Future Developments.—From the tailrace level of the existing plant to mean tide level at the mouth of the Stave River, there is a total fall of 134 ft. The daily range of the tide is about 4 ft. In June and July, when the Fraser River is in flood, the water may rise as much at 16 ft., though 12 ft. is the usual maximum rise. During Stave River freshets, the water near the mouth of the river may rise several feet.

As freshets will nearly all be controlled by the dam at Stave Falls, and as the Fraser River floods affect the situation for less than two months in the year, it is feasible to design future developments to utilize a fall of 130 ft.

This could be developed in one plant by building a dam in the narrow gorge just above the mouth of the river and driving a 2,000-ft. tunnel for the penstocks. The dam would back the water up to the tailrace of the existing plant, forming a storage reservoir that would be large enough to hold a day's supply for the plant with a variation in head of less than 10 ft.

The dam would have a maximum height of 170 ft. in a channel 100 ft. wide, though outside of the channel it would not be more than 100 ft. high.

While this development would be quite economical for the full capacity of the plant, the initial cost would be high, as the dam alone would cost $1,000,000.

As the full development will not be required for a number of years, and as it is important that expenditures on future construction shall not be made further in advance of actual demand than absolutely necessary, a plan is under consideration for the development in two plants, each operating under a head of 65 ft.

The lower canyon allows of a very economical development under this head, and a good site for the middle plant exists about two miles below Stave Falls.

Both these plants would be designed for single-runner vertical turbines of from 10,000 to 12,000 h.p. capacity.

By the adoption of this plan of development, the Western Canada Power Company, Limited, can increase its plant capacity step by step, to keep pace with the demand for power, until it has installed a total of 120,000 h.p.

CUTTING SHEET STEEL PILING BY OXY-ACETYLENE BLOW-PIPE.

The superiority of the blow-pipe over the old method of cutting sheet piling is illustrated by reference to a piling job at Jacksonville, Fla., where a large drawbridge is under construction over the St. Johns River by the Florida East Coast Railway Co. Lackawanna sheet steel piling has been used in the construction of the protection piers. This piling is driven down in sections. Each sheet or section consists of ⅜-inch web, being about 2¼ inches thick on the lock joint. In all, approximately 860 feet of piling had to be cut off at a uniform height. An oxy-acetylene cutting blow-pipe was used, employing Prest-O-Lite gas and compressed oxygen, both in portable cylinders.

On account of the peculiar construction of the lock joints, the operator was handicapped in making speed, although the work was completed at an enormous saving over the old method of sawing through, which would have been an extremely slow and tedious operation. At the lock joint practically four sections of metal had to be cut through, requiring frequent changes in the adjustment of the blow-pipe. Nevertheless, it is stated that between 40 and 50 lineal feet of piling were cut in seven hours, one man handling the entire job.

MITIGATION OF ELECTROLYSIS.

The subject of electrolysis, comprising a comparison of electrolysis conditions in America with those in other countries, a discussion of electrolytic corrosion proper as distinguished from self-corrosion, and touching briefly on electrolysis effects in concrete and steel buildings is dealt with in a technologic paper of the United States Bureau of Standards, newly issued. There is also a brief discussion of the effects of stray currents other than corrosion, such, for example, as the production of fires or explosions.

Methods of electrolysis mitigation are discussed at length. All of the various methods of mitigation that have been proposed or tried are discussed under two main heads: First, those methods applicable to underground pipe and cable systems; and, second, those applicable to the railway negative return. Those methods applicable to underground pipe systems comprise the following: (1) Surface insulation of the pipes; (2) chemical protection,—that is, rendering the pipe surface passive by surrounding it with earth filled with lime or other chemical that will prevent corrosion; (3) cement coatings; (4) cathodic protection,—that is, maintaining the pipe or cable always negative to earth by means of a motor generator set or battery or other sources of electromotive force; (5) favorable location of pipe with respect to tracks; (6) the use of non-corrodible conducting coatings; (7) electric screens; (8) the use of insulating joints in pipes; and (9) pipe drainage.

The discussion leads to the conclusion that of the various methods under this class that have been tried none are suitable for general use as primary means of preventing electrolysis trouble. The methods of chemical protection, cement coatings, cathodic protection, and conducting coatings should be regarded as substantially worthless in their present state of development. Surface insulation of pipes by means of paints or dips is not much more reliable, but insulation by putting pipes in troughs or conduits filled with pitch may be used in special cases where the expense would be justified. The practice of placing all pipes as far as possible from railway tracks affords a certain measure of protection, of which advantage should always be taken wherever practicable in laying new lines or relaying old ones. The use of electric screens is often a valuable expedient in taking care of acute local cases of trouble in existing mains.

These methods, with the exception of that relating to the proper location of pipes in new work, are suitable only to special conditions, however, and are not usually to be considered as important factors in any general plan for electrolysis mitigation.

Pipe drainage is sometimes useful, but should be used with proper restriction and with due precautions against setting up any dangerous conditions either in the system drained or in neighboring systems. In general, in city networks where there are a number of independent underground systems to be protected pipe drainage should be used as little as possible, the chief reliance being placed on mitigative measures applied to the railway negative return. The drainage of lead cable systems will, however, usually be desirable, and these should always be drained by means of suitable insulated feeder systems so arranged as to drain the least practicable current from the cables in order that neighboring structures may not be subjected to unnecessary danger thereby.

The most valuable mitigative measure that can be applied to the pipe system consists in the proper use of