



Fig. 4.—Time-Table Showing Difference Between "Variable-Speed" and "Constant-Speed" Service. The portion on the left shows two trains hauled by steam locomotives of the same type and size. The two trains are started twenty minutes apart and are supposed to make the run from A to B in the same time. For some reason the second train is heavier than the first. It therefore takes much longer to get this train over the line. The time-table also shows that considerable time is lost by both trains on those parts of the line where grades are encountered. The right-hand portion of the illustration shows the same trains hauled by a three-phase alternating current electric locomotive. This locomotive is capable of maintaining the same speed up grade and down grade, and irrespective of weight of train. The resulting uniformity of train service is plainly visible, and the time saved is quite material.

tomers thus commends itself on both engineering and financial grounds, and it should be included, if consistent with other conditions, in the program of any future electrification plans.

### St. Paul Pass Electrification

Electricity is to be used as motive power on the Idaho Division of the Chicago, Milwaukee & Puget Sound Railroad, which extends from St.

Regis, Montana, to St. Joe, Idaho, a distance of 106 miles over the Bitter Root Mountains.

We are pleased to note that the natural water power resources of the region are to be used for this proposition.

Sites for two hydro-electric power stations have already been purchased, one on the St. Joe River, in Idaho, and the other on the Missoula River, in Western Montana.

The initial capacity of the two

plants, which are to be built this summer, will be 30,000 horse power.

Other sites for plants have already been located, and will be purchased and developed if the future requirements of the railroad should make it desirable.

Bids for the construction of the dams and power houses have already been received, and it is expected that awards will be made soon, so that work may begin whenever the weather permits.

This is the second western railroad which will use electricity produced by water power for the propulsion of its trains over the heavy mountain grades.

The first one was the Great Northern, which uses a water power on the Wenatchee River, in Washington, for the operation of its trains over the Cascade Mountains.

### Ontario Power Line

Referring to main article in our last issue, we are pleased to add that Smith, Kerry & Chace, of Toronto, have been employed as engineers by the F. H. McGuigan Construction Company, and will have general supervision of the execution of the entire contract.

The work is progressing very nicely.

The first steel towers have already been tested. The aluminum cable is being turned out, and field work should begin next month.

Muralt & Company will, as previously stated, have charge of the act-

ual erection of the line, as engineers for the Niagara & Ontario Construction Company.

### Tests of Catenary Line Construction

The Connecticut Company is equipping six sections, of 2,000 feet each, of its railway between Hartford and Middletown, Connecticut, with catenary overhead line material, supplied by six different manufacturers. Exhaustive tests are to be made, and it is hoped that it will be possible to evolve a standard specification for this type of line construction by combining the best features of all six systems.

The line wires are to be supported in each case from poles spaced about 150 feet apart on tangents, this being considered the most suitable standard distance for one span.

During the tests the six sections will be operated as much as possible under the same conditions.

A further experiment will then be made by equipping a half mile section with a No. 0000 trolley wire of steel, supported by a messenger cable of copper.

This is the reverse of common practice, which employs a copper trolley wire and a steel messenger cable.

The purpose of this latter experiment is to find a line construction which will combine exceptional wearing qualities in the contact wire with a high electrical conductivity.