ing to customers or built for the purpose of high-grade relay of relatively high annual output.

Table Showing the Extent of Supplemental Plant Capacity and Output in Per Cent. of Water Power Capacity.

	Water power kw. capacity.	Per cent. steam capacity.	Per cent. steam output.
1 . . .	50,000	15	2.5 to 20
2 . . .	5,000	85	20
3 . . .	15,000	40	5
4 . . .	12,000	30	50
5 . . .	6,500	25	very small
6 . . .	12,000	30	——
7 . . .	9,000	50 (?)	——
8 . . .	2,400	—	20 (formerly)
9 . . .	11,400*	(16,000 kw.)	(present)
10 . . .	5,300	17	55

*Including customer's plant.

The general conclusions that may be drawn from the somewhat limited data at hand are:

(1) That steam relay is depended on in widely varying proportions of water power capacity, depending partly on the character and regulation of the streams, partly on the character of power demanded, and more and more on the extent to which the systems are interconnected with others for the interchange of power.

(2) That, on the whole, the companies have been successful in utilizing the existing steam capacity of their customers.

(3) That the principal uses to which supplemental capacity has been put are: (*a*) Relay for low water; (*b*) breakdown; (*c*) peak capacity; (*d*) base load.

(4) That the supplemental plants, being largely old plants belonging to companies formerly supplying their own individual markets, since consolidated into more or less comprehensive systems, are generally scattered among local centres of distribution.

(5) That only in rare cases have provisions been made in special equipment or organization for quick starting, and that for this reason quick starts are rarely made. In certain cases, however, where such relay is of importance oil firing is being introduced and in rarer cases gas and oil engines.

MAGNESITE DEPOSITS IN BRITISH COLUMBIA.

Magnesite, one of the most valuable of the non-metallic minerals, has been found in large quantities along the shore of Lake Atlin, in the north-eastern part of British Columbia. Seven claims have been located by Vancouver parties, and plans are being made for working the deposits. This ore is shown by analysis to be exceptionally pure, running as high as 98 per cent. in magnesium carbonate. The world's supply has so far come from California, Greece and Austria. On account of the war the latter source is cut off, and since this was the most important, there is an extraordinary demand for the mineral which British Columbia will soon be in a position to supply.

Magnesite consists of magnesia, 48 per cent., and carbon dioxide, 52 per cent., and used, after calcination, to make bricks for refractory furnace lining, nonconductive covering for steam pipes, boilers, etc. Magnesium salts, especially the sulphates, are used in the arts and in medicines, also in the paper industry, and in connection with the pulp industry of this province. This new discovery may prove to be of special value, since the chief value of the spruce forests in British Columbia is in their paper-making possibilities, and the fact that magnesia necessary to the manufacture of a finished product is right at hand, may result in greatly increasing the importance of the pulp industry.

ACTIVATED SLUDGE TREATMENT COSTS.

IN *The Canadian Engineer* for October 28th, 1915, a description was presented of the new plant at Milwaukee for the treatment of sewage on a large scale by the activated sludge process. Mr. T. C. Hatton, the chief engineer of the Milwaukee Sewerage Commission, in describing the development at the Dayton Convention of the American Society of Municipal Improvements, gave some important estimates of cost relating to the extensive experimental work carried out under his supervision. Fig. 1 is a diagram showing the quantity and cost of air required for the process. In this particular case the amount of air used per million gallons of sewage is based upon the use of a tank of 9 ft. average depth. The final cost of aeration is, however, nearly independent of the depth of tank if the rate of aeration per square foot of tank surface remains constant, as if the depth were doubled the volume of air per gallon of sewage would be halved, but its pressure doubled. As

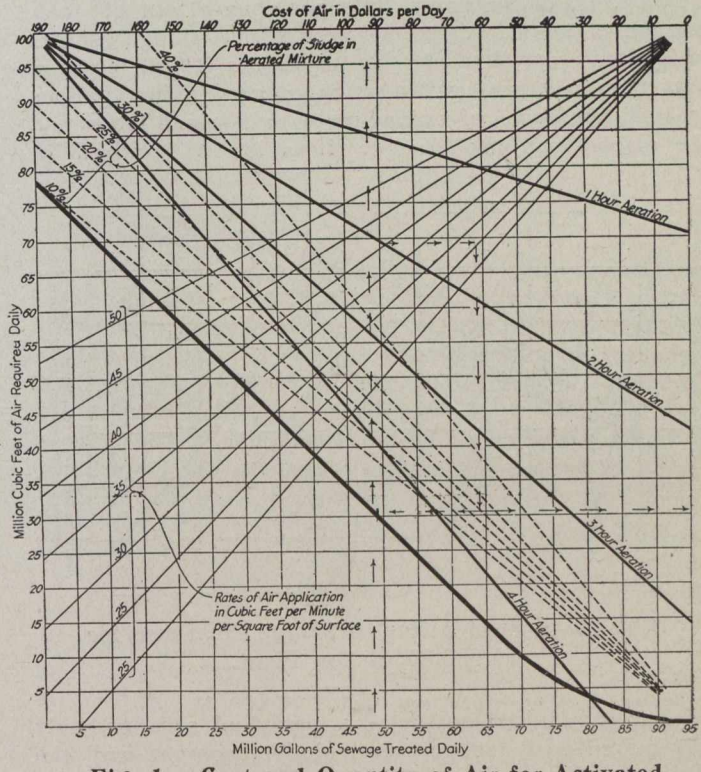

Fig. 1.—Cost and Quantity of Air for Activated Sludge Process.

an example of the use of the diagram the arrows show the procedure for 50,000,000 gal. of sewage, 2 hours aeration, 0.25 cu. ft. per million rate of air application and 25 per cent. of sludge. The cost is derived as follows:—

Begin at the bottom of the diagram with the number of gallons of sewage treated daily. Run vertically to the selected period of aeration, then horizontally, to the selected rate of air application, then vertically to the percentage of sludge, then horizontally to the heavy curve, and thence vertically to the cost in dollars per day. To find the amount of air in millions of cubic feet per day run horizontally to the left instead of to the heavy curve. In this manner the cost may be arrived at of producing the air per million gallons treated per day under varied conditions as to period of aeration, rate of air application per square foot of tank surface and per-