current-direct current service, the zoo-Grand Rapids line of the Michigan most powerful ever built for either rectifier car or locomotive is ideal if the United Traction Company, which will steam or electric service. (A complete usual direct-current control is used for connect these two cities. The line will

the Electrical Review and Western rent operation, instead of alternating- In the field of subway and elevated ELECTRICIAN for December 26.) current control for alternating-current transit the most important happening Progress has been made on the elec- operation and a different control for di- during 1914 was the awarding of seven trification project of the Norfolk & rect current. When a common control subway-construction contracts for New Western Railway and successful tests of is used for both, the arrangement is York City. These involve \$11,106,038. the single-phase-polyphase system to be about the simplest that can possibly be Minor extensions have been made elseused have been made. This system em- conceived for two kinds of service. where. Many elevated lines have imploys a split-phase motor between the It is frequently suggested that recti- proved their service and added new