Computerized rivers
Breakthrough in power generation

By using computer-based techniques, scientists at Alcan Smelter and Chemicals Limited will soon be able to fine-tune their hydroelectric systems and obtain more electricity at little or no extra capital cost.

Aluminum smelting is a power-hungry industry. To make one pound of aluminum, approximately seven kilowatt-hours are needed, an amount of electricity that would supply an average household for several hours. Indeed, according to Murray Lester, Assistant Manager of the Power Division at Alcan Smelter and Chemicals Ltd. of Montreal, P.Q., the cost of electricity is a crucial factor for Canada's large aluminum smelting industry. "Aside from electrical power considerations, there are not too many good reasons why Canada has become the world's leading aluminum exporting country. There are no commercial bauxite deposits here and the local market for aluminum is relatively small in the world context. It is the availability of large amounts of hydroelectric power at reasonable cost that makes us aluminum producers. Consider the drawbacks: a cold climate that hinders navigation several months of the year; high Canadian salaries compared to other aluminum-producing countries; and long shipping routes, both from the bauxite deposits and to the markets."

Contrary to most aluminum smelting companies in other countries, Alcan has its own hydroelectric power system in Canada, with about 2,700,000 kilowatts (kW) of hydroelectric capacity in the Saguenay-Lac St-Jean area of Quebec and some 900,000 kW in Kemano, British Columbia. The Saguenay system draws from a 30,000 square mile watershed and the facilities are spread out in a 120 mile-long array of three major reservoirs, six generating stations and 43 turbogenerator units of various ages, sizes and types. Alcan's electrical capacity in Quebec is equivalent to about 25 per cent that of Hydro-Quebec, and in fact, makes Alcan the largest power generating company in the world that is not a public utility.

"To operate an aluminum smelter," says Lester, "we need an almost constant amount of power, 24 hours a day, every day of the year, despite the seasonal and short-term variations in precipitation and run-off. Given such a large, complicated hydroelectric network, our main challenge is to exer-

Alcan Smelter and Chemicals Ltd./Société d'électrolyse et de chimie Alcan Ltée

Thanks to its abundant water resources and large supplies of hydroelectricity, Canada is the leading aluminum exporting country in the world.

Grâce à ses abondantes ressources hydro-électriques, le Canada est le premier pays exportateur d'aluminium du monde.