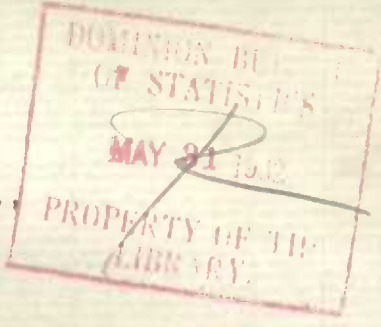


57-D-21

Historical File Copy



Published by Authority of Hon. H.H. Stevens, M.P.,
Minister of Trade and Commerce

DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
TRANSPORTATION AND PUBLIC UTILITIES BRANCH
OTTAWA

Dominion Statistician, R.H. Coats, B.A., F.S.S., (Hon.), F.R.S.C.
Chief, Transportation and Public Utilities Branch, G.S. Wrong, B.Sc.

PRODUCTION AND USE OF ELECTRIC ENERGY IN CANADA

1931

The output of central electric stations during 1931 amounted to 16,610 million kilowatt hours, including an estimate of 218 million kilowatt hours for small stations which do not report monthly. The large stations, generating over 98 per cent of the total of all stations, reported a total output of 16,391,510,000 kilowatt hours; 16,078,613,000 kilowatt hours generated by water power and 312,857,000 kilowatt hours generated by thermal engines.

The pulp and paper mills operate more or less continuously throughout the year and, with the large consumption of off-peak and surplus power used in electric boilers, use considerably more electricity per horse power of equipment than other industries. The motors in the pulp and paper industry operated on power purchased from central electric stations had a rated capacity of 859,017 horse power in 1928 and 993,024 in 1930, having increased by 81 per cent between 1926 and 1930. In 1930 their capacity was 39 per cent of the total of such motors in all manufacturing industries and quite probably the consumption of purchased electric energy was greater than for all other manufacturing industries combined.

The electrification of other industries has also increased and the lighting load, both commercial and domestic, has grown rapidly. Examples of this growth are the consumptions in Toronto, where the domestic lighting consumption increased by 94 per cent between 1925 and 1930 and commercial lighting increased by 72 per cent. The large increases in the commercial lighting and domestic consumptions have been due to better lighting, more advertising by electric signs, and, in the home, to a greater use of electrical appliances such as electric stoves, refrigerators, washing machines, irons, radios, etc. The number of domestic light customers in this city increased only by 27 per cent during these five years, but the average consumption per customer more than doubled. This is more or less typical of the whole country. There is also a considerable quantity of electricity generated by electric railways, manufacturing industries, etc. for their own use, which, for 1930, is computed at 1,374 million kilowatt hours, making the grand total of production by all sources 19,468 million kilowatt hours. There is hardly a hamlet that is not served with electric energy and the service to rural customers is being extended rapidly.

The tendency in the central electric station industry is towards consolidation and interconnection of stations for the sake of economies in operation and also to insure continuous service in the event of breakdowns. In Canada 24 large systems generated 15,662,858,000 kilowatt hours during 1931, which was over 94 per cent of the total for all stations, and the output of the four largest was over 60 per cent of the total. The outputs of these 24 systems are shown in table 5. There were large blocks of power interchanged between systems and consequently these outputs are not the total quantities distributed by each system.

The average daily outputs of the large stations for each month, 1926-1931, have been plotted on page 9 and the trend as indicated by the moving twelve-month average has also been plotted. The trend showed a steady rise from January 1926, reaching the peak in January 1930, and since then has shown a fairly uniform decrease.

During 1931 the export of electricity to the United States amounted to 1,235,325,000 kilowatt hours, or 7.4 per cent of the total output. Of this, 170,755,000 kilowatt hours was surplus power exported by the Hydro Electric Power Commission of Ontario and the Canadian Niagara Power Company from the Niagara plants which was a decrease from the surplus exported in 1930 of 231,536,000 kilowatt hours. The imports were small, amounting to only 5,610,611 kilowatt hours.

1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900

The tables on pages 7 and 8 show the total power employed in Canadian manufacturing industries for 1930. This power is the rated capacity of water wheels and turbines of 668,220 horse power, steam engines and turbines of 799,041 horse power, internal combustion engines of 65,650 horse power and motors operated on power purchased from central electric stations of 2,513,853 horse power, making the total power employed 4,051,744 horse power. The rating of motors operated on power generated by the industries themselves is also shown, which, added to the ratings of the motors operated on purchased power, is the total electric motor power employed. This total electric motor power divided by the total power employed is the percentage of electric power employed. There is a slight error in this computation caused by plants generating their own electric energy having motor capacity greater than the capacity of their prime movers. There is no error in considering such plants as 100 per cent electrified, but the surplus motor capacity affects the ratio of plants of the same industry operating entirely on thermal or hydraulic power. Also, the capacity of motors in a plant using electric drive exclusively is probably somewhat greater than the engine capacity of a similar plant using direct drive and, consequently, the ratios in the last column are affected. The data, however, are relative and show the growth in the use of electric motors in Canadian industries. Similar data for the mining industry are shown on page 8.

The manufacturing industries as a whole show that 74 per cent of the power employed was electric power, as against 72 per cent for 1928 and 69 per cent for 1926, and several industries operated entirely on electric energy, the three large industries being the automobile, bridge and structural steel and coke and gas. Only the industries having large installation of power equipment are shown in the table but there were many other industries for which 90 to 100 per cent of the power employed was electric power and there were also many individual plants operating entirely on electric energy even in industrial groups showing ratios of 90 per cent or lower. A rather significant feature of the tables is the large percentage of electric energy employed in coal mines and gas and oil industries.

The province of Manitoba shows the greatest percentage of equipment driven by electricity with 88 per cent, Ontario was second with 80 per cent and Quebec third with 72 per cent. In respect to power used the pulp and paper industry was the dominant factor in New Brunswick and Quebec, accounting for 53 and 60 per cent, respectively, of the total power equipment in these provinces and for 73 and 63 per cent, respectively, of the electric motors in manufacturing industries. When the pulp and paper industry is deducted the percentage of power equipment driven by electricity for Canada remains unchanged at 74 per cent, but the ratio for Nova Scotia is raised to 52 per cent, for New Brunswick it is lowered to 36 per cent and for Quebec to 67 per cent. For Ontario it is raised to 83 per cent and for British Columbia and the Yukon to 74 per cent, but for Manitoba it is lowered to 84 per cent. Even after deducting the pulp and paper industry Manitoba shows a greater percentage of electrically driven equipment in other manufacturing plants than any of the other provinces. This is due mainly to large quantities of cheap hydro electric power available in Winnipeg.

28/5/32

350

Table 1.

KILOWATT HOURS GENERATED BY PROVINCES

1 9 3 1

Province	:	Water	:	Fuel	:	Total
Prince Edward Island	....	-		3,352,421		3,352,421
Nova Scotia	.....	205,258,676		65,431,442		270,690,118
New Brunswick	.....	372,427,701		52,937,376		425,365,077
Quebec	.....	8,286,706,245		27,400		8,286,733,645
Ontario	.....	4,755,401,352		2,182,100		4,757,583,452
Manitoba	.....	954,598,972		1,354,300		955,953,272
Saskatchewan	.....	165,530,600		133,689,944		299,220,544
Alberta	.....	155,261,560		50,413,518		205,675,078
British Columbia	.....	1,183,467,628		3,468,828		1,186,936,456
TOTAL	.....	16,078,652,734		312,857,329		16,391,510,063

Table 2.

KILOWATT HOURS EXPORTED

1 9 3 1

	Total
Hydro Electric Power Commission of Ontario	366,303,300
" " " " " " (Surplus)	169,152,943
Cedar Rapids Manufacturing & Power Co., Ltd.	389,071,521
Canadian Niagara Company	277,815,131
" " " (Surplus)	1,630,300
Western Power Company	5,700
Ontario and Minnesota Power Company	8,510,400
Maine & New Brunswick Electric Power Company	12,244,594
British Columbia Electric Company	95,057
Northport Power and Light Company	283,797
Maritime Electric Company	289,818
Sherbrooke Railway and Power Company	464,797
Northern B.C. Power Company	57,580
International Railway Company	652,448
Fraser Companies, Ltd.	8,289,000
Detroit and Windsor Subway Company	458,400
TOTAL	1,235,324,786

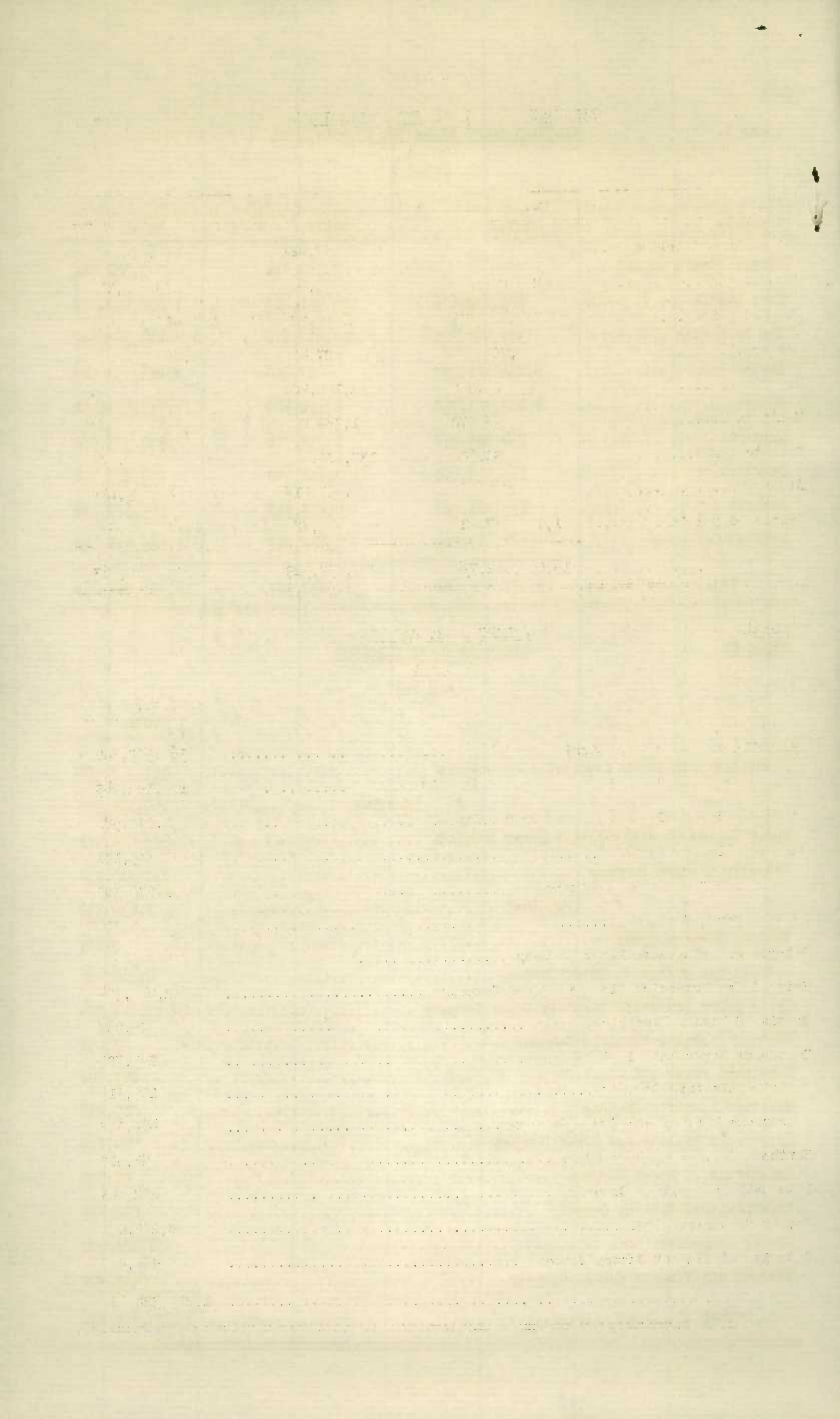


Table 3.

OUTPUT OF LARGE CENTRAL ELECTRIC STATIONS IN CANADA (A) MONTHLY OUTPUT
(Thousands of Kilowatt Hours)

Month	Totals for Canada			Generated by Water Power				Generated by Fuel			Total Exports
	Water	Fuel	Total	Maritime Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	Prairie Provinces	Other Provinces	
<u>1930</u>											
January	1,513,719	41,092	1,554,811	29,448	745,711	549,119	104,698	84,743	23,063	18,029	112,625
February	1,371,215	26,880	1,398,095	28,705	686,957	489,210	82,397	83,946	18,702	8,178	117,176
March	1,491,040	24,425	1,515,465	34,469	741,411	528,404	89,826	96,930	18,222	6,203	126,894
April	1,480,953	21,385	1,502,338	42,968	744,861	509,615	92,601	90,908	16,437	4,948	117,504
May	1,523,521	21,106	1,544,627	44,139	761,327	524,679	100,116	93,260	16,466	4,640	129,138
June	1,414,236	20,375	1,434,611	42,632	709,245	485,791	87,683	88,885	15,801	4,574	136,016
July	1,404,009	21,681	1,425,690	40,667	722,335	460,611	89,169	91,227	16,522	5,159	131,817
August	1,391,054	20,806	1,411,860	41,788	710,842	457,424	84,925	96,075	14,898	5,908	142,571
September	1,419,051	23,910	1,442,961	38,662	704,123	485,151	92,060	99,055	14,882	9,028	153,657
October	1,549,846	24,714	1,574,560	39,480	781,996	521,991	95,005	111,374	16,874	7,840	161,323
November	1,488,175	27,228	1,515,403	41,264	764,490	480,131	92,292	109,998	19,506	7,722	141,587
December	1,513,152	29,156	1,542,308	44,295	764,612	480,442	111,443	112,360	19,748	9,408	149,295
Undistributed corrections ...	- 6,203	- 408	- 6,607	+ 54	- 1,452	- 5,109	+ 786	- 483	+ 16	- 420	.....
TOTAL	17,553,768	302,354	17,856,122	468,572	8,836,458	5,967,459	1,123,001	1,158,278	211,137	91,217	1,619,603
<u>1931</u>											
January	1,456,326	32,395	1,488,721	44,394	735,385	469,438	104,099	103,010	20,187	12,208	162,443
February	1,311,136	27,851	1,338,987	31,097	674,560	422,213	88,481	94,785	17,298	10,553	145,498
March	1,391,982	25,576	1,417,558	34,338	703,708	451,912	95,991	106,033	15,992	9,584	127,985
April	1,388,034	23,056	1,411,090	52,154	717,900	415,482	101,539	100,959	13,360	9,696	97,677
May	1,342,940	22,846	1,365,786	53,433	693,853	394,243	102,640	98,771	12,781	10,065	86,824
June	1,267,869	21,959	1,289,828	52,675	638,719	379,568	101,337	95,570	12,139	9,820	88,602
July	1,230,622	20,700	1,251,322	50,712	620,634	369,294	100,480	89,502	12,297	8,403	95,085
August	1,234,266	21,883	1,256,149	44,924	644,446	352,877	98,119	93,900	12,905	8,978	99,780
September	1,263,412	25,001	1,288,413	46,251	662,400	355,122	102,835	96,804	13,436	11,565	93,288
October	1,400,704	27,638	1,428,342	55,743	736,381	384,065	123,087	101,428	15,332	12,306	95,423
November	1,385,378	29,642	1,415,020	56,725	731,014	373,084	125,867	98,688	18,819	10,823	73,357
December	1,397,876	34,306	1,432,182	55,214	722,508	385,407	130,407	104,340	20,908	13,398	69,362
Undistributed corrections ...	+ 8,107	+ 3	+ 8,110	+ 25	+ 5,196	+ 2,697	+ 510	- 321	+ 3	.....	.....
TOTAL	16,078,653	312,857	16,391,510	577,686	8,286,706	4,755,401	1,275,392	1,183,468	185,457	127,400	1,235,324

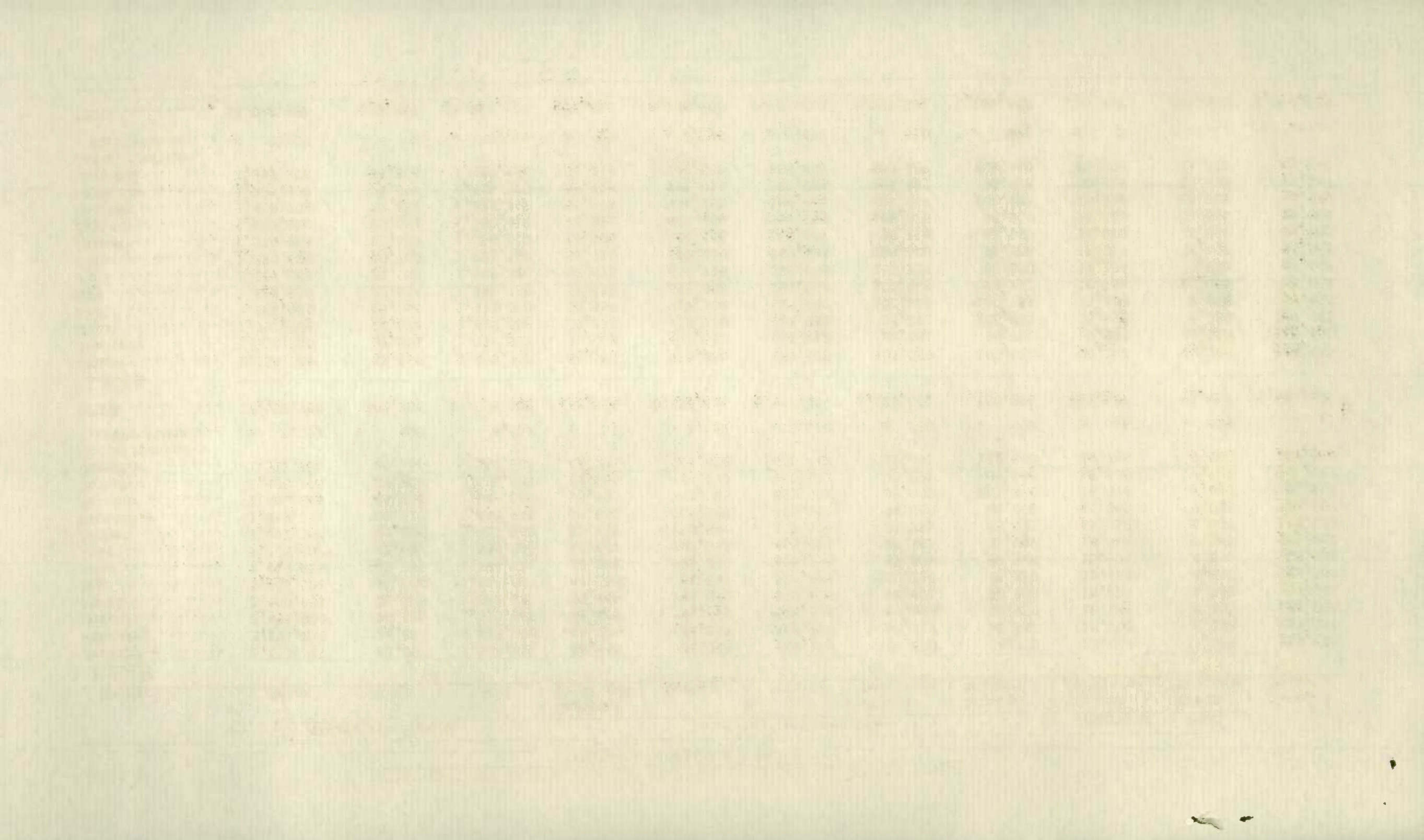


Table 4.

(B) AVERAGE DAILY OUTPUT
(Thousands of Kilowatt Hours)

Month	Totals for Canada			Generated by Water Power					Generated by Fuel		Total Exports
	Water	Fuel	Total	Maritime Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	Prairie Provinces	Other Provinces	
<u>1930</u>											
January	48,829	1,326	50,155	950	24,055	17,713	3,377	2,734	744	582	3,633
February	48,972	960	49,932	1,025	24,534	17,472	2,943	2,998	668	292	4,185
March	48,098	788	48,886	1,112	23,916	17,045	2,898	3,127	588	200	4,093
April	49,365	713	50,078	1,432	24,829	16,987	3,087	3,030	548	165	3,917
May	49,146	681	49,827	1,424	24,559	16,925	3,230	3,008	531	150	4,166
June	47,141	679	47,820	1,422	23,642	16,193	2,922	2,962	527	152	4,534
July	45,291	699	45,990	1,312	23,301	14,858	2,877	2,943	533	166	4,252
August	44,873	671	45,544	1,348	22,930	14,756	2,740	3,099	481	190	4,599
September	47,301	797	48,098	1,288	23,470	16,172	3,069	3,302	496	301	5,122
October	49,995	797	50,792	1,273	25,226	16,838	3,065	3,593	544	253	5,204
November	49,606	908	50,514	1,375	25,483	16,004	3,077	3,667	650	258	4,720
December	48,811	940	49,751	1,429	24,665	15,498	3,595	3,624	637	303	4,816
Undistributed corrections..	- 17	- 1	- 18	.....	- 4	- 14	+ 2	- 1	...	- 1	.....
AVERAGE	48,092	828	48,920	1,284	24,210	16,349	3,076	3,173	579	249	4,437
<u>1931</u>											
January	46,978	1,045	48,023	1,432	23,722	15,143	3,358	3,323	651	394	5,240
February	46,826	995	47,821	1,111	24,091	15,079	3,160	3,385	618	377	5,196
March	44,903	825	45,728	1,108	22,700	14,578	3,096	3,421	516	309	4,129
April	46,268	768	47,036	1,738	23,930	13,849	3,385	3,366	445	323	3,256
May	43,320	737	44,057	1,723	22,382	12,718	3,311	3,186	412	325	2,800
June	42,262	732	42,994	1,756	21,291	12,652	3,378	3,185	405	327	2,953
July	39,698	667	40,365	1,636	20,020	11,913	3,242	2,887	396	271	3,067
August	39,815	706	40,521	1,449	20,789	11,383	3,165	3,029	416	290	3,219
September	42,114	833	42,947	1,542	22,080	11,837	3,428	3,227	448	385	3,110
October	45,184	891	45,980	1,798	23,754	12,389	3,971	3,272	494	397	3,078
November	46,179	988	47,167	1,891	24,367	12,436	4,195	3,290	627	361	2,445
December	45,093	1,106	46,199	1,781	23,307	12,436	4,207	3,366	674	432	2,237
Undistributed corrections..	+ 22	...	+ 22	...	+ 14	+ 8	+ 1	- 1	...	...	...
AVERAGE	44,051	857	44,908	1,583	22,703	13,029	3,494	3,242	508	349	3,384

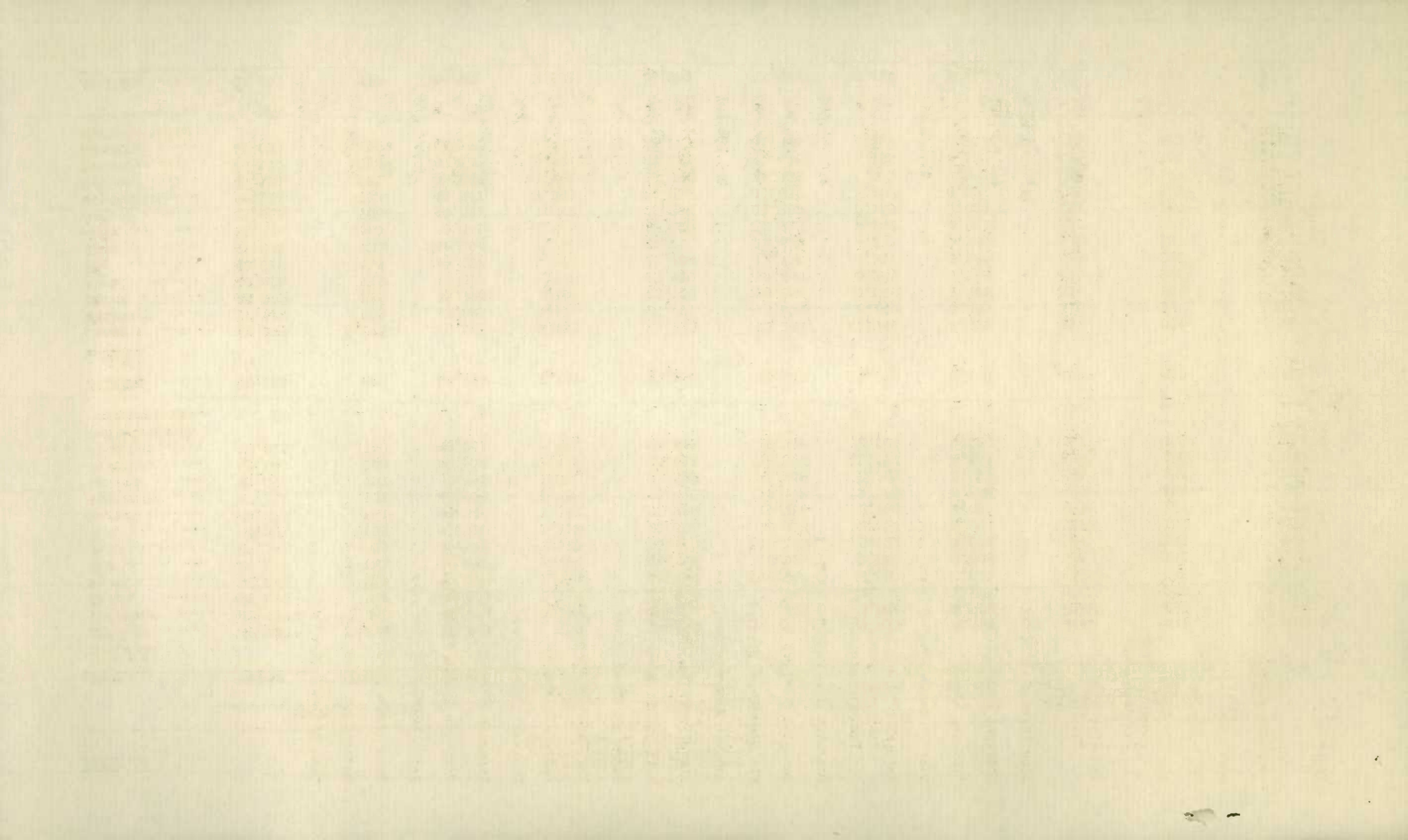


Table 5. OUTPUT OF 24 LARGEST CENTRAL ELECTRIC STATION SYSTEMS
IN CANADA

1 9 3 1

	Kilowatt Hours Generated
Hydro Electric Power Commission of Ontario	3,221,554,455
Shawinigan Water and Power Company	
Quebec Power Company	2,908,315,549
Canadian Light and Power Company	
Canadian Hydro Electric Power Corporation	
St. John River Power Company	2,412,326,862
Dalhousie Mill (Steam)	
Duke Price Power Company	1,518,632,376
Montreal Light, Heat & Power Consolidated	763,929,381
Winnipeg Electric Company and Manitoba Power Company	608,586,000
West Kootenay Power Company	591,772,849
British Columbia Power Corporation	
Vancouver Power Company	490,128,483
Western Power Company	
Canadian Niagara Power Company	482,783,500
Canadian Northern Power Corporation	418,226,810
Winnipeg Hydro Electric System	346,100,772
Abitibi Electric Development Co.,Ltd.	216,296,601
Alcoa Power Co.,Ltd.	206,468,353
Nova Scotia Power Commission	173,924,966
Churchill River Power Co.,Ltd.	165,530,600
The James Maclaren Co.,Ltd.	163,639,575
Calgary Power Co.	154,500,070
Montreal Island Power Co.	146,048,890
Huronian Power Co.	145,018,675
Southern Canada Power Co.	142,910,400
Price Brothers & Co.	136,697,900
Great Lakes Power Co.	88,217,675
Ontario and Minnesota Power Co.	84,930,000
East Kootenay Power Co.	76,317,102
TOTAL	15,662,857,844

Table 6. POWER EQUIPMENT OF MANUFACTURING INDUSTRIES (1)
IN CANADA
1930

INDUSTRIES	Electric Motors Operated				
	Total power employed	By power generated in the industries	By purchased power	Total motor capacity	Electric power. Per cent of total
	H.P.	H.P.	H.P.	H.P.	P. C.
<u>Group 1.- Vegetable Products</u>	313,527	26,404	199,441	225,845	72
Biscuits, confectionery, etc.	20,419	58	17,310	17,378	85
Breweries	22,850	1,950	16,007	17,557	77
Feed mills	36,833	35	8,732	8,767	24
Flour mills	35,031	1,924	48,662	50,592	61
Rubber goods	62,928	1,042	58,961	60,003	95
Sugar refineries	18,078	12,609	4,604	17,213	95
<u>Group 2.- Animal Products</u>	105,873	2,510	74,475	76,985	73
Butter and cheese	26,552	...	18,948	18,948	71
Slaughtering and meat packing	35,214	430	30,369	30,799	86
Leather tanneries	13,578	572	10,724	11,296	83
<u>Group 3.- Textile and Textile Products</u>	171,324	30,720	114,811	145,531	85
Cotton yarn and cloth	76,746	22,331	43,624	66,015	86
Hosiery, knit goods and gloves	16,980	2,513	10,496	13,009	77
Dyeing, cleaning and laundry	15,656	120	10,450	10,570	67
<u>Group 4.- Wood and Paper Products</u>	2,126,515	262,866	1,137,924	1,400,790	66
Furniture	21,398	2,147	11,023	13,175	60
Planing mills, sash & door	49,077	1,552	23,016	29,568	60
Printing and publishing	22,936	25	21,023	21,048	92
Pulp and Paper	1,634,784	207,546	993,024	1,211,570	74
Saw mills	316,176	48,842	27,128	75,970	24
<u>Group 5.- Iron and Its Products</u>	576,609	113,779	399,213	512,992	89
Agricultural implements	25,426	685	19,373	20,053	79
Automobiles	42,379	26,613	20,070	46,703	100
Castings and forgings	62,420	1,280	57,263	58,543	94
Machinery	33,646	4,164	25,932	30,096	89
Primary iron and steel	204,639	65,584	96,471	162,055	79
Railway rolling stock	107,698	6,537	91,234	97,821	91
Bridge and structural steel	23,091	890	22,352	23,242	100
<u>Group 6.- Non-ferrous Metal Products</u>	401,817	20,191	311,899	332,090	83
Brass and copper products	17,645	390	16,932	17,322	93
Electrical apparatus and supplies	77,507	4,661	70,230	74,891	92
Non-ferrous metal smelting	297,802	15,140	215,874	231,014	78
<u>Group 7.- Non-Metallic Mineral Products</u>	213,917	14,925	172,509	187,434	82
Cement	20,909	2,300	73,295	76,095	94
Clay products from domestic clay	29,291	1,302	20,672	21,974	75
Coke and gas products	24,365	6,426	17,630	24,606	100
Petroleum products	30,039	1,740	14,530	16,270	54
<u>Group 8.- Chemicals and Chemical Products</u>	87,332	7,153	61,588	68,741	79
Acids, Alkalies and salts	51,976	6,049	32,471	38,520	74
<u>Group 9.- Miscellaneous Industries</u>	54,820	...	46,993	46,993	86
Ice, artificial	9,948	...	9,493	9,493	95
Shipbuilding and repairs	28,183	...	24,966	24,966	89
<u>Total All Manufacturing Industries (1)</u>	<u>4,051,710</u>	<u>478,548</u>	<u>2,513,853</u>	<u>2,997,401</u>	<u>74</u>

(1) Excluding central electric stations.

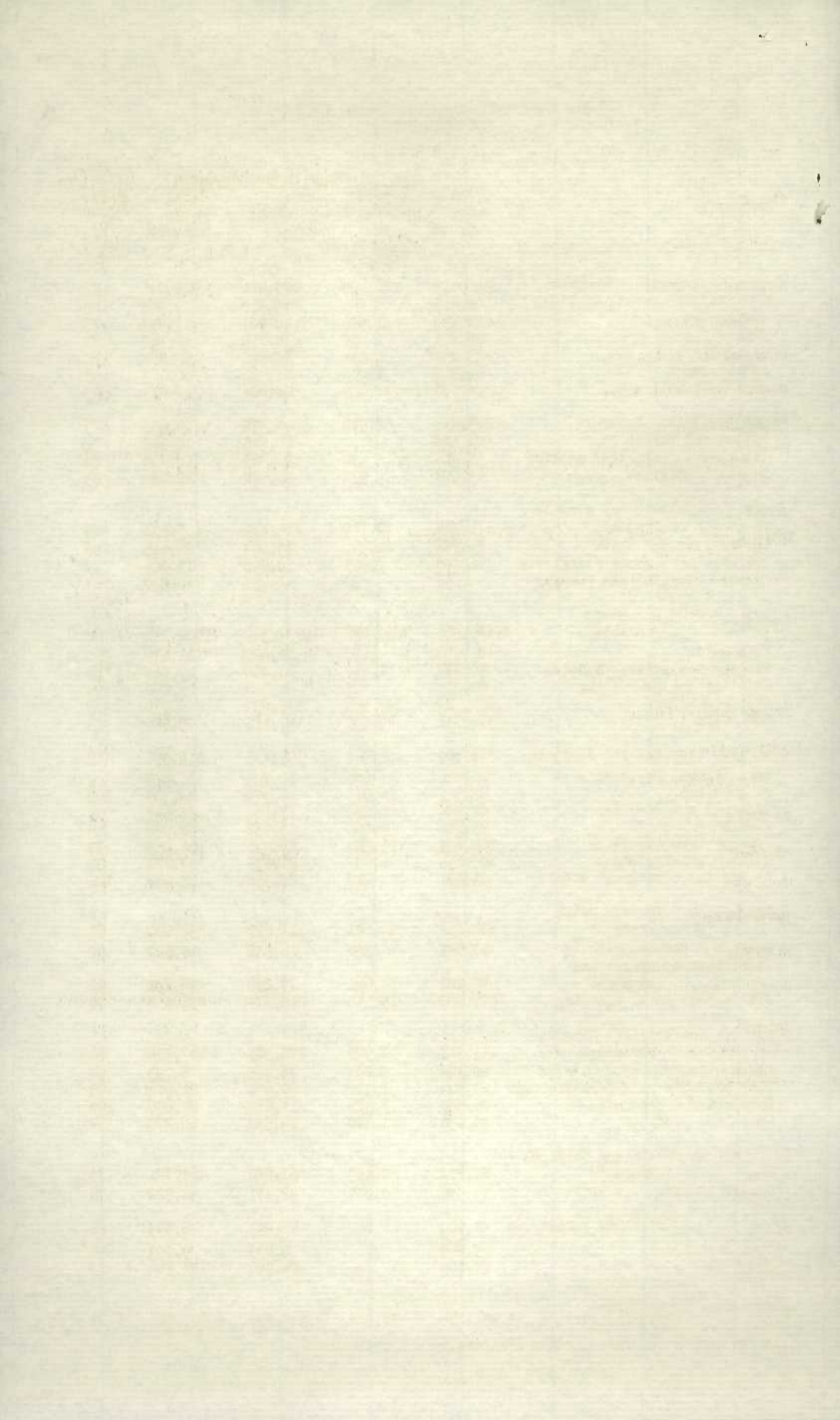


Table 7. POWER EMPLOYED IN THE MINING INDUSTRIES[†] IN CANADA, 1930

INDUSTRIES	: Total : power : H.P.	: Electric Motors Operated			: Electric : power : Per cent : of : total : P.C.
		: By power : generated : in the : industries: H.P.	: By : purchased : power : H.P.	: Total : motor : capacity : H.P.	
Metal mining	244,353	13,284	190,003	203,287	83
Non-metal mining	57,307	1,528	50,176	51,704	90
Sand, gravel and stone	42,847	2,622	28,252	30,874	72
Coal, gas and petroleum	164,500	71,151	29,395	100,546	61
Total Mining [†]	509,007	88,585	297,826	386,411	76

[†] Excluding non-ferrous smelting, salt, cement, clay products and lime.

Table 8. TOTAL POWER EMPLOYED IN MANUFACTURING INDUSTRIES^{*} IN CANADA
1930

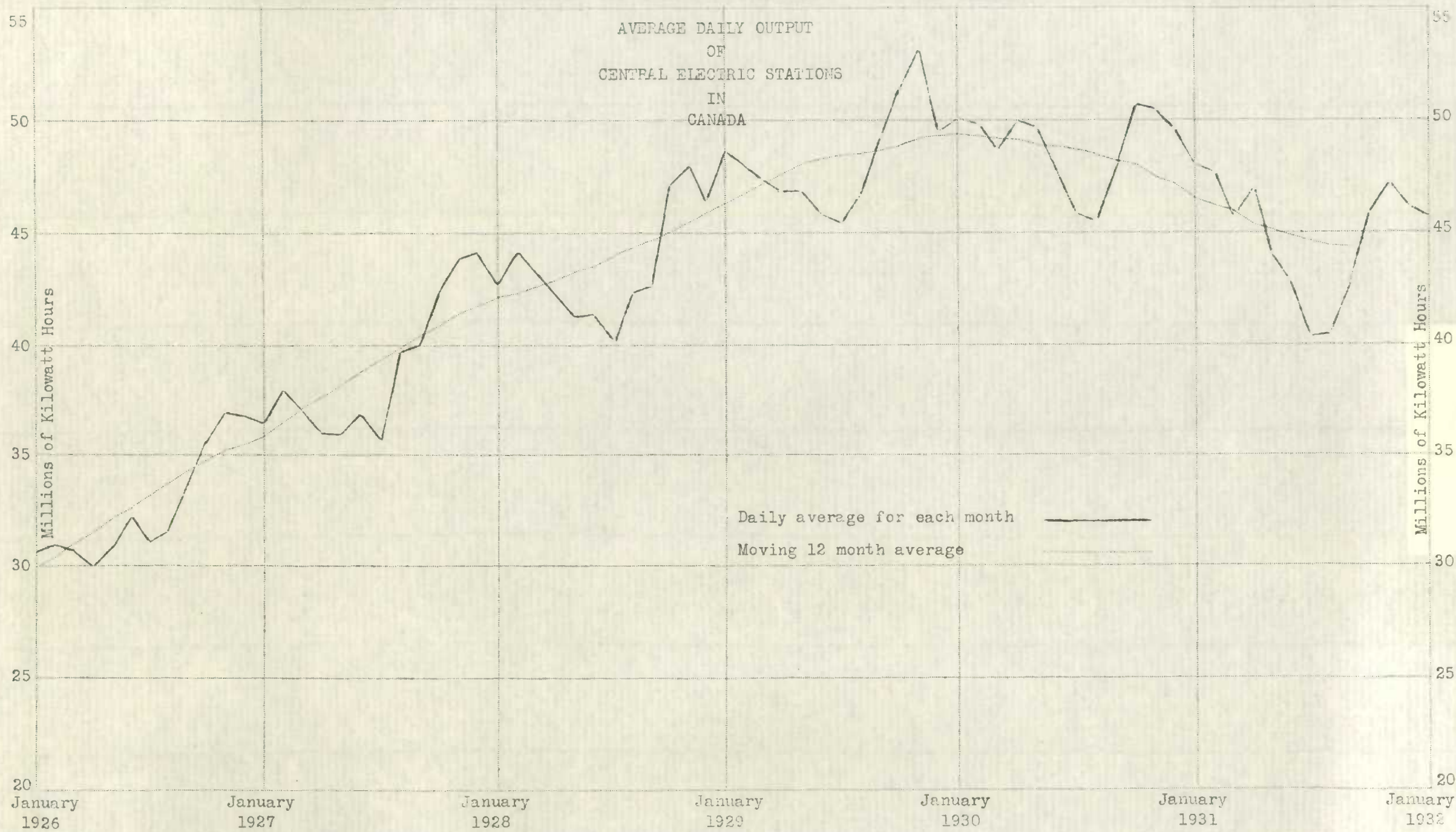
PROVINCE	: Total : power : employed : H.P.	: Electric Motors Operated			: Electric : power : Per cent : of : total : P.C.
		: By power : generated : in the : industries: H.P.	: By : purchased : power : H.P.	: Total : motor : capacity : H.P.	
Prince Edward Island	3,869	400	631	1,031	27
Nova Scotia	168,693	37,873	62,924	100,797	60
New Brunswick	127,337	33,456	47,248	80,704	63
Quebec	1,498,637	56,151	1,026,413	1,082,564	72
Ontario	1,613,214	254,714	1,025,354	1,280,068	80
Manitoba	115,524	582	101,267	101,849	88
Saskatchewan	28,815	89	16,453	16,542	57
Alberta	65,733	3,523	41,884	45,407	69
British Columbia & Yukon	429,922	91,760	196,679	288,439	67
Canada	4,051,744	478,548	2,518,853	2,997,401	74

^{*} Excluding central electric stations.

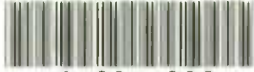
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200

201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300



STATISTICS CANADA LIBRARY
BIBLIOTHEQUE STATISTIQUE CANADA



1010311038

c.1