pany, and while other plants of this kind have so far not been put into operation commercially in this country, they have been seriously contemplated, and await only a sufficient source of low-price power for realization.

The electro-metallurgical industry is in its infancy, but promises great expansion, especially in the production of nicu-steel in Canada. Few people appreciate the rapid growth during the last two years in the use of electric furnaces for the production of the highest grades of steel.

By proper foresight the demand for hydro power for these industries need not conflict with other demands, as, for instance, municipal, domestic and ordinary industrial uses.

Total developed power, about 1,735,598 h.p.

Further Use of Hydro-Electric Power

In considering the future of water power development in Canada, it is important to note that it means the use of a non-expendible resource, and in many cases represents the substitution of an inexhaustible resource for an exhaustible one. For this reason, the use of hydro-electric energy should be encouraged in every reasonable way.

Further development of water power in Canada will, undoubtedly, be extensive and must depend very largely on:

(1) Additional requirements for municipal, industrial and domestic use.

(2) Growth of pulp and paper industry.

(3) New electro-chemical and electro-metallurgical processes.

(4) Electrification of steam roads, especially terminals and adjacent engine divisions.

(5) Substitution of hydro-electric power for fuel power in manufacturing and industry.

In the rapid development within a short space of time of our water powers to the extent of nearly 1,800,000 horse-power, it is natural to expect that there has been some misconception in design, in construction, in conservation of opportunity, in overlapping of service, and even in governmental administration, although as to the latter it is an axiom in British jurisprudence that "the King can do no wrong." If we were starting *de novo* to develop our water powers, with our present knowledge of what is essential in government investigation and administration, of what is really basic in conservation of resource, of the present practice of the art of hydraulic and electric engineering, and last, but by no means least, of what is the most important or prior market demand, from a national standpoint, from particular power sites, whether general municipal requirements should precede electro-chemical and allied industrial requirements, we would, for instance, most assuredly produce a very different power situation at Niagara. At the same time, this most important and world-famous source of our electric energy has well served us. Generally speaking, our water powers have undoubtedly proven to be one of Canada's most valuable assets.

Looking to the future in power development, if Canada is to reap full benefit from her heritage in white coal, there must be a constructive liaison between (*a*) the various Dominion and provincial government administrative departments concerned in water power matters; (*b*) the producing corporation or commission, and (*c*) between the consuming public. Concurrently with such a liaison there must also be an adequate co-ordination of the development and use of water power with that of all other power-producing agencies.

Anyone who has listened attentively to the very able presentation of the various elements in the fuel situation during the last two days, must realize that there is a prodigious field for such co-ordination in the development and use of our varied power and heat-producing resources which will combine the effective use of all, along lines for which each is best adapted, and which will, by avoiding duplication or misdirection of effort, promote the efficiency of both individual and conjoint use.

The necessity for the correlated development and use of all our fuel-power resources has surely passed the agitational or educational stage. The many urgent reasons for such correlated use are stressed a hundred-fold by the coal shortage experience of this winter.

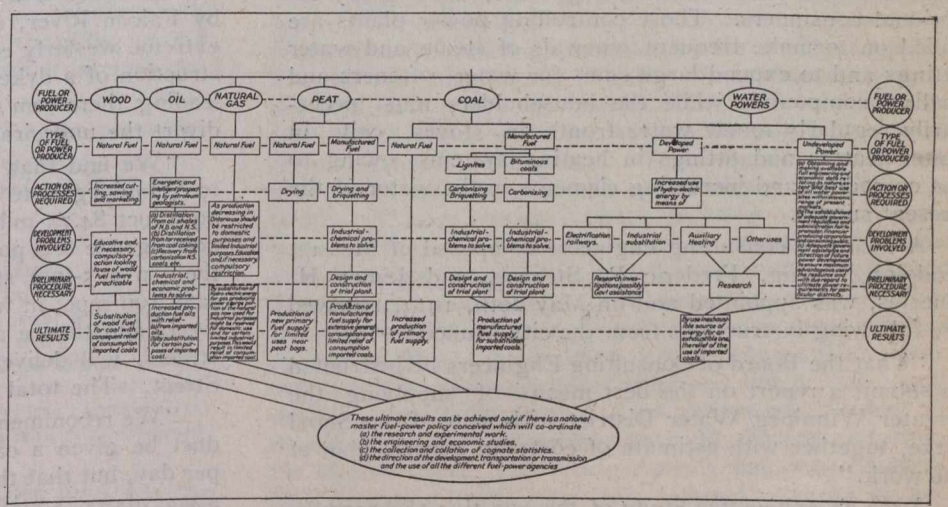

Plate No. 4—The Fuel-Power Resources of Canada

To visualize the interdependence and interrelation of all the fuel-power agencies available in Canada, and to offer something as a basis for general discussion, I have prepared a chart (Plate No. 4), which if it indicates any one thing it conclusively proves the immensity and complexity of the problems involved in effecting the co-ordinated, concomitant development and use of all our fuel-power resources. The chart shows that this can be best realized following the evolution of a national master fuel-power policy for all of Canada.

Gentlemen of the Canadian Society of Civil Engineers, are we going to leave this great problem in "the laps of the gods"? It is not one of peculiar concern to engineers, and of such timely and pressing importance to Canada that we, as a society, would be warranted in attempting a solution? Should we not mark the enlargement of the scope, influence and prestige of our society (which, we hope, is being exemplified by its transition to the Engineering Institute of Canada) by an earnest effort to evolve, in general terms, the basic principles of a national master fuel-power policy for Canada?

Cheap power promises to be one of this country's greatest assets in the post-bellum industrial rivalry of nations for world trade. Our great fuel reserves, supported by our water power resources, represent a sure source of cheap power, and should guarantee Canada her share in world trade, if our varied fuel-power resources are availed of to their maximum possible advantage.