# GOVERNMENT WATER CONSERVATION

THE following notes concerning government water conservation are taken from the address of the chairman of the Commission of Conservation, Sir Clifford Sifton, before the recent annual meeting held in Ottawa:—

#### Ottawa River Storage

Over half a century ago it was urged that the construction of dams on the Upper Ottawa would be of great benefit to power users at the Chaudiere Falls, Ottawa. Between 1904 and 1908, detailed surveys of the proposed Georgian Bay Ship Canal via Ottawa, Mattawa and French Rivers were made. These surveys demonstrated the value of conservation dams at several points, notably at the outlets of Lake Timiskaming, Kipawa Lake and Lac des Quinze. The construction of the three dams mentioned was completed in 1915 and the water-power interests have been much benefited by their operation, particularly during the winter of 1916-17, when the low-water flow was increased by letting out the storage water.

These reservoirs can supply an additional flow of 10,000 cubic feet per second, thus increasing the total power possibilities between Mattawa and Carillon by some 400,000 h.p., while at Ottawa alone where the water is being fully utilized the increase is approximately 30,000 horse-power.

# La Loutre Dam on the St. Maurice River

The most important water conservation work thus far undertaken in Canada is that being done by the Quebec government and now nearing completion at La Loutre, on the St. Maurice River. It will store up the waters of the St. Maurice for the benefit of its many water powers and will double the low-water flow.

This work had been projected for many years as the regulation of the river is of the greatest value to the important developed water powers at La Tuque, Grand Mere and Shawinigan Falls, but no construction work was undertaken. After full investigation of the project, both from the physical and financial viewpoint, the Quebec Streams Commission let the contract for construction in the summer of 1915.

The work has progressed steadily since, in spite of the great difficulties in transportation. It is now 80 per cent. completed and will cost about \$1,500,000. When finished, it will create a reservoir of 160,000 million cubic feet, forming the third largest artificial reservoir in the world, being exceeded only by the Assouan reservoir on the Nile and the Gatun Lake on the Panama Canal. From the owners of the power sites already developed, the commission will receive a revenue of upwards of \$130,000 per annum.

Between the reservoir and the mouth of the St. Maurice there are 17 power sites with heads of from 10 feet to 150 feet. The aggregate descent at these sites totals 800 feet but the dams erected in developing the various sites will increase this total head to 900 feet. Under present conditions, these sites have a total capacity of approximately 350,000 theoretical h.p., but it is estimated that some 900,000 h.p. will be available when the flow is regulated from the reservoir. At Shawinigan, Grand Mere and La Tuque alone, the three sites at present utilized on the St. Maurice, the potentiality will be raised from an aggregate of some 190,000 theoretical horsepower to over 400,000 horse-power.

Another water storage undertaking of the Quebec Streams Commission, now nearing completion, is the St.

Francis River dam at the outlet of Lake St. Francis, the lake being used as a reservoir.

### St. Francis River Storage

Contracts for the construction of the work were awarded in September, 1915. As the majority of the power sites on the St. Francis are actually developed and as the power owners have suffered from insufficient water for a number of years, this work will afford much-needed relief. It is estimated that revenue from the use of the conserved water will cover all overhead charges and maintenance costs.

By raising the level of the lake 15 feet, the reservoir will have a capacity of 12,200 million cubic feet, and will increase the flow at the outlet from the natural minimum of 100 cubic feet per second to 600 cubic feet per second. The corresponding total power increase on the river will be 21,810 h.p., of which 6,000 h.p. will immediately be absorbed by the present users, while the development of the remaining sites will be greatly facilitated.

#### **Trent River Conservation**

An extensive system of small conservation reservoirs has been established in connection with the canalization of the Trent River. These serve the double purpose of supplying the canal system and supplementing the minimum flow in the river for power purposes. There are four hydro-electric plants on this river, supplying the Central Ontario system of the Ontario Hydro-Electric Power Commission and these are benefited by the regulated flow in the river, some of these plants having a capacity as high as 8,000 h.p.

Dams have been built at the outlet of many lakes on tributary streams and the water is stored until required in the dry summer and autumn for navigation and power purposes. The control of the flow is being constantly improved by the further utilization to the fullest extent of the natural storage basins of the Trent Valley.

### Grand River Valley

It has for some years been a matter of public knowledge that the Grand River Valley in the province of Ontario is suffering more and more from a diminished flow in that river. I am not able to give an expert opinion upon the subject from an engineering standpoint, but it seems clear that the time has arrived when the Ontario government should make a thorough scientific examination of the subject with a view to ascertaining whether conservation works can be constructed which will remedy the evil. The experience of Quebec shows that where these works are practicable they can be constructed without placing any burden on the public exchequer.

During the few years preceding the war the chemical industry of France made considerable headway, the proportion between imports and exports showing a marked alteration in favor of the home industry. The French chemical industry was particularly wanting in coal-tar products, especially dyestuffs and pharmaceutical preparations, also potash, saltpetre, sulphuric acid, etc. On the other hand, France has always been able to export glycerin, substances for tanning, super-phosphates and soda products. At the commencement of the war there was a shortage of several chemicals particularly wanted for military purposes, such as benzol, phenol, etc., but during the war a number of coal tar products works have been erected, and it is considered quite likely that they will be able to maintain their position after the war.