energy can never as a heating agent be an adequate substitute for coal for the citizens of Canada, the sooner will action be concentrated upon sources from which real relief may be derived—there is no use entertaining hope towards a source from which no sufficient relief can come. At the annual meeting of the Commission of Conservation, in November, 1917, the author stated that: "The extent to which electric energy will be available for heating has been much overrated and, realizing the underlying physical limitations one cannot be enthusiastic respecting the extent to which it may be utilized." This statement being made at a time of serious hardship due to power and fuel shortage, attracted widespread attention.*

St. Lawrence River Water-Powers

Outside of the Niagara district the greatest amount of water-power of immediate economic importance is found along the St. Lawrence River. On a conservative basis, the low-water power of the international portion of the St. Lawrence River may be estimated at about 800,000 h.p., of which Canada is entitled to one half, or 400,000 h.p. The correspondingly estimated low-water power on the portion of the river which lies wholly within Canada, is about 1,400,000 h.p., thus making an estimated total for Canada of 1,800,000 low-water continuous h.p. Assuming the diversity load-factor of the present Niagara system of the Hydro-Electric Power Commission of Ontario, Canada's 1,800,000 h.p. on the St. Lawrence would take care of a power demand of some 2,400,000 h.p. The St. Lawrence River power sites are detailed in Table III.†

Coal Resources of Canada

Now, we have seen how great are the water-power resources of Canada, and these, it may be observed, are large-

TABLE III.—WATER-POWER ON THE ST. LAWRENCE RIVER (Tentative Schedule) (a)

Site	Head Available	Estimated Low-water 24-hr. h.p.	Average Estimated 24-hr. Low-water h.p.
Morrisburg-Rapide Plat	11-15	170,000-230,000	200,000
Long Sault rapid	30-40	500,000-650,000	575,000
Coteau rapid	15-17	230,000-260,000	250,000
Cedars rapid (b)	30-32	490,000-525,000	500,000
Split Rock and Cascades rapids	14-18	220,000-280,000	250,000
Lachine rapid	20-30	300,000-450,000	375,000
Total	....	1,910,000-2,395,000	2,150,000

(a) In this table, to have the estimates fairly representative of the possible quantities which might be expected under representative low-water flow conditions, some allowances have been made for efficiency and other factors.

(b) Under development for about one-third of the low-water flow of the river. Consideration would be given to the possibility of combining the Coteau, Cedars, Split Rock and Cascades; also of increasing the Lachine power.

ly spread over the areas which have no natural coal resources. These areas now importing coal will no doubt be increasingly supplied from the Canadian mines. Considering the country as a whole, Canada in respect of quantity, quality, and accessibility for mining purposes, possesses coal deposits which compare favorably with those of the greatest coal mining countries of the world. Canada, as we have seen, can never depend upon her water powers as a sole source for heat. Consequently, the alternative open to her, and it is this to which special attention is directed, is to develop, and that as rapidly as possible, both her own fuel and power resources, and by co-ordination of transportation and other cognate agencies to provide for the distribution of fuel to all communities in the Dominion. In some respects it is more important to move coal and have it adequately stored and distributed throughout Canada than it is to move the grain out of the country.

TABLE IV.—ESTIMATED COAL RESOURCES OF CANADA (a)

Province	Area of Coal Lands Square Miles	Semi-Anthracite Million Tons	Bituminous Million Tons	Sub-Bituminous Million Tons	Lignite Million Tons
Nova Scotia	521		10,691		
N.B.	121		166		
Ontario ...	10				27.5
Manitoba	48				176
Sask.	13,406				65,793
Alberta ...	81,878	845.9	217,918(b)	932,053	29,095
B.C.	6,045		77,923(b)		5,715.5(c)
Yukon	2,840		275(b)		5,159 (c)
N.W.T. ..	300				5,280 (c)
Arctic Is. ..	6,000		6,600		
Total	111,169	845.9	313,573	932,053	111,246

(a) Consult "Coal Fields and Coal Resources of Canada," by Dr. D. B. Dowling, Geological Survey of Canada; also "Coal Situation in Canada," by W. J. Dick, in "Transactions of the Canadian Mining Institute," 1916.

(b) Includes some anthracite coal.

(c) Includes some sub-bituminous coal.

The coal fields of Canada may conveniently be divided into four main divisions:—

1. The bituminous coal fields of Nova Scotia and New Brunswick.
2. The lignites of Manitoba and Saskatchewan, and the lignites, sub-bituminous and anthracite coal fields of Alberta and the Eastern Rocky Mountain region.
3. The semi-anthracite and bituminous fields of Vancouver Island, Queen Charlotte Island, and the interior of British Columbia, and the lignites of Yukon.
4. The low-grade bituminous coal and lignites of the Arctic-Mackenzie basin.

The coal areas and estimated quantities for the different provinces are shown in Table IV. There should, of course, for practical consideration, be a substantial reduction made in these quantities, due to waste in mining operations.

Coal Production and Distribution

Canada annually produces 15,000,000 tons of coal. Her coal and coke production in 1916, 1917 and 1918 are given in Table V. Canada is making special efforts to increase the production of, and areas served by, her coal mines. This is evident from the figures in the table for the province of Alberta, the mines of which, in 1918, increased their production by over 1,200,000 tons. The falling off in production from the Nova Scotia mines is more apparent than real. It is believed that but for the fact that the British Admiralty required, for war purposes, vessels which ordinarily would have been used for transporting coal from the Nova Scotia mines, considerably larger amounts of this coal would have been marketed in territory west of Montreal. No doubt increased quantities of coal will be shipped westward into central Canada through the 14-ft. navigation afforded from the sea to the Great Lakes by the present canal system of Canada.

As a result of the efforts of the Fuel Administration in Canada, there have been assembled considerable data not before available relating to the Canadian coal trade. Some of these data have now been incorporated in a valuable report on the coal trade of Canada. Table VI. from this report summarizes the facts respecting the output, importation and consumption of coal in Canada.*

*For several years past attention has been drawn by Mr. White to the relatively limited use that can efficiently be made of electrical energy as a heating agent. On February 11th, 1918, when addressing the important Fuel Conference held by municipalities in Galt (see "Galt Reporter," Februry 12th, 1918), Mr. White again emphasized his contention that, as a general proposition, electrical energy is more serviceably employed for strictly power purposes, while fuel, such as coal, oil, etc., is more profitably employed for heating. At this meeting he set forth the underlying principles governing in this matter. See "Monetary Times," March 1st, 1918, page 18. Consult, also, "Annual Reports of Commission of Conservation," Ottawa; and article by Mr. White, "Electricity will not Replace Coal," in "Industrial Canada," Toronto, April, 1918.

†From "Power Possibilities on the St. Lawrence River," by Arthur V. White, Ottawa, 1918. See, also, by same author, "Long Sault Rapids, St. Lawrence River, an Enquiry Into the Constitutional and Other Aspects of the Project to Develop Power Therefrom." Commission of Conservation, 384 pp. Ottawa, 1913.

*Consult "Report of the Coal Trade of Canada for the Year Ended March 31st, 1918," issued by the Internal Trade Division, Dominion Bureau of Statistics, 8vo., xiv., 59 pp., Ottawa, 1919.