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USE OF ELECTRIC POWER
IN
MANUFACTURING AND MINING INDUSTRIES
IN
CANADA
1936



OTTAWA
1938

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TRANSPORTATION AND PUBLIC UTILITIES BRANCH
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This report, issued during the past seven years, 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 distance 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. 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 thirteen years between 1923 and 1936 there has been very little net increase in the use of water power in manufacturing industries outside of the central electric station industry which is not included as a manufacturing industry. Steam engines had a total capacity only 34.1 per cent greater in 1936 than in 1923, whereas in 1935 the increase was 40.7 per cent. The increase in internal combustion engines moved up from 88.7 per cent for 1935 to 97.5 per cent for 1936. Electric motors operated on power purchased from central electric stations have more than trebled during this period, the increase being 210.6 per cent, and motors operated on power produced within the industries increased by only 48.0 per cent, making the increase in all motors 166.5 per cent, or by an average rate of 12.8 per cent per year. The details are as follows:

POWER EQUIPMENT IN MANUFACTURING INDUSTRIES

	Capacity		Per Cent of Increase
	1923	1936	
	H.P.	H.P.	P.C.
Water wheels	587,191	648,489	10.4
Steam engines	554,191	743,184	34.1
Internal combustion (gas & oil) engines	46,829	92,480	97.5
Total	1,188,211	1,484,153	24.9
Electric motors on purchased power	958,692	2,977,714	210.6
Total power	2,146,903	4,461,867	107.8
Electric motors on power produced in the industries	357,136	528,501	48.0
Total Electric Motors	1,315,828	3,506,215	166.5

The ratio of electric motor capacity to total power employed has increased steadily, the recessions being few and small. The saturation point will be reached somewhere below 100 per cent because direct hydraulic drive or steam or internal combustion engines always will be used in preference to electric motors in some plants. The increase in the ratio has been considerably less since 1929 than during the preceding six years, the increase being 3.9 points from 1929 to 1936 as against 13.4 points from 1923 to 1929. For 1936 data on spare or reserve equipment were collected and compiled for the second time and for all industries 5.8 per cent of the total capacity was reported not in use during the year which was approximately the same as in 1935. 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 would probably be reduced but the bringing into operation of idle plants will not necessarily affect the proportion of equipment in regular use and the proportion idle.

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 and the chief factor in increasing the ratio of electric power to total power in the total for all industries has been the development of the pulp and paper industry which is included with the "Wood and Paper Products" group and accounted for 78 per cent of the power equipment and 87 per cent of the electric motor capacity of that group in 1936. Eliminating this group from table 3 would give ratios of 74.6 per cent in 1923 and 85.9 per cent in 1936, or an increase of 10 points instead of an increase of 17 points with this group included. The lowering of the ratio of electric motors to total power from 85.9 to 77.9 per cent when the wood and paper group is included in the total is due to the direct hydraulic drive in pulp mills and the use of steam engines in saw mills, many of which use wood as fuel, and in planing mills, furniture factories, etc.

Table 4 shows the power equipment in regular use in manufacturing plants operating during 1936. The data in this table differ from those shown in previous reports in that idle equipment is excluded here except for the group totals where totals 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 for all purposes is also shown for each industry listed. This is not all used to drive machinery, large quantities being used in electric boilers in the pulp and paper mills, in electric furnaces, electric ovens, electro-chemical processes, etc., in other industries. A total of 7,565,570,000 kilowatt hours, or 43 per cent of the total, was reported consumed for purposes other than power and light and the records indicate that this consumption in electric boilers, electric furnaces, electrolytic purposes, etc., was even greater than this. As yet comprehensive statistics showing the break-down of these consumption data are not available.

The mining industries in Canada are nearly as completely electrified as the manufacturing industries with the exception of the fuel group and the increase in the ratio of electric motors to total power equipment during these thirteen years has been even greater, rising from 57.3 per cent in 1923 to 76.3 per cent in 1936. Data for the mining industries are shown in Tables 2 and 7.

Tables 8, 9 and 10 show for the nine groups of manufacturing industries and the totals, (1) the horse power ratings of the power equipment, (2) the number of employees, and (3) the net value of production for the years 1923-1936, and the index numbers of these are charted on pages 14-17.

While power equipment in all manufacturing industries more than doubled during these thirteen years the net value of production rose to a peak in 1929 and declined rapidly to 1933 when it was only 82 per cent of the 1923 value, but in 1934, 1935 and 1936 it showed increases of 10.2, 12.2, and 3.5 points. The man power, or number of employees, also ran to a peak of 121.9 per cent in 1929, fell to 93.2 per cent in 1933, and rose during the last three years. In the recovery the index of employees rose 22.4 points and the index of power rose only 14.6 points as would be expected.

The charts on pages 14-17 show the power curves rising considerably faster than the employee curves up to 1929 and continuing upward in most cases to 1936. The employee curves failed to keep pace with the power curves in all but one group and although since 1933 they have been rising faster than the power curves it is quite probable that when a balance is again reached the trends will be somewhat similar to the 1923-1929 trends.

The three sets of data for the tables 8, 9 and 10 and the charts were compiled from the same reports and consequently are all affected by the opening or closing of plants. The divergence of the power and employee curves indicates a substitution of mechanical power for man power.

A change in method of computing the number of employees for the years 1925-1930, inclusive, tended to increase the number for these years so that the peaks in 1929 are higher than if this change had not been made and the divergence from the power curves is consequently less. For the years 1923 and 1924 and again 1931 onwards the number of employees was computed by dividing the sum of the monthly counts by 12. Thus it represented the average man year positions. For the years 1925-1930, inclusive, the sum of the monthly counts for each plant was divided by the number of months the plant operated which would give the average monthly employment. This second method produced a much higher figure for seasonal industries, such as fruit, vegetable and fish canneries, and was probably an important factor in raising the employee curve above the power curve for Group 1, "Vegetable Products" and for the sharp rise in 1925 for Group 2, "Animal Products", and some of the other groups. The change in method of computing employees would only cause breaks in the curves upward in 1925 and downward in 1931 and would not affect the slopes of the curves except at these points. It is impossible, however, to calculate the exact effect of the change.

The 1936 data contain some revisions which have not yet been carried back to previous

years. "Laundering" was dropped from group 4, "Textiles and Textile Products" and "Ship-building and repairs" and "Aircraft" were transferred from group 9, "Miscellaneous Industries" to group 5, "Iron and its Products," and "Aerated and mineral waters" was transferred from group 7, "Non-metallic Products" to group 1, "Vegetable Products." These transfers are undoubtedly the main factors in the decline in group 9, "Miscellaneous Industries" as compared with 1935 data.

Table 1. POWER EQUIPMENT OF ALL MANUFACTURING INDUSTRIES IN CANADA

SUMMARY					
Year	Total Power Employed	Electric Motors Operated			Electric Power Per Cent of Total
		By Central Electric Sta. Power	By Power generated in the industries	Total Motor Capacity	
	H.P.	H.P.	H.P.	H.P.	P.C.
1923	2,146,903	958,492	357,136	1,315,828	61.3
1924	2,538,535	1,256,183	398,001	1,654,184	65.2
1925	2,888,164	1,547,754	434,678	1,982,432	68.6
1926	3,134,248	1,770,334	392,322	2,162,656	69.0
1927	3,287,582	1,924,687	386,555	2,311,242	70.3
1928	3,592,184	2,139,129	457,565	2,596,694	72.3
1929	3,867,979	2,393,684	496,036	2,889,720	74.7
1930	4,051,744	2,518,853	478,548	2,997,401	74.0
1931	4,114,677	2,587,411	539,800	3,127,211	76.0
1932	4,157,420	2,694,164	516,157	3,210,321	77.2
1933	4,147,831	2,671,440	502,706	3,174,147	76.5
1934	4,244,696	2,779,913	550,500	3,330,413	78.5
1935	4,346,775	2,874,693	512,396	3,387,089	77.9
1936	4,461,867	2,977,714	528,501	3,506,215	78.6

/ Excluding central electric stations.

Table 2.

POWER EMPLOYED IN THE MINING INDUSTRY IN CANADA

Year	Total power employed	Electric Motors			Electric Power Per cent 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	323,882	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	75,069	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	69.3
1934	621,071	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	76.3

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

Table 3. Manufacturing Industries	1923		1929		1935		1936	
	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	326,346	74	331,361	74	342,123	76
2. Animal Products	80,895	72	101,268	72	122,560	74	126,807	74
3. Textile Products	107,850	83	168,614	81	240,549	85	221,830	85
4. Wood and Paper Products	1,146,571	50	2,022,839	69	2,160,083	72	2,227,328	73
5. Iron and its Products	213,705	89	529,162	100	660,491	82	681,038	88
6. Non-ferrous Metal Products	99,963	47	351,752	82	416,927	93	461,129	85
7. Non-metallic Mineral Pds..	131,780	83	210,804	88	222,555	84	237,163	82
8. Chemical and Allied Products	62,447	72	83,935	77	130,464	86	137,442	86
9. Miscellaneous	46,516	86	73,259	86	61,785	89	27,002	88
TOTAL	2,146,903	61	3,867,979	75	4,346,775	78	4,461,867	79

Table 4.

POWER EQUIPMENT OF MANUFACTURING INDUSTRIES IN CANADA, 1936
(Equipment in Regular Use)

Industries	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 cent. elec. stations	Generated by the industries	Total
	H.P.	H.P.	H.P.	H.P.	P.C.	(Thousands of Kilowatt Hours)		
Group 1. VEGETABLE PRODUCTS ...	(X 342,123 (324,819	231,201 221,487	27,883 27,381	259,084 248,868	75.7 76.6	392,559	23,249	415,808
Biscuits, confectionery, etc..	21,452	18,951	472	19,423	90.5	20,196	...	20,196
Bread & bakery products	15,848	14,332	23	14,355	90.6	31,990	...	31,990
Breweries	23,018	17,435	648	18,083	78.6	27,356	152	27,508
Flour and feed mills	110,713	55,469	1,961	57,430	51.9	108,719	3	108,722
Rubber goods, footwear, etc...	63,099	60,195	1,810	62,005	98.3	133,803	...	133,803
Sugar refineries	21,662	6,962	16,992	23,954	100.0	12,617	13,106	25,723
Group 2. ANIMAL PRODUCTS	(X 126,807 (121,902	91,458 89,750	2,792 2,785	94,250 92,535	74.3 75.9	172,093	1,819	173,912
Butter and cheese	40,128	27,986	...	27,986	69.7	29,970	...	29,970
Leather tanneries	14,119	11,911	766	12,677	89.8	13,505	...	13,505
Slaughtering & meat packing...	36,389	32,194	415	32,609	89.6	99,802	398	100,200
Group 3. TEXTILES AND TEXTILE PRODUCTS	(X 221,830 (199,503	166,691 159,456	21,406 21,043	188,097 180,499	84.8 90.5	463,654	60,894	524,548
Cotton yarn and cloth	95,523	77,601	10,002	87,603	91.7	268,990	30,077	299,067
Hosiery and knitted goods.....	17,023	9,832	3,557	13,389	78.7	18,515	3,555	22,070
Silk and artificial silk	19,829	16,459	3,076	19,535	98.5	103,603	10,687	114,290
Woollen cloth	12,777	10,022	515	10,537	82.5	16,083	614	16,697
Group 4. WOOD AND PAPER PRODUCTS	(X2,227,328 (2,143,264	1,261,471 1,226,373	372,679 361,807	1,634,150 1,588,180	73.4 74.1	10,248,876	1,318,724	11,567,600
Furniture	19,785	11,886	1,720	13,606	68.8	9,491	1,007	10,498
Planing mills, sash & door ...	46,080	26,801	1,630	28,431	61.7	15,608	1,272	16,880
Printing and publishing	24,683	23,483	646	24,129	97.8	29,959	36	29,995
Pulp and paper	1,674,923	1,074,686	309,490	1,384,176	82.6	10,109,638	1,258,327	11,367,965
Saw mills	295,027	27,303	44,711	72,014	24.4	16,899	56,795	73,694

<u>Group 5. IRON AND ITS PRODUCTS</u>	(X 681,038 (639,341	522,981 506,771	76,342 71,074	599,323 577,845	88.0 90.4	679,013	38,188	717,201
Agricultural implements	22,033	19,021	72	19,093	86.7	16,843	...	16,843
Automobiles	29,452	12,772	20,111	32,883	100.0	14,489	26,207	40,696
Automobile supplies	36,715	35,090	...	35,090	95.6	32,158	...	32,158
Bridge and structural steel..	26,878	25,453	...	25,453	94.7	7,924	...	7,924
Castings and forgings	49,740	47,955	252	48,207	96.9	36,772	...	36,772
Machinery	41,330	36,619	3,227	39,846	96.4	21,123	2,336	23,459
Primary iron and steel	206,491	130,622	32,749	163,371	79.1	352,226	3,270	355,496
Railway rolling stock	107,410	94,222	7,249	101,471	94.5	89,762	6,018	95,780
Ship building and repairs....	37,771	30,858	2,250	33,108	87.7	119	...	119
<u>Group 6. NON FERROUS METAL PRODUCTS</u>	(X 461,129 (418,880	379,442 350,274	13,910 13,376	393,252 363,650	85.3 86.8	2,282,562	39,742	2,322,304
Brass and copper	25,320	23,832	320	24,152	95.4	25,195	119	25,314
Electrical apparatus and supplies	66,060	58,381	5,134	63,515	96.1	56,556	9,772	66,328
Non-ferrous metal smelting...	313,438	254,009	7,922	261,931	83.6	1,240,494	29,851	1,270,345
<u>Group 7. NON METALLIC MINERAL PRODUCTS</u>	(X 237,163 (218,956	189,503 179,516	5,863 5,653	195,366 185,169	82.4 84.6	656,690	6,035	662,725
Abrasive products	6,703	6,703	...	6,703	100.0	352,268	...	352,268
Cement	71,237	69,203	756	69,959	98.2	62,039	...	62,039
Clay products from domestic clay	20,974	15,525	116	15,641	74.6	7,765	169	7,934
Coke and gas products	27,975	18,546	2,258	20,804	74.4	49,328	...	49,328
Glass products	12,451	12,351	...	12,351	99.2	28,299	...	28,299
Miscellaneous non-metallic products	9,619	9,378	60	9,438	98.1	80,026	251	80,277
Petroleum products	41,122	23,813	...	23,813	57.9	55,105	399	55,504
<u>Group 8. CHEMICALS AND CHEMICAL PRODUCTS.</u>	(X 137,442 (124,096	111,205 101,632	7,521 6,937	113,726 108,569	86.4 87.5	1,192,075	86,916	1,278,991
Acids, alkalies and salts....	64,679	48,830	6,217	55,047	85.1	812,960	85,834	898,794
Fertilizers	20,185	20,070	...	20,070	99.4	272,229	...	272,229
Soaps and washing compounds..	6,149	5,512	...	5,512	89.6	6,398	...	6,398
<u>Group 9. MISC. INDUSTRIES.....</u>	(X 27,007 (24,879	23,762 22,826	105 105	23,867 22,931	88.4 92.2	32,616	1,044	33,660
Ice, artificial	10,267	10,217	...	10,217	99.5	21,292	...	21,292
Mattresses and springs	4,254	4,254	...	4,254	100.0	2,814	...	2,814
TOTAL ALL INDUSTRIES	(X 4,461,867 (4,215,640	2,977,714 2,858,085	528,501 510,161	3,506,215 3,368,246	78.6 79.9	16,120,138	1,576,611	17,696,749

X Including equipment held idle or in reserve, which is comparable with totals in previous reports.

+ Excluding central electric stations.

Table 5.

POWER EMPLOYED IN MANUFACTURING INDUSTRIES, BY PROVINCES, 1936.

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
	H.P.	H.P.	H.P.	H.P.	P.C.	(Thousands of Kilowatt Hours)		
P.E. Island	3,475	663	...	663	19.1	458	...	458
Nova Scotia	168,755	92,668	12,077	104,745	62.1	216,158	43,251	259,409
New Brunswick	186,563	98,869	47,056	145,925	78.2	347,556	132,517	480,073
Quebec	1,530,055	1,139,319	100,630	1,239,949	81.0	9,136,430	313,896	9,450,326
Ontario	1,633,353	1,122,113	227,681	1,349,794	82.6	4,538,166	716,467	5,254,633
Manitoba	124,167	110,202	1,359	111,561	89.8	537,561	2,266	539,827
Saskatchewan	32,814	21,155	61	21,216	64.7	64,813	167	64,980
Alberta	68,157	40,048	4,864	44,912	65.9	40,882	3,455	44,337
British Columbia and Yukon	468,301	233,048	116,433	349,481	74.6	1,238,114	364,592	1,602,706
CANADA	4,215,640	2,858,085	510,161	3,368,246	79.9	16,120,138	1,576,611	17,696,749
INCLUDING IDLE AND RESERVE EQUIPMENT								
P.E. Island	3,578	703	...	703	19.6			
Nova Scotia	175,455	94,462	12,468	106,930	60.2			
New Brunswick	203,062	105,461	48,273	153,734	75.7			
Quebec	1,613,597	1,178,828	103,355	1,282,183	79.5			
Ontario	1,734,311	1,174,325	241,184	1,415,509	81.6			
Manitoba	130,111	112,153	1,359	113,512	87.2			
Saskatchewan	36,116	21,566	61	21,627	59.9			
Alberta	71,258	41,179	4,864	46,043	64.6			
British Columbia and Yukon	494,379	249,037	116,937	365,974	74.0			
CANADA	4,461,867	2,977,714	528,501	3,506,215	78.6			

† Excluding central electric stations.

POWER EQUIPMENT - IN REGULAR USE AND TOTAL INCLUDING IDLE AND RESERVE, 1938

Table 8.

MANUFACTURING INDUSTRIES

	TOTAL POWER EMPLOYED		ELECTRIC MOTORS OPERATED BY						ELECTRIC POWER		CONSUMPTION OF ELECTRICITY		
	In Regular Use	Including Reserve Equipment	Central Station Power		Power Generated in the Industries		T o t a l		Per cent of Total		Purchased from Cent. Elec. Stations	Generated by the Industries	Total
			In Regular Use	Including Reserve	In Regular Use	Including Reserve	In Regular Use	Including Reserve	Regular	Including Reserve			
	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	P.C.	P.C.	(Thousands of Kilowatt Hours)		
1. Vegetable Products	324,819	342,123	221,487	231,201	27,381	27,883	248,868	259,084	76.6	75.7	392,559	23,249	415,808
2. Animal Products..	121,902	126,807	89,750	91,458	2,785	2,792	92,535	94,250	75.9	74.3	172,093	1,819	173,912
3. Textiles and Textile Products	199,503	221,850	159,456	166,691	21,043	21,406	180,499	188,097	90.3	84.8	463,654	60,394	524,548
4. Wood and Paper Products	2,143,264	2,227,328	1,226,373	1,261,471	361,807	372,879	1,588,180	1,634,150	74.1	73.4	10,248,878	1,318,724	11,567,600
5. Iron and its Products	639,341	681,038	506,771	522,981	71,074	76,342	577,845	599,323	90.4	88.0	679,013	38,188	717,201
6. Non-ferrous Metal Products	418,880	461,129	350,274	379,442	13,376	13,910	363,650	393,352	86.8	85.3	2,282,562	39,742	2,322,304
7. Non-metallic Mineral Products	218,956	237,163	179,516	189,503	5,653	5,863	185,169	195,366	84.6	82.4	656,690	6,035	662,725
8. Chemicals and Chemical Pds...	124,096	137,442	101,632	111,205	6,937	7,521	108,569	118,726	87.5	86.4	1,192,075	86,916	278,391
9. Miscellaneous Industries	24,879	27,007	22,826	23,762	105	105	22,931	23,867	92.2	88.4	32,616	1,044	33,660
TOTAL	4,215,640	4,461,867	2,858,085	2,977,714	510,161	528,501	3,368,246	3,506,215	79.9	78.6	16,120,138	1,576,611	17,696,749

Table 7.

MINING INDUSTRIES

Metal mining	357,071	400,877	277,196	303,271	37,332	38,687	314,528	341,958	87.8	85.3	658,327	94,703	753,030
Non-metal mining....	63,084	70,081	54,060	59,792	3,222	3,370	57,282	63,162	90.8	90.1	96,867	4,395	101,262
Sand, Gravel & Stone	38,648	43,912	25,029	27,470	1,860	2,195	26,889	29,665	69.6	67.6	20,515	...	20,515
Fuels	196,977	209,769	82,782	83,467	34,033	34,888	116,815	118,355	59.3	56.4	113,958	10,261	124,219
TOTAL	655,780	724,639	439,067	474,000	76,447	79,140	515,514	553,140	78.6	76.3	889,667	109,359	999,026

X

MANUFACTURING INDUSTRIES

Table 8.

POWER EMPLOYED
H.P.

	1923	1925	1926	1927	1928	1929
1. Vegetable products	257,176	266,709	267,643	280,170	309,611	326,346
2. Animal products	80,895	89,823	96,151	101,650	104,166	101,268
3. Textiles & textile pdts.	107,850	144,573	153,235	157,055	163,773	168,614
4. Wood and paper products	1,146,571	1,317,502	1,552,885	1,770,909	1,908,738	2,022,839
5. Iron and its products	213,705	461,961	422,356	451,576	438,521	529,162
6. Non-ferrous metal pdts.	99,963	222,737	228,870	237,520	294,642	351,752
7. Non-metallic mineral pdts.	131,780	126,190	150,915	160,196	181,666	210,804
8. Chemical & allied products	62,447	58,502	63,635	65,898	71,401	83,935
9. Miscellaneous industries	46,516	45,277	44,143	62,608	69,660	73,259
TOTAL	2,146,903	2,733,280	2,979,898	3,287,582	3,592,184	3,867,979

Table 9.

EMPLOYEES
No.

	1923	1925	1926	1927	1928	1929
1. Vegetable products	65,395	72,035	73,908	78,300	83,764	88,858
2. Animal products	61,517	63,675	67,843	68,381	67,777	67,670
3. Textiles & textile pdts.	92,669	94,531	100,572	107,519	113,724	115,620
4. Wood and paper products	128,404	127,859	134,187	150,550	158,005	164,800
5. Iron and its products	88,071	90,125	103,510	106,293	119,199	132,281
6. Non-ferrous metal products	21,409	27,735	30,095	33,443	35,568	39,867
7. Non-metallic mineral pdts.	24,978	24,468	26,045	26,662	28,650	31,431
8. Chemical & allied products	15,149	13,951	14,345	14,559	16,130	16,694
9. Miscellaneous industries	16,581	16,583	17,628	18,518	19,351	21,049
TOTAL	514,173	530,962	568,133	604,225	642,168	678,270

Table 10.

NET VALUE OF PRODUCTION
(Thousands of dollars)

	1923	1925	1926	1927	1928	1929
1. Vegetable products	209,884	227,526	244,004	283,375	317,073	344,438
2. Animal products	110,090	115,863	122,921	132,261	133,697	132,410
3. Textiles & textile pdts.	157,994	143,950	163,502	183,137	191,672	205,943
4. Wood and paper products	319,216	310,543	339,063	357,787	383,390	411,616
5. Iron and its products	209,542	205,041	247,168	264,819	300,015	353,087
6. Non-ferrous metal pdts.	45,424	85,702	92,889	112,757	139,221	158,645
7. Non-metallic mineral pdts.	74,673	78,970	91,863	89,434	112,393	124,774
8. Chemical & allied products	56,606	56,608	62,465	63,854	72,813	83,361
9. Miscellaneous industries	36,455	33,989	39,836	44,467	50,440	60,092
TOTAL	1,219,884	1,258,292	1,403,711	1,531,891	1,706,719	1,874,466

MANUFACTURING INDUSTRIES

POWER EMPLOYED
H.P.

1930	1931	1932	1933	1934	1935	1936
313,527	322,401	326,829	326,666	332,052	331,361	342,123
105,833	98,892	100,069	112,035	117,843	122,560	126,807
171,324	186,952	183,915	215,907	213,938	240,549	221,830
2,126,515	2,126,398	2,094,010	2,035,112	2,115,205	2,160,083	2,227,328
576,609	589,261	623,888	626,730	637,718	660,491	681,038
401,817	424,738	450,271	474,581	405,248	416,927	461,129
213,917	212,179	209,484	219,612	231,585	222,555	237,163
87,382	96,893	105,671	110,873	115,082	130,464	137,442
54,820	56,963	57,283	66,315	70,024	61,785	27,007
4,051,744	4,114,677	4,157,420	4,147,831	4,244,696	4,346,775	4,461,867

EMPLOYEES
No.

84,182	77,706	72,390	73,095	77,464	79,285	87,071
57,657	51,297	49,953	53,111	57,199	60,124	63,609
109,576	105,473	102,116	106,235	115,695	120,699	114,966
156,724	121,672	107,834	105,471	116,691	123,724	132,374
119,987	96,927	74,214	70,947	81,782	95,426	107,203
38,756	34,414	26,704	25,273	30,177	33,613	36,935
29,868	24,895	20,342	19,296	21,959	23,342	21,974
15,503	15,207	15,295	15,397	17,130	18,933	19,910
14,328	12,821	11,155	10,361	12,091	12,270	10,317
626,581	540,412	480,003	479,186	530,188	567,416	594,359

NET VALUE OF PRODUCTION
(Thousands of dollars)

314,513	274,475	211,601	197,607	210,899	226,140	254,135
132,212	106,060	95,623	91,638	94,998	104,268	109,824
177,251	163,967	144,943	150,131	160,723	173,186	162,677
368,351	291,858	227,252	207,175	223,241	266,120	261,020
288,032	203,970	123,542	114,256	143,370	186,247	211,573
138,720	116,520	84,176	92,775	112,156	113,616	132,424
109,606	102,486	73,407	70,077	71,357	87,215	68,708
71,805	64,745	60,003	58,549	62,216	70,257	69,854
35,458	28,190	21,258	17,919	21,522	22,287	19,378
1,635,948	1,352,271	1,041,805	1,000,127	1,100,482	1,249,336	1,289,593

MANUFACTURING INDUSTRIES

INDEX NUMBERS
(1923 = 100)

Table 11. POWER EMPLOYED

	1924	1925	1926	1927	1928
1. Vegetable products	100.6	103.7	104.1	108.9	120.4
2. Animal products	110.6	111.0	118.9	125.7	128.8
3. Textiles and textile products	129.3	134.0	142.1	145.6	151.9
4. Wood and paper products	106.0	114.9	135.4	154.5	166.5
5. Iron and its products	164.2	216.2	197.6	211.3	228.6
6. Non-ferrous metal products	104.0	222.8	229.0	237.6	294.7
7. Non-metallic mineral products	92.0	95.8	114.5	121.6	137.9
8. Chemical & allied products	95.9	93.7	101.9	105.5	114.3
9. Miscellaneous industries	94.7	97.3	94.9	134.6	149.7
TOTAL	111.0	127.3	138.8	153.1	167.3

Table 12. EMPLOYEES

	1924	1925	1926	1927	1928
1. Vegetable products	101.2	110.2	113.0	119.7	128.1
2. Animal products	93.9	103.5	110.3	111.1	110.2
3. Textiles and textile products	97.4	102.0	108.5	116.0	122.7
4. Wood and paper products	99.3	99.6	104.5	117.2	123.1
5. Iron and its products	88.9	102.3	117.5	120.7	135.3
6. Non-ferrous metal products	101.2	129.5	140.6	156.2	166.1
7. Non-metallic mineral products	96.8	98.0	104.3	106.7	114.7
8. Chemical & allied products	91.1	92.1	94.7	96.1	106.6
9. Miscellaneous industries	95.4	100.0	106.3	111.7	116.7
TOTAL	96.4	103.2	110.5	117.5	124.9

Table 13. NET VALUE OF PRODUCTION

	1924	1925	1926	1927	1928
1. Vegetable products	105.0	108.4	116.3	135.0	151.1
2. Animal products	99.7	105.2	111.7	120.1	121.4
3. Textiles and textile products	89.8	91.1	103.5	115.9	121.3
4. Wood and paper products	94.1	97.3	106.2	112.1	122.0
5. Iron and its products	83.1	97.9	118.0	126.4	143.2
6. Non-ferrous metal products	112.2	188.7	204.5	248.2	306.5
7. Non-metallic mineral products	102.9	105.8	123.0	119.8	150.5
8. Chemical & allied products	95.2	100.0	110.4	112.8	128.6
9. Miscellaneous industries	91.4	93.2	109.3	122.0	138.3
TOTAL	95.2	103.1	115.1	125.6	139.9

MANUFACTURING INDUSTRIES

INDEX NUMBERS
(1923 = 100)

POWER EMPLOYED

	1929	1930	1931	1932	1933	1934	1935	1936
	126.9	121.9	125.4	127.1	127.0	129.1	128.8	133.0
	125.2	130.8	122.2	123.7	138.5	145.7	151.5	156.8
	156.3	158.8	173.3	176.1	200.2	203.9	223.0	205.7
	176.4	185.5	185.5	182.6	177.5	184.5	188.4	194.3
	247.6	269.8	275.7	291.9	293.3	298.4	309.1	318.7
	351.9	402.0	424.9	450.4	434.7	405.4	417.1	461.3
	160.0	162.3	161.0	159.0	166.7	175.7	168.9	180.0
	134.4	139.9	155.2	169.2	177.6	184.3	208.9	220.1
	157.5	117.9	122.4	123.1	142.6	150.5	132.8	58.1
	180.2	188.7	191.7	193.6	193.2	197.7	202.5	207.8

EMPLOYEES

	135.9	128.7	118.8	110.7	111.8	118.5	121.2	133.1
	110.0	93.7	83.4	81.2	86.3	93.0	97.7	103.4
	124.8	118.2	113.8	110.2	114.6	124.8	130.2	124.1
	128.3	122.1	94.8	84.0	82.1	90.9	96.4	103.1
	150.2	136.2	110.0	84.3	80.6	92.9	108.4	121.7
	186.2	181.0	160.7	124.7	118.0	141.0	157.0	172.5
	125.8	119.6	99.7	81.4	77.3	87.9	93.5	88.0
	110.2	102.3	100.4	101.0	101.6	113.1	125.0	131.4
	126.9	86.4	77.3	67.3	62.5	72.9	74.0	62.2
	131.9	121.9	105.1	93.4	93.2	103.1	110.4	115.6

NET VALUE OF PRODUCTION

	164.1	149.9	130.8	100.8	94.2	100.5	107.7	121.1
	120.3	120.1	96.3	86.8	83.2	86.3	94.7	99.8
	130.3	112.2	103.8	91.7	95.0	101.7	109.6	103.0
	128.9	115.4	91.4	71.2	64.9	69.9	83.4	81.8
	168.5	137.5	97.3	59.0	54.5	68.4	88.9	101.0
	349.3	305.4	256.5	185.3	204.2	246.9	250.1	291.5
	167.2	146.8	137.2	98.3	93.8	95.5	116.8	92.0
	147.3	126.9	114.4	106.0	103.4	109.9	124.1	123.4
	164.8	97.3	77.3	58.3	49.2	59.0	61.1	53.2
	153.7	134.1	110.9	85.4	82.0	90.2	102.4	105.7

MANUFACTURING INDUSTRIES

1923=100

Chart 1
 POWER EMPLOYED.....
 EMPLOYEES.....
 NET VALUE OF PRODUCTION.....

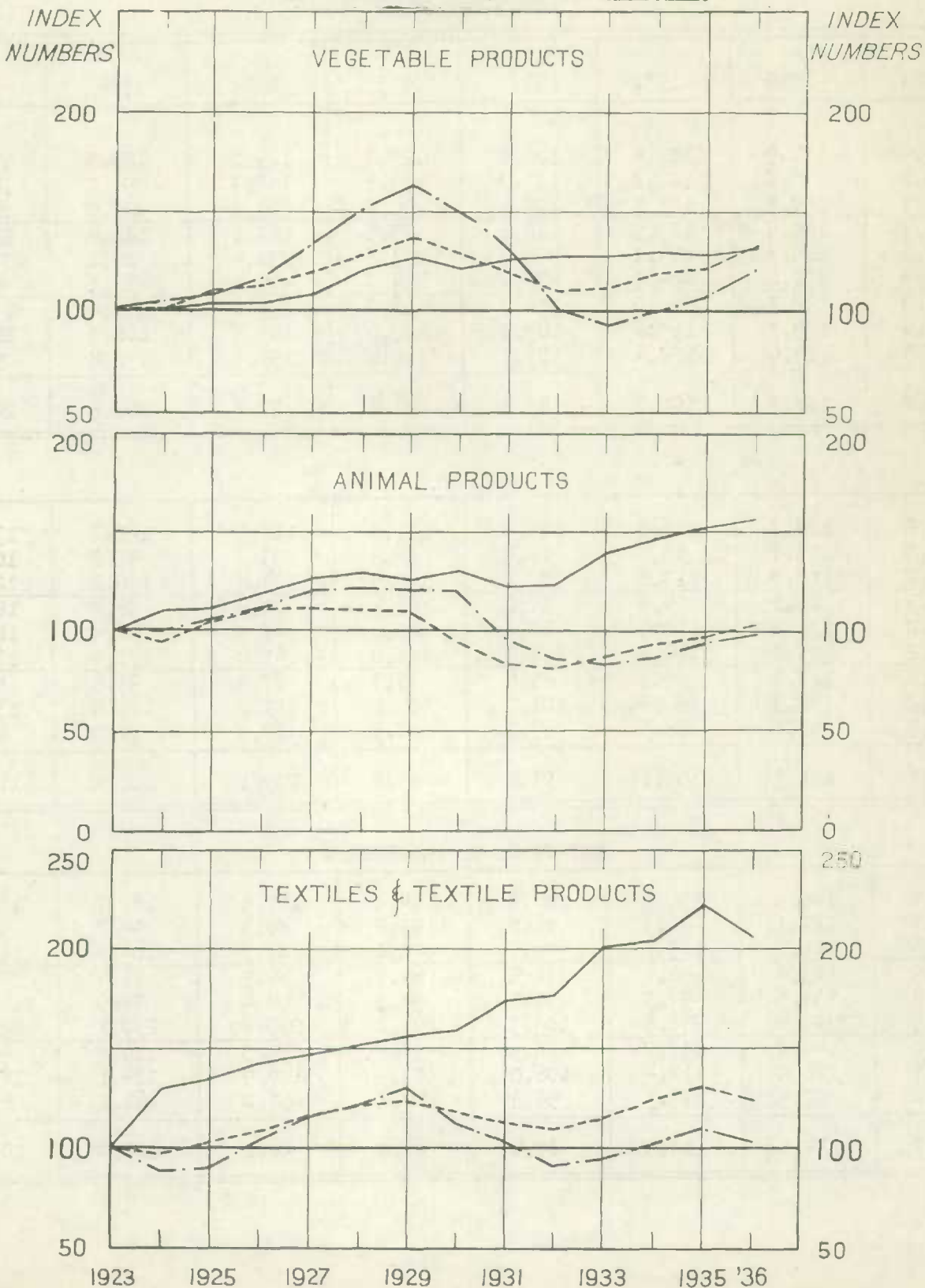


Chart 2

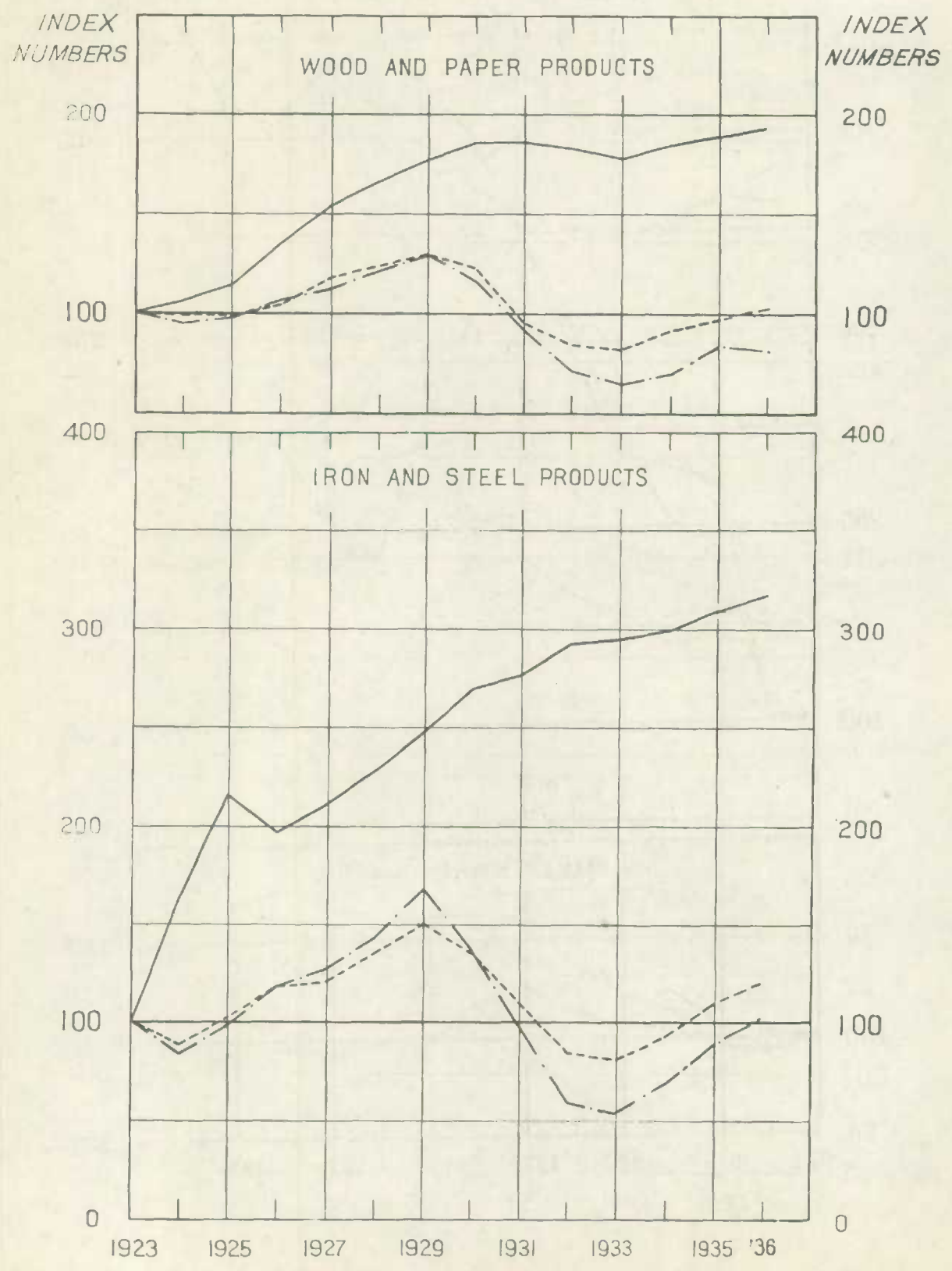


Chart 3

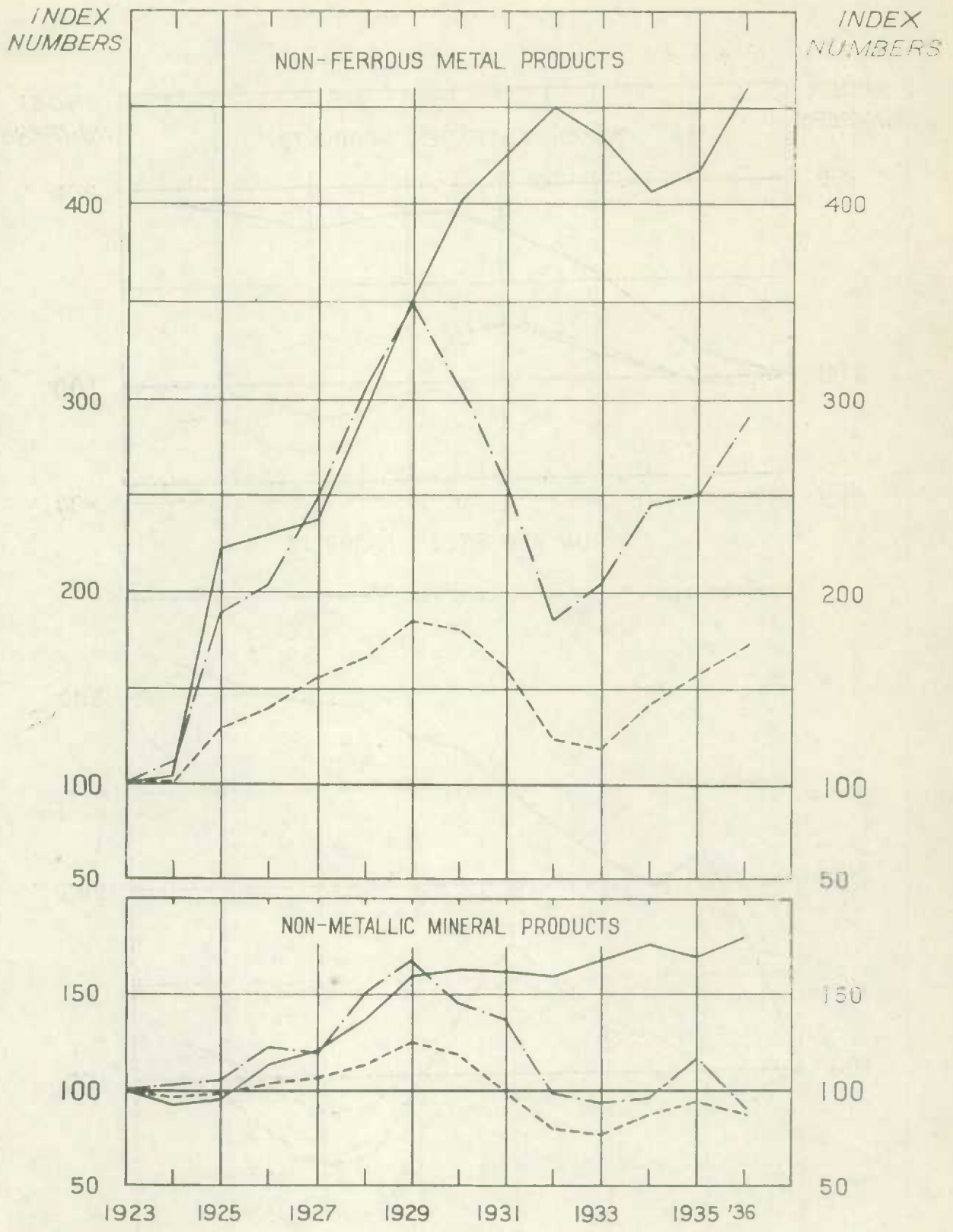
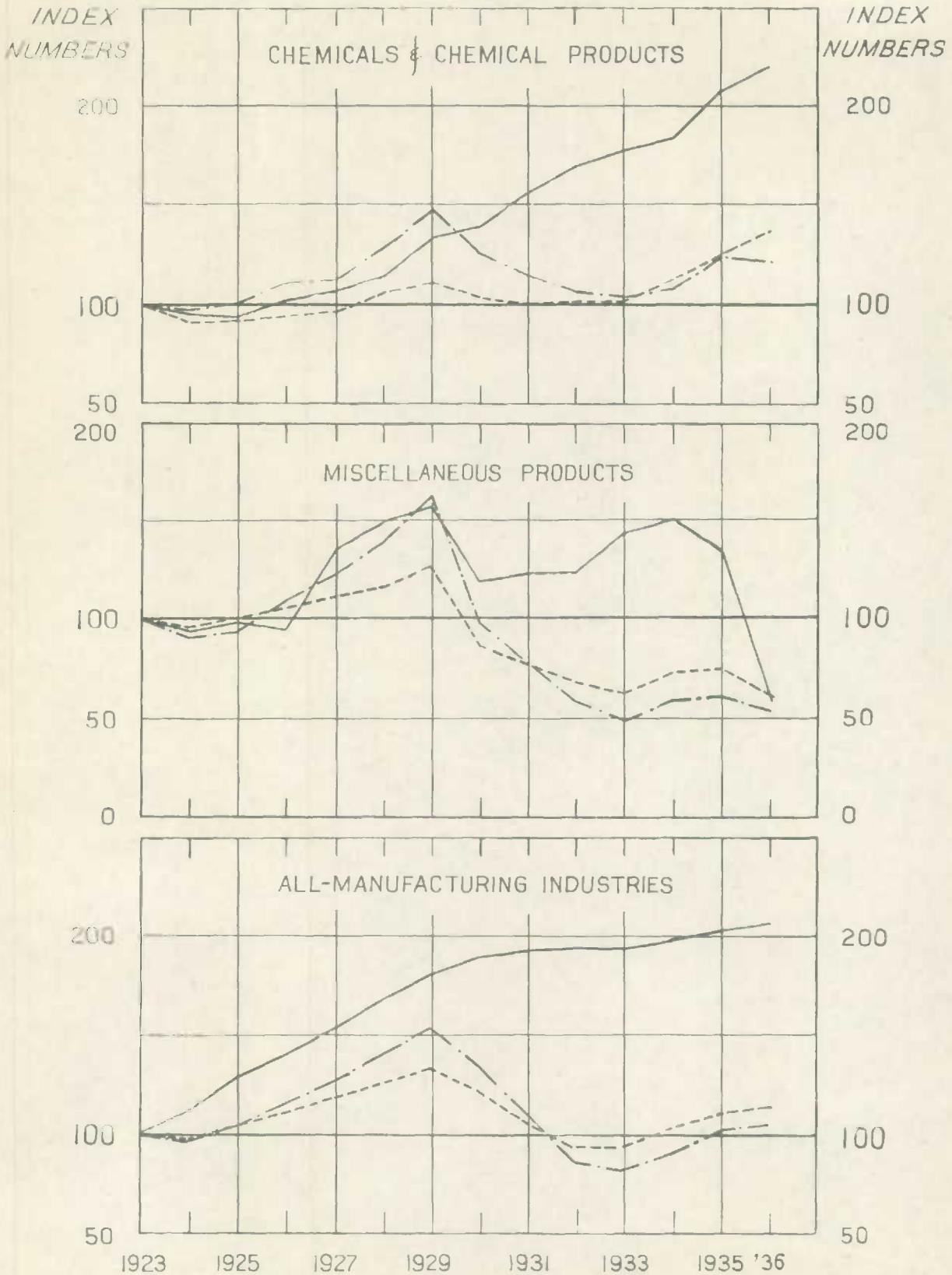


Chart 4



e. 2

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