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USE OF ELECTRIC POWER
IN
MANUFACTURING AND MINING INDUSTRIES
IN
CANADA
1944



OTTAWA
1947

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MANUFACTURING AND MINING INDUSTRIES

20-1920

IN CANADA

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This report has attempted to show the evolution of power machinery in manufacturing and mining industries in Canada toward electric drive and particularly toward electric motors driven by power generated in central stations. With no coal mined in the chief manufacturing provinces of Ontario and Quebec and with a large supply of water power within economic transmission distances of manufacturing and mining centres in these and in most of the other provinces, this trend has been more pronounced than in many countries. The trend has been measured by the ratio of electric motor capacity to total power equipment installed in these industries, the central electric station industry being excluded as one of the manufacturing industries.

This ratio of electric motor rating to total power equipment indicates this evolution, but the movement towards electric drive is slightly exaggerated because of the practice in mills, factories, etc., of installing motors at each machine or group of machines with a total capacity greater than would be necessary if only one large motor were used or if a steam engine and belts and shafting were used. Also there are some industries which require steam in their manufacturing processes, and consequently use steam engines as their primary power equipment. Some of these are a hundred per cent electrified and some are not. Other industries use direct hydraulic drive such as ground wood pulp mills. In such industries it is probable that electric motors will never supplant other forms of power equipment.

In the early annual industrial censuses no segregation was made of electric motors operated on power purchased from central electric stations and on power produced within the establishment making the report. Consequently, 1923 is the first year for which total power employed can be compiled without duplication.

During the twenty-one years from 1923 to 1944 there has been a steady increase in total capacity of power equipment in manufacturing and mining industries and electric motors driven by central station power, which constitute 69 per cent of the total power capacity, increased by 376 per cent. The capacity of water wheels increased only 27 per cent, the majority of new installations being in central electric stations. Steam engines also showed a relatively small increase compared to the total and although internal combustion

engines increased in capacity by 61.8 per cent, they still constitute only 5 per cent of the total capacity. These include both diesel or compression ignition engines and electric ignition engines, the latter having approximately twice the capacity of the former.

Electric motors driven by current generated in the manufacturing industries showed a small increase in 1944 from the 1943 capacity and also in the mining industries.

The following table shows the rated capacity in horse power of all power equipment in manufacturing and mining industries in 1923 and 1944. These include equipment in regular use and idle equipment in operating industries.

	Capacity (Horse Power)		Increase	
	1923	1944	H. P.	P. C.
<u>Manufacturing Industries</u>				
Water Wheels	587,191	729,216	142,025	24
Steam Engines	554,191	1,013,615	459,424	83
Internal Combustion Engines	46,829	288,312	241,483	516
Total	1,188,211	2,031,143	842,932	71
Electric Motors on Purchased Power	958,692	4,437,236	3,478,604	363
Total Power	2,146,903	6,468,439	4,321,536	201
Electric Motors on Power Generated in the Industries ...	357,136	779,717	422,581	118
Total Electric Motors	1,315,828	5,217,013	3,901,185	296
<u>Mining Industries</u>				
Water Wheels	27,528	50,634	23,106	84
Steam Engines	148,039	139,437	- 8,602	- 6
Internal Combustion Engines	6,914	97,462	90,548	1,310
Total	182,481	287,533	105,052	57
Electric Motors on Purchased Power	118,835	687,652	568,817	479
Total Power	301,316	975,185	673,869	224
Electric Motors on Power Generated in the Industries ...	53,860	86,558	32,698	61
Total Electric Motors	172,695	774,210	601,515	348
<u>Manufacturing and Mining Industries</u>				
Water Wheels	614,719	779,850	165,131	27
Steam Engines	702,230	1,153,052	450,822	64
Internal Combustion Engines	53,743	385,774	332,031	618
Total	1,370,692	2,318,676	947,984	69
Electric Motors on Purchased Power	1,077,527	5,124,948	4,047,421	376
Total Power	2,448,219	7,443,624	4,995,405	204
Electric Motors on Power Generated in the Industries ...	410,996	866,275	455,279	111
Total Electric Motors	1,488,523	5,991,223	4,502,700	302

The ratio of electric motor capacity to total power employed in manufacturing industries has increased fairly steadily, the few recessions being less than one point up to 1943 when the decline was from 81.7 to 80.7 per cent. Commencing with 1955 reports data were gathered on spare or idle equipment. For each of the years 1935-1944 the percentage of total equipment not in regular use was approximately the same, around six per cent. The equipment in regular use is more informative than total figures and when data for several years are available these tables will be compiled on the basis of equipment in regular use. In the meantime, comparisons are possible only for total equipment in the operating plants. Although equipment in idle plants might be considered as idle or spare equipment in the industry or group of industries, it is not included in these tables as reports are received only from plants in operation during the year. With increased business the idle equipment might be expected to decline in both total capacity and as a percentage of the total, but this has not occurred. In 1935 idle equipment in the manufacturing industry had a total capacity of 255,347 h.p. or 5.9 per cent of the total capacity, whereas in 1944 the capacity was 434,217 or 6.7 per cent of the total. Apparently a certain amount of reserve equipment is required in various industries.

Table 3 indicates that while the transfer to electric drive from other forms of power has been taking place in all groups of industries, many of them were highly electrified in 1923.

The power employed in the pulp and paper industry is by far the greatest of any industry, constituting 35 per cent of the total for all manufacturing industries in 1923 and 33 per cent in 1944.

In previous years the consumption of electricity by the pulp and paper mills was an even larger percentage of the total consumption, but with the increasing requirement of primary power for the aluminium industry and other electro-metallurgical and electro-chemical industries the pulp and paper's percentage dropped from 39.8 in 1941 to 27 in 1943. This was due to the increased consumption of electricity by other industries and also by the transfer from electric boilers to fuel boilers by the pulp and paper mills; in 1939 these mills purchased 5,152,790,000 kw. hrs. for their boilers, whereas in 1944 the energy purchased for this purpose decreased to 1,647,917,000 kw. hrs. The consumption for all purposes by the non-ferrous metal, smelting and refining group, which includes the aluminium industry, increased from 3,492,822,000 kw. hrs. in 1939 to 10,885,916,000 kw. hrs., an amount 31 per cent above that consumed by the pulp and paper industry, and this does not include the fabricating plants of the aluminium industry.

Table 4 shows the power equipment in regular use in manufacturing plants operating during 1944. The data in this table differ from those shown in reports prior to 1936 in that idle equipment is excluded here except for the group totals where totals both including and excluding idle equipment are shown. Under each group are shown only the industries having large power installations. Many other industries not listed use electric drive almost exclusively. The consumption of electricity is also shown for each industry listed. This is broken down into "purchased from central stations" and "generated by the industries." The former is also divided between that used for lighting and power purposes and for other purposes, which includes electricity used in electric furnaces, electric boilers, electro-chemical processes, etc. Electric boilers, particularly in pulp and paper mills, took the major portion of this class of electricity in years prior to 1940, and in most cases it was surplus or off-peak power that was purchased for this purpose. The total consumption for these other purposes in 1944 was 14,929,905,000 kw.hrs. of purchased power, or 58 per cent of the total quantity purchased. A portion of the power generated in the industries also is used for other

than lighting and driving machines but a comprehensive breakdown is not available.

The mining industries are practically as highly electrified as the manufacturing industries, the ratio increasing from 57.3 p.c. in 1923 to 79.4 p.c. in 1944. Data for the mining industries are shown in Tables 2 & 7.

The fuels group showed an increase in capacity of motors operated on purchased power from 10,035 h.p. in 1923 to 125,796 h.p. in 1944 as compared with a decrease from 37,308 to 24,316 h.p. in motors operated by power generated by the coal mines and gas and oil wells. These industries apparently have found it more economical to purchase electricity than produce it themselves and also more advantageous than to use steam engines.

Table 8 brings together, by groups of manufacturing industries, the number of employees on salaries and on wages, and the h.p. ratings of all power equipment, including both active and idle, and from these data the average horse power of power equipment per employee have been computed.

The rising averages up to 1939 indicate in a general way a substitution of mechanical power for manpower or, in other words, they indicate an increasing productive capacity per employees. The number of employees fluctuate more quickly than installed power equipment capacities. Thus the reduction of employees in 1933 did not have a corresponding reduction in power equipment and consequently the average horse power per employee showed an increase out of line with the trend.

The downward trend of these averages during the war years was undoubtedly due to the increased employment of night shifts resulting in a greater use per day of the power equipment. This is indicated by an increased consumption of electricity for power and lighting per horse power of electric motors of 24 per cent and with the pulp and paper industry excluded the increase was 31 per cent; the pulp and paper industries use enormous quantities of electricity, much more than any other industry. On an employee basis most of the industries consumed slightly less electricity which was to be expected. Again excluding the pulp and paper industry the decrease per employee was only approximately 2 per cent.

Table 1 POWER EQUIPMENT OF ALL MANUFACTURING INDUSTRIES IN CANADA

S U M M A R Y					
Year	Total Power Employed	Electric Motors Operated			Electric Power Per Cent of Total
		By Central Electric Stn. Power	By Power generated in the Industries	Total Motor Capacity	
	H.P.	H.P.	H.P.	H.P.	P.C.
1923	2,146,903	958,692	357,136	1,315,828	61.3
1929	3,367,079	2,393,684	496,036	2,889,720	74.7
1931	4,114,677	2,587,411	539,800	3,127,211	76.0
1933	4,147,831	2,671,440	502,706	3,174,147	76.5
1935	4,346,775	2,874,693	512,396	3,387,089	77.9
1937	4,712,279	3,129,790	602,955	3,732,745	79.2
1939	5,056,357	3,375,169	694,450	4,069,619	80.5
1940	5,290,935	3,563,048	724,769	4,287,817	81.1
1941	5,850,076	4,028,942	740,112	4,769,054	81.6
1942	5,969,895	4,076,277	800,917	4,877,194	81.7
1943	6,415,851	4,420,105	760,630	x 5,180,735	80.7
1944	6,468,439	4,437,296	779,717	5,217,013	80.7

x Excluding central electric stations and including idle and reserve equipment.

x - Revised.

POWER EMPLOYED IN THE MINING INDUSTRY IN CANADA

Table 2

Year	Total Power Employed	Electric Motors			Electric Power P.C. of Total
		Operated by Central Electric Station Power	Operated by Power Generated in the Industry	Total Motor Capacity	
	H.P.	H.P.	H.P.	H.P.	P.C.
1923	301,316	118,835	53,860	172,695	57.3
1924	314,173	125,725	71,376	197,101	62.7
1925	323,862	147,191	64,126	211,317	65.2
1926	336,880	167,241	64,277	231,518	68.7
1927	380,460	202,702	62,067	264,769	69.6
1928	419,464	223,666	68,121	291,787	69.6
1929	450,261	238,974	75,068	314,043	69.7
1930	509,007	297,826	88,585	386,411	75.9
1931	520,638	313,567	79,259	392,826	75.5
1932	482,344	287,130	76,626	363,756	75.4
1933	533,779	322,361	47,407	369,768	69.5
1934	621,072	400,035	66,647	466,682	75.1
1935	688,470	446,247	74,687	520,934	75.7
1936	724,639	474,000	79,140	553,140	76.5
1937	850,489	577,703	101,526	678,229	79.7
1938	874,943	582,510	89,368	671,878	76.8
1939	1,015,200	712,311	101,740	814,051	80.2
1940	1,061,840	746,777	101,606	848,383	79.9
1941	1,113,042	749,126	106,501	855,627	76.9
1942	1,008,777	672,097	118,748	790,845	78.4
1943	988,457	695,109	105,436	800,545	81.0
1944	975,185	687,652	86,558	774,210	79.4

/ Excluding non-ferrous smelting, salt, cement clay products and lime, included with "Manufacturing".

Table 3

SUMMARY OF POWER EMPLOYED IN MANUFACTURING INDUSTRIES
(Including Idle and Reserve Equipment)

Manufacturing Industries	1923		1942		1943		1944	
	Power		Power		Power		Power	
	Total H.P.	Per cent Electric Motor	Total H.P.	Per cent Electric Motor	Total H.P.	Per cent Electric Motor	Total H.P.	Per cent Electric Motor
1. Vegetable Products	257,176	65	405,076	79	414,953	80	508,073	74
2. Animal Products	80,895	72	165,682	84	179,322	79	189,159	88
3. Textile Products	107,850	83	258,679	91	266,854	92	277,304	91
4. Wood & Paper Products	1,140,571	50	2,742,314	73	2,766,491	72	2,845,242	73
5. Iron and its "	213,705	89	1,056,870	95	1,209,202	91	1,260,802	91
6. Non-ferrous Metal "	99,963	47	656,415	90	701,970	89	656,664	90
7. Non-metallic Mineral Products	131,780	83	289,332	83	314,221	80	316,177	80
8. Chemical & Allied "	62,447	72	354,314	92	525,762	85	377,448	91
9. Miscellaneous	46,516	86	32,107	98	57,096	98	37,570	98
TOTAL	2,146,903	61	5,969,895	82	6,415,851	81	6,468,439	81

Table 4

POWER EQUIPMENT OF MANUFACTURING INDUSTRIES IN CANADA, 1944
(Equipment in Regular Use)

	Total Power Employed	Electric Motors Operated			Electric Power Per Cent of Total	Consumption of Electricity			
		By Central Electric Station Power	By Power Generated in the Industries	Total Motor Capacity		Purchased from Central Electric Stations for		Generated by the Industries	Total Consumption
						Power and Lighting	Other Purposes		
	A H.P.	B H.P.	C H.P.	D H.P.	E P.C.	F	G (Thousands of Kilowatt Hours)	H	I
GROUP 1. VEGETABLE PRODUCTS x	508,073	325,186	52,949	378,135	74.4				
	482,048	308,634	48,767	357,401	74.1	491,989	851	75,511	568,351
Biscuits, confectionery, etc.	24,308	22,268	341	22,609	93.0	29,444	6	-	29,450
Bread and bakery products	19,535	18,126	4	18,130	93.0	37,286	43	-	37,329
Breweries	26,249	21,605	559	22,164	84.4	35,563	90	-	35,653
Flour and feed mills	121,692	68,283	1,496	69,779	57.3	109,533	7	1,187	110,727
Fruit and vegetable preparations	29,705	18,845	906	19,751	66.5	18,442	44	81	18,567
Rubber goods, footwear, etc.	153,477	81,148	19,151	100,299	65.4	135,725	586	55,721	192,034
Sugar refineries	22,599	8,877	18,180	27,057	119.7	9,947	-	17,616	27,563
GROUP 2. ANIMAL PRODUCTS x	189,159	146,869	3,616	150,485	79.4				
	177,592	140,321	5,515	143,836	80.9	249,014	40,140	4,729	293,883
Butter and cheese	48,585	37,631	60	37,691	77.5	48,996	46	-	49,042
Fish curing and packing	22,981	8,405	1,897	10,302	44.8	11,160	2,420	2,536	16,116
Leather tanneries	17,519	15,008	623	15,631	89.2	20,447	-	-	20,447
Slaughtering and meat packing	57,353	52,757	122	52,879	92.2	122,967	37,289	-	160,256
GROUP 3. TEXTILES AND TEXTILE PRODUCTS x	277,304	220,277	30,984	251,261	90.6				
	257,402	207,564	29,316	236,880	92.0	457,905	15,679	84,899	558,483
Cotton yarn and cloth	107,893	88,302	10,901	99,203	91.9	208,032	10,289	43,204	261,525
Hosiery and knitted goods	21,552	14,003	4,102	18,105	84.0	20,642	7	4,433	31,082
Silk and artificial silk	38,137	28,232	8,140	36,372	95.4	102,554	5,372	26,493	134,419
Woollen cloth goods	18,557	16,504	465	16,969	91.4	28,752	-	1,142	29,894
GROUP 4. WOOD & PAPER PRODUCTS x	2,845,242	1,557,565	509,685	2,067,250	72.7				
	2,691,107	1,489,233	485,052	1,974,285	73.4	4,935,071	1,649,217	1,932,761	8,517,049
Furniture	29,144	20,557	3,557	24,114	82.7	19,101	105	3,589	22,795
Planing mills, sash and door	57,972	34,235	3,039	37,274	64.3	25,543	300	2,838	28,681
Printing and publishing	28,050	27,482	799	28,281	100.9	36,259	619	156	37,034
Pulp and paper	1,990,807	1,260,490	401,778	1,662,268	83.5	4,689,472	1,647,917	1,851,288	8,168,677
Saw mills	459,341	50,455	66,234	116,689	25.4	44,027	85	82,439	126,551

<u>GROUP 5. IRON AND ITS PRODUCTS</u> x	1,260,802	1,021,881	123,562	1,145,443	90.9				
	1,167,371	977,066	120,888	1,097,954	94.1	1,449,340	1,188,770	246,257	2,884,367
Agricultural implements	29,474	26,854	-	26,854	91.0	48,396	-	-	48,396
Aircraft	39,437	38,329	-	38,329	97.2	130,311	2,109	-	132,420
Automobiles	64,130	19,222	37,910	57,132	89.1	31,792	-	84,526	116,318
Automobile supplies	67,253	66,739	-	66,739	99.2	112,224	26,558	-	138,782
Bridge and structural steel	35,213	32,046	-	32,046	91.0	55,115	-	-	35,115
Castings, iron	57,705	55,784	1,125	56,909	98.6	72,605	470	150	73,225
Iron and steel products	126,958	124,614	94	124,708	98.2	164,112	144	-	164,256
Machinery	77,919	73,694	5,350	79,044	101.4	64,289	32	-	64,321
Primary iron and steel	290,211	208,888	54,474	263,362	90.7	314,080	1,149,228	141,285	1,604,593
Railway rolling stock	122,788	105,845	9,744	115,589	94.1	128,309	2,540	15,368	144,217
Shipbuilding and repairs	117,196	93,498	3,496	96,994	82.8	146,273	-	93	146,366
<u>GROUP 6. NON-FERROUS METAL PRODUCTS</u> x	656,664	567,754	22,651	590,405	89.9				
	600,831	520,647	19,894	540,541	90.0	1,238,352	9,588,942	271,680	11,098,974
Aluminium products	37,835	37,615	-	37,615	99.4	41,078	61,085	-	102,163
Brass and copper products	75,926	75,426	-	75,426	99.3	81,581	70,453	-	152,034
Electrical apparatus and supplies	98,287	86,227	13,602	99,829	101.6	124,826	3,751	13,923	142,500
Non-ferrous smelting and refining	374,556	307,159	6,292	313,451	83.7	974,507	9,453,652	257,757	10,685,916
<u>GROUP 7. NON-METALLIC MINERAL PRODUCTS</u> x	316,177	244,311	9,488	253,799	80.3				
	276,788	216,553	8,906	225,459	81.5	429,720	1,035,688	17,353	1,482,761
Abrasive products	13,446	13,396	-	13,396	99.6	20,229	784,486	-	804,715
Cement	73,780	77,304	1,193	78,497	98.4	137,259	-	-	137,259
Clay products - domestic clay	18,306	11,938	234	12,172	66.5	15,318	100	-	13,418
Coke and gas products	29,919	18,917	3,945	22,862	76.4	51,709	12,428	9,118	73,255
Petroleum products	70,631	36,767	279	37,046	52.5	101,135	-	381	101,516
<u>GROUP 8. CHEMICALS AND CHEMICAL PRODUCTS</u> x	377,448	319,430	23,856	343,286	90.9				
	345,891	295,118	22,721	317,839	91.9	1,524,323	1,410,597	118,935	3,053,855
Acids, alkalies and salts	156,765	126,584	12,085	138,669	88.5	644,804	1,386,289	108,658	2,139,751
Fertilizers	30,378	30,228	-	30,228	99.5	611,431	-	-	611,431
<u>GROUP 9. MISCELLANEOUS INDUSTRIES</u> x	37,570	34,023	2,926	36,949	98.3				
	35,192	32,934	2,469	35,403	100.6	71,620	41	-	71,661
Artificial ice	11,950	11,900	604	12,504	104.6	39,626	-	-	39,626
<u>TOTAL ALL INDUSTRIES - 1944</u> x	6,468,439	4,437,296	779,717	5,217,013	80.6				
	6,034,222	4,188,070	741,528	4,929,598	81.7	10,847,334	14,929,905	2,752,125	28,529,364
<u>1943</u> x	6,415,851	4,420,105	760,630	5,180,735	80.7				
	6,009,521	4,196,534	715,377	4,911,911	81.7	10,495,523	15,904,207	3,211,609	29,611,339

x - Including equipment idle or reserve. These totals are comparable with data in reports prior to 1936.

Table 5

POWER EMPLOYED IN MANUFACTURING INDUSTRIES, BY PROVINCES, 1944
(In Regular Use)

Provinces	Total Power Employed	Electric Motors Operated			Electric Power Per Cent of Total	Consumption of Electricity			
		By Central Electric Station Power	By Power Generated in the Industries	Total Motor Capacity		Purchased from Central Electric Stations		Generated by the Industries	Total
						For Power and Lighting	For Other Purposes		
	H.P.	H.P.	H.P.	H.P.	P.C.	(Thousands of kilowatt hours)			
Prince Edward Island	4,441	1,021	-	1,021	23.0	935	-	-	935
Nova Scotia	183,369	88,619	64,456	153,075	83.5	208,754	1,544	115,375	325,673
New Brunswick	225,448	123,548	52,429	175,977	78.1	352,784	10,882	204,128	567,794
Quebec	2,147,944	1,586,579	166,032	1,752,611	81.6	13,145,294	2,433,453	1,011,555	16,590,302
Ontario	2,527,768	1,850,290	297,267	2,147,557	85.0	4,149,062	2,805,219	1,005,286	7,959,567
Manitoba	163,312	137,716	5,171	142,887	87.5	341,573	215,055	8,631	565,259
Saskatchewan	77,383	42,814	269	43,083	55.7	267,356	15	-	267,371
Alberta	133,715	87,010	5,551	92,561	69.2	235,825	26	5,803	241,654
British Columbia	570,305	270,465	150,353	420,818	73.8	1,599,382	10,057	401,346	2,010,785
Yukon & N.W. Territories	517	8	-	8	15.5	16	-	-	16
Total	6,034,222	4,188,070	741,528	4,929,598	81.7	20,300,981	5,476,251	2,752,124	28,529,356
<u>Including Idle and Reserve Equipment</u>									
Prince Edward Island	4,874	1,162	-	1,162	23.8				
Nova Scotia	193,060	91,980	65,400	157,380	81.5				
New Brunswick	255,262	130,426	56,847	187,273	73.4				
Quebec	2,288,183	1,686,492	176,475	1,862,967	81.4				
Ontario	2,715,516	1,948,635	315,975	2,264,610	83.4				
Manitoba	171,022	144,078	5,773	149,851	87.6				
Saskatchewan	85,347	45,118	304	45,422	53.2				
Alberta	145,461	94,170	6,150	100,320	69.0				
British Columbia	609,097	295,225	152,793	448,018	73.6				
Yukon & N.W. Territories	617	10	-	10	1.6				
Total	6,468,439	4,437,296	773,717	5,217,013	80.7				

Table 6

POWER EQUIPMENT - IN REGULAR USE AND INCLUDING IDLE AND RESERVE EQUIPMENT, 1944

MANUFACTURING INDUSTRIES

Industry	TOTAL POWER EMPLOYED		ELECTRIC MOTORS OPERATED BY						ELECTRIC POWER		CONSUMPTION OF ELECTRICITY			
	In Regular Use	Incl. Idle & Reserve Equipment	Central Station Power		Power Generated in the Industries		Total		Per Cent of Total		Purchased from Central Electric Stations		Generated by the Industries	Total
			In Regular Use	Incl. Idle & Reserve	In Regular Use	Incl. Idle & Reserve	In Regular Use	Incl. Idle & Reserve	In Regular Use	Incl. Idle & Reserve	For Power & Lighting	For Other Purposes		
	A H.P.	B H.P.	C H.P.	D H.P.	E H.P.	F H.P.	G H.P.	H H.P.	I P.C.	J P.C.	L (Thousands of Kilowatt Hours)		M	N
1. Vegetable Products	482,048	508,073	308,634	325,186	48,767	52,949	357,401	378,135	74.1	74.4	491,989	851	75,511	568,551
2. Animal Products	177,592	189,159	140,321	146,869	3,515	3,616	143,836	150,485	80.9	79.5	249,014	40,140	4,729	293,865
3. Textiles and Textile Products	257,402	277,304	207,564	220,277	29,316	30,984	236,880	251,261	92.0	90.6	457,905	15,679	84,899	558,483
4. Wood & Paper "	2,691,107	2,845,242	1,489,233	1,557,565	485,052	509,685	1,974,285	2,067,250	73.4	72.7	4,935,071	1,649,217	1,952,761	8,517,049
5. Iron and its "	1,167,371	1,260,802	977,066	1,021,861	120,888	123,562	1,097,954	1,145,443	94.1	90.9	1,449,340	1,188,770	246,257	2,884,567
6. Non-ferrous Metal Products	600,831	656,664	520,647	567,754	19,894	22,651	540,541	590,405	90.0	89.9	1,238,352	9,588,942	271,680	11,098,974
7. Non-metallic Mineral Products	276,788	316,177	216,553	244,311	8,906	9,488	225,459	253,799	81.5	80.3	429,720	1,035,688	17,353	1,482,761
8. Chemicals and Chemical Products	345,891	377,448	295,118	319,430	22,721	23,856	317,639	343,286	91.9	90.9	1,524,323	1,410,597	118,935	3,053,855
9. Miscellaneous Industries	35,192	37,570	32,934	34,023	2,469	-	35,403	36,949	100.6	98.3	71,620	41	-	71,661
Total - 1944	6,034,222	6,468,439	4,188,070	4,437,296	741,528	779,717	4,929,598	5,217,013	81.7	80.7	10,847,334	14,929,905	2,752,125	28,529,564
1943	6,009,521	6,415,851	4,196,534	4,420,105	715,377	760,630	4,911,911	5,180,735	81.7	80.7	10,495,523	15,904,207	3,211,609	29,611,339
Per cent change	+ 4.1	+ 8.2	- 2.0	+ 3.9	+ 3.7	+ 4.5	+ 3.6	+ 9.9			+ 3.3	- 6.1	- 14.3	- 3.7

Table 7

MINING INDUSTRIES

Metal Mining	491,173	555,736	417,158	456,017	47,405	55,762	464,563	511,779	98.6	92.1	1,964,558	-	145,886	2,110,444
Non-metal Mining	90,686	99,061	69,205	73,878	3,645	4,280	72,850	78,158	80.3	78.9	164,162	-	10,547	174,709
Sand, Gravel & Stone	49,253	55,382	27,686	31,961	2,200	2,200	29,886	34,161	60.7	61.7	24,687	-	444	25,131
Fuels	248,147	265,006	121,154	125,796	23,564	24,316	144,718	150,112	58.3	56.6	167,821	-	53,677	221,498
Total - 1944	879,259	975,185	635,203	687,652	76,814	86,558	712,017	774,210	81.0	79.4	2,321,228	-	210,554	2,531,782
1943	891,303	988,457	647,358	695,109	80,802	105,433	728,160	800,545	81.7	81.0	1,638,661	7,408	248,848	1,894,917
Per cent change	- 1.4	- 1.3	- 1.3	- 1.1	- 4.9	- 1.8	- 2.2	- 3.3			+ 4.2	-	- 1.5	+ 3.4

Totals Tables 6 & 7

MANUFACTURING AND MINING INDUSTRIES

1944	6,913,481	7,443,624	4,823,273	5,124,948	818,342	866,275	5,641,615	5,991,223	81.6	80.5	13,168,562	14,929,905	2,962,679	31,061,146
1943	6,900,824	7,404,308	4,843,802	5,115,214	796,179	866,066	5,640,071	5,981,280	81.7	80.6	12,134,184	15,911,615	3,460,457	31,506,256
Per cent change	+ 1.8	+ 5.3	- 4.3	+ 1.9	+ 2.3	- 1.8	+ 2.7	+ 4.2			+ 8.5	- 6.2	- 14.4	- 1.4

MANUFACTURING INDUSTRIES

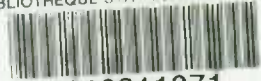
Table 8

TOTAL POWER EQUIPMENT - TOTAL EMPLOYEES

Average Horse power per Employee

	1923	1929	1931	1933	1935	1937	1939	1940	1941	1942	1943	1944
<u>Power Employed - H. P.</u>												
1. Vegetable Products	257,176	326,346	322,401	326,666	331,361	347,002	364,195	376,319	402,441	405,076	414,953	508,075
2. Animal "	80,895	101,268	98,892	112,035	122,560	133,647	145,931	151,321	163,917	165,682	179,322	189,159
3. Textiles & Textile "	107,850	168,614	186,952	215,907	240,549	211,729	234,597	246,054	251,916	258,679	266,854	277,304
4. Wood & Paper "	1,146,571	2,022,839	2,126,398	2,035,112	2,160,083	2,420,436	2,579,463	2,677,502	2,772,081	2,742,314	2,766,491	2,845,242
5. Iron and its "	213,705	529,162	589,261	626,730	660,491	719,265	730,594	763,195	963,548	1,056,870	1,209,202	1,260,802
6. Non-ferrous Metal "	99,963	351,752	424,738	434,581	416,927	472,031	549,120	598,106	673,480	656,415	701,970	656,664
7. Non-metallic Mineral Products	131,780	210,804	212,179	219,612	222,555	239,898	257,731	270,534	285,820	289,332	314,221	316,177
8. Chemicals & Allied "	62,447	83,935	96,893	110,873	130,464	141,755	158,300	179,741	302,746	354,314	525,762	377,448
9. Miscellaneous Industries	46,516	73,259	56,963	66,315	61,785	26,520	27,361	28,163	34,127	32,107	37,096	37,570
Total	2,146,903	3,867,979	4,114,677	4,147,831	4,346,775	4,712,283	5,047,292	5,290,935	5,850,076	5,969,895	6,415,851	6,468,439
<u>Employees</u>												
1. Vegetable Products	65,395	88,858	77,706	73,095	79,285	94,258	99,447	103,634	113,753	115,476	117,243	130,679
2. Animal "	61,517	67,670	51,297	53,111	60,124	67,996	69,358	73,666	82,131	87,038	88,037	94,195
3. Textiles & Textile "	92,669	115,620	105,473	106,235	120,699	121,677	121,022	138,973	156,892	165,478	157,987	153,122
4. Wood & Paper "	128,404	164,800	121,672	105,471	123,724	147,254	144,782	160,868	179,967	186,106	183,865	189,674
5. Iron and its "	88,071	132,281	96,927	70,947	95,426	127,148	121,041	164,325	253,701	360,845	435,744	411,944
6. Non-ferrous Metal "	21,409	39,867	34,414	25,273	33,613	44,614	44,563	54,317	73,450	90,937	109,522	104,314
7. Non-metallic Mineral Products	24,978	31,431	24,895	19,296	23,342	23,837	23,026	25,415	28,829	30,707	30,994	31,590
8. Chemicals & Allied "	15,149	16,694	15,207	15,397	18,933	21,968	22,595	27,682	54,014	93,030	92,288	81,822
9. Miscellaneous Industries	16,581	21,049	12,821	10,361	12,270	11,699	12,280	13,364	18,441	22,474	25,388	25,542
Total	514,173	678,270	540,412	479,186	567,416	660,451	658,114	762,244	961,178	1,152,091	1,241,068	1,222,882
<u>Average Horse power of Equipment in Manufacturing Industries per Employee</u>												
1. Vegetable Products	3.9	3.7	4.1	4.5	3.9	3.7	3.7	3.6	3.5	3.5	3.5	3.9
2. Animal Products	1.3	1.5	1.9	2.1	2.0	2.0	2.1	2.1	2.0	1.9	2.0	2.0
3. Textiles & Textile Products	1.2	1.5	1.8	2.0	1.9	1.7	1.9	1.8	1.6	1.6	1.7	1.8
4. Wood & Paper "	8.9	12.3	17.5	19.3	16.8	16.4	17.8	16.7	15.4	14.7	15.1	15.0
5. Iron and its "	2.4	4.0	6.1	8.8	6.3	5.7	6.0	4.6	3.8	2.9	2.8	3.1
6. Non-ferrous Metal "	4.7	8.8	12.3	17.2	12.5	10.6	12.3	11.0	9.2	7.2	6.4	5.3
7. Non-metallic Mineral Products	5.3	6.7	8.5	11.4	10.8	10.1	11.2	10.6	9.9	9.4	10.1	10.0
8. Chemicals & Allied "	4.1	5.0	6.4	7.2	6.9	6.5	7.0	6.5	5.6	3.8	5.7	4.6
9. Miscellaneous Industries	2.8	3.5	4.4	6.4	2.6	2.3	2.2	2.1	1.9	1.4	1.5	1.5
Total	4.2	5.7	7.6	8.7	7.5	7.1	7.7	6.9	6.1	5.2	5.2	5.3

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