through a steel main about eight and one-half miles in length, along road allowances, and there discharged into a circular reinforced concrete reservoir. Although the supply is dependent to a large extent on wells and underground water-sheds, certain sprinks will play an important factor if this report is adopted and carried out.

The estimates of the cost of the proposed works are placed under four heads, as follows:—

Silver Stream Section.—Pipe lines, $274,740; 400 h.p. engines and 7,000,000-gallon pumps, $20,000; pump well, $20,000; engine house, $2,000; cottages, $4,000; meters, water level recorders, $8,000; contingencies, $32,874; making a total of $361,614.

Slough Creek Section.—Pipe lines, $163,056; meters, $6,000; contingencies, $16,950; making a total of $185,961.

Hicksvale Creek Section.—Pipe lines, $270,400; two 1,000,000-gallon reservoirs, $35,000; meters, $6,000; turbine pumps and station, $6,000; cottage, $2,000; contingencies, $31,940; making a total of $351, 340.

Rastadt Springs Section.—Pipe lines, $179,300; engine, pump and building, $6,000; cottage, $2,000; meter, $1,000; contingencies, $18,830; making a total of $207,130.

It is proposed to deliver the water to the city through a steel main to be laid from Silver Stream along Dewdney Street and connect to the city water mains at a convenient point. It is proposed that the city water pressure should be maintained at about 65 pounds per square inch—that is about 150 feet head, which will be sufficient to provide an ample supply to the highest building in the city. The system would be capable of supplying water under a greater pressure when necessary

It is estimated that the combined scheme and watersheds described will probably yield a total supply of about 7,000,000 gallons per day. It is pointed out that it would be advisable to install self-recording meters on the various sections.

THE ST. JOHN VALLEY RAILROAD.

The contract for the construction of the above mentioned railway, when completed, will be a great impetus to commerce in the Maritime Provinces, particularly New Brunswick. The route, as described in the contract, is, briefly, from a point on the National Continental Railway at or near Grand Falls, via Centerville and Lakeside, to Woodstock, thence by the River St. John to Fredericton and Gagetown, thence crossing the St. John River at or near the Mistake, thence crossing the Kennabacasis River at or near Perry's Point, and thence to the city of St. John, the whole representing 208 miles. It is provided that the divisions from Fredericton to Woodstock and Woodstock to Centerville shall be completed on or before November 1st, 1913, and the whole road is to be completed on or before November 1st, 1915. The Provincial Government guarantees the bonds of the company to the extent of $25,000 per mile.

The road now under contract is one link in a chain of railroad development. Logically connected with the St. John Valley is the proposed line known as the St. John and Quebec Railroad, which it is planned to cross the State of Maine from a point of connection with the Aroostook Valley Road at Washburn to the western boundary of the State, from which point a line is chartered by the Dominion Government to run to the St. Lawrence River, fifty miles.

When these two sections of road are completed, the distance by rail from Quebec to St. John will be 370 miles, and a very important saving will be effected in transportation in these portions of the Dominion. Mr. Ross Thompson is the chief engineer, and Mr. S. B. Wass the assistant chief engineer of the company.

FORESTRY OPERATIONS ON THE PENNSYLVANIA RAILROAD.

An important work of interest to railway officials and others is the conservative management of the Pennsylvania Railroad timbered lands. The logging operations which have been conducted by the company's foresters during the last three years cover a total area of about 1,200 acres and form only one of the means which are being used by this railroad to solve the problem of procuring ties and other timbers. It has been in use for three years, during which time 2,600,000 board feet of lumber and 15,000 ties were procured from woodlands managed by the foresters. The tracts on which they are applying the principles of silviculture include small areas along the right-of-way which have no value to the company except from the timber which is growing on them, and the more extensive areas of land which are the catchment basins for the mountain reservoirs which supply water for locomotive and shop use.

Logging operations as carried on by the foresters have in view the best utilization of the standing timber and the conservation of the supply for future operations. Although the aim is to leave each tract logged in more productive condition than before, each case presents its own peculiar conditions, and must be considered as a separate problem. On many unmanaged timber tracts frequent fires have added to the injury caused by partial cuttings. In extreme cases the result of such fires and cuttings is that there are no young trees which are worth leaving and the mature trees are badly damaged. Under such extreme conditions the area, as a rule, would be cut clean and a complete planting made. The other extreme condition evists when the area has been free from fires and cuttings and the growth is so well graded in age that it is possible to cut out matured trees and still leave sufficient young growth to stock the area. The most prevalent condition, however, lies between these two extremes, and the methods adopted under such conditions are well illustrated by the work done on the Brush Mountain tract near Altoona, Pa., according to the Railway Age Gazette. This tract includes about 700 acres in the drainage basin of the reservoirs which store the water for use in case of fire at the Altoona shops. Forest growth conserves and purifies the ground water supply, and in order properly to care for the timberlands in drainage areas the officers responsible for the water supply were glad to avail themselves of the services of the company's foresters. The tract under management lies in a basin-shaped valley known locally as the "Kettle." The slopes are steep, with a range of about 400 ft. in elevation. The forest on most of the area was second growth in blocks of even age from six to eighty years old, resulting from fires and partial cuttings. There were also some virgin trees which had been left because they were not merchantable. Three types of timber are distinguishable. The bottom land bears hemlock, white pine, black birch, red maple, white ash, cucumber tree, tulip, basswood and black ash. As this low ground is continually moist, fires have never been able to run over it, and on that account the reproduction is good. The slopes, which include most of the area, have white oak, red oak, scarlet oak, black oak, chestnut, beech, black birch, white pine, pitch pine, black gum and pignut hickory. Fires have repeatedly run over these areas, with the result that there is very little ground cover and reproduction is mostly of sprout origin. The ridges are dry and the scattered timber was stunted and of poor quality. The principal species are chestnut oak, black oak and pitch pine. The reproduceion is so poor as to be hardly worth considering. Many trees on the tract had been seriously damaged by fire and wind, and many