

Dhananjayrao Gadgil Library



GIPE-PUNE-009909

COMBINES AND RATIONALISATION IN GERMANY

1924—1928

COMBINES
AND RATIONALISATION
IN GERMANY

1924—1928

By

D. WARRINER, B.A. (Oxon), Ph.D. (Lond.)

LONDON

P. S. KING & SON LTD.

ORCHARD HOUSE, WESTMINSTER

1931

X : 5170k84(D).5E

(1)

9909

CONTENTS

CHAP.		PAGE
	FOREWORD	vii
I	INDUSTRIAL AND FINANCIAL SETTING OF THE COMBINE MOVEMENT	I
II	THE EXTENT OF MARKET CONTROL	14
III	THE EXTENT OF RATIONALISATION	29
	(i) Meaning of the term.	
	(ii) Results up to 1928.	
IV	THE RATIONALISING AGENT : TRUST AND STATE	48
V	THE ACHIEVEMENT OF THE COMBINES	64
	A. In Heavy and Finishing Industries.	
	(I) Cost Reduction.	
	(II) Extension and Regulation of the Market.	
	B. In New Industries.	
VI	THE EFFECT ON GENERAL INDUSTRIAL CON- DITIONS	101
	(i) Cartels and the Price Level.	
	(ii) Combines and Investment.	
VII	THE PROBLEM OF STATE POLICY	125
	(i) The cartel decree : cartels.	
	(ii) The cartel decree : trusts.	
	(iii) The working of the decree.	
	(iv) Proposals for Reform.	
	(v) Practical obstacles to reform.	
VIII	THE PROBLEM OF THEORETICAL ANALYSIS OF THE COMBINE MOVEMENT	146

	PAGE
APPENDIX	
I STRUCTURAL CHANGES IN THE HEAVY INDUSTRIES AFFECTING COMBINATION ..	159
II EXTENT OF MARKET CONTROL	169
III EXTENT OF RATIONALISATION IN THE HEAVY INDUSTRIES	192
<hr/>	
BIBLIOGRAPHY	209

FOREWORD

THIS study was undertaken during my tenure of a research studentship at the London School of Economics and completed during my tenure of the Mary Somerville Research Fellowship at Somerville College, Oxford. My thanks are due to Professor D. H. Macgregor, Dr. Hugh Dalton and Mr. J. W. F. Rowe for their assistance and advice. I have also to thank Herr Präsident Lukas of the Reichswirtschaftsgericht, who gave me access to records of the cartel court and enabled me to attend its sittings, and Professor Dr. Hirsch of Berlin for information about the effects of the cartel decree. In collecting material I was enabled by the courtesy of the Verein deutscher Maschinenbauanstalten to use their special publications and records. To Professor Harms of Kiel I am very deeply indebted for permission to use the collections of cartel contracts and annual reports in the library of the Institut für Weltwirtschaft at Kiel, and for much valuable advice.

During many months' residence in Germany I naturally obtained much information, personally given, on small points, but have relied chiefly on the very full and detailed reports of the Ausschuss zur Untersuchung der Erzeugungs- und Absatzbedingungen der deutschen Wirtschaft, since they provide original sources for the study of the whole German economic system which render direct investigation unnecessary.

D. WARRINER.

September, 1930.

APPENDIX I

STRUCTURAL CHANGES IN THE HEAVY INDUSTRIES AFFECTING COMBINATION

I. INCREASE IN SIZE OF COAL UNDERTAKINGS

Up till 1924 official statistics did not define establishment or undertaking, sometimes using the term "Werke," meaning one undertaking with all its shafts, sometimes one shaft: in that year classification on the latter basis was introduced. In the following table this classification has been used for the 1900 results: the 1913 figures are not comparable as they are based on the former classification.

No. of Independent "Werke."

Output.	1900.		1924.		1927.	
	No.	Output.	No.	Output.	No.	Output.
Under 1,000 tons	15	34,594	25	73,087	13	19,000
10-100 thousand	20	1,086,567	19	1,125,843	9	475,530
100-500 thousand	155	43,306,347	153	46,285,091	81	30,675,971
500 thousand - 1 million	24	15,689,870	64	43,436,869	99	68,790,634
Over 1 million	—	—	3	3,206,840	14	18,060,951
Total		60,119,378	264	94,127,750	216	118,022,086

Percentage of Total Output.

	1900.	1924.	1927.
Under 1,000 tons	0.07	0.07	0.02
10-100 thousand	1.95	1.20	0.40
100-500 thousand	70.75	49.17	26.00
500 thousand-1 million ..	27.23	46.15	58.28
Over 1 million	—	3.41	15.30

	Plant Mill. RM. 1913.	Coal Output Mill. tons. 1913.	Coke Output Mill. tons. 1913.	Plant Mill. RM. 1926.	Coal O. Mill. tons. 1926.	Coke O. Mill. tons. 1926.	Depre- ciation Mill. RM. 1926.	Balance Sheet Profit Mill. RM. 1926.
Adler	—	—	—	6.976	0.991	—	0.432	0.409
Concordia	—	—	—	31.132	1.545	0.285	5.360	0.117
Constantin	35.289	2.801	0.808	30.499	2.611	0.719	1.735	—
Dahlbusch	13.171	1.206	0.152	13.733	1.070	0.126	1.680	1.278
Diergardt	15.003	0.491	—	11.520	0.712	—	0.400	0.550
König Wilhelm	23.116	1.191	0.402	24.707	1.074	0.226	0.949	1.303
Essener Steinkohlen	35.380	2.629	—	50.568	3.523	0.254	2.815	4.445
Friedrich Heinrich	40.705	0.468	0.146	19.341	1.399	0.572	0.976	2.612
Harpen	139.184	8.626	1.632	93.730	7.943	1.333	17.617	7.192
Hibernia	103.145	5.698	0.716	58.661	5.088	0.709	5.253	2.804
Klöckner	30.000	1.859	0.855	71.223	3.972	0.829	3.053	—
Köln-Neuessen	13.042	1.949	0.315	57.481	2.623	0.455	4.007	—
König Ludwig	33.603	1.433	0.472	31.567	1.421	0.345	1.314	1.974
Langenbrahm	15.966	0.766	—	12.558	0.776	—	0.531	1.776
Lothringen	—	—	—	76.180	1.345	0.364	3.863	2.151
Magdeburg Bergw.	2.947	0.584	—	10.598	0.542	—	0.347	0.144
Mülheim Bergw.	18.515	1.485	0.076	8.561	1.386	0.058	0.619	0.695
Niederrhein Bergw.	—	—	—	8.878	0.458	—	0.405	0.17
Recklinghausen	—	—	—	37.904	4.687	0.921	3.150	3.478
Westfalen	—	—	—	15.306	0.792	0.163	1.000	0.21
Total	519.066	31.186	5.574	671.123	43.958	7.359	55.506	30.636
Value of Plant per ton coal output	16.64			15.27				

Defining the undertaking as the concern, the increase in size can only be indicated roughly by pointing out that when the syndicate was formed in 1893 it had ninety-eight members, and when the new contract was signed in 1925, fifty-seven. At the foundation the Harpen mine had the highest output capacity with three million tons per annum; now the highest capacity is ten million tons (Gelsenkirchen) and ten concerns exceed the three million ton figure; the smaller undertakings, however, have not closed down; thirty-seven members of the syndicate have quotas under 1.6 mill. tons. The increase in size is due partly to expansion in the northern limits of the coal field, where shafts must be deeper and capital therefore larger, partly to the causes mentioned in the section on iron and steel.

II. EFFECTS OF THE LOSS OF LORRAINE ON THE STEEL INDUSTRY.

Before the war Lorraine and Luxemburg supplied the Ruhr blast furnaces with ore, and in their own blast furnaces made pig iron for the Ruhr rolling mills; in return the Ruhr sent coal, coke and finished steel products to Lorraine and Luxemburg. Ruhr mine-owners owned blast furnaces and ore mines in Lorraine, Lorraine ore mine-owners owned rolling mills in the Ruhr; each district was so necessary to the existence of the other that the two branches were considered members of one economic system, the heavy industry of the Continent. The treaty destroyed the system. Lorraine had to rely on compulsory coal deliveries, and had to build steel works to finish her pig iron; the Ruhr had to build blast furnaces and find alternative supplies of ore.

The tables illustrate the completeness of the destruction of the system, and the Ruhr's recovery.

Receipt of Coal, Iron and Steel in Rhineland-Westphalia from Lorraine, Luxemburg, Saar and France.

Metric tons.

	1913.	1925.
Pig Iron	1,015,460	17,849
Semi-finished	536,626	132,226
Rolling Mill Products	461,234	88,482
Apparatus	4,374	3,522
Scrap	219,164	25,637
Ore	3,913,777	682,138
Coal and Coke	480,209	226,281
Total	6,630,844	1,176,135

Deliveries of Coal, Iron and Steel from Rhineland-Westphalia to Lorraine, Luxemburg, Saar and France.

Metric tons.

	1913.	1925.
Pig Iron	179,347	21,168
Semi-finished	52,558	233
Rolling Mill Products	145,461	11,370
Apparatus	28,922	4,573
Scrap	4,387	4,633
Ore	5,574	1,965
Coal and Coke	9,381,459	6,375,365
Total	9,797,708	6,419,307

German Iron and Steel Production.

1,000 Metric tons.

	Pig Iron.		Ingot Steel.		*Rolling Mill Products.	
	1913.	1925.	1913.	1925.	1913.	1925.
Rheinland-Westphalia	8,209	8,000	10,112	9,895	9,181	8,161
Siegerland	995	581	388	285	446	451
Saar	1,371	—	2,080	—	1,652	—
Lorraine and Luxemburg	6,418	—	3,623	—	3,033	—
N., E., and C. Germany	1,001	1,050	1,072	1,432	917	1,143
South Germany	320	257	253	215	191	204
Silesia	995	289	1,407	366	1,279	287
Total: pre-war area	19,309	—	18,935	—	16,699	—
Total: post-war area	10,907	10,177	12,236	12,193	11,005	10,246

1909-13.	Pig Iron.	Ingot Steel.	*Rolling Mill Products.	
Average Annual Production (post-war area)	9,240	—	—	11,005
1913	10,907	12,236	—	9,520
1924	—	—	—	—
1925	10,177	12,193	10,426	9,308
1926	9,644	12,342	—	9,017
1927	13,103	16,305	—	—

* Includes rails, sleepers, and fish plates, girders, steel bars, loops and strips, rolled wire, sheets and plates, tin plates, tubes, axles and wheels, forgings and other finished steel.

(1) The first most obvious consequence of the loss of Lorraine is a greater output of ingot steel in relation to pig iron, as a result of the Ruhr taking over the production of semi-finished goods which were produced in the minette area. The Ruhr district has increased its surplus production of ingot steel from 9 per cent. to 17 per cent., although the Empire is now a minus area for ingot steel.

	Ingot Steel in % of Pig Iron.		Rolling Mill Products in % of Ingot Steel.	
	1913.	1925.	1913.	1925.
Rheinland-Westphalia ..	123	126	91	83
Siegerland	39	49	115	158
Saar	152	—	79	—
Lorraine and Luxemburg	56	—	84	—
N., E. and C. Germany ..	107	136	86	79
South Germany	79	84	75	95
Silesia	141	127	91	78

(2) It might be expected that the loss of Lorraine would have necessitated a much larger import of ore. Under the treaty Germany lost 79.7 per cent. of her average annual ore output in the years 1909-13 (31 million tons with an iron content of 9.4 million tons) leaving her with almost no ore above the U.S. mining standard (45 per cent. Fe), for there are no rich ores and so-called middle grade ores (40-55 per cent.) are only found in small quantities in the Siegerland, the valley of the Lahn and Dill (Hesse) and the Harz foreland. What deposits are left (estimated at 474 million tons in 1926 against France's 9,763, U.S.A.'s 4,258, England's 2,929 and Sweden's 1,335) are worked under difficulties, too much quartz in the Siegerland, too much sulphur and phosphorus in the Lahn and Dill, too high mining costs in the Harz. The output of these seams, about 4 million tons per annum (2.5 million tons from Siegerland, 1.5 from the Lahn and Dill and other districts) cannot be increased; in 1927 the home output only provided 13.6 per cent. of the total ore consumed (11.8 per cent. of iron content). The existence of the entire ore mining industry is not economically justifiable. Evidence produced for the Enquête Ausschuss proves that without a subsidy, and allowing a proper depreciation figure, the balance sheets of all firms in the industry would show a loss; even with the subsidy (for half the year) the 1926 balance sheets of eleven of the twenty-seven Siegerland firms showed no profit, and of these eleven, seven in 1927 were still working at a loss; conditions

in other districts are less uniform, but generally speaking are as uneconomic as those of the Siegerland.

This state of affairs is due to the increase in costs, in the Siegerland in 1926, 25 per cent. higher than in 1913, in the Lahn and Dill 37.6 per cent. (exclusive of depreciation) while profits have not increased in proportion, being in the Siegerland 3.7 per cent. higher than in 1913, in the Lahn and Dill 10.8 per cent. higher. Costs are higher because it is necessary to work at greater depths, using more explosives. There is no hope of improving the situation by any sort of "rationalisation": every effort has been made to introduce the best methods, with the result that output per man shift in 1926 was a little higher than the 1909-13 average, though in no district was the 1913 level exceeded.* Nor can organisation do anything; in both areas the mines are owned by the Rhenish-Westphalian concerns and there is consequently no purchasing organisation in the home market.† There are two cartels, the Siegerland Eisensteinverein, and the Berg-und Hüttenmannische Verein, Wetzlar, both nominally controlling the whole output of their districts, but the former must allow such high self-consumption quotas that its power of market control is small, and the latter is no more than a loose price convention.

It is generally agreed that the mines must be subsidised in the interests of the population of the districts, which has no alternative industry and whose agricultural resources are poor; from June, 1926, the mines received a premium of 2 RM. per ton of output from the Reich and the governments of the states concerned. But the indefensibility of the subsidy on economic grounds was generally admitted and the premium ceased in the autumn of 1927; it was hoped that the special railway tariff then introduced would assist the mines for a time. The problem of the transfer of an industrial population—on a smaller scale resembling the British—remains to be dealt with.

Import of ore has in consequence increased in volume and the Ruhr industry relies to a greater extent on the Swedish supply.

	Siegerland.	Lahn and Dill.
*Monthly average output 1909-1913 ..	16.8 tons	16.1 tons
1913 ..	19.4 ..	18.2 ..
1926 ..	17.5 ..	18 ..

† Percentage of output controlled by concerns, 1926.

Siegerland.		Lahn and Dill.	
United Steel Works 44.5%	Krupp 36.5%	Gutehoffnungshütte 10.5%	
Krupp .. 21.4	Buderus 13.1	Preussag .. 6.3	
Hoesch .. 8.2	Bürger 10.9	United Steel Works 5.8	

Import of Iron Ore.

	Million tons.	Iron Content.
Average 1919-13	12.029	5.64
1922	11.013	5.55
1923	2.377	1.32
1924	3.076	1.79
1925	11.579	6.27
1926	9.553	5.07
Jan.-Sept. 1927	13.358	6.99

Import from Principal Sources.
Thousand tons, Iron Content.

	1909-13.	1925.	1926.	1927.
Belgium*	113.7	109.5	86.9	87.9
France†	870.8	408.8	537.2	966.8
Sweden	2,225.5	4,475.7	3,566.3	5,361.1
Other countries	2,428.3	275.4	872.2	2,288.6

* From 1925 including Luxemburg.

† From 1925 including Lorraine.

Germany has always taken the greater part of the Swedish ore export, and though her share declined in the years immediately after the war it is now greater than in 1913. The higher iron content compensates for the higher transport costs.

*Total Swedish Ore Export.**Export to Germany.*

	Mill. tons.	
1909	3.19	2.5
1913	6.44	5.00
1919	2.41	1.47
1920	3.72	2.60
1921	4.33	3.25
1922	5.32	3.94
1923	4.95	2.50
1924	5.94	4.29
1925	8.80	7.12
1926	7.65	6.18

No difficulty in securing adequate supplies of ore is likely to arise except in so far as the power of producers in Sweden and Lorraine may be strengthened by political efforts to restrict production. In this one field the Ruhr industry finds itself dependent (for the foreign properties owned by it are at present insignificant) on the policies of other monopolistic organisations, the Swedish trust (the Trafikaktiebolaget Grängesberg-Oxelösund) controlling 90 per cent. of the Swedish phosphoric ore output, the Lorraine syndicate (Somilor) controlling the output of the minette area. At present there is no friction between the powerful groups; contracts are made between individual works and mines for the most part, though the Ruhr firms collectively have signed long-period contracts covering 60 per cent. of the total supply from Sweden; only about 20-25 per cent. of the total import passes through the hands of the trade.

The increase of ore import has not been greater because scrap consumption has increased. Of the iron content of the raw material required by the iron and steel industry for an annual output of 12 million tons of ingot steel, half takes the form of scrap, one-third of foreign ore, one-sixth of German ore.

Total Consumption of Scrap Iron.

Ore.

	Thous. tons.	%	Thous. tons.	%
Pre-war area, 1913 ..	6,892	27	16,100	73
Post-war area 1913 ..	4,766	32	10,560	68
1924 ..	5,057	44	6,600	56
1925 ..	5,980	39	8,950	61
1926 ..	6,006	41	8,660	59

Consumption of scrap could be increased by increasing the output of Siemens Martin steel, which since 1917 has exceeded that of Thomas steel.

*Change of Processes.
Steel Output in 1,000 tons.*

	Bessemer and Thomas.	Siemens Martin.
1913: old frontiers ..	9,373	7,418
1913: post-war frontiers	5,166	6,147
1924	4,017	5,462
1925	5,133	6,607
1926	5,453	6,582
1927	6,904	9,191

Area.	Year.	Total Ingot Steel Output.	Siemens Martin.	Thomas, Bessemer and other.
Rhineland-Westphalia ..	1913	10,112,000	5,139,300	4,972,700
	1925	9,895,700	5,251,800	4,643,900
West Upper Silesia ..	1913	349,200	349,200	—
	1925	366,400	366,700	—
North, East and Central Germany	1913	740,900	437,200	303,700
	1925	984,800	571,900	412,900
Siegerland, Lahn and Dill, Upper Hesse	1913	388,300	388,000	300
	1925	284,800	273,000	11,800
Saxony	1913	331,100	243,800	87,300
	1925	447,500	392,200	55,300
South Germany ..	1913	253,000	32,800	220,200
	1925	215,300	66,400	148,900

Scrap Consumption.

NORMAL CHARGE OF SCRAP.

Blast furnaces. 10 per cent., varying in different districts and depends on price relation of ore and scrap.

Siemens Martin Furnace. 70-80 per cent, about the same for acid and basic and for different sizes of furnace.

Cupola Furnace. 50-70 per cent.

Electro Furnaces. 70-100 per cent., size of furnace is indifferent.

Percentage of Total Scrap Consumption.

	1913.	1925.
Blast Furnaces ..	2.5	10
Foundries	14.5	14.2
Steel works ..	81.1	77.1

Average Charge of Scrap in German Blast Furnaces, per 100 tons Pig Iron.

	Tons.
1913	1.24
1919	12.30
1920	14.90
1921	14.52
1922	10.44
1923	10.45
1924	9.22
1925	6.31
1926	6.75

The increased demand in the years immediately after the War was met by the sale of Government stocks and the breaking up of the fleet, but these supplies have now ceased and

the question of the future supply and demand for scrap is acutely interesting and peculiar to Germany. Import is impossible since export is prohibited by all surrounding states. At present there is no absolute shortage on account of the export prohibition, and the fact that the steel industry is not working to capacity ; but it is believed that if the export prohibition were removed and the industry occupied to, say, 90 per cent. of its capacity, a scrap shortage might easily ensue, which would seriously affect the industry, especially the Central German and Eastern works, which rely almost entirely on scrap. Shortage of ores with high phosphoric content will necessitate further reliance on the Siemens Martin process in years to come, and scrap shortage would therefore necessitate production of pig iron of a kind suitable for use in the Martin steel works.

Hence the greater part of the evidence given to the committee of the Enquête Ausschuss is occupied by calculations of the amount of investment in iron and steel goods, with the object of estimating the future supply. The amount available at the present time is determined by the cost of transport. Since the pre-war period scrap freights have increased (1927) 38 per cent. for 400 km., 50 per cent. for 200 km., 60 per cent. for 50 km., with the result that though the price of scrap is not higher than in the pre-war period, its cost to the consumer has increased as much as that of ore, of which the price increase is roughly 20 per cent., and average transport cost 40 per cent. For many years the Western works have tried to persuade the Reichsbahn to introduce a through tariff, in conjunction with the Rhine shipping and canal authorities, thus forming a cheap route from South Germany to the Ruhr, a proposal recently finally rejected. In the East there are no waterways and general reduction of rates are the works' only hope ; how much higher the German rates are than those of other countries is illustrated by the experience of the compulsory scrap deliveries to Poland ; from Danzig to the Polish works the rate was 6.50 RM. per ton, from Stettin, the same distance, 16 RM.

APPENDIX II.

EXTENT OF MARKET CONTROL

I. CHEMICALS.

(A) Branches Controlled by the Trust.

The presence of the valuable by-products of Ruhr coal and the absence of pyrites mines necessitated the German industry's specialisation on the organic branch, in which before the war it held a monopolistic position. At the time German agriculture relied upon import of Chilean nitrate and the potash deposits. During the war, Britain, France, and the United States, being cut off from their source of supply, began to produce their own dye-stuffs, and German agriculture looked for a substitute for its nitrates, with the result that the German industry lost its monopolistic position in one branch at the same time as it widened its range. The great dyes firms were obliged to take the initiative in carrying out the requirements of the Hindenburg programme, for only they had the necessary experience and equipment. Not until 1925 did the chemical industry turn its attention to the manufacture of artificial silk.

The result of the industry's wider scope has been a change in location; the three main areas are engaged on different branches of production. Since the discovery of the alizarine process in 1869, the Upper Rhine and Main area has been the centre of the dye-stuffs industry, owing to its plentiful water supply and water transport facilities for Ruhr coal. All the dye factories are situated on the river banks, Weiler-ter-Meer, Bayer, Kalle and Badische Anilin on the Main. The towns in this area show the highest degree of industrial concentration in Germany: 63 per cent. of the total population of Ludwigshafen in 1925 were engaged in industry, 21 per cent. in chemicals, the highest percentage in any town engaged in any single industry.

The Central German area before the war produced only heavy alkalis and superphosphates, the large soda manufacturers, after the discovery of the Solvay process and abandonment of the Leblanc, having left their original site near Ruhr coal for the Halle salt deposits and adjacent lignite. The smaller Leblanc factories situated in Central Germany continued to make soda on the old process, relying on chloride of potash as a by-product until the discovery of the new process by a Bitterfeld factory

forced them to give up both and take up manufacture of superphosphates. At Oppau, the production of synthetic nitrogen had been carried on on a small scale before the war, but the plant was not extended during the war, being within the range of enemy aircraft: the great emergency plants were constructed at Leuna and Piesteritz in Central Germany, their site being chosen for the lignite deposits, which contain a high percentage of bitumen and provide the material for the Farben Industrie's coal distillation experiments. Should these succeed, the value of the Central German area's output will greatly exceed that of the Lower Rhine area; at present it is perhaps 75 per cent. as great.

The Cologne area is the site of the artificial silk works: the value of its output is probably about 25 per cent. as great as that of the Lower Rhine area. The many solitary sulphuric acid works which the trust controls are scattered over wide areas, because the industry must be situated near its consumers and use water transport if possible; hence works are found on the Elbe near Hamburg and Magdeburg, on the Oder at Stettin and Breslau, and in and about Danzig, Memel and Posen.

In all important products, the trust has the advantage of local concentration. Since the fusion it has re-organised the management of its works, dividing them into four districts, Upper Rhine, Middle Rhine, Lower Rhine and Central Germany. Further, it has concentrated certain branches of production in certain firms, for instance, pharmaceutical products in the Leverkusen and Höchst works: and has continued the process of concentration already begun, in the case of Griesheim (heavy chemicals) and photographic materials (Agfa).

(i) *Dyes.*

In this branch the trust has a monopoly.* Since the fusion it has re-organised its production, closing down three works, Leonhard of Mulheim, Wülfig-Dahl of Barmen, Jäger of Düsseldorf, which together accounted for about 1.5 per cent. of the total output. The works share in the total output as under:

	Per cent.		Per cent.
Ludwigshafen ..	23.10	Agfa, and Wolfen ..	11.20
Leverkusen ..	20.50	Kalle, Biebrich ..	4.45
Höchst ..	17.90	Weiler-ter-Meer ..	3.40
Casella, Frankfurt ..	14.80	Griesheim ..	3.25

* Another dye concern exists, of little importance compared with that of the trust, for its capital is small (15.20 Mill. RM.) and it is believed that the fusion of the members of the trust (Heyl, Beringen and Gützbrod) in October, 1927, was financed by the I.G. Wiedenfeld in his C.E.I. memorandum suggests that it is a rival of the trust which, of course, is impossible.

The production of dye-stuffs proceed on a unified plan ; certain dye-stuffs are concentrated in certain works. The number of dye-stuffs has been reduced from about eight thousand to two thousand.

Foreign competition in the home market has not been excluded as was expected, and the trust has met it, not by reducing prices but by a propaganda campaign for fadeless dyes—the so-called "Indanthren" dyes, which has succeeded in convincing consumers that no other dyes are fadeless and has secured the market at least for high quality dyes. Thus import is now confined to the cheaper qualities.

Average Value per 100 kg. in RM.

GERMAN EXPORT :	1925.	1926.	1927.
Anilin and Tar product dyes	728	625	537
Alizarin dyes	1,048	885	1,163
GERMAN IMPORT :			
Anilin and Tar product dyes	475	475	475
Alizarin dyes	452	451	456

The price policy of the trust has not been extortionate, but it is arguable that the "Indanthren" dyes campaign was economically unjustifiable, since the campaign itself was costly and has no doubt stimulated the use of higher quality dyes when lower quality would do. There can be no question of exploiting the home market to compensate the lower prices in the foreign market, because at least 75 per cent. of the trust's output is exported (estimated at 85 per cent. before the war).

(ii) *Nitrates.*

The trust owns the patents for the two chief processes for the fixation of atmospheric nitrogen, Frank-Caro (cyanamide) and Haber-Bosch (the direct synthesis of ammonia), using the Haber-Bosch process at the Badische Anilin works at Oppau, which was producing before the war, and the Leuna works at Merseburg constructed during the war ; until recently it also used the Caro process at the Knapsack works, but these have recently been converted to production of synthetic acetic acid. Under the Hindenburg programme, works were constructed by the government at Piesteritz, using the Caro process, now the property of the Mitteldeutsche Stickstoffwerke A.G. Recently these also have been converted ; half of the works are rented to the Farben Industrie and the Bayerische Stickstoffwerke A.G. for the production of electrolytic phosphorus, and in the other half the calcium cyanamide produced in the Bavarian works is converted

into nitrates. The only important independent calcium cyanamide producer at present is therefore the Bayerische Stickstoffwerke A.G., at Trostberg, whose output is small compared with that of the trust. So far as these two processes are concerned, the trust dominates the industry. To make the present position clear it is necessary to explain the nature of the processes used, because the industry has not yet taken a permanent technical form (in so far as any branch of the chemical industry is technically permanent). Costs of production of the processes are more or less equal and too high, as a result of the high cost of sulphuric acid, due to the absence of supplies of pyrites; the Haber-Bosch process requires large quantities of sulphuric acid (4 kilograms of 60° Bé to fix 1 kilogram of ammonia), and would be more costly than ammonia produced as a coke oven by-product, if the Caro product, nitro-lime, could be used alone; nitro-lime, however, is a fertiliser useful for some soils but generally dangerous and requiring the addition of sulphuric acid in the form of ammonium sulphate, with the result that the final product requires as much sulphuric acid as the Haber-Bosch. Thus the high cost of nitrate production has driven German agriculture to the use of nitro-lime alone and the Badische Anilin works to experiment with the object of perfecting the gypsum process for the production of ammonium sulphate, which dispenses with sulphuric acid.

Since the cost of synthetic nitrate production does not compare favourably with that of natural and by-product nitrates there are great possibilities for any concern which may hit upon a more profitable process, and the trust is anxious to suppress competitors of this kind. Two Ruhr mines, the Mont Cenis (Röchling concern) and Hibernia (property of the Prussian state) together founded the Gasverarbeitungs G.m.b.H. in March, 1927, to use the Uhde process, similar to the Haber-Bosch but working at lower pressure. The I.G. Farben Industrie, apparently not relying on expert opinion (which held that the process had no commercial future), in May, 1927, brought a suit for infringement of patent against Mont Cenis, which it lost. It is said that the Mont Cenis mine is financed by the Prussian government with the intention of destroying the Farben Industrie's monopoly: so presumably if the process is successful the coal mines will seek no agreement with the trust. Another Ruhr concern, Klöckner, is installing plant for the Claude process working with higher pressure than the Haber-Bosch; and in October, 1927, the United Steel Works and other Ruhr concerns founded the Kohlechemie A.G. to use the Casale process. The competitors are no longer by-product ammonia, Chilean nitrate, and synthetic nitrates, but synthetic nitrate produced by different processes, and mixed fertilisers of different composition.

German Nitrate Output.
In 1,000 tons Pure Nitrates.

	Fertiliser Years.		
	1926/27.	1927/28.*	1928/29.*
I.G. Farben Industrie: Oppau ..	100	100	100
Leuna ..	340	500	600
A.G. für Stickstoff. (arc) ..	5	10	10
Elektro Nitrum process (cokery) ..	4.5	50	50
Chem. W. Lothringen ..	30.5	50	50
Total ..	480	660	760
Bavarian and Central German works			
cyanamide ..	45	90	90
Ammoniak Verkaufs Vereinigung ..	60	80	96
Gaskoks Syndikat ..	—	—	60
Other cokng plant ..	—	2	12
Ruhr coal interests:			
Mont Ceniz and Hibernia ..	—	—	?
Klöckner-Wintershall ..	—	—	—
Ruhr Chemie A.G. ..	—	—	—
Total ..	585	832	1,018

* Waller's estimates.

B. Branches in which Other Producers Exist.

(i) *Heavy Chemicals.*

"In pre-war days sulphuric acid was regarded as the most important heavy chemical for use as a re-agent in almost every staple industry. Today probably about one-half of the sulphuric acid manufactured in the world is used in converting phosphate rock into the fertiliser, superphosphate of lime. The second largest use is in connection with the recovery of ammonia at gas works and at cokng plants."* Since the war both consumers have had to meet the competition of the atmospheric nitrogen industry, and their demand has declined while the nitrate processes have not provided a substitute, for the I.G. Farben Industrie, in order to reduce the cost of synthetic nitrate production and to free itself from dependence on foreign pyrites, uses processes which reduce its works' consumption of sulphuric acid and is carrying on experiments in its laboratories to discover methods of eliminating its use still further. As a result of the competition of synthetic nitrates with the products of the acid's chief consumers (including the explosives industry) combined with these attempts, the German output of sulphuric acid in

* See C.E.I. memorandum on the Chemical Industry.

1925 only reached two-thirds of the 1913 output, though the world output exceeded that of 1913 by 25 per cent. When the new process of phosphate conversion in the electric furnace is perfected the industry must face gradual extinction.

The trust controls numerous sulphuric acid works, supplying its own needs largely from those at Griesheim; it does not appear to injure the independent producers and indeed would have no object in doing so, for difficulties of transport restrict the chemical to a local market, and works are scattered all over Germany.

The *soda* industry is dominated by the Deutsche Solvay Werke A.G., completely controlled by the Belgian concern. With its capital of 75 mill. RM. and 8,000 workers it is the most important chemical undertaking next to the trust, a vertically organised concern owning salt and lignite mines; its importance seems likely to increase as the Bernburg works are planning an increase of 50 per cent. of their output (from 100,000 kg. to 150,000 kg. daily, equal to an annual output of 450,500 tons).

Sulphate and Hydrochloric Acid.—Formerly these were the products of a special industry which converted salt into sulphate and hydrochloric acid with the sulphuric acid produced in its own works, an industry now disappearing under attack by by-products on both fronts. The Farben Industrie is now responsible for the greater part of the output of hydrochloric acid, producing it by the direct union of chlorine and hydrogen, the chlorine being a by-product in the electrolytic production of caustic alkali: no cartel exists and the old industry is in process of extinction. War time shortage of sulphuric acid stimulated production of by-product sulphate by the potash mines; since it is a by-product, costs are incomparably lower. The potash concern Kaiseroda withdrew from the convention in 1924, finding its market restricted by convention prices; the old sulphate producers found their position endangered and succeeded in getting the convention renewed after its dissolution, though on terms less favourable to themselves. The maintenance of the cartel agreement cannot hinder the extinction of the old factories, which are rapidly being closed down.

(ii) *Superphosphates.*

The decline in production in superphosphates has been due to the collapse of both the export and the inland markets. Total production declined from 1.85 million tons in 1913 to 0.66 million in 1925: export declined from 283 thousand tons in 1913 to 46 thousand in 1925. (80 thousand in 1926.) The loss of the export trade is due to the development of the industry in distant European and neutral countries, which erected their own plants

while unable to obtain their normal supply from the belligerent countries, which needed all their own sulphuric acid for the manufacture of explosives. In 1925/26 consumption of phosphates by German agriculture only amounted to 68 per cent. of the 1913 consumption. The decline is partly the result of the import of basic slag from the Lorraine and Luxemburg furnaces, stimulated in 1926 by franc inflation. It is argued that neither basic slag (a winter dressing) nor nitrates should be regarded as competitors of superphosphates, a spring dressing; in practice, however, they are used as substitutes. In the case of the Farben Industrie's new mixed fertilisers, Leunaphos and Leunaphoska, no such alibi can be pleaded.

The industry has resorted to fusions as a means of closing down inefficient works. Some time before the War the number of factories was decreasing; there were 131 factories producing in 1905, eighty-four in 1913 and fifty-four in 1927. In 1926 two fusions took place, one between the Guano-Merck firms in Hamburg and Lübeck, the other between a Berlin firm, the Chemische Fabrik Milch, A.G., and a Stettin firm, the A.G. der Chemischen Produktenfabrik, Pommerensdorf, one of the largest factories of the Silesian Oberkoks firm. In the Milch-Pommerensdorf fusion the Norderham works of the Oberkoks concern were not included, because a North-West German firm would have no object in entering a combination of North-East German producers which aims at closing down works. The wide dispersion of other works will probably hinder further trustification.

In the production of mixed fertilisers, one firm, until recently, competed with the Farben Industrie: the Rhenania-Kunheim group. (Rhenania's fertiliser is made by a kind of blast furnace process. The Farben Industrie's process consists of heating the rock phosphate in an electric furnace; for this process the F.I. and the Bayrischer Stickstoffwerke have made an agreement with the Government Nitrate Works at Piesteritz for production of phosphorus by the electrical process for an ammonium phosphate fertiliser, not Leunaphos.) The fusion of the two companies took place in 1926, before competition with the dyes trust had become acute, with the object of improving Kunheim's financial position; competition in 1927 was so acute that Rhenania was obliged to write down its capital of 20 mill. RM. to 10 mill. RM., and to close down four works.

In November, 1927, it was announced that the majority shareholders of Rhenania, the potash group Neustassfurt Friedrichshall (which after the fusion acquired the Kunheim family's shares and undertook to provide Rhenania with potash), had made a contract with the Farben Industrie for common sale of some of the Company's products, sulphur and barium compounds and acids, but not Rhenania phosphate. No doubt this arrangement

will before long lead to the trust's absorption of Rhenania, since it is a small firm and not financially sound.

(iii) *Artificial Silk.*

The Farben Industrie's interests were only recently acquired and its output is at present small compared with that of the Glanzstoff-Bemberg group, which is responsible for 85-90 per cent. of the total German output. Of the 1927 output of 18.5 Mill. kg., 8 Mill. kg. came from the Glanzstoff Company's four works, 3½ from Glanzstoff-Courtaulds, 1½ from Bemberg of Barmen, 1½ from the Breslau works founded by Glanzstoff and Bemberg, and 1½ from the works of the Dyes I.G. At the beginning of 1928 its interests consisted of :

(i) Viscose : one works at Wolfen, producing 2,000 kg. daily, and three other works taken over from Köln Rottweil in 1926 not yet producing, with a capacity of 5,000 kg. daily each.

(ii) Cupra-ammonium : a half interest in the Hölkenseide firm which uses the Bemberg patent ; acetyl cellulose is being produced at the Köln-Dormagen works.

(iii) Acetate: the trust have been characteristically responsible for the introduction of this process : in collaboration with Glanzstoff it set up in 1926 the Acetate G.m.b.H. in Berlin-Lichtenberg, at present not producing ; both firms are sceptical as to its prospects.

The total output of viscose and copper silk at the beginning of 1928 was 11-12,000 kg. daily ; by the end of the year it was expected to amount to 22,000 kg. daily.

These interests draw the trust into the international network of alliances "fabulous in size and nebulous in character," with Du Pont de Nemours, financially almost as powerful as the trust itself, through the fusion with Köln-Rottweil, and with Glanzstoff-Bemberg (and therefore with Snia Viscosa and Courtaulds) through the Aceta G.m.b.H. and Hölkenseide. Both connections are slight, and though co-operation with Glanzstoff-Bemberg is a matter of course, the trust develops its new processes independently. If the trust increases its output on the scale prophesied, it will have to seek a closer alliance with Glanzstoff.

It is difficult to say what the effect on Glanzstoff would be. The firm has dominated the German market since its foundation in 1902. Unlike Bemberg, a century-old silk-weaving firm with which it amalgamated in 1924, it has always produced artificial silk only: since the war its position has been even more secure, for the small firms, which flourished until the substitution of viscose for the cupra-ammonium process necessitated a scale of production of at least 1,500 kg. daily, have all been absorbed, with one exception, F. Kuttner of Pirna. Thus the Farben Industrie is the group's only potential competitor in the home market. The

Viscose Convention represented simply an agreement between the two, a defensive measure against inflation—stimulated import of French and Italian silk into the practically unprotected German market in 1925 and 1926. Shortly after the Köln-Rottweil transaction, the two groups agreed to introduce a uniform system of grading and price calculation. In 1927 the producers were able to draw knitters, weavers, and consumers of artificial silk waste, wholesale and retail traders into an "Arbeitsgemeinschaft." The price policy of the convention is generally considered moderate, though it appears to have raised prices in 1927 to take advantage of the textile boom when world prices were not rising. Although import of foreign silk increased during the period of its control, and broke up the convention in December, 1928, the increase was not due to an excessively high price level. Successful in stabilising the market it certainly was, but the genuine cartel problem—regulation of output—was unknown to it, for since it began the industry has had one long boom.

No agreement exists at present with foreign concerns for acetate silk: when the Acetat G.m.b.H. begins to produce it may have a rival in Deutsche Acetat-Kunstseiden A.G. Rhodiaseta of Freiburg, founded in 1927 by the Ruhr heavy industry firms with the patent of the French group, Bernheim.

It does not appear that the artificial silk firms derive any economic advantage from their membership of the chemical trust—that they can rely, for instance, on a cheaper supply of cellulose or heavy chemicals. None of the great concerns are independent of the market for raw material, nor need they be. Glanzstoff made attempts to secure its supplies of cellulose, but failed to obtain control of the South German Waldhof concern in 1923, and of coal, purchasing the Adler mining company in 1921. Köln-Rottweil, previous to absorption by the Farben Industrie, had acquired control of a cellulose firm, Gebr. Vogel in Zell in Weisenthal. Both Glanzstoff and Köln-Rottweil control their own supplies of heavy chemicals; part of Glanzstoff's caustic soda, bisulphide of carbon and ammonia requirements are provided by their own works at Sydowsaue; the Köln-Rottweil group is, of course, supplied by the Farben Industrie; the Hölkenseide works, controlled by the Farben Industrie and Bemberg together, one supplied by the A.G. für Anilin fabrikation, the property of the former.

Nor does it appear up to the present that the artificial silk undertakings are much profited by the trust's financial power. None of the absorptions and expansions of Glanzstoff-Bemberg in 1925 and 1926 necessitated the issue of new capital until the spring of 1927; Glanzstoff-Courtaulds was provided with its 2 million RM. from the working capital of the two concerns. It

seems likely that the trust's financial strength will give it an advantage in the future: Glanzstoff could not emulate the loan of 250 Mill. RM. convertible bonds issued in 1928 to finance the new artificial silk works and the synthetic fuel experiments.

(iv) *Synthetic Fuel.*

The more sensational the activities of the trust, the more reticent is its attitude concerning them. Very little information is vouchsafed to the public about the finance and nature of the synthetic fuel processes. Here the available information is summarised in order to indicate the relations of the trust with the Ruhr coal and steel concerns, Standard Oil and the Shell group.

There are three principal processes:

(1) For the first the Ruhr firms are responsible; it was discovered by Fischer and Tropsch at the Coal Research Institute at Mulheim (for its exact nature see "*Brennstoffchemie*" for April, 1926). The plant is being installed by the A.G. für Kohlenverwertung, founded by concerns in the Ruhr and Aachen coal seams and the Cologne lignite seam.

(2) Liquefaction on the Bergius process, using lignite, has been carried on since April, 1927, at the dyes trust's Leuna works near Merseburg, and the product is on the market. In August, 1927, Standard Oil announced that an agreement had been reached between it and the dyes trust for the exploitation of this process.

(3) The patents for the third, distillation by the cracking method (also the Bergius process), are owned by the Steinkohlen Bergin A.G., 35 per cent. of whose capital is controlled by the Gesellschaft für Teerverwertung, which was founded by the United Steel works and other heavy industry concerns, and 65 per cent. by the Farben Industrie through the Evag (Erdöl und Kohle Verwertungs-Gesellschaft, acquired in 1925 and 1926 from the Ruhr interests which had acquired it after the dissolution of the Stinnes concern). The Gesellschaft für Teerverwertung in April, 1927, set up the A.G. für Kohlenverflüssigung, which intends to use the Bergius patent and must, therefore, secure an agreement with the dyes trust as represented by the Steinkohlen Bergin. The Deutsche Gasolin A.G. (taken over from the Stinnes concern) is to finance this process; its capital is in the possession of the Dyes Trust, Standard Oil, and the Shell group. In addition, an agreement for the exploitation of this process was made between Standard Oil and the Dyes Trust in August, 1927.

(v) *Wood Distillation.*

The trust's discovery of synthetic methyl and butyl alcohols has revolutionised this branch. The existing producers are obliged to close down (as Henke und Baertling A.G. of Holzminden)

to concentrate on other products (the Verein für Chemische Industrie of Frankfurt) or to seek agreement with the trust. Two agreements have been made, one under which the Holzverkohlungs A.G. of Constance, the largest producer in this branch (capital 10 mill. RM.), and the Frankfurt Verein who were contemplating fusion as a remedy in 1926, undertake the sale of the I.G.'s methanol, in all markets except Great Britain and the United States, and the other to regulate the sale of acetic acid with allotment of quotas.

The I.G.'s nitro-cellulose lacquers have revolutionised the lacquer branch and price agreements exist between the I.G. and certain old factories. Seventy of the cellulose lacquer manufacturers are organised in the Gesellschaft für Zellulose-Lackindustrie; the pyroxylin lacquer manufacturers have attempted in vain to organise themselves against complete substitution of the new product.

(vi) *Gases.*

Gases are produced by the Griesheim Elektron firm whose branches are scattered all over Germany. For Berlin an agreement exists with the Linde refrigerator concern: the trust and Linde control the Vereinigte Sauerstoff Werken, which at the beginning of 1926 began to compete violently with the forty or so independent works, reducing its prices to a level which barely covers their costs and forcing them to form the Deutsche Industriegas-Vereinigung e.V.

(vii) *Pharmaceutical.*

The concentration of resources proposed in Duisberg's famous 1904 memorandum was intended to include the pharmaceutical firms as well, but none of them joined either of the two Interessengemeinschaften which resulted from it, because they saw no advantage in alliance with partners financially so much more powerful than themselves. They took Duisberg's advice, however, and formed an Interessengemeinschaft among themselves in the following year, including all the important firms (Gehe & Co. A.G., E. Merck, Knoll & Co., J. D. Riedel, C. F. Boehringer & Söhne), with the exception of Vereinigten Chininfabriken Zimmer & Co. Its object was similar to that of the two agreements in the dyes branch: co-operation and price regulation. The I.G. has existed continuously since, being undisturbed by the withdrawal of J. D. Riedel in 1920: it is accompanied by many secret agreements for special products.

Besides these firms, which are makers of pharmaceutical products only there are two others not included which manufacture other chemical products: Schering (16 mill. RM.) a member of

the Silesian Oberkoks concern, and von Heyden of Dresden (also heavy chemicals and alkali electrolysis).

Little is known of the trust's relation to these two groups. Between the trust and one member of the pharmaceutical I.G., Merck, agreements exist for the sale of many products, and for co-operation in the actual manufacture of the rachitis remedy. The Farben Industrie and the two mixed firms are members of the Verband deutscher Chemisch-Pharmazeutischen Gross-industrie e.V., which is believed to act as a cartel: the trust has made a special agreement with von Heyden about its semi-finished tar dye products. Riedel alone appears isolated.

A survival in this branch presents a curious contrast to the large undertakings: in almost all the larger villages on the northern side of the Thuringian forest there is a chemical factory often of a "hand-work" character, employing no scientific workers, using old family recipes, plant extracts and pine needles, paying low wages, and favoured by the proximity of the glass, carton and wood industries.

C. Branches in which the Trust is not interested.

The I.G. Farben Industrie has no glue or soap interests. These products are controlled by a trust formed in 1923, the Vereinigte deutsche Fettwerke A.G., 50 per cent. of the capital of which is owned by the Sunlicht A.G. of Mannheim, a subsidiary of Lever Brothers, 25 per cent. by the Verkaufsgemeinschaft deutscher Oelmühlen A.G. Hamburg, a union of seven oil mills, and the Scheidemantel firm which has a monopoly of glue.

Nor has it any interest in certain coal-tar products—for instance, roofing felt, of which Rütgerswerke (Silesian coal, Central German oil and lignite) and Oberkoks (Silesian coal and coal-tar products) are the principal manufacturers. Their subsidiary companies amalgamated in 1927.

D. Cartel Control.

The cartel fulfils a subordinate but essential function in every branch of the industry: only the pre-war dyes agreements (alizarine and natural indigo) have been superseded by trustification. Even where the trust controls 80 per cent. or 90 per cent. of the branch's output, as for instance, nitrates, lithopone, carbon disulphide, the cartel organisation has been maintained. In the nitrates syndicate, the I.G. has used its influence to hold prices high enough to enable the cyanamide works to continue production, even though it might have benefited itself by a larger volume of sales at lower prices. Other branches not controlled by the trust, but by other large concerns, have developed powerful marketing organisations: superphosphates, soda, borax and caustic alkali, are all controlled by syndicates regulating output,

prices, and sales. Weaker organisations fix prices of basic slag and sulphuric acid (local associations). In only one important branch—hydrochloric acid—does genuine and violent competition prevail.

II. TEXTILES.

Owing to the great variety of the textile branches and the incomplete character of the production statistics, it is difficult to arrive at a satisfactory estimate of the total volume of production.

The foreign trade figures are not much guide to the position of the industry as a whole because many of the exporting branches are peculiar and the industry as a whole exports a much smaller percentage of its total output than do the British and French industries. Kertesz (*Die Textilindustrie sämtlicher Staaten, 1917*) estimated the total value of German textile output at 5,312.8 Million Marks, of which 77.5 per cent. was taken by the inland market and 22.5 per cent. exported. (The value of the total textile import he estimated at 2,018.8 so that even if there had been no export German production could not cover the demands of the home market.) His estimates are not sufficiently detailed to serve as a basis for comparison with the post-war period. The percentage exported varies very much from branch to branch; the Institut für Konjunkturforschung uses rough estimates for the percentage of output exported by branches of the industry (Silk 33½ per cent., wool 15 per cent., cotton 10 per cent., linen, hemp, jute 13 per cent.) but even if these estimates are accurate enough they are not very useful in view of the variety of further sub-divisions.

As the annual or biennial census of production results cannot be used in conjunction with the foreign trade returns, it is better in attempting a rough estimate of the value of production (with no intention of comparison with the pre-war period) to rely wholly on these rather than on the foreign trade figures. The census results are more complete than in the pre-war period, since the first post-war census included the weaving branches, as the pre-war censuses did not. At the time of writing, however, there are only 1925 returns for the weaving and woollen spinning industries and as the financial crisis made itself felt with exceptional severity in textiles, causing a considerable decline both in the volume and value of total output, these cannot be used as a basis for an estimate in 1926 unless it is assumed that the output of the weaving branches underwent the same percentage decline in value as that of the spinning branches. Assuming on their basis that the value of the production of the weaving branches is 2.9 Milliard RM., the gross output of the textile industry might be put at 5 milliard RM.

Value of Total Output of Yarn and Thread.

	Milliard RM.	
	1925.	1926.
Cotton	1.2	.821
Worsted .. ..	.612	.553
Woollen .. ..	.316	.280*
Linen .. ..	.092	.054
Jute .. ..	.164	.116
Hemp .. ..	.096	.079
Silk .. ..	.173	.149
Total	2.653	2.052

* Estimate, no 1926 result.

Value of Output of Woven Material.

	1925.
Wool and half wool clothing	1,119,315
Carpets	121,913
Sundry wool	51,947
Cotton	1,236,364
Cotton velvet and plush	45,364
Furniture material	126,774
Silk	381,318
Linen	290,435
Heavy fabrics	49,954
Jute	141,096
Sundry	113,750
Total	3,678,230

(From *Wirtschaft und Statistik*, 1927, pp. 414, 732, 768, 928; 1928, p. 392; 1929, p. 318.)

For the purpose of estimating the amount of output controlled, the output of the different branches can be divided as under :

	Milliard RM.	
	Output, 1926.	Controlled.
Cotton	1.9	0.4
Woollen and worsted	1.9	1.0
Linen	0.3	0.2
Silk	0.4	0.0
Jute	0.2	0.2
Hemp and sundry	0.3	0.2
Total	5.0	2.0

Cotton certainly does not control so much as one-quarter of its output. Fluctuations in the price of raw cotton would probably not have been sufficient to prevent a general price association of spinners, since the industry enjoyed up to 1924 a measure of protection, had the industry been locally concentrated. As it is, there is no general price cartel of cotton weavers or spinners; the spinner's national organisation (the Arbeitsausschuss der deutschen Baumwollspinnerversbände) succeeded in establishing in 1920 a standard sale contract for yarn, with the weavers' national association, which marks a considerable advance on pre-war organisation.

The prevalence of the connection of weaving and spinning varies in the three main areas*: the only figures available are the totals for the whole Empire, which show that about 40 per cent. of the total annual production of cotton yarn is woven in the same establishment; about 20 per cent. of all doubled yarn is woven by the doubler; and about 6 per cent. spun on commission. In the Lower Rhine and Dutch frontier area† weaving and spinning are usually carried on in separate establishments; the area purchases very little yarn from the rest of Germany. Before the war the spinners of the area agreed to institute a central office to fix yarn prices varying with prices of raw material and spinning costs; the complaints of the weavers suggest that they succeeded.‡ Since the war no yarn prices have been fixed. The large establishments, uniformity of conditions and organisation of labour in this district contrast with those of the Central German area, in which conditions are so diverse that no price association of spinners and weavers has ever been possible. In Central Germany all counts, from the coarsest to the finest are spun; sometimes one establishment spins several counts. Most of the speciality branches are located in Saxony.

* Production of Cotton Yarn and Thread, 1925.

	Yarn.	Thread.
	Mill. Kg.	
1. Prussia	97.4	19.4
(Rheinland- Westphalia)	79.9	16.9
2. Saxony	64.5	7.0
3. Bavaria	64.5	7.0
Württemberg	42.6	4.9
Baden	20.9	1.7
	12.0	0.8

† i.e., München-Gladbach, Mulfort, Viersen, Rheydt, Dulken, Gronau, Rheine, Nordholt, Bocholt.

‡ Dilthey, *Geschichte der niederrheinischen Baumwollindustrie*, 1912.

So far as generalisation is possible, weavers appear better organised; in the Vögtland a strong condition cartel exists which acts, it is believed, as an open price association: the national organisation of the coloured weavers (the Verband deutscher Buntwebereien), has set up an arbitration court in Leipzig to settle disputes with consumers, in co-operation with the association of the linen weavers, weavers, and handkerchief manufacturers, but makes no attempt at price regulation. In Central Germany the prevalence of the connection of weaving and spinning varies from town to town: in the Upper Franconian district* with which the Chemnitz area exchanges its yarn, the spinning and weaving establishment is about as common as the one-process establishment; the Silesian industry confines itself almost entirely to weaving and purchases its yarn from Saxony. The third principal area, South Germany, is locally coherent and fairly uniform: the characteristic firm spins low and medium counts and weaves plain cloths for printing and bleaching. Consequently combination of weavers is much easier than in the other areas: the Verband Süddeutscher Baumwollindustrieller of Augsburg, an old condition cartel, acts as an open price association; in the middle of 1926 the South German weavers came to an agreement on minimum prices and "when a sudden fall in the price of raw cotton by about 40 per cent. occurred in September and October the effect on the prices of cotton manufacturers was inconsiderable."†

The woollen and worsted industries probably control roughly half their total output, though they are even more widely distributed than cotton. Wool spinning is the principal industry in certain Saxon towns, as Crimmitschau, Werdau, Kirchberg and Lengenfeld, but has less importance in the central German areas as a whole than worsted spinning, which is carried on in nearly all the larger Saxon and Thuringian towns. Both are found in Eastern and Northern Germany.‡ In the west, worsted yarn is spun in the Rheinland area, München-Gladbach, Aachen, Kettwig a.d. Ruhr, and has recently arrived in the Palatinate where woollen yarn has two old important centres, Lambrecht and Kusel. Neither industry appears to be developing a greater degree of local concentration. Unlike cotton, the connection of spinning and weaving offers definite advantages and disadvantages. The worsted branch is more specialised than elsewhere in Europe: according to the 1925 production census only 7 per cent. of the total annual production of worsted yarn was woven

* Hof, Münchberg, Bamberg, Bayreuth, Erlangen, Fürth—Hof is generally considered the nearest approach to the Lancashire cotton town.

† *Department of Overseas Trade Report, 1927.*

‡ Worsteds in Lückenwalde in Brandenburg, in Lusatia, Spremberg, Cottbus, woollen in Brandenburg, Lower Silesia, Neumunster.

by the same establishment. In the woollen branch the same establishment usually weaves and spins, and the connection of processes appears to be becoming more usual for the 1907 production census showed that half the total annual production of yarn was woven by the same establishment, while in 1925, "combined establishments" accounted for more than three-quarters of the total output of yarn. The technical causes for the contrast between the two branches are universally effective and well-known. The average woollen firm employing 100 to 300 workers is smaller than the average worsted spinning firm, which employs about 500.

As might be expected, organisation of spinners and combers has been most successful in the worsted branch, and organisation of weavers in the woollen branch. However, the worsted spinners' and combers' association (the Verein deutscher Wollkammer und Kammgarnspinner) although it is a powerful organisation and includes nearly all spinners and combers, only fixes terms and not prices. The eight large commission combers have maintained a price convention since the 80's which attempts to equalise differences arising from the geographical position of its members, but the industry does not suffer from excessive conversion costs, because at least half the annual output of yarn is combed by spinning establishments, so that the independent combers are not in a position to dictate. The few independent spinners of the woollen branch, because they are locally concentrated, have succeeded in forming price conventions, one in Forst, one in Cottbus, one in Reichenbach.

No weavers' organisation in either branch has much influence on the market, with the exception of the clothmakers' convention, which included nearly all cloth manufacturers at the date of its foundation. Since 1923 it has included the Verband halbwollener und wollener Stoffe and the Saxon-Thuringian weavers, so that it can dictate terms to traders, which were the subject of bitter controversy from the middle of 1924 to the end of 1926; at one point the traders petitioned the Reichs Economic Minister to prosecute the convention for behaviour "gegen die guten Sitten," with no result. In the end the Cloth Convention made some concessions, in particular an extension of credit terms after the traders had formed a defensive organisation (the Vereinigung der Tuchgrossisten in Herrenbekleidungseinzelhandel).

Linen.—The strongest spinners' organisation is found in the linen branch, controlling 90 per cent. of the total output. Since the middle of last century the industry has been growing more locally concentrated, a process not perceptible in any other textile branch. The eastern industry centres round Lauban and follows the lower heights of the Rieserigebirge into Silesia; in the west the centres are Bielefeld, once famous, now losing its pre-eminence,

Kampen and Düren. Connection of weaving and spinning is not usual: according to the 1925 census of production, only 20 per cent. of the total production of linen yarn is woven by the same concern. Under these circumstances it is surprising that no permanent spinners' cartel existed before the war.* War organisation left behind it a central office, (the *Leinengarnabrechnungstelle*) and accustomed manufacturers to co-operation, but in the following two or three years the industry prospered in comparison with other textile branches, so concentration was postponed: the stabilisation crisis showed that output was in excess of demand and restriction necessary. A syndicate contract was signed in June, 1926, by firms controlling 265,000 spindles out of a total of 300,000 employed in the industry, the outsiders being smaller establishments. Under the contract the *Leinengarnvertriebsgesellschaft G.m.b.H.* undertook not only to fix prices and terms of delivery, but also to regulate production and to allow rebates to weavers who agree to deal exclusively with it. The weavers responded by setting up a committee to safeguard their interests; apart from this, their branch is unorganised except for one or two condition cartels; they use antiquated methods and home work lingers in many districts. No syndicate can do much to rescue the industry from the depression it is enduring.

Silk.—Before the war well-organised condition cartels existed in every branch of silk weaving: there are no silk spinners' associations because independent spinners do not exist. None of the highly organised cartels now control prices. The present *Verband der Seidenstofffabrikanten* (with eighty-seven members, sixteen affiliated members) includes all manufacturers of silk (in the narrow sense, for clothing); it dates from 1905 and has always been a condition cartel, though before the war one of its branches, the crepe manufacturers, succeeded in forming a price association. The *Turquoisefabrikanten* (cachenez weavers) have belonged to a condition cartel since before the war. The manufacturers of umbrella silk belong to a condition cartel, the *Verband der Schirmstofffabrikanten*, which in 1926 aroused great opposition by granting rebates to customers who undertook to deal exclusively with it; traders threatened cartel court proceedings without effect. Only one cartel, the *Verband deutscher Krawattenfabrikanten*, fixes prices as well as terms: it has done so since 1906, having been founded in 1903 as a condition cartel.

The jute, hemp and linoleum branches control the whole of their output.

* In periods of depression certain branches achieved temporary cartels—the spinners in 1892-94, and 1901-02, weavers in November, 1899, and the doublers in 1899-1900.

The jute syndicate (Interessengemeinschaft deutscher Jute-industrieller) was formed as a result of the rise of jute prices in April, 1926. In that month the Dundee jute spinners gave up their minimum price agreement and the German syndicate which had existed since 1920* broke up; for some time its production quotas had been ineffective, because firms refused to reckon their export in their production quota. The present syndicate is stronger in appearance in the inland market than its predecessor, but as it now permits members to export, without reckoning export in their production quota, its actual control is weaker. Throughout 1926 and until the third quarter of 1927 it restricted productive capacity by 50 per cent.; in the third quarter of 1927 it restricted it by 40 per cent., although production was increasing to a greater extent; the extra output was, therefore, exported, so that syndicate policy has the effect of stimulating export, thus explaining the disparity between post-war and pre-war production capacity and inland consumption.

The syndicate includes eleven out of the thirty-four firms, and covers about 80 per cent. of the total production, since the smaller firms are excluded. Half of the syndicate members' output is produced by the Blumenstein group (whose withdrawal in April, 1926, was therefore decisive).

The hemp industry is dominated by two large concerns, the Bindwarenfabrik Immenstadt and the Seilenwarenfabrik Füssen, which, in 1920, made an Interessengemeinschaft to arrange for common sales purchase and export, and to "complete each other's production programme." About three-quarters of the total hemp output is produced by these two firms; and most of the remaining quarter must be produced by the Hanf-Union A.G. (capital 3 Mill. RM. against Füssen-Immenstadt's 11.2 million) which represents the Blumenstein concern's hemp interests. These companies are members of a syndicate which regulates output and prices, the Verband deutscher Hanfindustrieller, G.m.b.H., a pre-war cartel of long ancestry, which lapsed after the war, and was not revived till May, 1927, when it issued its first price list.

In the linoleum branch, trustification has superseded the syndicate, which was first formed in 1910. Since its renewal in 1920 the agreement has often been broken, though actually there was only one outsider. The present company, the Deutsche Linoleumwerke A.G., originated from the fusion of four companies, two of which were already controlled by the Bremen Linoleumwerke A.G., Delmenhorst, which therefore remains a holding company. The motive for trust formation appears to have been the Delmenhorst company's wish to dominate the market: before the fusion it owned a controlling interest in the Hansa and Ankermark companies, both of Delmenhorst, and when the

* There has been a syndicate since 1901 of the same kind.

Germania company of Stuttgart brought a new floor covering similar to linoleum on the market, it made an agreement with the company and with the other remaining works, the Maximiliansaw A.G., but fearing that this agreement might be ineffective, persuaded the companies that fusion would be advantageous to them. The trust proceeded to rationalise; it has divided the market into five areas, each served by one company, it has reduced its number of designs, and its works are to specialise on certain designs and qualities. It is not over-capitalised: for 1927-28 it paid a 15 per cent. dividend and with a capital of 11.2 Mill. RM. devoted 3.8 to depreciation. Since the revival of the international linoleum agreement in March, 1927, and the foundation of the international holding company at Zürich in February, 1928, it has complete control of the German market. There are, in fact, three other producers, the Rheinischen Linoleumwerke in Bedburg (always an outsider of the syndicate) and the Keffel A.G. in Tannenbergsthal in V. and a company in Westphalia, but these are all unimportant.

III. PAPER.

The estimate of the value of paper production is based on the foreign trade return and association output figures.

Although cartels exist in every branch except cardboard, the industry's output is not fully controlled owing to inter-cartel competition:

The Verband deutscher Druckpapierfabrikanten in 1925 included fifty-three newspaper manufacturers,* twelve of whom are insignificant; and controlled over four-fifths of the total output; the remaining manufacturers were organised as a rival association, the Vereinigte Ringfreien Zeitungsdruckpapier Fabriken G.m.b.H. In conjunction with equally well organised industries in other European countries and in Canada it has formed a committee in Stockholm for the purpose of collecting information.

Packing paper prices are controlled by various conventions, of no special interest; the German producers do not co-operate with the central European (i.e. Austria, Czechoslovakia, Jugo-Slavia) cartel. The cardboard branch has been less successful. A sales organisation set up at Dresden would have controlled 80 per cent. of the total German output, but the quotas allotted were never enforced, and the association only fixed minimum prices: two members in February, 1924, gave notice of rescission which the cartel court refused to sanction; it approved the rescission of seven members in November, 1926,† on the same ground, with the result that the selling association dissolved and

* The press does not, as a rule, attempt to acquire manufacturing interest.

† See decisions of February 13th, 1924, and November 8th, 1926: instance of wise policy on the part of the court.

a committee was set up to work in conjunction with the trade association, the Verein deutscher Pappenfabrikanten, and arrange price scales and terms of delivery on a surer basis. Recently the large consumers of cardboard have formed an association to deal directly with the manufacturers. In spite of these arrangements the branch at present works under genuine competitive conditions. In the carton branch organisation has made progress since the war: the first syndicate was founded in 1927.

In the wall-paper branch stimulus to combination came, as it did in the porcelain branch, from the manufacturers of high quality goods, who were obliged to protect themselves against the competition of inferior qualities, the manufacturers of which have little interest in combination, since their margin of profit is so small. The pre-war associations therefore never lasted long, because as soon as the manufacturers of the higher grades had succeeded in fixing prices the manufacturers of low-grade papers began to make higher quality papers. In 1912 the building boom, which had continued since the beginning of the century, came to an end, and the necessity of organisation being greater than before, the Verband deutscher Tapetenfabrikanten was formed, with thirty-one members against twenty-four outsiders. Since the war it continues, carrying on an intermittent struggle with another association.

Most progress in organisation in the post war period has been made in the raw materials and semi-finished products branches.

Before 1928 the rag trade was unorganised: early in the year three purchase associations were formed. The North West German firms originally planned an organisation to include all German dealers: the plan was frustrated by five large South German firms setting up the Sudddeutsche Rohstoffhandels G.m.b.H. in January and four Rheinland firms following their example a month later; the eleven North West German firms, therefore, were obliged to set up a purchasing organisation also. The effect of the existence of three organisations is expected to intensify competition.

In the wood pulp branch, the South German producers had formed a selling association with a price scale before the war; now all the producers are members of the Verein deutscher Holzstofffabrikanten e.V., a price and terms association. The only purchasing association was formed by the Black Forest manufacturers before the war; whether it still functions is not known. In 1927 Sweden, Norway, and Finland producers formed an output-controlling cartel.

Until recently the cellulose branch was unorganised, owing to the prevalence of the connection between cellulose and paper manufacture. The trade association (Verband Zellulosefabrikanten) for many years recommended minimum prices to its

members but did not compel adherence. The market is rapidly expanding with the growth of the artificial silk industry, but in spite of the high quality of the German product, German manufacturers began to feel Scandinavian and Czech competition very acutely in the second half of 1927, and, in order to meet it, set up (in April, 1928) the Sulfitzellstoff G.m.b.H., a central sales company regulating output and prices (excluding only straw and natron cellulose which does not come on the market). The four large firms, Waldhof, Aschaffenburg, Koholyt and Hoesch, control three-quarters of its total output. Immediately after its foundation the German producers succeeded in persuading the Czech industry to restrict its export to Germany and began to negotiate with the Scandinavians for the same purpose.

IV. NON-FERROUS METALS.

100 per cent. output cartel-controlled in 1928.

Copper, lead, enamel : national and international cartels.

Zinc : International cartel, national cartel broke up under pressure of outsiders in 1927, since renewed.

Aluminium : Three large concerns, national and international cartel.

V. FOOD.

Here estimate is difficult as there are no valuations of the output of the groups. The value of the output of beer in relation to the other groups cannot be so high as in Great Britain (according to the London and Cambridge Economic Service index of production, 45 per cent. of the value of the group's output) because sugar is relatively more important ; 35 per cent. can be allowed. The entire output is controlled by the Schulheiss Patzenhofer trust. Another 15 per cent. may be allowed for yeast (trust and cartel), cigarettes (weak price associations suffering from perpetual undercutting), chocolate (price convention), grain milling (local price convention). Concern formation has gone farthest in grain milling, where three great concerns, the Strassburg group, the Deutsche Mühlenvereinigung A.G., and Kampffmeyer, control over 50 per cent. of the total output ; the remainder is produced by thirteen large works sometimes co-operating with the large concerns, sometimes not.

VI. ELECTRICAL.

70 per cent. total output is controlled by the three large combines, Siemens-Schuckert and Siemens and Halske, the A.E.G. with its subsidiaries, the sales association based on the association of Voigt and Haeffner, Sachswerk A.G., and a number of smaller firms. But agreements exist between them for certain products only.

The extent of price control in this branch is commonly

exaggerated, for instance, the Beama publication, *Trusts and Combines in the Electrical Industry*, describing the central association, the Zentralverband der deutschen elektrotechnischen Industrie, states that "its main function lies, however, in fixing standard prices, conditions of contract and specification, for the great majority of the products of the industry; it is served by a number of groups devoted to one special branch of inter-related branches, and in some cases not only determines prices but allocates orders. There are few articles not produced in Germany, few contracts, from a complete power station equipment costing hundreds of thousands of pounds, to a small fractional horse-power motor, which are not subject to the control, direct or indirect, of the association. In addition to the central association a number of cartels deal specifically with certain branches which lend themselves more easily to quota production on standard lines and to division between producers on a quota system. Mention should be made in this connection of the Elektrizitäts-Zähler-Verband (Meters), Cable Makers, Insulated Wire Association, Verein deutscher Isolatorenwerke (insulators), heating and cooling apparatus, while other groups have dealt with condensers, insulated tubes, porcelain and ceramics, and a separate union covers contracting firms."

In fact, the central association does not fix or control prices except in so far as it provides methods of price calculation. Of the cartels mentioned, only two regulate output, the meters and cable associations, which allot quotas, but have not succeeded in introducing central sales. The Insulated Wire Association was the only sales syndicate in the industry; it broke up in the middle of 1927—being unable to reconcile the interests of the large and small firms. Two others, insulated tubes and heating and cooling apparatus, never controlled output and have ceased to control prices since 1926 and 1925 respectively. In porcelain the high tension branch is well organised, regulating output, but the low tension branch is not organised at all.

VII. EXPORT GROUP.

(Calculated on export figures.)

	Output. Million RM.	Controlled.
Clocks	100	60
Musical instruments	150	—
Toys	220	—
Pottery	260	240
Glass	440	300
Total :	1,170	600

For extent of combination, see pp. 89-92.

APPENDIX III

THE EXTENT OF RATIONALISATION IN THE HEAVY INDUSTRIES

I. ECONOMIC POSITION OF THE RUHR COAL SEAM

The available evidence as to financial and technical efficiency is hardly sufficient to determine the exact extent to which the industry is working on a non-economic basis. So far as output per man shift and installation of machinery are concerned, the industry's efficiency is increasing.

(1) Monthly Output per Man Shift, Ruhr Area.

	Total employed.	In the mines, i.e., not in subsidiary works.	Underground workers only.
	Kg.	1913=100	Kg.
1913	943	100.00	1,161
1922	633	67.13	814
1923	349	37.01	471
1924	857	90.88	1,079
1925	946	100.32	1,179
1926	1,114	118.13	1,374
1927:—			
January	1,141	121.00	1,387
February	1,147	121.63	1,393
March	1,127	119.51	1,369
April	1,105	117.18	1,357
May	1,117	118.45	1,374
June	1,131	119.94	1,389
July	1,122	118.98	1,379
August	1,125	119.30	1,381
September	1,127	119.51	1,382
October	1,134	120.25	1,390
November	1,153	122.27	1,412
December	1,151	122.06	1,410
Average Year	1,132	120.04	1,385

(The figures produced for the Economic Conference were misleading because the most recent were for 1924 and related only to the Dortmund area. The above figures are the Syndicate's own.) (See *Glückauf*, June 2nd, 1928.)

(2) Installation of Machinery.

According to the report prepared for the Economic Conference, in 1913 only 5 per cent. of the Ruhr coal output was got by mechanical means; and in 1927 only 49.6 per cent. of the

output is got by manual labour and blasting. The Glückauf figures illustrate the change.

No. of Machines Installed.

	1913.	1925.	1926.	1927.	1927 in % of 1925.	1927 in % of 1926.
Hammer drills (Böhrhammer) ..	11,656	36,502	33,104	33,559	- 8.06	+ 1.37
Drilling machines (Drehbohrmaschinen)	37	2,618	1,977	1,700	- 35.06	- 14.01
Hammerpicks (Abbauhämmer) ..	217	41,309	45,299	64,428	55.96	+42.23
Coal-cutting machines (Kohlenschnäider) ..	—	366	233	186	- 49.18	- 20.17
Conveyors (Grosschrammas- chinen)	15	605	470	358	- 40.83	- 23.83
Pillar Conveyors (Säulenschrammas- chinen)	265	866	574	421	- 51.39	- 26.66
Winding engines (Schuttelrutschen- motoren)	1,922	7,175	6,461	6,571	- 8.42	- 1.70

But not much increase in technical efficiency can be attributed to closing down of mines.

In the first great closing down period (1904 and following years) many mines were shut down for natural causes, or else as a result of purchase of quotas by larger mines. The mines closed down in the post-war period, up to 1925, were all exhausted mines on the southern border of the coal-field. To what extent uneconomic closing down has taken place no figures can suggest. No systematic plan has been made for the whole coal-field.

Mines closed down in the Ruhr Area to 1925.

	1923 ..	13	employing	1,500
	1924 ..	24	"	8,398
	1925 ..	31	"	35,810
	1926 ..	19	"	25,293
Total since	1923 ..	87	"	71,000
	Of these	11	with	5,778 employees resumed working in 1926.

APPENDIX III

THE EXTENT OF RATIONALISATION IN THE HEAVY INDUSTRIES

I. ECONOMIC POSITION OF THE RUHR COAL SEAM

The available evidence as to financial and technical efficiency is hardly sufficient to determine the exact extent to which the industry is working on a non-economic basis. So far as output per man shift and installation of machinery are concerned, the industry's efficiency is increasing.

(1) *Monthly Output per Man Shift, Ruhr Area.*

	Total employed.	In the mines, i.e., not in subsidiary works.	Underground workers only.
	Kg.	1913=100	Kg.
1913	943	100.00	1,161
1922	633	67.13	814
1923	349	37.01	471
1924	857	90.88	1,079
1925	946	100.32	1,179
1926	1,114	118.13	1,374
1927:—			
January	1,141	121.00	1,387
February	1,147	121.63	1,393
March	1,127	119.51	1,369
April	1,105	117.18	1,357
May	1,117	118.45	1,374
June	1,131	119.94	1,389
July	1,122	118.98	1,379
August	1,125	119.30	1,381
September	1,127	119.51	1,382
October	1,134	120.25	1,390
November	1,153	122.27	1,412
December	1,151	122.06	1,410
Average Year	1,132	120.04	1,385

(The figures produced for the Economic Conference were misleading because the most recent were for 1924 and related only to the Dortmund area. The above figures are the Syndicate's own.) (See *Glückauf*, June 2nd, 1928.)

(2) *Installation of Machinery.*

According to the report prepared for the Economic Conference, in 1913 only 5 per cent. of the Ruhr coal output was got by mechanical means; and in 1927 only 49.6 per cent. of the

APPENDIX

output is got by manual labour and blasting. The Gluckauf figures illustrate the change.

No. of Machines Installed.

	1913.	1925.	1926.	1927.	1927 in % of 1925.	1927 in % of 1926.
Hammer drills (Böhrhammer)	11,656	36,582	33,104	33,559	- 8.06	+ 1.37
Drilling machines (Drehbohrmaschinen)	37	2,618	1,977	1,700	- 35.06	- 14.01
Hammerpicks (Abbauhämmer)	217	42,309	45,299	64,428	55.96	+ 42.23
Coal-cutting machines (Kohlenschneider)	—	366	233	186	- 49.18	- 20.17
Conveyors (Grosskrumm- maschinen)	15	605	470	358	- 40.83	- 23.83
Pillar Conveyors (Stälenschram- maschinen)	265	866	574	421	- 51.39	- 26.66
Winding engines (Schwartzschei- motoren)	1,922	7,175	6,461	6,571	- 8.42	- 1.70

But not much increase in technical efficiency can be attributed to closing down of mines.

In the first great closing down period (1904 and following years) many mines were shut down for natural causes, or else as a result of purchase of quotas by larger mines. The mines closed down in the post-war period, up to 1925, were all exhausted mines on the southern border of the coal-field. To what extent uneconomic closing down has taken place no figures can suggest. No systematic plan has been made for the whole coal-field.

Mines closed down in the Ruhr Area to 1925.

	1923	13	employing	1,500
	1924	24	"	8,398
	1925	31	"	35,810
	1926	19	"	25,293
Total since	1923	87	"	71,000
Of these		11	with	5,778 employees resumed working in 1926.

The available statistics of costs of production in the Rhenish-Westphalian coal seam were collected by the Economic Ministry in 1924, 1926 and November, 1927.

Costs in three Ruhr Coal Mines, November, 1927.

	Average cost per ton RM.	% of total costs.
Wages	6.924	56.66
Salaries	0.858	7.02
Total	7.782	63.68
Wood	7.778	6.37
Iron and metal	0.682	5.58
Dynamite	0.169	1.38
Building material	0.102	0.83
Oil and fat	0.075	0.62
Sundry materials	0.246	2.01
Steam, Gas, Current	0.115	0.94
Total	2.167	17.73
Social Insurance	1.065	8.71
Mining accidents	0.129	1.06
Undertaker's work	0.193	1.58
Freights	0.052	0.43
Taxes	0.608	4.97
Overhead charges	0.260	2.13
Total	2.307	18.88
Total 1, 2, 3	12.256	100.29
Minus working receipts	0.035	0.29
Total costs without depreciation	12.221	100

The same mines were not investigated on each occasion, so the results cannot be used as data for arguments about the progress of rationalisation. The three investigated in November, 1927, produce 14.87 per cent. of the total Ruhr coal output, 13.9 per cent. of the coke output; although the proportion is small, the uniformity of conditions in the Ruhr is such that these figures can be regarded as representative.

These statistics were not regarded as important until April, 1928, when the Commission appointed by the Economic Ministry to enquire into "the present position of Rhenish-Westphalian coal mining" used them as a basis for its calculations. The Commission was set up for the same reason

as the Central German lignite commission—for the same reason as the British coal commission—to enquire into the relation between prices and wages, though the actual circumstances differed, in that wages had been raised under a compulsory arbitration award and the minister had refused to sanction a price increase. The Commission decided to confine itself to as narrow a sphere as possible.

According to the Commission's calculations, wage costs amount to 50 per cent. of the total cost per ton, a little more if social insurance and salaries were added. (Compare Annex 9 of the British Coal Commission's report, p. 293.) They took wage rates for granted, as they were obliged to do, and attempted to deal with depreciation allowance, a problem of extreme difficulty in view of the immense capital investments of recent years, and extremely important because it is the only cost which varies greatly from mine to mine and the only item for which the official calculation is unsatisfactory. The Economic Ministry's estimate (1.25 RM. a ton) is no more than an estimate based on antiquated conditions. The majority report recommends a rate of 1.74 RM. per ton of output (coal, coke and briquettes) exclusive of interest charges. The Commission first attempted to calculate the amount to be allowed for depreciation by acquiring information as to the cost of sinking new mines and erecting new coking plant, but found this method impossible. They then drew up a questionnaire, receiving replies from twelve mines, and made a thorough investigation into two mines' value of plant and allowance for depreciation. For the larger mines (annual output 1 million tons) they arrived at a depreciation figure of 1.58 RM. per ton total output and for the smaller mines (annual output 500,000 tons) 1.91 RM. per ton total output. The average of the two is the allowance recommended.

Dr. Baade, while approving the general basis of the cost calculation, prepared a special report to prove that this figure is too high: he considers that in the instances selected value of plant was over-estimated, length of life of plant under-estimated. As his own estimate he offers 1.04 RM. per ton. Consequently the total calculations vary widely: according to the majority report, Ruhr mines are working with a loss of 27 Pfennig per ton of marketable output (i.e., coal and coke) (a total loss equivalent to one-fifth the total British loss, according to the Coal Commission report, on half the British output), which with the higher wage rate will become 1.05 RM. a ton—according to Baade's calculations with a profit of 58 Pfennig a ton. Very little light is thrown on the position of the Ruhr mining *concerns* (as distinct from the mines) chiefly because the Commission, although it examined the financial results of the concerns, could not connect them with its costs calculations.

Profit and Loss per ton Ruhr Coal, Coke and Briquettes.

	Majority Report.	Minority Report.
Costs, according to official figures ..	RM. 13.64	RM. 13.64
Taxation not included therein	0.09	0.09
Costs of accidents not included therein	0.15	*
Depreciation	1.74	1.04
Total Costs	15.62	14.87
Receipts	14.21	14.21
Trade Profit	0.16	0.16
Total Receipts	14.37	14.37
Profit per ton coke	0.95	0.95
Profit per ton briquettes	0.03	0.03
Total Receipts per ton coal, coke, briquettes	15.35	15.35
=Loss of	0.27	0.58=Profit

* The official figures allow .15 RM. which is included in the total costs figure. Dr. Baade considers this sufficient and does not allow the *extra* .15 RM. which the majority report does.

II. RATIONALISATION IN LIGNITE.

Lignite cartels work under peculiar conditions, since although the total output of lignite increased by 80 per cent. between 1913 and 1927, the market remained local. The two chief districts, the Rheinland and Central Germany, exhibit a striking contrast in cartel organisation and exhibit its value and limitations better than any other industry. Producers in the Cologne seam work under uniform conditions, and being situated on the outskirts of the Rhenish-Westphalian area, must compete with Ruhr coal. In the numerous Central German and East Elbe seams conditions vary considerably, and the fuel has only feeble rivals in Saxon and Silesian coal; its use has been responsible for the principal changes of industrial location since the war, indeed for the emergence of a new economic unity, comparatively self-contained and independent of the rest of the Reich to a greater degree than any other area.

(a) Central Germany.

Neither the East Elbe area or the Central German area proper had formed cartels of sufficient strength to overcome the great hindrances in their way in the previous period. The natural difficulties of the wide dispersion of the seams were intensified by the policies of the three Bohemian trading firms, Ignaz and Julius Petschek and Gebr. Weinmann, which acquired several of the larger mines in the early years of the century and caused the dissolution of local cartels. (At present the Petscheks own large properties in all the lignite seams, but only dominate the East Elbe seam where they control the Ilse Bergbau, a mine producing one-fourth of the total output of the area.)

The present organisations for Central Germany and the East Elbe area are compulsory cartels under the coal industry law. Neither are syndicates in the correct sense. The Central German cartel does not sell coal or briquettes or regulate production; it fixes prices but does not compel adherence to them. The East Elbe syndicate sells a small portion of its output direct to large consumers, but does not regulate production and permits reduced prices to meet the competition of Silesian coal (a curious position, since the Silesian coal syndicate is also a compulsory syndicate under the same law). The areas controlled by the two syndicates correspond to no geographical or geological division; in both areas seams lie far apart and conditions of working vary considerably, for instance, in 1925 output per man shift in the Niederlausitz seam was almost twice as great as in the Frankfort seam. In the East Elbe area conditions are rather more uniform because there are only four seams, of which the Niederlausitz is far more important than the three on its borders; the Central German area has nine. Amalgamation of the two syndicates is quite possible, and desirable, since it would reduce cost of management, and obviate waste through unnecessary transport.

So far as rough lignite is concerned the weakness of the two cartels is of little consequence since it has only a local market and the large consumers own mines.* In the briquet market it is

* Ownership of Mines in % Output:—

	C. Germany.		E. Elbe.		Rheinland.	
	Briquettes.	Coal.	Briquettes.	Coal.	Briquettes.	Coal.
Trade	47.5	11	84	46	50	32
Chemicals ..	33	42	—	—	10	—
Electrical ..	9.7	30	1.8	23.5	25	60
Iron and Ore ..	2.8	1.5	2.7	5.8	13	2
Glass	—	—	4	2	—	—
Potash	0.2	5.0	—	—	—	—

injurious, for it permits uneconomic production and directly promotes uneconomic marketing. Neither syndicate regulates production by fixing quotas, and therefore concerns have no inducement to close down inefficient mines. According to an official enquiry made in February, 1926, into the costs of production of fourteen open working mines, in the Central German area, eight of the fourteen were unable to work at a profit at an average price per ton briquettes per cent. 8.85 RM., the highest price reached in the subsequent year, April, 1926, to March, 1927. No economies of production can be realised in this, the only unorganised branch of the German heavy industry, without an instrument in the form of a strong production cartel similar to the Rhenish-Westphalian coal syndicate.

The Schmalenbach commission, which was appointed to enquire into the possibilities of economising costs in order to offset the wage increase which followed the 1927 strike, found that at least half the wage increase (estimated at 56 Pf. a ton briquettes) could be offset by economies in marketing. In the East Elbe area briquettes pass through the hands of two wholesale traders instead of one, a state of affairs due to the preponderance of the Petscheks' influence. Only 7 per cent. of the total annual output of briquettes is supplied by the syndicate direct to large consumers; of the remainder one-third each is sold by the syndicates' firms, by the works' firms and by the free traders; the independent traders, being able to dispose of larger amounts than the quota allotted to them allows them to purchase from the syndicate, are obliged to buy the rest from the works' trade firms. Under the 1927 scale of rebates, the works' firms have an incentive to sell to the smaller wholesale traders because, by selling in smaller quantities, they forego less of the rebate which they receive from the syndicate. Thus the limitation of the free traders' quota and the rebate system combine to raise the cost of marketing.*

In the Central German area, traders have a less pernicious influence because the syndicate does not sell itself and therefore does not allot quotas to the free traders and the works' firms. The works' firms compete among themselves, without restriction, without allocation of markets, without grading or marking the widely differing qualities. As the Commission points out,

* The share of the "works trades firms" is increasing.

Share of total output.	1926-7 (Mill. tons).	1927-8.	%
Syndicate firms ..	4.78	3.85	-20
"Works firms" ..	1.76	3.21	80
Free trade ..	3.94	3.94	(17)

economies in marketing as well as economies in production depend on the existence of a single syndicate strong enough to control the market, an impossibility so long as the Petscheks retain their hold over the East Elbe syndicate. The report is striking testimony to the value of genuine syndicate organisation, and to the failure of compulsory organisation alone, as an instrument of rationalisation, but its recommendations have met with opposition from the industry and trade.

(b) The Cologne Seam.

The producers of lignite in the Cologne seam (the deposits of which are much larger than those of all the other German seams together, though the seam produces only 28 per cent. of the total German output) are in a position in all respects the reverse of that of other German lignite producers.

The seam lies between Cologne, Bonn and Düren, and runs parallel to the Rhine, about 50 kilometres away from it; it is four miles wide by forty-five long. The deposits are very thick, usually 20-25 metres, sometimes 60-100 metres. In the Rheinland, lignite is only a minor source of power as it is inferior to Central German and East Elbe lignite and far inferior to Ruhr coal, and would not be important if conditions of production were not extremely favourable and uniform, and if policy of the syndicate had not been successful and its management admirable. All deposits are accessible by open working, permitting the extensive use of machinery, so output per man-shift is far higher than in the Central German seams; the discovery of a special type of dredging machine during the war is said to have reduced costs by 30 per cent. All producers work under the same conditions and new mines can be easily opened. Since the market is local, it is always threatened by over-production. Without a strong syndicate policy, a steady increase in production would not have been possible, because market fluctuations would have been so great.

As soon as the mines achieved any importance, in the 80's, attempts were made to control the brikett market; at the end of the 90's depression forced two ineffectual organisations to combine. The syndicate did not include four works producing 23 per cent. of the total brikett output, and though that is not a high percentage of outsiders, it was too much for a lignite association, which must be all-inclusive since new mines can be so easily opened. In 1902 all the twenty-one works of the Cologne seam formed the Braunkohlen Briketts Verkaufsverein, G.m.b.H., Köln, the oldest established coal syndicate which has functioned uninterruptedly. Its first triumph was the purchase and closing down of the old mine "Theresia" which an outsider had

bought and prepared to work. At an early age it began to compete with the Ruhr coal syndicate in the South German market and resisted the coal syndicate's attempts to incorporate it. It has been successful because it has solved two problems which confront the heavy industry: it has regulated self-consumption and subdued the wholesale traders. But the real cartel problem—restriction of output—has never troubled it.

It has only been able to regulate self-consumption because it does not control the production of raw lignite, not because concern consumption is unimportant. Fifty-four per cent. of the syndicate's total output is produced by the two great firms; Roddergrube A.G. (four works) and the Rheinische A.G. für Braunkohlen-und Brikettfabrikation (ten works). Three smaller concerns, an Interessengemeinschaft of three firms with the works of the I.G. Farben Industrie, and the concern of the Horrem Brikettfabrik, have quotas of 7.5 per cent., 5.5 per cent. and 4.5 per cent.; the remaining 28.5 per cent. is divided between twenty-one companies whose shares run from 0.94 per cent. to 3.4 per cent. All the large concerns have connections with consumers who take all their rough lignite output. More than half of the Rheinland's electrical power supply is produced by five great stations using lignite as their chief form of fuel.* During and after the war, other industries secured supplies of raw lignite, the dye branches of the chemical industry, a nitrate factory at Grevenbroich and an electro-steel works at Bonn. The market for rough lignite cannot be controlled by the the vertical nor has it attempted to control it since 1923, since syndicate connections of the producers absorb all their production.

The market for briquettes is wider, and the syndicate fixes a self-consumption figure for the supply of mines' own needs, though not for the needs of undertakings which have only agreements with mines and are not their property. When the syndicate began, 80 per cent. of its total output was exported: the increase of export was one of its chief objects. By 1913 the

* The shares of the Bergeist mine came into the possession of the Rheinische Westphälische Elektrizitäts Gesellschaft which had previously used only hard coal, in 1906 and 1911; when in 1913 its supplies were insufficient, Stinnes made a long term contract with Roddergrube to supply the great Goldenburg works; in 1921 the R.W.E. took over the management of Roddergrube, much against the wishes of Roddergrube's shareholders. The two Fortuna Stations, and the Zukunft Station have been the creation of the lignite industry itself. In 1910, the Rheinische A.G., für Braunkohlen Bergbau-und Brikettfabrikation constructed the Fortuna I. power station in Cologne, and in 1912 agreed with the municipal authorities to supply it with current; the second Fortuna station they finished in 1922, as the first station alone could not supply all the Cologne current. The Zukunft station was completed by the Braunkohlen Industrie A.G., Zukunft in 1913, to supply the Aachen district.

export market was relatively unimportant ; the syndicate had created a new inland market for itself without assistance from the traders whom it had brought completely under its control. The syndicate has not attempted to include the traders as the coal syndicate has done, or to set up its own selling organisation because it has no need to do so ; it divides its market into sixty-two districts, each of which is shared by several traders who may not—and do not—sell outside their own district—an arrangement which survives from the fuel shortage period when it was desirable to distribute fuel supplies as evenly as possible ; its present object is to enable traders to consider the needs of their own district. The trader may not make exclusive contracts or allow his customer bonuses, lest he should acquire a monopolistic position ; for itself the syndicate has no such fears and will not allow him to sell lignite produced by firms not members of the syndicate. The penalties for breaking the syndicate's rules are heavy, but they are rarely broken, for though severe, they are uniform.

The syndicate is a compulsory organisation under the Coal Industry law. But would continue to exist if the law were repealed. It is one of the best established organisations in Germany today, but since its strength has never been tested by the necessity of reducing output, it cannot be regarded as a model for other cartels.

III. THE PROBLEM OF RE-ORGANISATION IN THE ROLLING STOCK BRANCHES.

Even before the war the railway waggon industry was only occupied to 80 per cent. of its capacity, but in the war and post-war period, as a result of the great construction programme undertaken by the Reichsbahn, it doubled its production capacity ; by 1923 there were seventy works in the branch against forty before the war. Since the sudden reduction of the Reichsbahn's orders caused by stabilisation, the industry existed for four years in a state of crisis, which attempts at organisation did not succeed in relieving. In 1926 eight of the larger firms began to negotiate for fusion : Linke Hofmann and the Gothaer Waggonfabrik in Uerdingen set up a study company to investigate, which found that fusion was not desirable (previously the only organisation had been two loose price conventions) but recommended as an alternative an association to the members of which the Reichsbahn should allot quotas. This the Reichsbahn agreed to do, on the condition that the thirty members of the association should "rationalise" their methods of production : but not a single attempt at rationalisation was made by any firm during the first years of its existence. Two groups crystallised

among the members: the Western group,* amalgamated in October, 1927, and the Eastern group† in May, 1928. Fusion is not likely to take place between the South German works which are departments of larger concerns. The Western trust is over-capitalised; experts consider that for every 1 per cent. Reichsbahn quota half a million RM. capital is sufficient; the trust has a capital of 11 Mill. RM. and a quota of 13½ per cent., i.e., about 830,000 RM. for every 1 per cent. The same must apply to the Eastern group, which will control 25 per cent. of the Reichsbahn's orders, with a capital of 30 Mill. RM., but no exact calculation can be made because the fusion was carried through by Linke-Hofmann, a general engineering firm, raising its capital and exchanging shares with the other two.

The problem in the locomotive branch is even more acute. The number of locomotives constructed for the home and foreign market declined from 4,052 in 1913 to 615 in 1926, having reached 5,370 in 1921 under the influence of inflation. The Reichsbahn's orders for locomotives have declined to a greater extent even than its orders for carriages, on account of technical changes—adoption of the through brake, re-organisation of repair shops, and the decline of passenger traffic. In addition the branch has lost all its export markets. Organisation to restrict output is even more difficult than for the carriage makers, for all the works, with one exception, are departments of large firms: trustification is impossible even if a trust could include so many as twenty works. Since the expiry of the contract of the association—never very strong—in 1927, the branch has been unorganised. Had the waggon builders' association been successful, the locomotive branch might have attempted something similar. As it is, no effort was made to improve the situation beyond the petition presented to the Reichswirtschaftsminister by four leading firms. The petition suggests that the Government should grant a credit of 50 Mill. RM. to the Reichsbahn for new orders to be allotted among the larger works, and that it should give financial assistance to the smaller works which would receive no orders to enable them to convert their works to other branches of machine construction. The minister refused the petition on the ground that special credit facilities would only provide artificial and temporary relief and postpone real re-organisation. Subsequently

* The Western group consists of:

Waggonfabriken von der Zypen & Charlier in Köln, Düsseldorfer Eisenbahnbedarf, Killinger & Sohn.

It was expected that other firms would join and bring the trust's quota up to 20 per cent., but in January, 1928, this had not taken place.

† The Eastern group includes:

Linke Hofmann in Breslau, Busch in Bautzen, Sächsischen Waggonfabrik, Werdau.

several specialisation contracts accompanied by restriction of output have been made, one of which will be accompanied by amalgamation.

Other branches faced by the same problem have been able to solve it by amalgamation because producers in each branch are few. Three large boiler-making firms amalgamated in September, 1927, with the assistance of Demag. The boiler tubes branch made plans for a similar amalgamation at the beginning of 1926, which it abandoned in the middle of 1927 when revival seemed to diminish the necessity. The three firms manufacturing ore-dressing machinery amalgamated in November, 1927, forming the Aufbereitungs A.G. in Essen.

IV. RATIONALISATION CARTELS.

Specialisation by cartels is possible but not usual, and is very rare, if the number of members exceeds three or four. The typical agreement is signed by two or three producers, rarely by all manufacturers of the branch. If there are more than three or four members, thorough specialisation is bound to entail financial loss for some firms, which must be made good by a scheme of profit-sharing, equivalent to loss of financial independence. The object of the following list is to estimate as exactly as possible the prevalence of agreements of this kind and to suggest reasons for their success in certain branches.

Specialisation Agreements.

Branch.	No.	Date.	
I. Machine Tools and Mechanical Tools	3 of 3 firms each.		In three branches, boring machines, turning lathes, and milling machines, groups of three firms have successfully specialised by agreements. Other groups of firms in the same branches have advanced no further than negotiations. Branch after branch reports failure to achieve organisation of any kind.
Wood-working machines	?	1924	The firm Maschinenbau Balcke A.G. in Bochum agreed with several North German door and window glass manufacturers to standardise and modernise their works, and to take over their sale of products, purchase and distribution of raw material.

Specialisation Agreements.

Branch.	No.	Date.	
II. Textile machines	14	1923	"Unionmatex." Five firms (now increased to fourteen) agreed to specialise. No central management and therefore no compensation or profit equalisation: has only partially specialised. The Central bureau acted at first as an official for information; now undertakes sales for certain area and partially for export; advertises, and cost is shared by members.
V. Diesel motors		1927	The Motorenwerke Mannheim vorm. Benz had made three Interessengemeinschaften with three companies for specialisation on certain kinds of Diesel motors.
VI. Pumps	3, 2, 2	1924 & 1927	Three agreements between three groups of firms 2 and 2, for specialisation.
VIII. Mechanical Transport	Several —2	One before war; one 1925	The pre-war agreement was signed by several firms, for thorough specialisation, with trustee to supervise. The 1925 agreement signed by two firms for specialisation.
IX. Envelope machines	6	1917	Verband deutscher Kuvertmaschinen-fabrikanten. In this small branch (400 workers) the five firms have been able to carry out complete specialisation by cartel agreement under peculiar circumstances. Their market is in fact guaranteed, for the incentive to organisation came from their consumers, the envelope makers' association, which threatened to boycott the machine-makers and manufacture machines on their own account if the machine-makers continued to sell to the outsiders of the association. A reciprocal contract was made in 1913 under which the envelope-makers guaranteed to the machine-makers a volume of orders equal to the average of the three previous years. The guarantee clause is no longer in force but the effect of the contract has been to secure the market to the machine-

Specialisation Agreements.

Branch.	No.	Date.	
Printing machines	24	1920	<p>manufacturers, while it has not checked the delivery of machines to non-members of the envelope-makers' association, who take about 30 per cent. of the machine association's output. The machine-makers' association has only two outsiders, one unimportant, the other Winkler and Dunnebier, manufacturing a special machine for mass production; the latter are permitted to supply the envelope-makers under a special contract and negotiations to draw it into the cartel are in progress.</p>
			<p>As a result of the specialisation contract made in 1917, each firm now manufactures three or four machines instead of twenty as before; prices have not increased anything like in proportion to the increase in prices of raw material and costs have been reduced by about 30 per cent. Clearly the success of the specialisation programme is due to the exceptionally strong position of the manufacturers compared with that of their consumers.</p>
			<p>The Vereinigung deutscher Druckmaschinen developed from a trade association and began to act as a cartel, fixing prices and terms, in 1920; unlike other cartels in this branch its activities were not disturbed by the events of 1924 and 1925, but in 1926 it was at last obliged to relax its regulations which were reinforced in 1927. There are a few important outsiders responsible for 6-7 per cent. of the total German output.</p>
			<p>Rationalisation in this branch means standardisation rather than specialisation. Attempts have been made by its nine groups, which have for the most part failed. Standardisation of machines must be preceded by standardisation of</p>

Specialisation Agreements.

Branch.	No.	Date.	
	6	Dec., 1925	<p>parts, which the industry regards as impossible, because standardisation is specially difficult for the large firms which should take the lead, because they construct large machines of very different types.</p> <p>Only one group, the lithographic machine-makers, has succeeded as a specialisation cartel and was instituted as such. Its six members now manufacture only two or three types of machine (instead of in one case forty-eight) and output is restricted. The specialisation contract was accompanied by a compensation fund and fairly elaborate regulations which have worked well. The exceptional success of specialisation in this branch is due to the increasing use of the offset machine which has gradually been displacing the lithographic type since the war; manufacturers were obliged to limit their output and specialisation was a convenient accompaniment. Further, the usual risk of specialisation is absent because all firms but one manufacture other printing machines. Successful specialisation in a permanently depressed branch is uncommon.</p> <p>Another group, the Verband deutscher Rotationsmaschinenfabrikanten, has achieved a high degree of organisation unaccompanied by specialisation. On account of the large size of the machines the manufacturers found it desirable to stabilise employment by pooling orders. Consumers object to this arrangement alleging that orders given to one factory are transferred to another without their consent and executed on different lines. In consequence of the complaints made by them before the Enquête-Ausschuss the group abandoned the pooling arrangements and substituted for it a system of output control.</p>

Specialisation Agreements.

Branch.	No.	Date.	
X. Refrigerators and cooling plants	2, 3	1927	Borsig and Mannesmann specialise in certain branches.
			Maschinenfabrik Augsburg Nürnberg, Maschinenfabrik Esslingen and the Linde concern specialise. There are forty to fifty firms engaged in this branch, but these five firms dominate the industry.
XI. Casting machines Electro-technical Furnace Construction	3-4	1919 or 1920	Specialisation and central sales.
	3	?	Specialisation and central sales.
	3	1928	Demag, Central German Steel Works and Martin & Pagenstecker in Köln founded a holding Company to re-organise their plant.

V. INVESTMENT IN THE HEAVY INDUSTRY, 1927.

	Loan.	Share issue.	Purpose.
Klöckner	Germany : 40 Mill. RM. 1926	20 Mill. RM. Dec., 1927	New steel works at Haspe, cement works at Osnabrück, new Thomas furnaces.
	Holland : 8 Mill. Lf. 1927		Synthetic nitrate enterprises with which potash interests are connected.
Hoesch-Köln-Neuessener Bergwerksverein	Germany : 18 Mill. RM. 1926	32 Mill. RM. 1928	Modernisation of steel works and rolling mills, construction of new blast furnace as substitute for three existing ones, with object of installing plant for the continuous use of blast furnace gas and a central power supply for the Dortmund plant; re-organisation of the finishing works to deal with a larger proportion

APPENDIX

	Loan.	Share issue.	Purpose.
			of the semi-finished steel. Thirty new coke furnaces at Kaiserstuhl II. mine, a new coking plant at its Emscher shafts and additions to the coking plant at Altessen. Patents taken out for a new steel process for direct production from ore.
Gütehoffnungshutte (Haniel) ..	U.S. 7½ Mill. \$ Nov., 1925. 2½ Mill. \$ Feb., 1926.		Enlargement of blast furnaces; construction of cement works at Oberhausen.
Mannesmann ..	U.S., 5 Mill. \$ 1926	44 Mill. RM. 1927	New coking plant and blast furnaces at Hückingen, which will make it a complete vertically integrated concern.
	Govt. loan of 8.5 Mill. RM.	20 Mill. RM. 1928	18 Mill. RM. of the 1927 issue paid off American loan. Govt. loan granted to retain property in Morocco.
Krupp	U.S. 10 Mill. \$ 1925 60 Mill. \$ 1927 9 Mill. RM. profits invested in addition to loan.		Complete re-organisation.

BIBLIOGRAPHY

A. BOOKS AND ARTICLES.

I. GENERAL. (Descriptive.)

- von Beckerath. *Kräfte, Ziele und Gestaltungen in der deutschen Industrie*, 1924.
- Schlier, O. *Der deutsche Industriekörper seit 1860*; 1922.
- Scheu, E. *Des Reiches wirtschaftliche Einheit*, 1927.
- Wiedefeld, K. *Ein Jahrhundert Rh. Westfälische Montanindustrie*, 1916. LSE.
- Deutsch, P. *Die Oberschlesische Montanindustrie*, 1926.
- Knochenhauer. *Die Oberschlesische Montanindustrie*, 1927.
- Müller, J. *Der mitteldeutsche Industriebezirk*, 1927.
- Aubin, G. *Entwicklung und Bedeutung der mitteldeutschen Industrie*, 1924.
- Tittler. *Das niederschlesische Industriegebiet in der Nachkriegszeit*, Berlin, 1927.
- Jahrbuch der bayerischen Wirtschaft*, 1925.
- Die Industrie in Baden*, 1926.
- Zahn, P. *Die innere Verflechtung der deutschen Wirtschaft in Jahrbuch für Nationalökonomie und Statistik*, 1926.
- Strukturwandlungen der deutschen Volkswirtschaft: 1928*, especially Hirsch: Wandlungen im Aufbau der deutschen Industrie.
- Hirsch, J. *Deutschlands Betriebskapital. Vierteljahrshefte zur Konjunkturforschung. Sonderheft*, 1927.
- Bosch, W. *Kreditrestriktionspolitik der Reichsbank*, 1927.
- Institut für Konjunkturforschung. *Die Lage der verarbeitenden Industrie im Lichte der Leipziger Frühjahrsmesse*, 1927.
- Aron, A. *Die Kapitalveränderungen deutscher Aktiengesellschaften nach dem Kriege*, Berlin, 1927.
- Handbuch der deutschen Aktiengesellschaften*, Berlin.
- Sammelanleihen für die Mittelindustrie. *Magazin der Wirtschaft*, 20 Oct., 1927.
- Kredit für Klein und mittelindustrie. *Magazin der Wirtschaft*, 15 Sept., 1927.
- Langfristige Kredite für Mittelindustrie. *Bank Archiv*. No. 18, 1927.
- Industrielle Gegenwartsfragen (Köln), 1928. Heft 3.

II. SPECIAL INDUSTRIES.

(1) Coal.

- Jahrbuch für das Oberbergamt Dortmund*, 1922-1925. (Contains syndicate contract and production figures for each concern.) 1926.
- Handbuch für Kohlenwirtschaft*, 1926.
- Bubnoff. *Deutschlands Steinkohlenfelder*, 1926.
- C.E.I. *Memo. on Coal*.
- Storm, E. *Geschichte der Kohlenwirtschaft Deutschlands, 1914-26*, 1926.
- Greiling, W. *Die deutsche Brennstoffwirtschaft*, 1927.
- Baumont, M. *La grosse industrie allemande et le charbon*, 1928.
- Wiedenfeld, K. *Das Rh.-Westfälische Kohlensyndikat*, 1912.
- Article in *Kohlenhandelsfragen*, (Festgabe für Wiesinger), 1925.
- Lüthgen, H. *Das Rh.-W. Kohlensyndikat in der Vorkriegs-, Kriegs- und Nachkriegszeit*, 1926.
- Ledermann, E. *Die Organisation des Ruhrbergbaus unter Berücksichtigung der Beziehungen zur Eisenindustrie*, Berlin, 1927.
- Jungst, E. Size of Undertakings in Ruhr coalfield. *Glückauf*, 1 Jan., 1926.
- Gutachten der Schmalenbach Kommission*, April, 1928.
- Memorandum of A.G. für Kohleverwertung, 1927.
- Heukeshoven. *Die wirtschaftlichen Auswirkungen einer Gasfernversorgung*. (Diss. Hamburg.) 1928.
- Gasfernversorgung. Article in *Industrielle Gegenwartsfrage*, 1928.
- Article in *Aufbau der europäischen Elektrizitätswirtschaft*, 1928.
- Spethmann. *Die Grosswirtschaft an der Ruhr*, pp. 103-151, 1925.
- Meis, H. *Eisenbahntarifpolitik und Ruhrbergbau*. Glückauf, 1924.
- See also articles in *Glückauf*, June, 1926, 2 June, 1928.
- Domsch. *Staffeltarif oder Kilometertarif?* 1926.
- Adolph, E. *Ruhrkohlenbergbau, Transportwesen und Eisenbahntarifpolitik*. Reprinted from *Archiv für Eisenbahnwesen*, 1927.
- Skalweit. Article in *Handbuch für Kohlenwirtschaft*.
- Teubert. *Der Güterverkehr und seine Veränderungen in der Nachkriegszeit*, in *Vierteljahrshefte zur Konjunkturforschung*; Sonderheft 5. 1928.
- Vogt, V. *Wandlungen im deutschen Eisenbahnwesen*; in *Strukturwandlungen der deutschen Volkswirtschaft*, 1928.
- von Beckerath, E. *Neudeutsche Kanalpolitik*; in *Strukturwandlungen der deutschen Volkswirtschaft*, 1928.

(ii) *Iron and Steel.*

- Enquête Ausschuss. III Unterausschuss. *Die Rohstoffversorgung der deutschen eisenerzeugenden Industrie*, 1928.
- Schneider, H. *Zur Analyse des Eisenmarkts. Sonderheft des Instituts für Konjunkturforschung*, 1927.
- Greiling W. *Die deutsche Montanindustrie*, 1926.
- L. & C. Economic Service, 1925. Special memo. *The German Iron and Steel Industry*.
- Berkenkopf, H. *Die Entwicklungen der Lage der Lothringischen und Luxemburgischen Grosseisenindustrie*, 1924.
- Greer. *Ruhr-Lorraine Industrial Problem*, 1925.
- Tross, A. *Der Aufbau der Eisen- und eisenerarbeitenden Industriekonzerne Deutschlands*, 1924.
- Ufermann-Hüglin. *Stinnes*, 1926.
- Arnst. *August Thyssen und sein Werk*, 1925.
- Schwarz, Goldschmidt & Co. *Die Vereinigte Stahlwerke A.G.*, 1926.
- Glückauf, June, 1927. Article on Organisation of the Trust.
- Enquête Ausschuss. *Wandlungen in den Rechtsformen der Einzel-Unternehmungen und Konzerne. (Section 5a.)* Berlin.
- Klotzbach, A. *Der Roheisenverband*, 1926.
- Adler. *Die Organisationsbestrebungen in Stabeisenfabrikation und Stabeisenhandel*, 1920.
- Krüger. *Die moderne Kartellorganisation der deutschen Stahlindustrie*, 1927.
- Reichert. *Die festländische Rohstahlgemeinschaft. Weltwirtschafts-Archiv*, 1927.
- Schlenker. *Die Eisenindustrie der Welt mit besonderer Berücksichtigung des internationalen Eisenpaktes. Kieler Vorträge*, 1927.
- Lange. *Die Stellung der deutschen eisenerarbeitenden Industrie zum Internationalen Eisenkartell in Maschinenbauwirtschaft*, 20 Oct., 1926.
- Vögele. *Historische Entwicklung der Neuordnung am europäischen Eisenmarkt in Maschinenbauwirtschaft*, 16 Dec., 1926.

(iii) *Lignite.*

- Report of Schmalenbach commission. *Gutachten über Ersparnismöglichkeiten in der Produktion und im Absatz Ostelbischer und Mitteldeutscher Braunkohlenbriketts*, 1928.
- Öllerich and Czempin. *Der deutsche Braunkohlenbergbau*, 1927.
- Förster. *Absatzfragen des mitteldeutschen Braunkohlenbergbaus*, 1927.

- Altgeld. *Der Braunkohlenbergbau des Geiseltales.*
 Spett, O. *Der Bitterfelder Braunkohlenbergbau, 1921.*
 Grosse. *Volkswirtschaftliche Bedeutung der sächsisch-thüringischen Braunkohlenteer und Montanwachsindustrie, 1922.*
 Baumont. *Le rôle du lignite en Allemagne.* Revue Economique Internationale, March, 1927.
La grosse industrie allemande et le lignite, 1928.
 Rosell. Articles on Rheinland syndicate in *Glückauf*, October, 1926.
 Redmayne. *German lignite.* "Fuel Economist," Dec., 1926.
Der deutsche Volkswirt, 22nd June, 1928. Flatau, *Ferngasversorgung und Braunkohlenbergbau.*
 Fullest information is to be found in the works on coal (Storm, Wiedenfeld, Greiling), and on Central Germany (Müller, Aubin, etc.).
 Consumption of lignite by electrical power stations. *Wirtschaft und Statistik, 1927.* No. 2.
 British Electrical and Allied Manufacturers Association. *The Electrical Industry in Germany, 1927.*
 Jähncke and others. *Der Aufbau der öffentlichen Elektrizitätswirtschaft auf der Braunkohle Mitteldeutschlands.*
 Gautschki. *Die Aluminiumindustrie.* Zürich, 1925.

(iv) Chemicals.

- C.E.I.10. *The Chemical Industry, 1927.*
 C.E.I.30. *The Artificial Silk Industry, 1927.*
 Ebert. *Die chemische Industrie Deutschlands, 1924.*
 Rassow. *Die chemische Industrie, 1925.*
 Christiansen. *Der Standort der chemischen und farbenindustrie, 1922* (written in 1914).
 Waeser. *The Atmospheric Nitrogen Industry, 1922.* English translation, 1925.
 Giffei. *Die deutsche Kalisalpeterindustrie, 1921.*
 Koenigsberger. *Die deutsche Kunstseiden- und Kunstseidenfaserindustrie in den Kriegs- und Nachkriegsjahren.* Berlin, 1925.
 Merck. *Entwicklung und Stand der pharmazeutischen Grossindustrie Deutschlands, 1923.*
 Waller. *Probleme der chemische Industrie, 1928.*
 Schwarz-Goldschmidt & Co. *Die I.G. Farbenindustrie, A.G., April, 1927.*
Technik und Wirtschaft. Ungewitter: Production statistics, May, 1927.

- Wirtschaftshefte der Frankfurter Zeitung*. Vol. I: *Chemie Wirtschaftsdienst*. Financial position of concerns, Oct. 20, 1927.
- Weltwirtschaftliches-Archiv*. Vol. II, 1926; Vol. II, 1927.
R. Arzet on Artificial Silk.
- Magazin der Wirtschaft*. Oppenheimer on Superphosphates.
May, 1927.
- Enquête-Ausschuss. *Report of Sub-Committee 1, Group 3, 1928: Wandlungen in den Rechtsformen der Einzelunternehmungen und Konzerne*, Section 5c.
- Sonderdruck aus Das Spezial Archiv*. *Der Farben Konzern*, 1927.
Glanzstoff-Bemberg, 1927.
- Handbuch der Internationalen Stickstoff und Düngemittelindustrie*, 1927.
- German Chemical Developments in 1926*. Daugherty. *Trade Information Bulletin*, U.S. Department of Commerce, 1927.

Owing to the Farben-Industrie's policy, there is very little information about this industry, but very much about potash. The more recent publications are:

- C.E.I. *Potash*, 1927.
- Musold, W. *Die Organisation der Kaliwirtschaft*, 1926.
- Münstermann, H. *Die Konzerne der Kali-Industrie*, 1925.
- Hoehstetter, W. *Kontingentwirtschaft in der Kali-Industrie*, 1927.
- Rationalisierung und Wirtschaftlichkeit in der Kali-Industrie*
Branchenleitung für die Kali-Industrie, 1926.
- Financial Position, *Wirtschaftsdienst*. October, 1927: 23rd
November, 1928.
- III Unterausschuss, Enquête Ausschuss, *Die deutsche Kali-Industrie*, 1929.

(v) *Textiles*.

- von Beckerath, H. *Die handelspolitische Lage der Textilindustrie in Schriften des Vereins für Sozialpolitik*, Vol. 171, II, 1925.
- C.E.I. *Cotton, Natural Silk*, 1927.
- Kahn, O. *Die deutsche Leinenindustrie*, 1925.
- Dietel, E. *Die deutsche Kammgarnweberei*, 1922.
- Marx, A. *Die Kammgarn- und die Streichgarnindustrie*, 1927.
- Goldschmidt, A. *Die Wollindustrie nach dem Kriege*, 1925.
(Unpublished figures for post-war "Veredlungsverkehr.")
Diss. Berlin.
- Rothschild. *Die süddeutsche Baumwollindustrie*, 1922.
- Dehn, R. *German Cotton Industry*, 1913.

- Börger. *Die Hanfspinnerei und Seilerwarenfabrikation mit Berücksichtigung der Hanfwerke Füssen Immenstadt*, 1925.
- Willms, M. *Zur Frage der Rohstoffversorgung der deutschen Jute-Industrie*, 1920.
- Kirchner. *Die Barmen-Textilindustrie*, 1921. Diss. Berlin.
- Schneider. *Apoldaer Wirkwarenindustrie*, 1922. Diss. Berlin.
- Hoin. *Die Vogtländische Spitzen- und Stickerie-Industrie*, 1922. Diss. Berlin.
- Taute. *Neuorganisation im deutschen Handel mit den Rohstoffen der Textilindustrie*, 1927. Diss. Berlin.
- U.S. Department of Commerce. *Cotton Waste Industry of Eastern Saxony*: Special Bulletin No. 489, 1926.
- Enquête-Ausschuss. I Unterausschuss. 3 Arbeitsgruppe.
III Teil. *Entwicklungslinien der industriellen und gewerblichen Kartellierung*. III Textilindustrie.
- Claren, C. *Denkschrift für den Ausschuss—über die Verbände der deutschen Textilveredlungsindustrie*. (Privately circulated), 1927.
- Reports and Articles of Association of many cartels, chiefly confidential, in the library of the Institut für Weltwirtschaft, Kiel.
- Weishäupl, M. *Zwei Grosshandelskartelle der Textilbranche*, 1924.
- vonBeckerath. *Die Kartelle der deutschen Seidenweberei-Industrie*, 1911.
- Munchau, K. *Die Bedeutung der Kapitalkonzentration in der deutschen Baumwollindustrie*. Halle, 1922. Diss. Berlin.
- Gädcke, C. W. *Die F. H. Hammersen A.G.* Würzburg, 1923. Diss. Berlin.
- Harder. *Die Konzernbildung in der Textilindustrie*. Gottingen, 1925. Diss. Berlin.
- I.G. Hammersen Dierig. *Kartell Rundschau*. 5. 1926.
- Larsen. *Organisation und Finanzlage der Textilkonzerne*, Wirtschaftsdienst, 16th December, 1927.

(vi) *Machine Construction.*

- Enquête Ausschuss. I Unterausschuss. 3 Arbeitsgruppe.
Entwicklungslinien der industriellen und gewerblichen Kartellierung. I Maschinenbau.
- Müllensiefen. *Kartelle als Produktionsförderer*, 1927.
- Kruspi. *Gegenwart und Zukunft der deutschen Maschinenindustrie*, 1926.
- Ahrens. *Die deutsche Landmaschinenindustrie*, 1926.

BIBLIOGRAPHY

215

- Schulz-Mehrin. *Spezialisierungs- und Verkaufsgemeinschaften im Maschinenbau, V.D.M.A., Berlin, 1927.*
Förderung der Leistungsfähigkeit der Maschinen- und Apparateindustrie durch ihre Fachverbände, Berlin, 1926.
Produktionswirtschaftliche Zusammenschlüsse im Maschinenbau und verwandten Zweigen, Berlin, 1928.
 Records and annual reports of the V.d.M.A. at Berlin office.
Maschinenbauwirtschaft (V.d.M.A. periodical).

(vii) Paper.

- Production. *Department of Commerce Reports, Vol. III, 1926, p. 21.*
Pulp and Paper Industry of Germany. Also Vol. I for March 29th, 1926.
Wirtschaft und Statistik No. 12, 1927.
Institut für Konjunkturforschung, No. 4, 1926.
 Export. *Wirtschaftsdienst, 17th June, 1927; 30th Sept., 1927; 7th Oct., 1927.*
Fünfundzwanzig Jahre Druckpapier Verband, 1925.
 Staudt. *Die Standortwahl der deutschen Papierindustrie, Berlin. Diss. Berlin, 1926.*
 Freitag. *Entwicklung der Rohstoffversorgung der deutschen Papierindustrie. Diss. Berlin, 1922.*
 te Neues. *Die Grundlage der deutschen Papierausfuhr vor und nach dem Kriege. Diss. Berlin, 1925.*
 Salzmann. *Die Papierindustrie, 1911.*
 Strohmeyer. *Die wachsende Bedeutung der Transportkosten in der Papierindustrie, unter Berücksichtigung des Herzogtums Baden. Jahrbuch für Nationalökonomie und Statistik, 1908.*
 Statistical Yearbook, 1926, and reports of Verband d. deutsche Papierfabrikanten—confidential.

(viii) Organisation for Export.

International market for this group of industries in *Wirtschaftsdienst* :

- 28th July, 1927 : Pottery.
 18th November, 1927 : Glass.
 24th June, 1927 : Clocks.
 6th January, 1928, 28th July and 13th May, 1927 : Leather and Shoes.

- 21st October, 1927 : Musical Instruments.
 8th July, 1927 : Pianos.
 14th October, 1927 : Toys.
 U. S. Department of Commerce reports provide some information about this group.
- Trömel, W. *Kartell und Preisbildung in der deutschen Geschirr- und Luxus-porzellanindustrie*, 1926.
 Vershöfen. *Die Lage der deutschen Porzellanindustrie in den Jahren, 1925, 1926 and Anfang, 1927 ; 1927.*
 Fillman. *Konzerne und Kartell. Weltwirtschaftliches Archiv.*, 1925. (LSE.)
 Dienemann. *Karte der Rohstoffe und Standorte der deutschen Glasindustrie*, 1927.
Die Glas-Industrie ; Das Glas—Trade periodicals.
 Dienstag. *Die deutsche Uhrenindustrie*, 1910.
Wirtschaftsdienst. Concentration in the Clock Industry. September 9th, 1927.
 Link. *Die Lederindustrie*, 1913. (LSE.)
 Trier. *Die Lederindustrie*, 1909.
 Hänger. *Die Musikinstrumentindustrie*, 1919. Industrial census results in *Wirtschaft und Statistik* No. II, 1927.

(ix) *Building Materials.*

- Enquête-Ausschuss : I Unterausschuss. 3 Arbeitsgruppe. II Teil : *Entwicklungslinien der industriellen und gewerblichen Kartellierung.* II Baustoffindustrie, 1928.
 Kühn, G. *Die Zementindustrie*, 1927.

(x) *Other Industries.*

Electrotechnical :

- Enquête Ausschuss. Sub-committee I, group 3. *Wandlungen in den Rechtsformen.* Section 5b. A.E.G. and Siemens.
 Eisfeldt. *Die Kartellierung der deutsche Elektroindustrie.*
 Beama. *Trusts and Combines in the Electrical Industry.*

Food :

- Liefmann. *Kartelle und Konzerne.* 7th Edition, p. 277 (beer). *Magazin der Wirtschaft*, 7th April, 16th June, 1927. Grain milling.
Wirtschaftsdienst, 21st Jan., 1927. Sugar.

BIBLIOGRAPHY

III. LEGISLATION.

(i) *The Decree itself.*

- Blum. *Grundzüge des neuen deutschen Kartellrechts*, 1924.
Flechtheim. *Die rechtliche Grundlage der Kartelle*, 1923.
Die Kündigung des G.m.b.H. Kartell. Kartell Rundschau, 1927.
Isay. *Studien im privaten und öffentlichen Kartellrecht*, 1924.
Tschierschky. *Probleme der Kartellaufsicht*, 1923.
Die Patentgemeinschaft im Dienste des Kartellgedankens, 1922.
Isay-Tschierschky. *Kartellverordnung*, 1924.
Lehnic-Fischer. *Das Kartellgesetz*, 1924.
Günther. *Kartell in Form von rechtsfähigen Verein*, 1920.
Geiler. *Gesellschaftliche Organisationsformen*, 1922.
Caro. *Die Kartellgerichtspraxis und ihre Auswirkungen*, 1926.
Lehnic, O. *Kartell und Staat*, 1928.
Simpson. *Law of England in relation to monopoly, Law Quarterly Review*, Oct., 1925.
Koch, F. *Grundzüge des englischen Kartellrechts*, 1927.
Sanderson. *Restraint of Trade*, 1926.

(ii) *Government Policy.*

On compulsory organisations, the works on coal and potash provide plenty of information. There are one or two special books :

- Thoenes. *Zwangssyndikate im Kohlenbergbau*, 1922.
Bruns. *Eisenwirtschaftsbund*, 1922.
Musold. *Organisation der Kaliwirtschaft*, 1925.

On the price reduction campaign, the *Kartell Rundschau* for 1925 contains many articles and summaries of press discussion :

- Woerner, K. *Preisniveau und Verbilligungsaktionen in Deutschland während d. Jahren 1924-25*. Berlin, 1927.

On plural voting shares, report of the 3rd group of the 1st sub-committee of the Enquête Ausschuss contains memoranda and discussion.

Wandlungen in den Rechtsformen der Einzelunternehmungen und Konzerne, 1928.

Statistics of Plural voting shares. *Wirtschaft und Statistik* No. 14, 1927 ; 1928.

For negotiations of Jurists' Conference in August, 1928, see *Kartell Rundschau* Nos. 11 and 12, 1928.

IV. THEORY.

- Liefmann. *Kartelle und Trusts*, 1924.
Kartelle, Konzerne and Trusts, 1927.
- von Beckerath. *Kräfte, Ziele und Gestaltungen*, 1924.
- Tschierschky. *Zur Reform der Industriekartelle*, 1921.
- Löffler, W. *Die moderne Konzernierung*, 1925.
- Schmitt-Schowalter. *Konzern und Kartell*, 1926.
- Kestner. *Der Organisationszwang*. (New edition, revised Lehnich), 1927.
- Saitzew, M. *Horizontal und Vertikal* (Kieler Vorträge), 1927.
- Wiedefeld, K. *Gegenwartsfragen industrieller Organisation*. (A lecture given in 1924, published in 1927, with his C.E.I. paper.)
Gewerbepolitik, 1928.
- Lederer, E. *Monopole und Konjunktur*, in *Vierteljahrshefte zur Konjunkturforschung*. Ergänzungsheft 2, 1927.
- C.E.I. Papers by Wiedefeld, de Rousiers, Macgregor, Cassel, Hirsch.

The 1927 controversy stimulated many articles, of which the more interesting are :

- Hirsch in *Berliner Tageblatt*, 7th July, 1927.
- von Beckerath in *Wirtschaftsdienst*, 29th July, 1927.
- Tschierschky in *Wirtschaftsdienst*, Sept., 1927.
- Liefmann, *Deutscher Ökonomist*, 21st July ; 27th October.
Kartell Rundschau, 1, 1928.

B. STATISTICAL MATERIAL.

(i) *Combination*.

Concerns.—Konzerne, Interessengemeinschaften und ähnliche Zusammenschlüsse im Deutschen Reiche Ende, 1926. Einzelschrift zur Statistik des Deutsche Reichs.

This publication was compiled from information either obtained from the concerns themselves or collected from the press. It refers only to the financial connection of share companies and does not include all of them. Material is so arranged that share capital of concerns cannot be added, since in many cases capital of the holding company and of the subsidiary company are both inserted* : nor is it clear how much this takes place as a result of total interest of the holding company being unknown.

* This fault is corrected by a calculation in *Wirtschaft und Statistik*, No. 3, 1928.

BIBLIOGRAPHY

—7

Cartels.—The Statistisches Reichsamt has much information of which nothing is published but the numbers (incomplete) of associations in each industry, under the headings "Reichsverbände" and "Landes-und Bezirksverbände" occupied (1) with economic questions only (i.e., not trade organisations), (2) with special economic questions only (the cartel proper), (3) with economic and labour questions (not necessarily cartels at all).

These results are published in *Statistisches Jahrbuch für das Deutsche Reich*, 1927, p. 510, and in *Jahrbuch der Berufsverbände im Deutschen Reiche*, Ausgabe, 1927. Sonderheft zum Reichs-Arbeitsblatt No. 36.

(ii) *Size, Number and Location of Undertakings.*

Wirtschaft and Statistik, 1927, No. 4 and No. 16, first results for the Empire of the *Betriebszahlung* of 1925. For difficulties of comparison with 1907 results see W. and S., 1926, No. 16, p. 572.

This census is the first since the war: the results hitherto (December, 1927) published use the pre-war unit to define the undertaking. The last pre-war census for which results are published, 1907, used methods so different that comparison with it is not possible. The 1913 census results, if they are ever published, probably would provide a basis for comparison. The complete 1925 census will use a threefold classification, i.e., as well as *örtliche Einheit*, *technische* and *wirtschaftliche Einheit*. The last classification will resemble the American "Central office" classification (see Thorpe, *Integration of Industrial Operation*) and will, therefore, give direct information about combined management.

The only *annual* statistics are those published by the Gewerbeaufsicht authorities (factory inspectors). These refer to about 80 per cent. total number of establishments: up to 1920 they did not include establishments employing under ten workers; since then they do not include establishments employing less than five. They only include power-using establishments.

Location.—The material used by all writers on industrial location since the war is *Die Arbeiterverteilung in der deutschen Industrie*, 1922 and 1924, not comparable with census results.

(iii) *Production.*

Monthly official statistics are issued for production of coal, coke and by-products, lignite and by-products, potash, pig iron, steel works and rolling mills products, other metals, and sulphuric acid. These are available in *Wirtschaft and Statistik* each month, and in the *Vierteljahrshefte* and the year book for the annual results.

The coal, lignite, potash, iron and steel syndicates also publish statistics of monthly output and employment which are available in *Glückauf* monthly.

The *Produktionserhebungen* are censuses taken originally for tariff-making and military purposes of the volume and value of the annual output of certain industries. The first, taken in 1898 for the 1902 tariff, was the widest in range, including mining, iron, chemicals, rubber, celluloid, cement, pottery, glass, paper, some branches of textiles, leather, tobacco and starch, women's and children's clothing. The 1907 census only included the more important branches. The results of the 1913 census are not yet published. Thus, there are available, so far as pre-war official statistics are concerned :

Mining : Continuous since 1860, modernised 1913.

Chemicals : 1898, 1907 for cokery products and sulphuric acid. Annual for potash since 1860.

Textiles : Cotton, 1907 ; worsted, 1897, 1907-8-9 ; linen, 1907-8-9.

Power-driven vehicles : 1901-3-6-10-11-12.

Leather : 1898-1910.

Food Industries : 1907.

There was never a general census, except in Bavaria in 1913, the results of which were not published.

These were resumed in 1925 and 1926 ; results are available for :

Textiles : *Wirtschaft and Statistik*, 1927-9, worsted washing and combing, worsted spinning ; 1917, cotton-spinning ; 1918, jute ; 1921, flax-spinning ; 1922, hemp ; and 1928, jute. So far as method is concerned these are comparable with the pre-war results, but offer no indication as to the effect or loss of territory (which affects cotton results most seriously). Provide information as to prevalence of commission work and integration of processes, value of raw materials.

Electrical Power : 1925-6.

Leather : 1925-6.

Power-driven vehicles : 1925-6.

Estimates of the total value of German industrial production are made by Hirsch in article in *Strukturwandlungen der Deutschen Volkswirtschaft* and in *Vierteljahrshefte zur Konjunkturforschung* 2 and 3, 1927 ; of value of textile production before the war by Kertesz, *Die Textilindustrie sämtlicher Staaten*, 1917, of the proportion of output exported in *Vierteljahrshefte zur Konjunkturforschung* 3, 1928.

BIBLIOGRAPHY

Association Statistics have made great progress in the last few years. Most of these are collected for the purpose of business forecasting.

Engineering.—The Verein deutsche Maschinenbauanstalten alone of the great industrial associations collects statistics of costs, orders received, employment and output and publishes some of its results, together with information as to the size of firms, fusions, cartel formation.

Mining.—One small association, the Verein für die bergbaulichen Interessen Niederschlesiens, has very complete material as to costs, output per head, stocks, output. Other syndicates output and output per head only.

Paper.—The Central Association collects output statistics for paper, pasteboard, wood pulp, cellulose, rags, circulates them among its members and supplies the Institut für Konjunkturforschung with data which are not published.

Textiles.—Certain textile associations supply the Institut für Konjunkturforschung with data for its production index, not published. One or two collect figures for forecasting purposes.

Pottery.—The cartel has collected statistics since 1922. These are available in Vershofen: *Die Lage der deutschen Porzellanindustrie in den Jahren 1925, 1926 und Anfang 1927*, very complete information as to costs, output, employment, utilisation of capacity.

The retail traders and the association of consumers' co-operative societies (Edeka) have collected statistics of turnover for the last three years.

In some industries no figures, either official or private, are available, chemicals being the outstanding example. The German association prepared the estimates of world production for the Economic Conference; the only other figures for German output appear in the U.S. Department of Commerce reports, the source being presumably the reparation authorities. The D.O.C. reports are the only source of information for glass and clock manufacture.

(iv) *Balance Sheets of Share Companies.*

The Balance Sheets for Gold Mark conversion and year 1924/5 are summarised in *Viertelsjahrshefte zur Statistik des deutschen Reichs*, No. IV of 1926. Includes about two-thirds of all share companies.

Aron, A. *Die Kapitalveränderungen deutscher Aktiengesellschaften nach dem Kriege, 1927*, uses the official statistics.

(v) Prices.

Wirtschaft and Statistik.

Wirtschaftskurve der Frankfurter Zeitung.

Allgemeine Statistisches Archiv, Vol. 16, part 4, explains the composition of the new official wholesale prices index numbers.

Institut für Konjunkturforschung, two price indices.

(vi) Foreign Trade.

Der Auswärtige Handel Deutschlands, Vol. 339 of Statistik des Deutschen Reichs for 1926 compared with 1913 and 1925.

In these volumes only the headings of the International Classification are given with 1913 values, therefore more convenient to use *Der Deutsche Aussenhandel*, prepared for the Foreign Trade Committee of the Enquête-Ausschuss, gives 1913 values for 1925 trade for each heading for each country, and therefore slightly different results for the totals in the International Classification. Also an index number to show divergence of volume and value changes.

(vii) Costs.

See sections on Coal, Iron Ore and Lignite : no other material.

INDEX

- Acetate Silk, *see* Artificial Silk
 Allgemeine Elektrizitäts Gesellschaft, 38, 39 *note*
 Aluminium Company of America, 94 *note*, 97
 Aluminium Industry, 93, 97
 World output, 1924-30, 99
 American Aluminium Trust, 121
 Anderson, R. J., 97, 99
 Apolda Textiles, 77, 92 *note*
 Arenberg & Klöckner, 17
 Artificial Silk:
 By-products recovery, 103
 Cellulose Supply, 177
 Chemicals Trust, 46, 176
 Competition, 23
 Control by Combines, 93, 94
 Expansion of Industry, 122
 World Output, 1922-28, 100
- Baade, Dr., 195
 Balfour Committee, 31 *note*, 65 *note*, 142
 Basic Slag, 180
 Beckerath, H. von, 147
 Belgian Iron, Cartel Court judgment, 11
 Blast Furnaces, productive capacity, 65
 Blumenstein Textile Concern, 38, 79
 Bonn, Dr. Moritz, 102, 117
 Bonner Verein, 104
 Bowen, L. J., 134
 Brick-making, 81
 Butyl Alcohol, synthetic, 178
- Canal Transport, 72, 73
 Capital:
 Foreign, Influx of, 31, 112
 Working, Shortage of, 79
 Capitalism, Effect of Rationalisation on, 102
 Cartel Decree, 126 *et seq.*
 Reform proposals, obstacles to, 140 *et seq.*
 Trusts, provisions affecting, 133 *et seq.*
 Working of, 137
- Cartels:
 "Calculation," 130, 147
 Capacity, Excess, 67, 68
 Compulsory, 53, 54, 55, 57, 58, 59, 62
 "Condition," 80, 130, 147
 Cost Reduction, 64
 Export, promotion by, 86 *et seq.*, 191
 Formation, 1924-28, 30
 Liefmann definition, 146, 147
 Output control, 15, 17
 Over-investment stimulation, 66
 Prices Policy, 101 *et seq.*, 103, 119
 Rationalisation, 50 *et seq.*, 141, 203
 State Policy, 125 *et seq.*
 Underselling by, 105
 Cement Industries, 54, 56, 66, 67
 Market Regulation, 83
 Rationalisation, 35
 Census, Industrial, 1925, 15, 16
 Chemical Industries:
 Crisis of 1925, 115
 Rationalisation, 45
 Chemicals Trust:
 Market Control by, 169 *et seq.*
 Products in which not interested, 180
 Chemnitz Brick Company, 81
 Cigarette Industry, 54, 59
 Clock-making Industry, 45, 48, 89, 91
 Coal:
 Canal Transport, 72, 73
 Costs, Ruhr Mines, 1927, 192, 194
 Economic Position of Ruhr Seam, 192 *et seq.*
 Export Markets, 86 *et seq.*
 Increase in size of undertakings, 159
 Markets and Market Control, 68 *et seq.*
 Rationalisation, 33, 192 *et seq.*
 Silesian, 69
 Syndicates, 57
 Coal-tar Products, 180
 "Cold Socialisation," 53, 68, 133
 Cologne Lignite Seam, 199

- Combines :**
 Achievement of, 64 *et seq.*
 Analysis of Movement, 146 *et seq.*
 Industrial Conditions and Combines, 101 *et seq.*
 Market Control, Extent of, 169 *et seq.*
 Company Law, 142
 Cost Reduction, Heavy and Finishing Industries, 64
 Cotton, *see* Textiles
 Cotton Waste, 24, 92 *note*
 Cyanamide Works, 104
- Deutsch-Luxemburg A. G., 36
 Deutsche Maschinenfabrik A. G., 42
 Deutsche Schrottvereinigung, 21 *note*
 Duisberg, Geheimrat, 45, 50 *note*, 118, 154
 Dyes Group, 45
 Dyes Trust, 83, 104, 115, 117, 118, 144, 170, 176
- Electrical Goods, Market Control,** 190
Essener Steinkohlenbergwerke A. G., 71 *note*
Eve, Mr. Justice, 135
Exports, Cartel Policy, 86 *et seq.*, 191
- Ferro-concrete,** 84
Fertilisers, 46, 56
See Nitrates—Superphosphates, etc.
- Finishing Industries :**
 Production Index, 1925-27, 13
 Rationalisation, 44 *et seq.*
- Food, Extent of Market Control,** 190
Ford, Henry, 29
Fuel, Synthetic, 178
- Gas :**
 Production, 96, 179
 Ruhr Scheme, 64, 74, 75
 Gelsenkirchen A. G., 35, 36, 37, 120
 Glanzstoff, *see* Artificial Silk
 Glass Industry, 89, 90, 91, 104
 Glue, 180
 Gordon, A. P. L., 55
- Hammersen Textile Concern,** 79
Harpen Bergbau A. G., 71 *note*, 115
Hasper Iron Works, 37
- Heavy Industries :**
 Cost Reduction, 64
 Investment in, 207
 Rationalisation, 33 *et seq.*
 Structural changes, 159 *et seq.*
 Helfferich, 9, 121 *note*
 Hemp, 187
 Hirsch, Julius, 15
 Hoesch Steel Works, 37 *note*
 Hydrochloric Acid, 181
- I. G. Farben Industrie, *see* Dyes Trust**
"Indanthren" Dyes Campaign, 83 *note*, 171
Ingot Steel in relation to Pig Iron, 163
Investment, Effect of Combines, 111 *et seq.*
Iron-Steel Production, Statistics, 162
Iron Ore Imports, 165
Isay, Dr., 144, 145, 147, 148
- Jute Industries, Market Control,** 27, 187
- Kohlenkontor,** 71
Kolbermoor Textile Concern, 79
Konjunkturforschung, Institut für, 12, 15, 73 *note*
Klöckner Group, 37, 115
Krupps, 43, 115, 119
- Lacquers,** 179
Leather Industry, 44, 89, 91
Lift-construction, 85
Lignite :
 Central Germany, Deposits, 69
 Cologne Seam, 199
 Costs of Working, 76
 Market Control, 18
 Output of Mines, 1928, 77
 Rationalisation, 34, 196
 Sales Organisation, 107
- Linen,** 185
Linke-Hofmann Locomotive Works, 42 *note*
Linoleum Industry, 27, 44, 187
Loans and Security Issues, 1925-28, 113
Lorraine, Loss of, effect on Steel Industry, 161
Low Temperature Carbonisation, 122
- MacDonnell, Sir John,** 135
Macnaghten, Lord, 134

- Mannesmann Tube Works, 37 *note*,
42, 43, 144
- Market Control, 14 *et seq.*
Cartels, 52
Chemicals Trust, 169 *et seq.*
Ruhr Coal Syndicate, 68
Textiles, 181 *et seq.*
- Markets, Extension and regulation,
82
- Metals, Non-ferrous, Cartel control,
190
- Methyl Alcohol, Synthetic, 178
- Michels, 60 *note*
- Mitteldeutsche Stahlwerke A. G.,
42
- Musical Instruments Industry, 89,
92
- New Industries, Expansion, 122
- Newspaper Syndicate, 23
- Niederrhein Stahlwerke, 22 *note*
- Nitrates:
Chemicals Trust, 94, 96, 104,
171
New Industries, 122
Output, 1926-29, 173
World Output, 1924-28, 100
- Norddeutsche Kammgarn Concern,
79
- Output, Gross and "Controlled,"
15, 16, 17
- Over-Investment stimulated by
Cartels, 66
- Paper:
Combines and Market Control,
22, 23, 188 *et seq.*
Export Markets, 88, 89, 108
Location, change in, 98
Production Tables, 99
Pharmaceutical Products, 179
Pig-Iron Association, 4, 18
Pigou, A. C., 153 *note*
"Planwirtschaft," 29 *et seq.*, 53,
127, 132, 134
Porcelain Industries, 44, 91
Potash, 18, 54, 55
Pottery Industries, 45, 48
- Prices:
Cartels Policy, 93-96, 101 *et seq.*,
103, 119
Costs, adjustment of prices to,
109
New Industries, Price Control,
93, 96
Wholesale, Statistics, 110
- Quigley and Clark, 12
- Rag Trade, 189
- Railway Rolling Stock, Rational-
isation, 54, 59, 201
- Rationalisation, 29 *et seq.*
Cartels, 203
Extent of, 192 *et seq.*
Industrial Conditions, affect on,
101 *et seq.*
Results up to 1928, 32 *et seq.*
Trust and State as Agent, 48 *et
seq.*
- Raw Materials, Production Index,
1925-27, 13
- Rhenish-Westphalian Coal Syndi-
cate, 7, 17
- Rhenish-Westphalian Iron and Steel,
18, 65 *note*, 161, 162, 163
- Rheinische Union, 36
- Rohstahlgemeinschaft, 18, 19
- Rolling Mills Products Syndicates,
21
- "Roof-Trusts," 38
- Roussiers, P. de, 68 *note*
- Ruhr Coalfields, *see* Coal
- Ruhr Gas Scheme, 64, 74, 75
- Sales Agencies, 83, 84
- Salzburg Jurists' Conference, 1928,
141
- Schacht, Dr. H., 49, 112
- Schalke Gruben und Hütten
Verein, 36
- Schlitter, Dr., 116 *note*
- Schmalenbach, Professor, 64
- Schneider-de-Wendel Group, 36
- Schumpeter, 150, 151, 154, 155, 157
- Scrap Iron Consumption, Tables,
166, 167
- Siegerland Ore Industry, 54, 60, 164
- Siemens Martin Steel Process, 19,
20 *note*, 21 *note*, 40, 65, 166
- Siemens-Schuckert Concern, 36
- Silesian Cement Trust, 67
- Silesian Coal, 69
- Silk, *see* Artificial Silk, Textiles
- Simpson, F. D., 135
- Soda Industry, 174, 180, 184
- South German Heidelberg Cement
Trust, 67
- Stahlwerksverband, *see* Steel Union
- State as Rationalising Agent, 52 *et
seq.*
- Steel Industry:
Lorraine, Loss of, 161
Market Control, 19 *et seq.*
Output, change of Process, 166
Rationalisation, 35
Trust formation, 1925, 39

- Steel Union, 18, 19, 20 *note*, 21, 118, 120
- Stinnes Group, 36, 38 *note*, 40, 114, 115, 144
- Stinnes, Mathias, G. m. b. H., 71 *note*
- Stöhr Textile Concern, 79
- Stumm Concern, 17, 37, 115
- Sulphate and Hydrochloric Acid Industry, 174
- Superphosphates, 174
- Swedish Ore Export, 165
- Taylor Processes, 29
- Textiles :
- Apolda, 77, 92 *note*
- Artificial Silk, *see* that title
- Chemnitz, 92 *note*
- Cotton, 183
- Hemp, 187
- Hosiery and Gloves, 24
- Jute, 27, 187
- Linen, 185
- Linoleum, 27, 44, 187
- Market Control by Combines, 23 *et seq.*, 108, 181
- Output, Gross and Controlled, 16
- Silk, 186
- Velvet, 24
- Woollens and Worsted, 25, 184
- Working Capital, Shortage of, 79
- Thomas Steel Process, 19, 20, 21 *note*, 65, 166
- Thyssen, 17, 22 *note*, 36, 37, 39, 40, 42, 43, 115, 119, 144
- Toy Industry, 89, 92
- Transport Costs Reduction, 68
- Trust as Rationalising Agent, 48 *et seq.*
- Tschiersky, Dr., 147
- "Uneconomic Limitation," 131
- United States Steel Corporation, 41
- Viscose, *see* Artificial Silk
- Vögtland Textile Industry, 92 *note*
- Wages :
- Cartels and Wage negotiation, 108, 109
- Rationalisation, effect on, 102
- Ruhr Coal Mines, 195
- Wallpaper Combines, 23, 189
- Water Transport, 72, 73
- Westphalian Wickering Cement Trust, 67
- Wintershall and Salzdettfurth Groups, 55
- Wood Distillation, 178
- Woollens and Worsted, *see* Textiles

BOOKS TO READ

Trusts in British Industry, 1914-1921. A Study of Recent Developments in Business Organization.

By J. MORGAN REES, M.A., Lecturer in Economics and Political Science, University College of Wales, Aberystwyth. Demy 8vo. 269 pp. Cloth. 10s. 6d.

The Times.—"A useful and painstaking survey, with full bibliographies, of the development of Trusts in different industries, taken in separate sections; with historical retrospect. Mr. Rees arrives at the conclusion that British trade is now under the paramount control of large combines which control the Government, and he discusses measures of reform. Any successful handling of the problem must, in his view, be preceded by State ownership of the primary industrial enterprises of power and transport, with democratic control; and this would necessitate nationalisation of banking."

Philip Snowden : The Man and His Financial Policy.

By A. ANDRÉADES, C.B.E., Professor of Public Finance in the University of Athens. Crown 8vo. 128 pp. Cloth, 7s.

Times Literary Supplement.—"It is no detraction to say of Professor Andréades' little study that there is much more about Snowden the financier than there is about Snowden the man. His exposition of Mr. Snowden's two Budgets is clear, concise and balanced—a model in its way, and the more noteworthy because it comes from a foreigner."

The Economic Policy of Soviet Russia.

By PROFESSOR PAUL HAENSEL, D.L.L. Demy 8vo. 190 pp. Cloth, 9s.

Professor Haensel has a thorough inside knowledge of his subject, having held the chair of Public Finance in the University of Moscow for more than twenty-five years, besides occupying other public positions of importance, including membership of the Board of Directors of the State Bank of Russia. From 1921 to 1928 he was President, under the Soviet, of the financial section of the Institute of Economic Research, and he has taken part in the work of several of the Soviet Commissariats, in the State Budget Committee, the Tariffs Committee and other bodies.

British Banks and the Finance of Industry.

By S. EVELYN THOMAS, B.Com.(Lond.). Demy 8vo. 304 pp. Cloth, 12s. 6d.

A comprehensive account of the post-war controversy between British Banks and British Industrialists on the important question as to how far our banking technique and monetary policy have contributed to or accentuated the prevailing conditions of depression.

A concise comparison of Continental and British Industrial Finance is included, and, after reviewing the recent developments in our banking organisation, the author concludes that further distinct advance is called for if our banks are adequately to meet the requirements of our markedly changed economic structure.

P. S. KING & SON, LTD.,

14 Great Smith Street, London, S.W.1

BOOKS TO READ

Changes in the Structure of World Economics Since the War.

By DR. FELIX SOMARY, with an Introduction by T. E. GREGORY, D.Sc. (Econ.), Professor of Banking and Currency in the University of London. Crown 8vo., 224 pp. Cloth, 7s. 6d.

Written by an eminent Continental banker, this book deals with the present political and economic problems of Europe, and with those currents of public opinion which are shaping the course of events today. The issues discussed range from the possibilities of Franco-German co-operation to Empire Free Trade, and the dangers of continued European particularism in the face of the economic power of the United States.

The Theory of Collective Bargaining. A History, Analysis and Criticism of the Principal Theories which have sought to explain the effects of Trade Unionism upon the Distribution of the Product of Industry.

By W. H. HURT, Senior Lecturer in Commerce in the University of Cape Town. Crown 8vo. 120 pp. Cloth, 5s.

The Problem of Maintaining Purchasing Power : A Study of Industrial Depression and Recovery.

By P. W. MARTIN. Demy 8vo. 320 pp. Many Diagrams. Cloth, 15s.

This book furnishes the first satisfactory explanation of why buying intermittently fails to keep pace with production. By approaching the question from a new angle it elucidates and reconciles the apparently conflicting theories at present held. In particular, it shows that, although general overproduction is impossible, a general deficiency of purchasing power nevertheless occurs and is basically responsible for industrial depression.

The New Survey of London Life and Labour. Volume One : Forty Years of Change.

Demy 8vo. 438 pp. Portrait, seven Maps, Charts and Diagrams. Buckram, 17s. 6d.

The Times.—"It remains to commend the maps and charts, particularly the two population maps, in this extraordinarily rich and informative volume, and once more, perhaps, to emphasise the essential statistical nature of its contents, not forgetting the scrupulous way in which the method by which the statistics are used is frequently explained."

P. S. KING & SON, LTD.,
14 Great Smith Street, London, S.W.1