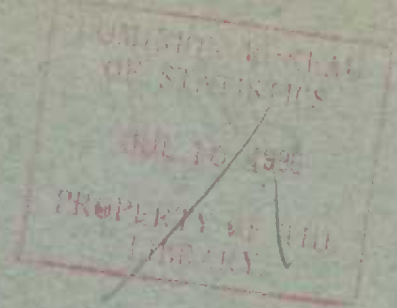


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USE OF ELECTRIC POWER
IN
MANUFACTURING AND MINING INDUSTRIES
IN
CANADA
1934

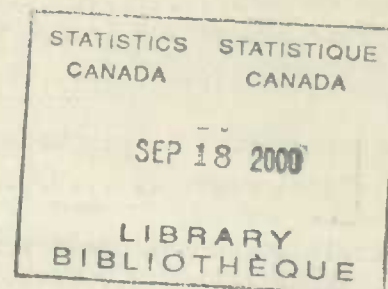
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OTTAWA

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USE OF ELECTRIC POWER
IN
MANUFACTURING AND MINING INDUSTRIES
IN CANADA
1934



This report, issued during the past five 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.

The report for the first four years also contained data on the production of electric power as reported monthly, but these data are now published monthly in a separate report.

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 eleven years between 1923 and 1934 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 excluded here. Steam engines increased by 40.7 per cent and internal combustion engines increased by 86.1 per cent, but the use of this latter type is still a very small part of the total. Electric motors operated on central station power, however, increased by 190.0 per cent and all electric motors increased by 153.1 per cent in capacity. The details are as follows:

POWER EQUIPMENT IN MANUFACTURING INDUSTRIES

	C a p a c i t y		Per cent of Increase
	1923	1934	
	H.P.	H.P.	
Water wheels	587,191	597,687	1.8
Steam engines	554,191	779,949	40.7
Internal combustion (gas & oil) engines	46,829	87,147	86.1
Total	1,188,211	1,464,783	23.3
Electric motors on purchased power	958,692	2,779,913	190.1
Total Power	2,146,903	4,244,696	97.7
Electric motors on power produced in the industries	357,136	550,500	54.1
Total Electric Motors	1,315,828	3,330,413	153.1

The ratio of electric motor capacity to total power employed has increased steadily from 1923 with only two small recessions and for 1934 was 78.5 per cent. Many industries use electric drive exclusively and scores of others have ratios above 90 per cent. This rise from 61.3 per cent in 1923 to 78.5 per cent in 1934 was affected largely by the pulp and paper mills included in Group 4, "Wood and Paper Products." The ratio of this group increased from 50 per cent in 1923 to 72 per cent in 1934 and the electric motors increased in total capacity from 569,437 horse power to 1,529,058 horse power. This accounted for close to 48 per cent of the total electric motor increase in all manufacturing industries. Non-ferrous metal products also showed a large increase from 47 per cent to 94 per cent during this period. The electric motors in this group had a capacity of only 381,150 horse power in 1934, or 11.4 per cent of the total in all manufacturing industries and, consequently, the effect on the total was small. Increases in other groups ranged from one to eleven points with two groups showing slight decreases. These comparisons are shown in Table 3.

Data in Table 4 are for all manufacturing industries, by groups, but data for only the large power industries in each group are shown separately. The table shows for the first time the kilowatt hour consumption and because a few industries had large consumptions, although relatively small power equipment installations, these have been included also. The large kilowatt hour consumption in these was largely in electric ovens, electric furnaces, electro-chemical processes, etc., and not solely for lighting and driving machines.

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 eleven years has been even greater, rising from 57.3 per cent in 1923 to 75.1 per cent in 1934. Data for the mining industries are shown in Tables 2 and 6.

Tables 7, 8 and 9 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 1923-1934, and the index numbers of these are charted on pages 14-17.

While the power equipment in all manufacturing industries almost doubled in capacity between 1923 and 1934, the net value of production rose to a peak in 1929 and then declined rapidly to 1932 and rose again in 1934. The two curves were approximately parallel from 1924 to 1929, but with the decline in business the net value of production naturally fell off while the equipment retained its position, although probably some of it was idle, and it also showed small net increases each year throughout the depression. The employees also increased in number from 1924 to 1929, but at a much lower rate than the power and net value of production and declined in somewhat the same way as the net value of production in 1930-1933 and rose in 1934. The peak reached by the employee curve in 1929 was only 32 points above the 1923 level, whereas the power curve rose 80 points and by 1934 had reached 97.7 points above the 1923 level.

These curves show the steadily increasing spread between power and employees employed in manufacturing industries. The charts for some of the nine groups show much greater spreads than the curves for the totals and quite probably curves for individual industries would show even greater differences.

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 three sets of data for these tables (7-8-9) and graphs were compiled from the same reports and consequently the curves indicate change in manufacturing technique, largely a substitution of mechanical power for man power.

The non-ferrous metal products industries showed an increase in power of 250 per cent from 1923 to 1929 and another 100 per cent to 1934, whereas the number of employees increased by only 86 per cent to 1929 and then declined to 1933. This group showed only 47 per cent electric drive in 1923 and 94 per cent in 1934. It is quite probable that this large increase in electric motors was a factor in this enormous spread between the power and employee curves. As stated above, over-installation is a characteristic of electric drive where individual motors are installed for each machine or groups of machines, but allowing half of the increase in electric motors in this group as excess capacity reduces the increase in power to 132 per cent between 1923 and 1929 for an increase in employees of only 86 per cent, 28 points of which were made in 1925 when the change in method of computation was made. This feature of electric drive probably affected the power curve of the "Wood and Paper Products" group which showed an increase in the ratio of electric motors to total power from 50 per cent in 1923 to 69 per cent in 1929 and to 72 per cent in 1934. The same adjustment for excess power in this group produced an increase in power between 1923 and 1929 of 46 per cent for an increase in employees of only 28 per cent. The increase in electric motor ratio to total power in the other groups did not exceed 11 points and, consequently, any excess motor capacity installed in these groups would have little effect on the spread between the power and employee curves.

It is not contended that the foregoing adjustment for excess motor capacity installed during these years is correct, but it is liberal. Even with it, a large difference existed between the rate at which the rated capacity of power equipment was being increased during the boom years up to 1929 and the rate at which the number of employees was being increased.

It is quite probable that, with a revival of business, the employee curve will rise at a sharper angle than the power curve, as it did for all the groups in 1934, until the present power equipment is used to a higher per cent of its capacity than in 1934. It is also probable that, after that point is reached, the record of 1923-1929 will be continued and the capacity of power equipment will increase at a faster rate than employees.

Table 1.

POWER EQUIPMENT OF ALL MANUFACTURING INDUSTRIESIN CANADA

S U M M A R Y

Year	Total power employed H.P.	Electric Motors Operated			Electric Power
		By central electric stn. power H.P.	By power generated in the industries H.P.	Total motor capacity H.P.	Per cent of total P.C.
1923	2,146,903	958,692	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

∕ Excluding central electric stations.

Table 2.

POWER EMPLOYED IN THE MINING INDUSTRY IN CANADA

Year	Total Power Employed	Electric Motors		Total Motor Capacity	Electric Power
		Operated by Central Electric Station Power	Operated by Power Generated in the Industry		Per cent of Total
	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

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

Table 3. Manufacturing Industries	1923		1929		1934	
	Power		Power		Power	
	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	332,052	72
2. Animal Products	80,895	72	101,268	72	117,843	73
3. Textile Products	107,850	83	168,614	81	219,938	85
4. Wood and Paper Products	1,146,571	50	2,022,839	69	2,115,205	72
5. Iron and its Products	213,705	89	529,162	100	637,718	86
6. Non ferrous Metal Products	99,963	47	351,752	82	405,248	94
7. Non metallic Mineral Products	131,780	83	210,804	88	231,586	87
8. Chemical and Allied Products	62,447	72	83,935	77	115,082	85
9. Miscellaneous	46,516	86	73,259	86	70,024	84
TOTAL	2,146,903	61	3,867,979	75	4,244,696	78

Table 4.

POWER EQUIPMENT OF MANUFACTURING INDUSTRIES^x IN CANADA, 1934

Industries	Total power employed	Electric Motors Operated			Electric Power	Consumption of Electricity		
		By central electric station power	By power generated in the industries	Total motor capacity	Per cent of Total	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	332,052	214,365	25,902	240,267	72.36	348,304	24,263	372,567
Biscuits, confectionery, etc.	22,299	19,239	306	19,545	87.65	30,078	...	30,078
Breweries	22,987	17,168	863	18,031	78.44	24,776	138	24,914
Flour & feed mills	123,442	58,387	2,904	61,291	49.65	96,789	654	97,443
Rubber goods, footwear, etc.	63,881	59,768	697	60,465	94.65	118,686	766	119,452
Sugar refineries	22,120	6,630	14,247	20,877	94.38	10,849	11,585	22,434
Bread & other bakery pdts.	15,769	14,094	...	14,094	89.38	24,167	...	24,167
Group 2. Animal Products	117,843	82,979	2,604	85,583	72.62	108,807	925	109,732
Butter and cheese	39,748	26,295	...	26,295	66.15	19,957	...	19,957
Leather tanneries	15,335	12,044	548	12,592	82.11	10,029	...	10,029
Slaughtering & meat packing	34,056	28,826	430	29,256	85.91	59,665	447	60,109
Group 3. Textiles and Textile Products	219,938	159,586	27,149	186,735	84.90	381,342	42,158	423,500
Cotton yarn & cloth	103,114	72,662	13,860	86,522	83.91	228,049	26,432	254,481
Dyeing, cleaning and laundering	15,024	9,530	5,786	15,316	101.94	13,301	...	13,301
Hosiery & knitted goods.	18,388	10,042	3,096	13,138	71.45	17,863	2,874	20,737
Silk & artificial silk ..	17,832	14,674	850	15,524	87.06	62,276	2,625	64,901
Woollen cloth	14,655	10,837	500	11,337	77.36	12,918	614	13,532
Group 4. Wood and Paper Products	2,115,205	1,171,128	357,930	1,529,058	72.29	8,460,640	1,184,434	9,645,074
Furniture	21,760	11,253	2,178	13,431	61.72	8,263	...	8,263
Planing mills, sash and door	47,078	26,081	1,997	28,078	59.64	11,536	6	11,542
Printing & publishing ..	24,752	22,929	646	23,575	95.24	25,254	45	25,299
Pulp and paper	1,654,085	1,029,308	303,023	1,332,331	80.55	8,360,423	1,184,354	9,544,777
Saw mills	283,682	20,329	45,665	65,994	23.26	7,638	...	7,638

Group 5. Iron and Iron								
<u>Products</u>	637,718	460,405	89,453	549,858	86.22	447,366	47,661	495,027
Agricultural implements.	21,676	18,126	72	18,198	83.95	10,595	215	10,810
Automobiles	38,090	14,889	22,616	37,505	98.46	10,836	21,542	32,378
Automobile supplies	30,873	28,905	...	28,905	93.63	23,091	2	23,093
Bridge & structural steel	39,066	37,821	...	37,821	96.81	5,428	...	5,428
Castings and forgings ..	63,813	59,453	1,343	60,796	95.27	50,958	590	51,548
Machinery	39,865	32,471	4,487	36,958	92.71	13,804	2,079	15,883
Primary iron and steel..	221,445	110,834	49,040	159,874	72.20	193,690	18,840	212,530
Railway rolling stock...	108,794	91,130	6,985	98,115	90.18	79,154	4,195	83,349
Group 6. Non-ferrous								
<u>Metal Products</u>	405,248	359,095	22,055	381,150	94.05	1,155,089	30,652	1,185,741
Brass and copper	24,311	22,748	343	23,091	94.98	21,257	...	21,257
Electrical apparatus and supplies	92,186	78,730	4,962	83,692	90.79	43,896	10,400	54,296
Non-ferrous metal smelting	279,023	247,889	16,750	264,639	94.84	1,077,755	20,252	1,098,007
Group 7. Non-metallic								
<u>Mineral Products</u>	231,586	187,301	13,953	201,254	86.90	462,353	10,666	473,019
Abrasive products	5,948	5,948	...	5,948	100.00	254,540	...	254,540
Cement	83,781	75,630	6,882	82,512	98.49	48,457	...	48,457
Clay products (domestic clay)	25,170	18,010	768	18,778	74.60	4,679	76	4,755
Coke & gas products	31,945	24,709	2,182	26,891	84.18	38,540	...	38,540
Glass products	12,315	11,807	...	11,807	95.87	22,198	...	22,198
Misc. non-metallic mineral products	7,004	6,956	37	6,993	99.84	32,227	...	32,227
Petroleum	36,774	20,037	1,992	22,029	59.90	44,905	3,665	48,570
Group 8. Chemicals and								
<u>Chemical Products</u> ...	115,082	88,821	9,084	97,905	85.07	931,632	65,622	997,254
Acids, alkalis & salts..	53,072	34,745	8,309	43,054	81.12	642,757	64,724	707,481
Fertilizers	23,100	22,980	15	22,995	99.55	207,251	...	207,251
Misc. chemical pdts.	6,358	3,907	127	4,034	63.45	47,446	...	47,446
Group 9. Misc. Industries								
<u>Ice, artificial</u>	10,861	10,811	...	10,811	99.54	21,968	...	21,968
Ship building & repairs.	42,521	31,730	2,250	33,980	79.91	8,339	123	8,462
TOTAL ALL MANUFACTURING								
<u>INDUSTRIES</u> x	4,244,696	2,779,913	550,500	3,330,413	78.46	12,336,893	1,407,272	13,744,165

x - Excluding central electric stations.

Table 5.

TOTAL POWER EMPLOYED IN MANUFACTURING INDUSTRIES^x IN CANADA

1 9 3 4

Provinces	Total power employed	Electric Motors Operated			Electric Power	Consumption of Electricity		
		By central electric station power	By power generated in the industries	Total motor capacity	Per cent of total	Purchased from cent. elec. stations	Generated by the industries	Total
	H.P.	H.P.	H.P.	H.P.	P.C.	(Thousands of Kilowatt Hours)		
P.E. Island	3,965	737	5	742	18.71	356	...	356
Nova Scotia	190,112	82,413	22,453	104,866	55.16	207,003	9,939	216,942
New Brunswick ...	186,987	95,941	46,362	142,303	76.10	328,312	98,476	426,788
Quebec	1,493,606	1,107,179	103,553	1,210,732	81.06	6,903,634	230,705	7,134,339
Ontario	1,680,373	1,121,025	253,685	1,374,710	81.81	3,746,549	707,342	4,453,891
Manitoba	94,329	79,418	313	79,731	84.52	235,175	219	235,394
Saskatchewan	34,165	20,767	54	20,821	60.94	60,209	78	60,287
Alberta	70,411	42,576	2,223	44,799	63.63	31,836	2,568	34,404
British Columbia and Yukon ...	490,748	229,857	121,852	351,709	71.67	823,820	357,944	1,181,764
CANADA	4,244,696	2,779,913	550,500	3,330,413	78.46	12,336,894	1,407,271	13,744,165

x - Excluding central electric stations.

Table 6.

POWER EMPLOYED IN THE MINING INDUSTRY IN CANADA

1934

Industries	Total power employed	Electric Motors Operated			Electric Power	Consumption of Electricity		
		By central electric station power	By power generated in the industries	Total motor capacity	Per cent of total	Purchased from cent. elec. stations	Generated by the industries	Total
	H.P.	H.P.	H.P.	H.P.	P.C.	(Thousands of Kilowatt Hours)		
Metal mining.....	307,674	239,296	33,119	272,415	88.54	610,758	92,144	702,902
Non-metal mining.	57,529	48,522	1,571	50,093	87.07	74,373	3,258	77,631
Sand, gravel and stone	42,703	31,101	791	31,892	74.68	18,289	381	18,670
Fuels	213,165	81,116	31,166	112,282	52.67	107,303	41,316	148,619
TOTAL MINING [/]	621,071	400,035	66,647	466,682	75.14	810,723	137,099	947,822

[/] Excluding non-ferrous smelting, salt, cement, clay products and lime, included with manufacturing industries.

MANUFACTURING INDUSTRIES

Table 7.

POWER EMPLOYED
H.P.

	1923	1924	1925	1926	1927
1. Vegetable products	257,176	258,719	266,709	267,643	280,170
2. Animal products	80,895	89,491	89,823	96,151	101,650
3. Textiles & textile products	107,850	139,482	144,579	153,295	157,055
4. Wood & paper products	1,146,571	1,215,688	1,317,502	1,552,885	1,770,909
5. Iron and its products	213,705	350,955	461,961	422,356	451,576
6. Non-ferrous metal products	99,963	104,010	222,737	228,870	237,520
7. Non-metallic mineral pdts.	131,780	121,386	126,190	150,915	160,196
8. Chemical & allied products	62,447	59,870	58,502	63,635	65,898
9. Miscellaneous industries	46,516	44,050	45,277	44,148	62,608
Total	2,146,903	2,383,651	2,733,280	2,979,898	3,287,582

Table 8.

EMPLOYEES
No.

	1923	1924	1925	1926	1927
1. Vegetable products	65,395	66,183	72,035	73,908	78,300
2. Animal products	61,517	57,779	63,675	67,843	68,381
3. Textiles & textile products	92,669	90,254	94,531	100,572	107,519
4. Wood & paper products	128,404	127,551	127,859	134,187	150,550
5. Iron and its products	88,071	78,314	90,125	103,510	106,293
6. Non-ferrous metal products	21,409	21,670	27,735	30,095	33,443
7. Non-metallic mineral pdts.	24,978	24,186	24,468	26,045	26,662
8. Chemical & allied products	15,149	13,796	13,951	14,345	14,559
9. Miscellaneous industries	16,581	15,814	16,583	17,628	18,518
Total	514,173	495,547	530,962	568,133	604,225

Table 9.

NET VALUE OF PRODUCTION
(Thousands of dollars)

	1923	1924	1925	1926	1927
1. Vegetable products	209,884	220,331	227,526	244,004	283,375
2. Animal products	110,090	109,784	115,863	122,921	132,261
3. Textiles & textile products	157,994	141,804	143,950	163,502	183,137
4. Wood and paper products	319,216	300,425	310,643	339,063	357,787
5. Iron & its products	209,542	174,107	205,041	247,168	264,819
6. Non-ferrous metal products	45,424	50,968	85,702	92,889	112,757
7. Non-metallic mineral pdts.	74,673	76,833	78,970	91,863	89,434
8. Chemical & allied products	56,606	53,905	56,608	62,465	63,854
9. Miscellaneous industries	36,455	33,317	33,989	39,836	44,467
Total	1,219,884	1,161,474	1,258,292	1,403,711	1,531,891

MANUFACTURING INDUSTRIES

POWER EMPLOYED

H.P.

	1928	1929	1930	1931	1932	1933	1934
	309,611	326,346	313,527	322,401	326,829	326,666	332,052
	104,166	101,268	105,833	98,892	100,069	112,035	117,843
	163,779	168,614	171,324	186,952	189,915	215,907	219,938
	1,908,738	2,022,839	2,126,515	2,126,398	2,094,010	2,035,112	2,115,205
	488,521	529,162	576,609	589,261	623,888	626,730	637,718
	294,642	351,752	401,817	424,738	450,271	434,581	405,248
	181,666	210,804	213,917	212,179	209,484	219,612	231,586
	71,401	83,935	87,382	96,893	105,671	110,873	115,082
	69,660	73,259	54,820	56,963	57,283	66,315	70,024
	3,592,184	3,867,979	4,051,744	4,114,677	4,157,420	4,147,831	4,244,696

EMPLOYEES

No.

	83,764	88,858	84,182	77,706	72,390	73,095	77,464
	67,777	67,670	57,657	51,297	49,953	53,111	57,199
	113,724	115,620	109,576	105,473	102,116	106,235	115,695
	158,005	164,800	156,724	121,672	107,834	105,471	116,691
	119,199	132,281	119,987	96,927	74,214	70,947	81,782
	35,568	39,867	38,756	34,414	26,704	25,273	30,177
	28,650	31,431	29,868	24,895	20,342	19,296	21,959
	16,130	16,694	15,503	15,207	15,295	15,397	17,130
	19,351	21,049	14,328	12,821	11,155	10,361	12,071
	642,168	678,270	626,581	540,412	480,003	479,186	530,188

NET VALUE OF PRODUCTION

(Thousands of dollars)

	317,073	344,438	314,513	274,475	211,601	197,607	210,899
	133,697	132,410	132,212	106,060	95,623	91,638	94,998
	191,672	205,943	177,251	163,967	144,943	150,131	160,723
	389,390	411,616	368,351	291,858	227,252	207,175	223,241
	300,015	353,087	288,032	203,970	123,542	114,256	143,370
	139,221	158,645	138,720	116,520	84,176	92,775	112,156
	112,398	124,874	109,606	102,486	73,407	70,077	71,357
	72,813	83,361	71,805	64,745	60,003	58,549	62,216
	50,440	60,092	35,458	28,190	21,258	17,919	21,522
	1,706,719	1,874,466	1,635,948	1,352,271	1,041,805	1,000,127	1,100,482

MANUFACTURING INDUSTRIESINDEX NUMBERS

(1923 = 100)

Table 10.

POWER EMPLOYED

	1923	1924	1925	1926	1927
1. Vegetable products	100	100.6	103.7	104.1	108.9
2. Animal products	100	110.6	111.0	118.9	125.7
3. Textiles & textile pdts.	100	129.3	134.0	142.1	145.6
4. Wood and paper products	100	106.0	114.9	135.4	154.5
5. Iron and its products	100	164.2	216.2	197.6	211.3
6. Non ferrous metal pdts.	100	104.0	222.8	229.0	237.6
7. Non metallic mineral pdts.	100	92.0	95.8	114.5	121.6
8. Chemical & allied products	100	95.9	93.7	101.9	105.5
9. Miscellaneous industries	100	94.7	97.3	94.9	134.6
Total	100	111.0	127.3	138.8	153.1

Table 11.

EMPLOYEES

1. Vegetable products	100	101.2	110.2	113.0	119.7
2. Animal products	100	93.9	103.5	110.3	111.1
3. Textiles & textile pdts.	100	97.4	102.0	108.5	116.0
4. Wood and paper products	100	99.3	99.6	104.5	117.2
5. Iron and its products	100	88.9	102.3	117.5	120.7
6. Non ferrous metal pdts.	100	101.2	129.5	140.6	156.2
7. Non metallic mineral pdts.	100	96.8	98.0	104.3	106.7
8. Chemical & allied products	100	91.1	92.1	94.7	96.1
9. Miscellaneous industries	100	95.4	100.0	106.3	111.7
Total	100	96.4	103.2	110.5	117.5

Table 12.

NET VALUE OF PRODUCTION

1. Vegetable products	100	105.0	108.4	116.3	135.0
2. Animal products	100	99.7	105.2	111.7	120.1
3. Textiles & textile pdts.	100	89.8	91.1	103.5	115.9
4. Wood and paper products	100	94.1	97.3	106.2	112.1
5. Iron and its products	100	83.1	97.9	118.0	126.4
6. Non ferrous metal products	100	112.2	188.7	204.5	248.2
7. Non metallic mineral pdts.	100	102.9	105.8	123.0	119.8
8. Chemical & allied products	100	95.2	100.0	110.4	112.8
9. Miscellaneous industries	100	91.4	93.2	109.3	122.0
Total	100	95.2	103.1	115.1	125.6

MANUFACTURING INDUSTRIESINDEX NUMBERS

(1923 = 100)

POWER EMPLOYED

	1928	1929	1930	1931	1932	1933	1934
	120.4	126.9	121.9	125.4	127.1	127.0	129.1
	128.8	125.2	130.8	122.2	123.7	138.5	145.7
	151.9	156.3	158.8	173.3	176.1	200.2	203.9
	166.5	176.4	185.5	185.5	182.6	177.5	184.5
	228.6	247.6	269.8	275.7	291.9	293.3	298.4
	294.7	351.9	402.0	424.9	450.4	434.7	405.4
	137.9	160.0	162.3	161.0	159.0	166.7	175.7
	114.3	134.4	139.9	155.2	169.2	177.6	184.3
	149.7	157.5	117.9	122.4	123.1	142.6	150.5
	167.3	180.2	188.7	191.7	193.6	193.2	197.7

EMPLOYEES

	128.1	135.9	128.7	118.8	110.7	111.8	118.5
	110.2	110.0	93.7	83.4	81.2	86.3	93.0
	122.7	124.8	118.2	113.8	110.2	114.6	124.8
	123.1	128.3	122.1	94.8	84.0	82.1	90.9
	135.3	150.2	136.2	110.0	84.3	80.6	92.9
	166.1	186.2	181.0	160.7	124.7	118.0	141.0
	114.7	125.8	119.6	99.7	81.4	77.3	87.9
	106.6	110.2	102.3	100.4	101.0	101.6	113.1
	116.7	126.9	86.4	77.3	67.3	62.5	72.9
	124.9	131.9	121.9	105.1	93.4	93.2	103.1

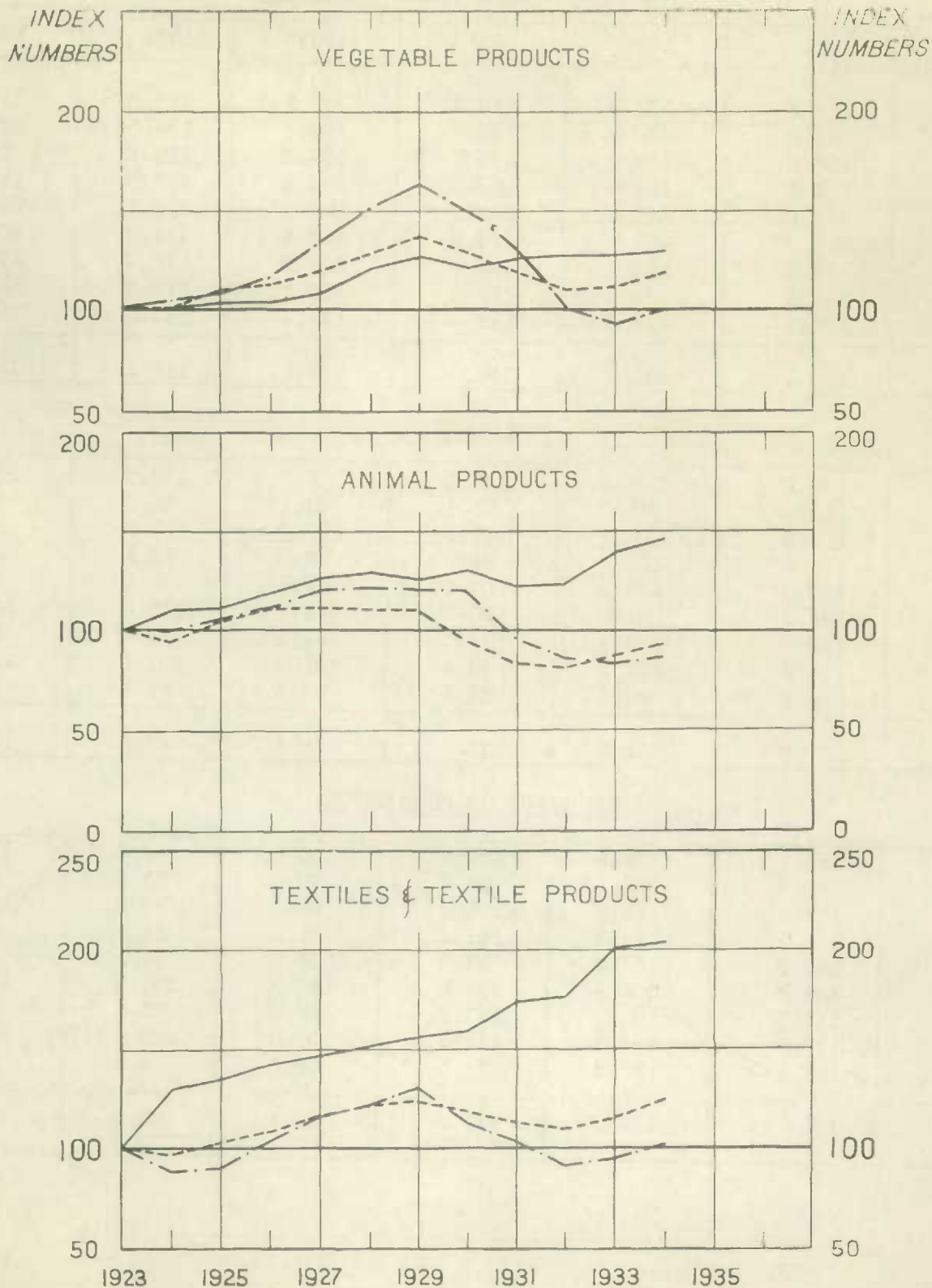
NET VALUE OF PRODUCTION

	151.1	164.1	149.9	130.8	100.8	94.2	100.5
	121.4	120.3	120.1	96.3	86.8	83.2	86.3
	121.3	130.3	112.2	103.8	91.7	95.0	101.7
	122.0	128.9	115.4	91.4	71.2	64.9	69.9
	143.2	168.5	137.5	97.3	59.0	54.5	68.4
	306.5	349.3	305.4	256.5	185.3	204.2	246.9
	150.5	167.2	146.8	137.2	98.3	93.8	95.5
	128.6	147.3	126.9	114.4	106.0	103.4	109.9
	138.3	164.8	97.3	77.3	58.3	49.2	59.0
	139.9	153.7	134.1	110.9	85.4	82.0	90.2

MANUFACTURING INDUSTRIES

1923=100

Chart 1
 Power Employed.....
 Employees.....
 Net Value of Production.....

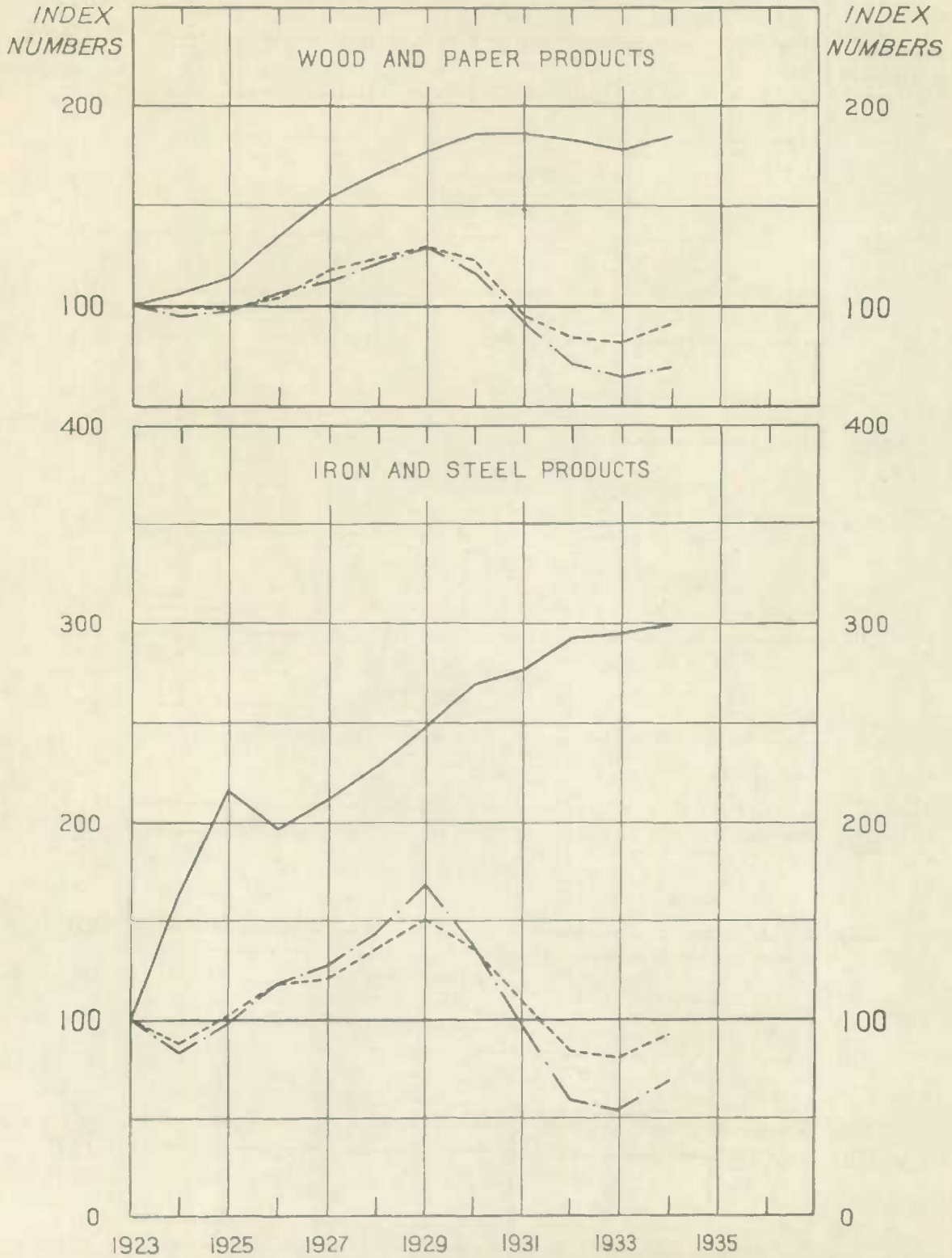


MANUFACTURING INDUSTRIES

1923=100

Chart 2

Power Employed.....
Employees.....
Net Value of Production.....

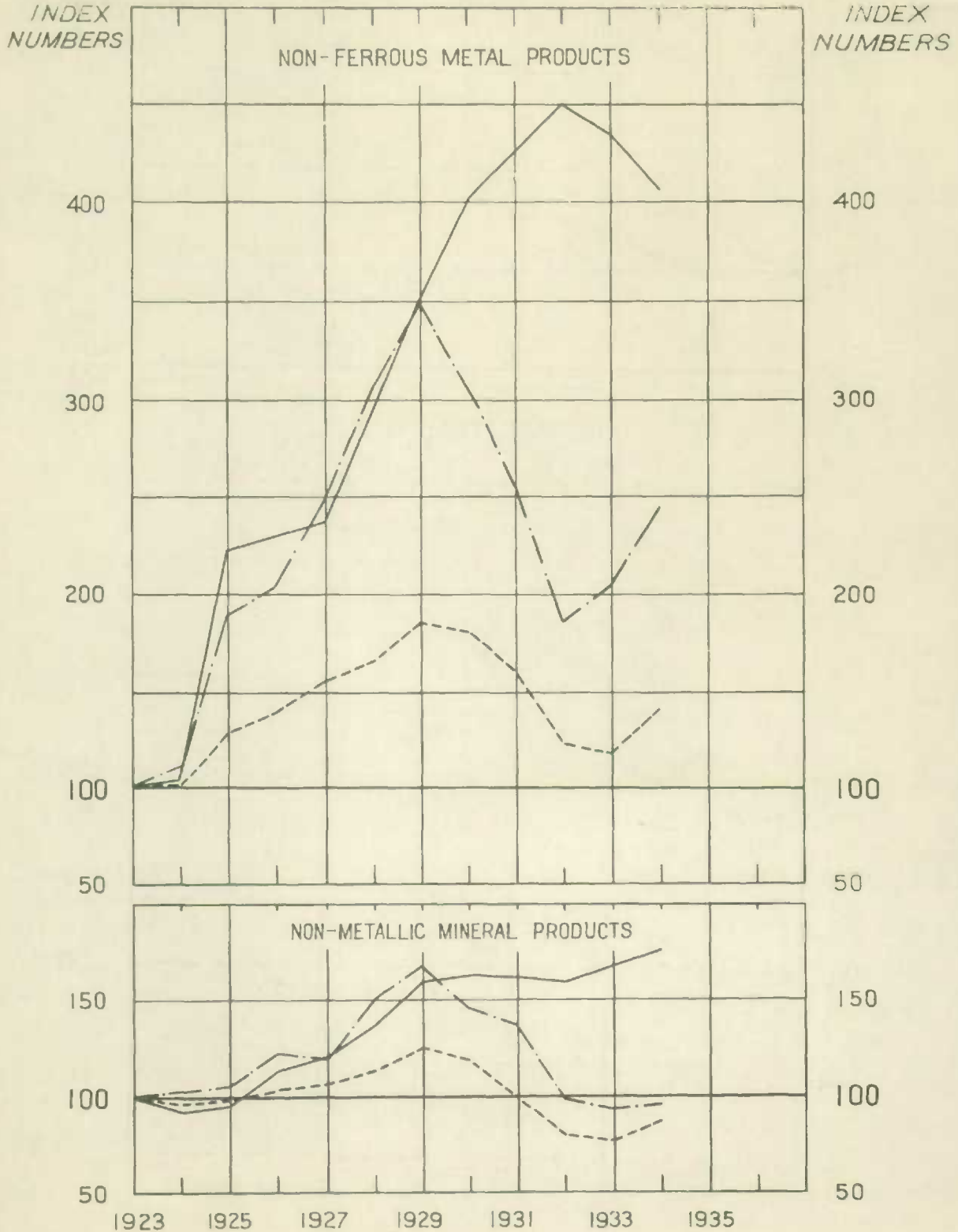


MANUFACTURING INDUSTRIES

1923=100

Power Employed
 Employees
 Net Value of Production

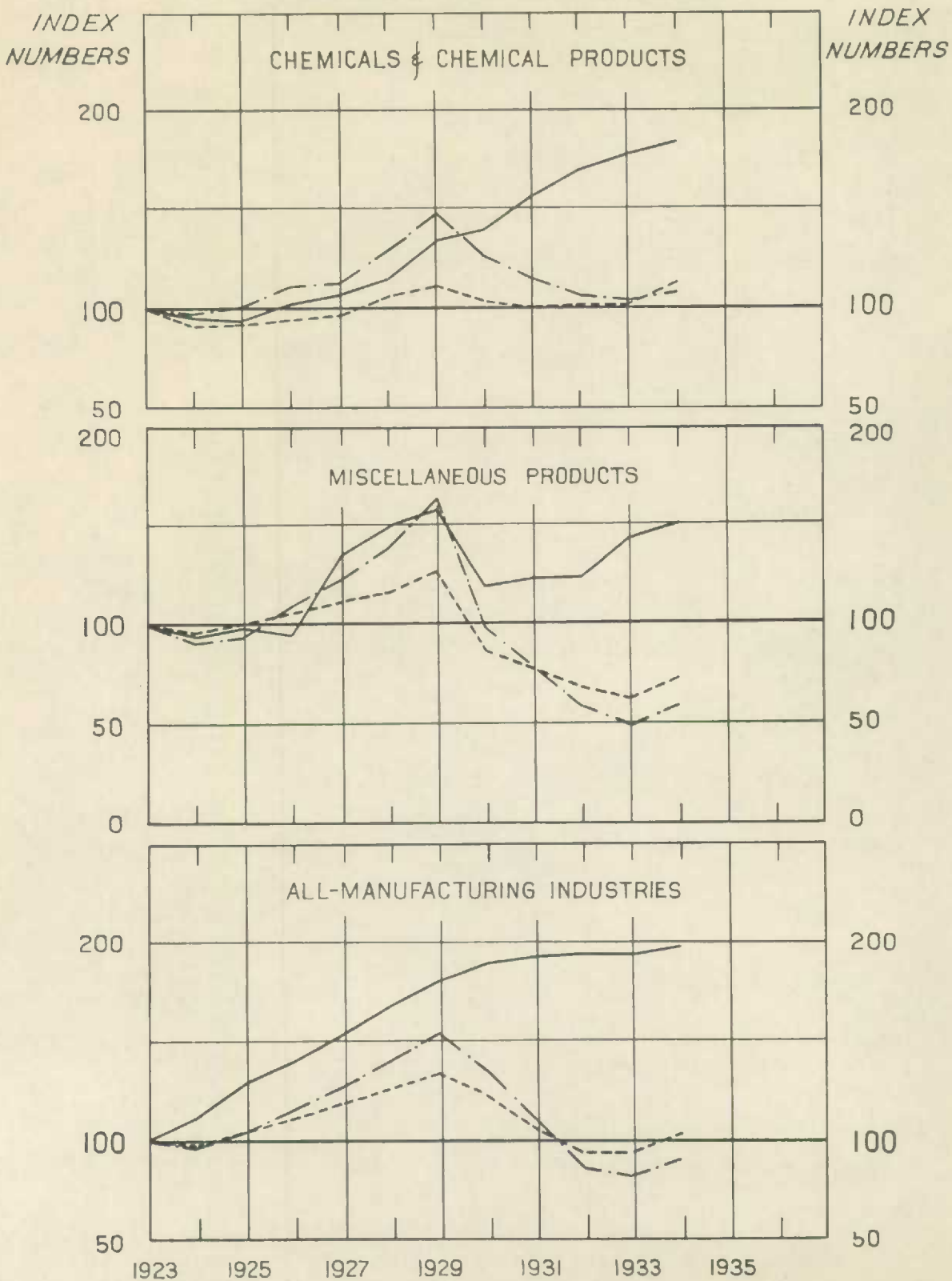
Chart 3



MANUFACTURING INDUSTRIES

1923=100

Chart 4
 Power Employed
 Employees
 Net Value of Production



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