remote and uninhabited parts of the country, there are, as well, great reserves of undeveloped power within ready transmission distance of existing centres of population and industry. It is not believed that this favourable condition exists to the same extent in countries such as Russia, India, and Brazil, and, excluding these countries, it is seen that, of the others listed, Canada is outranked only by the United States in potential resources.

In comparing the estimates of potential power with those of developed power and also in estimating the proportion of a nation's water-power resources already developed it should be kept in mind that the estimates of developed power are based on the installed capacity of hydraulic turbines and water wheels at constructed plants which average two or three times the potential power at low flow at the same sites. In Canada, for example, it is estimated that, under existing practices, the potential water-power resources of the country would support an installed turbine installation of probably 43,700,000 h.p. In other words, the present installation represents less than 19 p.c. of the country's total resources. The same holds true in regard to figures shown for other countries.

Problems in the Development of Hydraulic and of Hydro-Electric Power.

The national importance of water-power resources was immeasurably increased by the development of the electric generator. Later the application of the voltage transformer and high-tension transmission permitted the concentration and utilization of power at points remote from its origin where favourable conditions of labour, transportation, and raw materials existed or could be readily provided.

The earlier utilization of electricity was almost entirely for street, commercial, and household lighting. Its application to urban and interurban transportation quickly followed and with the perfecting of industrial machinery suitable for electric drive it soon became the leading motive force in industry. Next came its application to specialized industrial heating, and, more recently, its application to many electro-metallurgical and electro-chemical processes resulting in the large-scale production of electrolytic copper, aluminium, zinc, nickel, and other metals, calcium carbide, carborundum, inorganic fertilizers, weed killers, and elemental and other gases.

The abundant supply of low-cost hydro-electric power has been an important factor in the rapid growth of the manufacturing and mining industries in Canada. The accompanying demand for electric power, much of it necessarily transmitted over considerable distances, brought with it many problems of generation and transmission. These problems have been vigorously attacked and a high technique of successful year-round operation has been developed despite extreme variations of temperature experienced in many parts of the country.

The low temperatures experienced during the winter months necessitate the installation of heating apparatus, either steam or electric, for the maintenance of gate operation and to prevent the accumulation of ice on the trash racks. Special provision is also necessary in the design of waterway entrance structures to preclude the entry of floating ice and reduce the possibility of frazil- and anchor-ice formation. Also insulation or heating equipment has to be installed for the protection from freezing of the surge tanks built into the intake equipment to reduce the