
ARTICLES

Industrial Output in Romania and its Historical Regions, 1880 to 1930

Part II, 1913 to 1930

Marvin R. Jackson
Arizona State University, Tempe

III. Indicators of industrial development in greater Romania from 1913 to 1930

The next phase of Romania's industrial growth must be traced through two obstacles, territorial change and war. Greater Romania after the war centred on the Old Kingdom as its larger part to which were added areas from (1) the Hungarian part of the Hapsburg Empire, including Transylvania proper, large parts of the Banat and pieces of Crişana-Maramuriş, (2) the Austrian part of the same empire, Bucovine, (3) from the Russian Empire, Bessarabia, and (4) from Bulgaria, Southern Dobrogea. Each part had somewhat different categories of industrial statistics. Then the authorities in Greater Romania added their own new ones.

The effects of war on the Romania areas, both the destruction and dismantling of capital and the dislocation of labour and supplies, became a statistical problem because careful collection of comparable figures on industrial production start only with 1924. Indices created from them, presented in Annex Table D-1, show relatively high growth rates of 8-10 percent a year from 1924 to 1930. But where such growth took Romanian industry compared

to its development before the war is less clear. The evidence suggests that a good portion of the growth shown by these indices was (delayed) recovery to prewar levels of production.

Table 12 gives a first and extended view of the Greater Romanian regions, save Bessarabia, in terms of establishments and employment. The Old Kingdom, part of which has been already reviewed, shows rapid growth of employment from 1901-02 to 1911-12. Very clearly this rapid growth seems to have stopped from 1911-12 to 1930. However, the reductions may well have been concentrated in small-scale (artisan and household) manufacturing. They appear to occupy in 1930 no more persons than in 1901-02. Employment in large-scale or factory manufacturing continued to grow, although the rate of growth is obscured by differences in the definition of the data.

Employment in Transylvanian industry (the area defined to include also the Banat and Crisana-Maramuris) follows a similar pattern. From 1900 to 1910 overall employment grew on average from 2.4 percent to 3.2 percent per year, depending on which estimate is used. By contrast, large-scale establishments (including mining and extraction) experienced an average employment growth slightly over 5 percent a year.¹⁴ Then in the following twenty years total employment in Transylvanian industry seems to have fallen, but not in large-scale establishments. Their employment grew, but at a slower rate of about 2 percent. Small-scale establishments seem to have faced great problems, losing about 70,000 persons occupied.

Data are yet unavailable for Bucovina in 1910. From 1900 to 1930 employment in its large-scale establishments grew about 3.0 per year, as in Transylvania and slower than in the Old Kingdom (about 4.5 percent). As in the Old Kingdom, its small-scale estab-

¹⁴ As in the case of the Old Kingdom, this pace of growth had been established earlier. From 1890 to 1900 it averaged just under 5 percent, in both 1890 to 1900 and 1900 to 1910; the number of establishments with employment over 20 workers grew at annual rates of 6 percent.

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TABLE 12
ESTABLISHMENTS AND EMPLOYMENT IN INDUSTRY ON
THE TERRITORY OF GREATER ROMANIA, 1900 TO 1920

	Establishments	Persons Occupied	Workers
I. Old Kingdom			
A. 1901-1902:			
"Large-scale" manufacturing (plants with over 20 workers)	625 (410)	39,746 a	37,325 (35,466)
Small-scale manufacturing	54,405	105,031	
Special establishments ^b	6,923	17,853	
Mining and extraction ^c	235	6,568	
TOTAL	62,188	169,198	
B. 1911-1912:			
Total establishments (including construction)	(not available)	317,500	
"Large-scale" establishments Manufacturing (1915)		74,894 (60,937)	
C. 1930:			
Total establishments ^d	58,592	254,643	
Manufacturing	300	25,254	
Mining and extraction			
TOTAL	58,592	279,897	
<i>Establishments with more than 20 employees</i>			
Manufacturing	986	118,411	
Mining and extraction	131	24,115	
TOTAL	1,117	142,526	
<i>Establishments in Southern Dobrogea</i>			
Total	1,268	5,644	
With over 20 employees	9	632	
II. Transylvania (including the Banat and Crișana-Maramuriș)			
A. As reported by Madgearu and the Romanian Census:			
<i>Total establishments</i>			
1900	94,112	212,599	
1910	105,737	291,164	
1930	59,040	269,623	
<i>Establishments with more than 20 workers</i>			
1900	461	a	59,413 ^f
1910	f	a	97,706
1930	1,020	a	146,394
B. As reported by Vajda and Egyed (excluding restaurants and construction):			
<i>Total establishments</i>			
1900	(107,992) ^g	212,898	139,749
(distributed)		(188,007) ^h	(114,858)
1910	(124,890)	265,046 ^h	184,354
		(252,317) ^h	(171,030)
III. Bucovina			
<i>Total establishments</i>			
1900	7,363	21,416	
1930	7,764	31,516	
<i>Establishments with more than 20 workers</i>			
1900	77	a	6,198
1930	162	a	15,299

Notes: (a) Distributions by size typically gave only the number of workers, not total employees or persons occupied; (b) Mostly small mills; (c) Size distributions are unavailable; (d) Including those in Southern Dobrogea; (e) The census gave a slightly small figure of 59,376; (f) Madgearu gave establishments only for those employing more than 5 workers; (g) Includes restaurant and construction establishments; (h) Includes artisans estimated as equal to the number of establishments with no workers, but excludes those occupied in nonworker categories in other establishments; (i) Includes only workers covered in the statistics on size distribution.

Sources: Tables 1, 2 and 5; Institutul Central De Statistica, *Recensământul general al populației României*, Vol. X: Intreprinderi industriale și comerciale (Bucharest, 1938), pp. XVI-SVIII, 166-175, 250-89; Virgil N. Madgearu, *Evoluția economiei Românești după războiul mondial* (Bucharest, 1940), p. 143; N.N. COSTANTINESCU (ed.) *Din istoricul formării și dezvoltării clasei muncitoare din România pînă la primul război mondial*, pp. 484, 490, 500.

lishments appear to have simply maintained the 1900 level of employment in 1930.

With total employment in industry not rising from about 1910 to 1930; taking the country as a whole, any industrial growth would have to have come from the expected greater productivity of rising employment in factories.

The Growth of Industrial Production, 1913 to 1930. The broad definition of industry is covered by the estimates in Table 13. The several branches are summed into two estimates of total industry. One, gross output, includes significant double counting of which the largest element is surely from petroleum. By 1929 not only did crude oil count for 63 percent of mining and extraction output in current prices, but the value of refinery products from it were over 13 percent of the gross output of factory manufacturing. The series on net manufacturing output eliminates this particular source of doublecounting. But no effort has been made to eliminate the value of intermediate product inputs used by state monopolies, electric power, and mining and extraction.

The values in constant prices at 1913 levels in the third part of the table are based on applying the indices without parentheses to the respective values in current prices for 1913. A second set of indices, in parentheses, shows what would happen if the levels of output estimated to have been reached in 1924 for state monopolies and mining and extraction and in 1925 for electric power had thenceforth grown as in the indices of the Conjunctural Institute in Table D-1. While those estimates show faster growth of output from 1924 than the indices used in the table, there is no necessary reason that their starting points would be the same. That is, the faster growing indices could have done so because they started at lower initial levels. However, if the faster growth would have started at the same level in 1924 another 169 million *lei* (at 1913 price levels) would have been added to output by 1929. Such growth would have pushed the net and gross output indices to about 135-137. Even so this would result in an average output growth of less than 2 percent per year from 1913 to 1924.

TABLE 13

INDICATORS OF TOTAL INDUSTRIAL OUTPUT IN
GREATER ROMANIA, 1913 TO 1930

	Total Industry		Large-Scale Manufacturing		Small-Scale Manufacturing (net value)	Sales of State Monopolies (without sale)	Electric power Generation	Mining and Extraction
	Net	Gross	Net	Gross				
<i>In Current Prices (million lei)</i>								
1913			856.14	1,875.4	264.1	188.1	34.6	225.0
1919			4,812.5	11,464.9		224.7	246.3	
1920						428.0		
1921						1,282.8		2,176.2
1922			7,489.0	22,378.7		1,867.6		3,332.9
1923			14,848.6	34,384.3		2,780.7		6,118.6
1924			18,101.2	44,738.5		3,332.1		7,635.4
1925						4,557.8		8,875.9
1926					5,449	6,536	3,605	11,797.5
1927			22,375.2	59,044.5	6,903	7,391	4,414	10,238.2
1928			25,191.6	60,965.2	6,672	6,690	4,207	11,739.3
1929			23,809.2	56,128.8	7,450	6,648	3,745	11,725.6
1930			21,284.1	48,353.9	7,364	6,639	3,655	10,148.3
<i>Indices in Constant Prices</i>								
1913	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1919			60.2	66.2			106.6	50.6
1920						48.7	127.9	58.5
1921						63.9		63.1
1922			51.2	70.1		96.7		74.9
1923			69.4	73.3		88.7		85.7
1924			70.6	79.7		90.9*	(90.0)	99.1
1925			73.5	82.9		92.4	(93.3)	114.0
1926	95.5	98.5	83.4	94.1	62.6	96.1	(96.7)	140.5
							298.3	*(298.3)
							349.5	(481.9)
								*(121.7)
								(152.3)

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segue - Table 13

	Total Industry		Large-Scale Manufacturing		Small-Scale Manufacturing	Sales of State Monopolies		Electric power Generation		Mining and Extraction	
	Net	Gross	Net	Gross	(net value)	(without salt)					
1927	110.1	114.1	97.3	109.8	86.4	92.5	(93.9)	417.7	(524.5)	153.8	(170.1)
1928	118.3	124.4	108.2	122.2	83.7	91.1	(100.0)	460.4	(535.8)	167.1	(186.8)
1929	124.4	131.0	114.1	128.8	93.2	78.8	(87.4)	485.9	(568.2)	182.4	(237.6)
1930	124.6	129.7	111.1	125.5	99.5	69.5	(81.2)	469.9	(496.0)	198.4	(236.6)
<i>Values In Constant Prices At 1913 Levels (million lei)</i>											
1913	1,568.2	2,587.2	856.4	1,875.4	264.1	188.1		34.6			225.0
1926	1,497.3	2,547.3	714.2	1,764.2	165.3	180.8		120.9			316.1
1927	1,726.0	2,925.0	833.2	2,059.2	228.2	174.0		144.5			346.1
1928	1,854.4	3,219.5	926.6	2,291.7	221.1	171.4		159.3			376.0
1929	1,951.4	3,389.7	977.2	2,415.5	247.5	148.2		168.1			410.4
1930	1,954.0	3,356.1	951.5	2,353.6	262.8	130.7		162.6			446.4

Notes and Sources: (Large-scale manufacturing) See Table 14; these data are not corrected for the values of matches, explosives and grain cleaning included after 1921.

(Small-scale manufacturing) Values in current prices for 1913 include estimates for the following areas: Old Kingdom-111.0 million lei (M.A. Lupu, "Studii privind dezvoltarea economiei României în perioada capitalismului" *Studii și cercetări economice* 1967, pp. 332-333); Transylvania-107.0 million lei Friedrich von Fellner, "Die Verteilung des Volksvermögens und Volkseinkommens der Länder der Ungarischen Heiligen Krone zwischen dem Leutigen Urgarn und den Successions-Staaten", *Metron* (Rome), 3:2 (1928), pp. 282-286, with one crown equal 1.05 lei; Bessarabia-25.2 million lei (estimated at 85 percent of the per capita value in the Old Kingdom). The index in constant prices is based on deflating with the general wholesale price index in column 3 of Table 14.

(Sales of State Monopolies) The values in 1913 assumes the same per capita value of sales for greater Romania as in the Old Kingdom; the figures of 83.7 million lei has been multiplied 2.25 times. Other values are from the following sources: *Anuarul statistic 1922*, pp. 233-239; Ministère de L'Industrie, *La Roumanie Economique 1921* (Bucharest, 1921), pp. XL-SXI; Union des Chambres De Commerce et D'Industrie de Roumanine, *La Romanie Economique en 1926* (Bucharest, n.d.), pp. 86-87; *Enciclopedia României*, Vol. IV, p. 956. The index is explained in Annex Table D-3.

(Electric Power Generation) Values in current price are from the following sources: *Anuarul statistic 1922*, p. 207 and *Enciclopedia României*, Vol. 14, p. 955. The index is based on figures from 1925 to 1930 of power generation in million kwh in the *Enciclopedia. Rommenhoeller, op. cit.* pp. 346-347. The alternatives index, in parentheses, is the official index from Annex Table D-1.

(Mining and Extraction) The value in current prices for 1913 includes 0.299 million lei for Bucovina (see ERNST WAIZNER, "Das Volkseinkommen Alt-Österreichs und seine Verteilung auf die Nachfolgestaaten", *Metron* VII:4 (Roma 1932), p. 146, 62.646 million lei for Transylvania (see Fellner, *op. cit.* pp. 282-286), and 162.1 million lei for the Old Kingdom (petroleum and salt are from *Anuarul statistic 1915-1916*, pp. 201 and 206, 1922, pp. 208 and 226 while "other" output is from LUPU, "Studii și cercetări economice", 1967, p. 331. Current values for 1921 and after are from *Anuarul statistic 1939 si 1940*, p. 461. The index in constant prices is from Annex Table D-4. The alternative index, in parentheses, is the official index from Annex Table D-2.

The major component of Romanian industry was factory manufacturing. From 1913 to 1929 it gained compared to small-scale manufacturing, but not very much. At the same time, it lost relative to mining and extraction. But this judgment depends partly on which of several alternative measures of growth, shown in Tables 14 and 15, should be favoured.

Both Tables are developed on the basis of data for 1913 and 1919 prepared in a *Survey of Industry in 1920*, made under the direction of economist and politician, Mihail Manolescu, then director general of industry in the Ministry of Commerce and Industry. This survey seems to have suffered a rather odd neglect, going unmentioned in the best sources on Romanian interwar industry, bourgeois or socialist.¹⁵ Our sole references to them are found in the Romanian statistical yearbook of 1922, pp. 200-207 and extensive citations of them in a book by C.G. Rommenhoeller, one time consul general of Holland in Romania.¹⁶

Table 14 begins with the data from the 1920 survey which is connected to a series published regularly thenceforth as "mare" or « large scale » industry. Actually it covered only manufacturing and, as noted in Table 3, in establishments having over 20 horsepower of motors or 10 workers. Coverage was significantly greater than in the case of "encouraged" establishments in the Old Kingdom, counting well over 900 million *lei* of output in 1913 compared to the encouraged total of only about 550 million. As noted, the data of the survey of 1920 included the output of electric power stations while that of subsequent years included the value of match

¹⁵ See: N.P. ARCADIAN, *Industrializarea României* (Bucharest, 1936); VIRGIL N. MADGEARU, *Evoluția economiei românești* (Bucharest, 1940); N.N. CONSTANTINESCU and V. AXENCIUC, *Capitalismul monopolist în România* (Bucharest, 1962); and M.A. LUPU (ed.) *Istoria economiei naționale a României* (Bucharest, 1980).

¹⁶ *La Grande-Roumanie* (LaHaye: Martinus Nyhoff, 1926), pp. 225-354. Rommenhoeller cites the following source: Ministerul industriei și comerțului: Direcțiunea generală a industriei, "Ancheta industrială din 1920," *Buletinul industriei*, II: 7-9 (Bucharest, 1921). Materials were also published by the same agency as, *Prima statistică industrială a României după primul război mondial* (Bucharest, 1922).

TABLE 14 - GROSS OUTPUT OF FACTORY MANUFACTURING IN GREATER ROMANIA, 1913 TO 1930

Year	Gross Output Current Prices ^a (million lei)	Price Retail	Indices ^b Wholesale	Gross Output Constant Prices (million lei)	(index)	c	Alternative Indices d	e	f
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1913	1,875.4	100	100	1,875.4	100.0				100.0
1919	11,464.9	924		1,240.8	66.2				
1920	n.a.							35.0	
1921	n.a.							47.2	47
1922	22,378.7*	1,708		1,314.1	70.1			73.2	73
1923	34,384.3*	2,500		1,375.4	73.3			73.2	73
1924	44,738.5*	2,985	2,443	1,494.8	79.7	79.7	79.7	89.0	
1925	(g)		3,075	(g)	(g)	84.8	82.9	92.2	73
1926	(g)		3,296	(g)	(g)	99.4	94.1	103.7	89
1927	59,044.5*		3,026	1,951.2	104.0	111.3	109.8	118.8	79
1928	60,965.2*		3,020	2,018.7	107.6	120.7	122.2	131.1	79
1929	56,128.8*		3,026	1,854.9	98.9	117.7	128.8	136.9	69
1930	48,353.9		2,802	1,725.7	92.0	125.8	125.5	132.5	61
AVERAGE ANNUAL GROWTH					to 1928	to 1930	to 1929	to 1929	
					0.5	1.4	1.6	2.0	

NOTES AND SOURCES: (a) Data are uncorrected for the inclusion of cereal cleaning, matches and explosives in data after 1922, but exclude state monopolies, electric power and extraction. Data for 1913 and 1919 are from *Anuarul statistic 1922*, pp. 202-203 from which electric power output is subtracted. Other years are from N.P. Arcadian, *Industrializarea României*, pp. 169-177; (b) Wholesale prices do not seem to be available for the period 1919 to 1923. The retail price index suffers some uncertainty. One version of it is cited as a Bucharest cost of living index prepared by the State Institute for General Statistics with a base, 1913 = 100. Another index with the same values for 1923 through 1926 is cited as a general retail price index prepared by the Ministry of Industry and Commerce with a base, 1914 = 100. It appears that average retail prices in Bucharest (a simple average from *Anuarul statistic 1915-1916*, p. 160) were about 5 percent lower in 1914 than in 1913. Price indices are from Costin C. Kiritescu, *Sistemul banesc al leului si precursorii lui*, Vol. II (Bucharest, 1967), pp. 559-63; (c) The index in column 5 linked in 1924 to the Romanian index of manufacturing given in N.P. Arcadian, *Industrializarea României*, p. 213; (d) Same as (c) except a revised index of manufacturing is used as given in Institutul Romanesc de Conjunctura, *Buletin Trimestral*, III-I (1935), p. 61; (e) From League of Nations, *Industrialization and Foreign Trade* (1945), p. 137; (f) From Institut für Konjunkturforschung, *Vierteljahrshefte zur Konjunkturforschung*, «Die Industiewirtschaft» (Berlin, 1933), pp. 50 and 65; (g) Data are missing for the chemical industry.

TABLE 15
 OUTPUT IN BRANCHES OF FACTORY MANUFACTURING IN
 CONSTANT PRICES AT 1913 LEVELS, 1913 AND 1929
 (1,000 lei)

Gross Output	1913	1919 ^a	1929 ^a	1929/1913 Index	Annual Percent ^b
Metals and Machinery	121,188	41,990	272,888	225.2	5.2
Nonwood Building Materials	111,347	36,802	148,277	133.2	1.8
Chemicals	292,910	118,629	621,528	212.2	4.8
Wood Processing	230,851	115,426	134,408	58.2	(-3.3)
Paper	34,707	11,974	52,859	152.3	2.7
Food Products	867,766	575,741	387,741	44.7	(-4.9)
Textiles	95,862	30,451	188,301	196.4	4.3
Leather and Hides	79,852	55,896	51,192	64.1	(-2.7)
Printing	22,179	18,077	21,530	97.1	(-0.2)
TOTAL	1,856,662	1,004,986	1,878,700	101.2	0.1
<i>NET OUTPUT</i>					
Metals and Machinery	64,383		153,668	238.7	5.6
Nonwood Building Materials	54,084		67,160	124.2	1.4
Chemicals	183,184		241,177	131.7	1.7
Wood Processing	99,993		61,822	61.8	(-3.0)
Paper	16,863		26,243	155.6	7.6
Food Products	315,086		145,657	46.2	(-4.7)
Textiles	58,002		75,492	130.2	1.7
Leather and Hides	43,760		18,417	42.1	(-5.3)
Printing	15,723		14,016	89.1	(-0.7)
TOTAL	851,078		803,652	94.4	(-0.4)

Notes: (a) Where more than one value is given in the sources, the average value is reported in this table. (b) Compound growth rate from 1913 to 1929.
 Sources: Annex Tables D-5 and D-6.

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production and explosives. Adjustments have been made for such differences whenever possible.¹⁷

The figures reported are in terms of current prices and change mostly because of the considerable inflation of Romanian prices. Table 14 incorporates the only accessible general price indices for deflation. Table 15 generates totals as a sum of sectors where sectoral growth is estimated by a combination of means described in Annex Table D-5.

As noted in Table 14 there is some uncertainty about the base year of reported price indices used there. But a greater problem for estimates of real growth is that price deflation from 1924 on, as shown in column 5, estimates less growth than shown in Romanian indices of manufacturing growth from 1924 on, as shown in columns 6 and 7. If Romanian factory manufacturing had grown as slowly as is shown in column 5 of Table 14 it would have eliminated most of the total industrial growth shown by 1929 and 1930 in Table 13.¹⁸

Table 15 is based on efforts to evaluate each branch of Romanian manufacturing separately. The accuracy of branch indices is quite variable; but in no case can the least reliable branch index be considered of poorer quality than the general indices in Table 14. Hence, Table 15 may well be the better evidence.

In it Romanian manufacturing barely reaches its 1913 levels by 1929. Per capita production in 1929 with about 10 percent more population could have been lower than in 1913 by 10 percent in gross terms and 15 percent in net terms. Why manufacturing would have performed so poorly is not hard to find. The major problem is seen clearly to be the food processing industry which, if

¹⁷ Reliance has been on data published in *Arcadian*. They also appear in *Anuarul statistic 1939-1940*, pp. 478-479 with some differences. The latter source erroneously presents 1919 data as 1921 data and says that 1923 were missing. Also, minor differences appear in 1926. In both sources the output of chemicals is only partially reported in some years.

¹⁸ The index of gross output for total industry in 1929 would have been reduced to 109.3 (1913 = 100) while the index of net output would have been reduced to 116.0.

it had just held its own in 1929 would have added to gross output an amount equal to textiles combined with metals and machinery, and allowed the index to rise to 127 (1913 = 100). The impact of the food industry on net output is lower. Holding its own would have added slightly more net output than actually produced by metals above, and raised the index to 114 (1913 = 100).¹⁹

A final aspect of Romanian industrial growth is presented in Table 16 where changes in factory manufacturing are decomposed into their regional components.²⁰ The figures there are based on a simple deflation of output in 1919 and 1929 to price levels of 1913. The procedure is the same as for columns 4 and 5 in Table 14 except values of grain cleaning, matches and explosives have been removed in 1929.

Table 16 suggests that factory manufacturing in Bessarabia suffered more from the war period and recovered less in the 1920s than the other historical regions. But the problem of overall recovery of production really coincided with the Old Kingdom. Having about half of total factory manufacturing in both 1913 and 1919 meant its recovery to 100 percent would have put the whole country over that level. The Old Kingdom enjoyed a relatively rapid growth of the petroleum refining industry. It had, at the same time, over half of the food industry. Clearly before more can

¹⁹ In addition to food products the branches of wood processing and leather and hides were also problems. The reliability of calculations for them is much lower than in the case of food (see Annex Table D-5). Still, the common failure of the three may be connected. All three depended on agricultural and forestry production. All three may have been more dependent on export markets or less capable of import substitution.

²⁰ Fellner's estimates for factory manufacturing in the Romanian territories acquired from the Hungarian part of the Habsburg Empire, including Transylvania and the Banat in Table 16, suggest a gross output figure of only 506.4 million lei (excluding smelting). Waizner's estimate for Bucovina of 34.4 million lei is even further short of the number in Table 16. This suggests that both authors were following more restrictive definitions of a factory establishment. See Friedrich Fellner, "Die Verteilung des Volksvermögens und Volkseinkommens der Länder des Ungarischen Heiligen Krone zwischen dem heutigen Ungarn und den Successions-Staaten", *Metron* III:2 (Rome, 1928), p. 282, and Ernst Waizner, "Das Volkseinkommen Alt-Österreichs und seine Verteilung auf die Nachfolgestaaten," *Metron* VIII:4 (Rome 1932), p. 157.

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be said about Romania's regions their production, following Table 15, must be broken down by branches. That difficult task remains for the future. Meanwhile, both the indicators of regional industrial growth and its causes must be treated as having great uncertainty.

TABLE 16
 OUTPUT IN FACTORY MANUFACTURING IN THE HISTORIC REGIONS OF GREATER ROMANIA, 1913 AND 1929
 (1,000 lei)

	Total	Old Kingdom	Transylvania	Banat	Bucovina	Bessarabia
<i>Gross output in current values</i>						
1913 ^a	1,875,469	971,843	494,286	205,287	108,693	95,322
1919 ^a	11,464,932	6,069,901	3,069,176	1,269,035	625,240	431,545
1929 ^b	55,533,059	27,499,030	15,891,960	7,635,852	2,825,650	1,175,254
<i>Net output in current prices</i>						
1913 ^a	856,063	452,561	223,626	99,932	47,718	32,709
1919 ^a	4,812,471	2,720,752	1,171,597	622,395	139,324	158,380
1929 ^b	23,293,369	10,902,346	7,416,227	3,378,924	1,273,510	322,359
<i>Index of gross output in constant prices^c</i>						
1913	100.0	100.0	100.0	100.0	100.0	100.0
1919	66.1	67.6	67.2	66.9	62.2	49.0
1929 ^b	97.9	93.5	106.2	122.9	85.9	40.7
<i>Index of net output in constant prices^c</i>						
1913	100.0	100.0	100.0	100.0	100.0	100.0
1919	60.8	65.0	56.7	67.4	31.6	52.4
1929 ^b	89.9	79.6	109.6	111.7	88.1	32.6

Notes: The gross and net value of electric power stations have been eliminated from output data in 1913 and 1919 in order to make the values comparable with 1929; (b) The gross and net values of grain cleaning, matches and explosives have been eliminated from 1929 in order to make the values comparable with 1919. Grain cleaning establishments are assumed to be located all in the Old Kingdom. The two match factories listed in 1929 are assumed to be those located in Bucharest (Filaret) and Cluj; output is attributed to the two regions in the proportions of 2 to 1. One explosives plant is listed in 1929; the invested capital of this plant seems to match that of the "Prima Societate Romană de Explozion", a producer of dynamite located in Fagaras (in Transylvania). However, the state monopoly administration, "CAM", also had a factory for black power production located in the district of Dimbovita (in the Old Kingdom). On the chance that the output of the former was attributed to chemical fertilizers (along with the plant of Marasesti) the output of explosives is attributed to the Old Kingdom; (b) Deflation is according to the general price index given in Table 13; (c) Including Southern Dobrogea.

Sources: *Anuarul statistic 1922*, pp. 200-206; *Anuarul statistic 1930*, pp. 184-197; Rommenhoeller, *op. cit.* pp. 237-349; Ministerul industriei și comerțului, *Indicatorul industriei românești* (Bucharest, 1933), pp. 240-241 and 332-333.

ANNEX D

CALCULATIONS OF INDUSTRIAL GROWTH FROM 1913 TO 1929
BASED ON AVAILABLE DATA CONNECTING ROMANIA TO 1929
TO THE EQUIVALENT TERRITORIES IN 1913

Romanian economists in the Conjunctural Institute sometime in the late 1920s began to estimate a large number of series of major industrial products in physical units for the purpose of calculating production indices. Their work seems to have extended back only to 1924 and is presented in Table D-1. The contents of each branch, that is the individual product series in each one, remains unclear. Possibly it will turn up in further research.

The contents of Tables D-2, D-3 and D-4 need no comment. Table D-5 is relatively complicated because it attempts to assemble the available information to connect 1913 and 1919 to 1929 at a disaggregated level. The connections are made using a mixture of deflation by the prices in Table D-4 and of output series in physical units. No effort is made to incorporate the indices in Table D-1 pending the acquisition of more information.

Table D-6 uses the information developed in Table D-5 to deflate net output in 1929 to price levels comparable to 1913. The deflation, as mentioned above, incorporates information on both price and physical output.

Table D-1

INDICES OF INDUSTRIAL OUTPUT BY BRANCHES
OF INDUSTRY AND MANUFACTURING, 1924-1930

	Weights Based on 1927-1931	1924	1925	1926	1927	1928	1929	1930
Manufacturing	1.000	67.7	72.0	84.4	94.5	102.5	100.0	106.9
Metals and Machines	0.149	57.2	63.0	72.4	88.0	96.7	100.0	98.9
Electrical Products	0.003	33.2	61.2	68.2	90.7	94.1	100.0	80.3
TOTAL	0.152	56.7	63.0	72.3	88.0	96.6	100.0	98.6
Construction Materials	0.026	69.3	77.9	87.9	100.6	105.8	100.0	93.2
Glass and Ceramics	0.011	88.1	115.6	116.3	121.7	111.9	100.0	78.7
TOTAL	0.037	74.9	89.2	96.5	107.0	107.6	100.0	88.6
Chemicals	0.195	41.6	48.9	66.9	81.2	90.4	100.0	106.6
Wood Processing	0.079	114.0	117.5	116.7	101.4	101.2	100.0	89.6
Paper and Printing	0.045	58.7	68.9	75.1	96.0	101.8	100.0	97.7
Food	0.277	98.6	86.0	106.4	115.7	115.6	100.0	114.1
Textiles	0.150	51.6	63.1	75.0	87.6	97.9	100.0	125.3
Leather	0.065	69.2	90.2	87.1	86.2	122.2	100.0	93.0
State Monopolies		104.1	106.8	110.6	107.4	114.4	100.0	92.9
Tobacco		105.3	107.1	111.3	108.0	115.4	100.0	92.5
Salt		95.0	103.7	107.9	103.0	106.8	100.0	95.7
Electric Power		34.5	52.5	84.8	92.3	94.3	100.0	86.7
Mining and Extraction		41.7	51.0	64.1	71.6	78.6	100.0	99.7
TOTAL INDUSTRY		64.1	69.2	82.7	91.3	98.7	100.0	103.7
<i>REVISED SERIES</i>								
Manufacturing		61.9	64.4	73.1	85.3	94.9	100.0	97.4
State Monopolies		104.0	106.8	110.6	107.4	114.4	100.0	92.9
Electric Power		34.5	52.5	84.8	92.3	94.3	100.0	87.3
Mining and Extraction		41.7	51.0	64.1	71.6	78.6	100.0	99.6
TOTAL INDUSTRY		60.1	64.4	74.6	84.8	93.5	100.0	96.9

Notes: (a) Combined on the basis of weights given for 1927-1931.

Sources: Recalculated from N.P. Arcadian, *Industrializarea României* (Bucharest, 1936), p. 213; Institutul Românesc de Conjunctură, *Buletin Trimestrial*, II, 1 (1934), pp. 30-31 and III.1 (1935), p. 61.

Table D-2

SALES OF STATE MONOPOLIES IN PHYSICAL UNITS
AND CONSTANT PRICES, 1913 TO 1930

	Total (Index)	Tobacco (tons)	Matches (1,000 units) ^e	Playing Cards (decks)	Cigarette Paper (1,000)	Explosives kg.
1913 ^a		(6,908) ^c	(87,800) ^c	(265,102) ^c	n.a.	n.a.
1914 ^a		(7,776) ^c	(93,700) ^c	(258,026) ^c	(119,689) ^c	(177,294) ^c
1914 ^d	100.0	17,496 ^d	210,825	580,559	269,300	398,912
1920 ^a	48.7	8,940	130,800	167,624	78,099	204,093
1921 ^a	63.9	11,588	214,300	241,811	96,843	233,346
1922 ^a	96.7	17,947	268,100	236,659	138,806	351,965
1923 ^b	88.7	15,624	305,300	218,553	178,253	285,088
1924	90.9	15,570	335,000	247,759	192,032	599,286
1925	92.4	15,846	325,000	250,196	185,856	802,824
1926	96.1	16,469	344,000	256,945	191,295	847,643
1927	92.5	15,962	321,000	306,094	175,784	828,224
1928	91.1	17,065	306,000	310,299	54,951	743,641
1929	78.8	14,781	337,900	282,804	11,748	852,307
1930	69.5	13,152	251,900	265,260	13,523	638,709
PRICE IN 1930 lei		426.50		129.62	4,287.70	169.52
IN 1921 lei		91.03	0.4973	22.88	950.90	70.53
<i>Values in constant prices (million 1921 lei)</i>						
1914	(1,995.0) ^d	(1,592.7) ^d	(104.8) ^d	(13.3) ^d	(256.1) ^d	(28.1) ^d
1920	971.3	813.8	65.0	3.8	74.3	14.4
1921	1,275.5	1,054.9	106.6	5.5	92.1	16.4
1922	1,929.2	1,633.7	133.3	5.4	132.0	24.8
1923	1,768.6	1,422.2	151.8	5.0	169.5	20.1
1924	1,814.4	1,417.3	166.6	5.7	182.6	42.2
1925	1,843.0	1,442.5	161.6	5.7	176.7	56.5
1926	1,917.7	1,499.1	171.1	5.9	181.9	59.7
1927	1,845.8	1,453.0	159.6	7.0	167.2	59.0
1928	1,817.5	1,553.4	152.2	7.1	52.3	52.4
1929	1,591.1	1,345.4	168.0 ^f	6.5	11.2	60.0
1930	1,386.6	1,197.3	125.3	6.1	12.9	45.0

Notes: (a) Values for fiscal year; (b) Values for 9 months divided by 0.75; (c) Amounts for the Old Kingdom; (d) Amounts for the Old Kingdom multiplied by 2.25, assuming the same sales per capital; (e) In boxes only; (f) In 1929 the match monopoly was turned over to a private concession.

Sources: *Anuarul statistic 1915-1916*, pp. 212-216; 1922, pp. 233-239; 1931-1932, pp. 211-213; Lucian I. Turdeanu, *Avuția publică în România* (Bucharest, 1941), p. 117.

Table D-3

INDICATORS OF OUTPUT IN MINING
AND EXTRACTION, 1913 TO 1930

A. TERRITORY OF GREATER ROMANIA, 1913 TO 1921

	Quantity of Output ^b			Value in 1921 Prices (mil. lei) ^a				Index
	Crude Oil (1,000 tons)	Lignite (1,000 tons)	Salt (1,000 tons)	Crude Oil	Lignite	Salt	Total	
1913	1,847.9	2,566.0	355.2	1,615.1	1,257.3	162.9	3,035.3	100.0
1919	855.5	1,353.6	259.2	747.7	633.3	126.0	1,537.0	50.6
1920	1,108.9	1,400.0	247.0	969.2	686.0	120.0	1,775.2	58.5
1921	1,168.4	1,594.7	232.8	1,021.2	781.4	113.1	1,915.7	63.1

B. GREATER ROMANIA, 1921 TO 1930

	Crude oil	Natural Gas ^c	Other ^d (million lei in constant 1921 prices) ^a	Total	Index 1913 = 100
1921	1,021.3	33.3	1,121.6	2,176.2	100.0
1922	1,199.9	46.1	1,338.1	2,584.1	118.7
1923	1,321.8	52.9	1,581.5	2,956.2	135.8
1924	1,626.1	66.8	1,725.0	3,417.9	157.1
1925	2,025.0	68.2	1,837.2	3,930.4	180.6
1926	2,835.6	69.5	1,939.2	4,844.3	222.6
1927	3,207.0	81.0	2,016.6	5,304.6	243.8
1928	3,742.8	113.0	1,906.7	5,762.5	264.8
1929	4,227.5	148.7	1,912.3	6,288.5	289.0
1930	5,062.5	222.4	1,557.9	6,842.8	314.4

Notes and Sources: (a) Prices for 1921, as well as physical quantities and values in current prices for 1921 and thereafter are from *Anuarul statistic 1939 si 1940*, pp. 461 and 456-467; (b) Physical quantities for 1913, 1919 and 1920 are from League of Nations, *International Statistical Yearbook 1928* (Geneva, 1929), p. 90 and *Anuarul statistic 1922* pp. 216-227; 1930, pp. 214-215; (c) Based on amounts consumed in Transylvania and the Old Kingdom; (d) Based on an index covering coal, metallic and nonmetallic minerals and quarries published in Vasile Rausser (ed.) *Productivitatea muncii in industrie* (Bucharest, 1968), p. 28.

Table D-4

INDICATORS OF PRICE MOVEMENTS
IN ROMANIA, 1913 TO 1929

Industry and Product	1913	1919	1929
A. RETAIL PRICES			
Metals and Machinery			
Iron plate	100	1,071 ^b	
Sheet iron	100	715 ^b	
Copper	100	440 ^b	
Nonwood Building Materials			
Lime	100	890 ^a	
Cement	100		1,907
Bricks	100		3,200
Chemicals			
Petroleum	100	588 ^a	2,563
Denatural alcohol	100		7,288
Soap	100	1,578 ^a	
Wood			
Planks	100		4,052
Beams	100		3,747
Firewood	100	620 ^a	
Food Products			
Wheat flour	100		3,565
Corn meal	100	1,143 ^a	4,627
Sugar, cubes	100		3,127
Sugar, granulated	100	700 ^a	3,782
Sausage	100		3,181
Cheese	100	1,016 ^a	3,117
Bread, average	100	733 ^a	3,517
Textiles			
Wool cloth (stofa)	100	(2,276)*	6,713
Men's suits	100		6,072
Cotton cloth (sifon)	100	(1,200)*	3,557
Leather			
Sole leather	100	(767)*	
Man's shoes	100		5,107
Women's shoes	100		5,356
Common boots	100	(756)*	
B. IMPLICIT UNIT VALUES^c			
Beer	100	799	3,082
Spirits	100	1,462	4,164
Electric power	100	669	2,227
C. UNIT VALUES^d			
Raw Materials Used In:			
Shoes	100	946	
Tanning	100	960	
Belts	100	1,021	

Notes and Sources: (a) Based on prices for the Old Kingdom in October, 1919; items in parentheses are based on 1914 = 100 (*Buletin statistic al României*, Series IV; XV:3 (1920), pp. 97 and 100); (b) From the same source, but for January, 1919, and based on 1911-1915 = 100; (c) Calculated from separate values of output and of physical output from data and sources in Tables 14 (electric power) and D-5; (d) Calculated from Rommenhoeller, *op. cit.*, p. 204.

All other prices are from *Anuarul statistic 1930*, pp. 252-253, and *1939-1940*, p. 633.

Table D-5

ESTIMATES OF THE GROSS OUTPUT IN CONSTANT PRICES OF
THE MAIN BRANCHES OF FACTORY MANUFACTURING,
1913 TO 1939
(1,000 lei)

	1913	1919	1929
A. METALS AND MACHINERY			
1. <i>Values in Current Prices</i>			
Ferrous metallurgy	55,970	168,100	2,297,641
Other	65,218	1,162,062	6,354,844
TOTAL — gross	121,188	1,330,162	8,652,485
2. <i>Indices of Real Output</i>			
Ferrous metallurgy	100.0	(19-32)	111.6
Other	100.0	(42-43)	322.6
TOTAL	100.0	(26-41)	225.0
3. <i>Values in Constant Prices at 1913 Levels</i>			
Ferrous metallurgy — gross	55,970	14,272	62,463
Other — gross	65,218	27,718	210,425
TOTAL — gross	121,188	41,990	272,888
B. NONWOOD BUILDING MATERIALS			
1. <i>Values in Current Prices</i>			
Cement	35,324	87,287	670,873
Bricks	43,283	142,699	493,348
Lime	13,741	32,684	95,187
Other	18,999	80,391	1,020,556
TOTAL	111,347	343,061	2,279,964
2. <i>Indices of Real Output</i>			
Cement	(100.0)	(20.5)	(168.1)
Bricks			
Lime			
Other			
TOTAL	(100.0)	(33.9)	(148.0)
	100.0	33.1	118.4
3. <i>Values in Constant Prices at 1913 Levels</i>			
Cement	(35,324)	(7,241)	(59,396)
	35,324	7,468	26,422
Bricks	43,283	16,788	15,417
Lime	13,741	10,409	49,914
Other	18,999	2,250	40,037
TOTAL	(111,347)	(36,688)	(164,764)
C. CHEMICALS			
1. <i>Values in Current Prices</i>			
Refinery products	13,092	816,218	7,346,222
Other products:	79,818	401,699	3,125,574*
Soap and Candles	13,156	111,660	501,550
Soda products	17,660	79,366	250,074
Sulphur and sulphuric acid	6,404	44,859	306,137
Other	42,598	165,814	2,067,813*
TOTAL	292,910	1,217,917	10,471,796*

Table D-5

	1913	1919	1929
(* excluding 539,593 thousand lei of matches and explosives)			
<i>2. Indices of Real Output</i>			
Refinery products	100.0	41.8	259.3
	100.0	(40.3)	
Other products		(30.8-55.3)	
Soaps and candles	100.0	50.9	86.0
Soda products	100.0	20.3	78.9
Sulphur and sulphuric acid	100.0	24.4	79.8
TOTAL	100.0	.	210.7
	100.0	(36.6-44.4)	213.6
<i>3. Values in Constant Prices at 1913 levels</i>			
Refinery products	213,092	89,072	552,548
Other products	79,818		64,758
	(79,818)		(73,201)
Soap and candles	(13,156)	6,696	(11,314)
Soda products	(17,660)	12,415	(13,934)
Sulphur and sulphuric acid	(6,404)	1,755	(5,110)
Other	(42,598)		(42,843)
TOTAL	292,910		617,306
	(292,910)	(118,629)	(625,749)
D. WOOD PROCESSING			
<i>1. Values in Current Prices</i>			
Lumber mills	197,490	1,626,372	4,615,107
Carpentry	5,152	31,236	157,485
Furniture	25,674	229,478	330,226
Containers	2,273	11,870	106,701
Vehicles	262	1,928	19,862
Brushes			54,509
Other			78,989
TOTAL	230,851	1,900,884	5,362,879
<i>2. Indices of Real Output</i>			
Lumber mills	100	50	58.2
Carpentry			
Furniture			
Containers			
Vehicles			
Brushes			
Other			
TOTAL	100	50	58.2
<i>3. Values in Constant Prices at 1913 Levels and Weights</i>			
Lumber mills			
Carpentry			
Furniture			
Containers			
Vehicles			
Brushes			
Others			
TOTAL	230,851	115,426	134,408

Industrial Output in Romania and its Historical Regions, 1880 to 1930

Table D-5

	1913	1919	1929
E. PAPER			
1. <i>Values in Current Prices</i>			
Paper			1,452,923
Paper products	34,650	151,631	277,772
Cardboard products			64,896
Tobacco boxes	57	382	
TOTAL	34,707	152,013	1,795,591
2. <i>Indices of Real Output</i>			
TOTAL	100	34.5	152.3
3. <i>Values in Constant Prices at 1913 Levels</i>			
TOTAL	34,707	11,974	52,859
G. PRINTING			
1. <i>Values in Current Prices</i>			
Printing	22,179	167,029	618,334
Lithography			33,168
TOTAL	22,179	167,029	651,502
2. <i>Indices of Real Output</i>			
TOTAL	100.0	81.5	97.0
3. <i>Values in Constant Prices at 1913 Levels</i>			
TOTAL	22,179	18,077	21,530
H. FOOD PRODUCTS			
1. <i>Values in Current Prices</i>			
Flour	599,753	2,558,371	6,460,851
Bakeries	38,753	208,124	463,043
Biscuits			96,045
Macaroni	1,913	13,415	102,407
Grain cleaning			561,468
Rice cleaning	9,168	16,520	
Starch	1,071	3,362	
Beer	48,433	199,088	1,224,797
Malt			10,634
Spirits	48,383	452,033	477,171
Alcoholic beverages	830	4,867	352,524
Vinegar	7,138	18,104	55,677
Sugar	55,583	126,607	2,906,718
Sugar products	21,091	192,008	749,676
Vegetable oil	17,379	210,120	1,198,800
Cheese and dairy products	3,542	16,869	140,541
Conserved meat and vegetables	24,968	324,187	399,264
Coffee substitute	2,515	13,100	125,776
Dry ice			26,489
Mineral water	2,166	6,859	
Salt processing	3,150	55,948	
Other			60,195
TOTAL	346,037	4,416,580	18,605,354
2. <i>Indices of Real Output</i>			
Flour	a	100.0	67.7
	b	100.0	63.8
Bakeries	a	100.0	63.8
	b	100.0	34.0

Table D-5

		1913	1919	1929
Macaroni	a	100.0	77.1	161.6
	b			
Beer	a	100.0	51.4	82.0
	b			
Spirits	a	100.0	44.0	18.8
	b			
Alcoholic beverages	a	100.0	53.5	
	b	100.0		810.0
Vinegar	a	100.0	58.8	
	b	100.0		25.0
Sugar	a	100.0	16.5	151.9
	b	100.0		150.1
Sugar products	a	100.0	85.4	97.6
	b			
Vegetable oil	a	100.0	163.8	215.0
	b	100.0		199.0
Cheese and dairy products	a	100.0	88.3	
	b	100.0		135.0
Conserved products	a	100.0	135.8	
	b	100.0		50.0
TOTAL (using (a) when possible without flour)		100.0	66.3	42.1
TOTAL (using (b) when possible without flour)		100.0	63.3	87.1
		100.0		47.1
		100.0		85.9
3. Values in Constant Prices at 1913 Levels				
a. Based as far as possible on physical output indices - gross output				
Flour		599,793	406,033	131,946
Sugar		55,583	9,171	84,431
Vegetable oil		17,379	28,467	37,365
Sugar products		21,091	18,012	20,669
Macaroni		1,913	1,475	3,099
Beer		48,433	24,895	39,715
Spirits		48,383	21,289	9,193
Vinegar		7,138	4,197	1,785
Bakeries		38,753	24,724	13,176
Conserved food		24,968	33,906	12,484
Alcoholic beverages		830	444	6,723
Cheese and dairy		3,542	3,128	4,782
TOTAL		867,766	575,741	365,368
without flour)		268,013	169,708	233,422
b. Based as Far as Possible on Deflation of gross Output				
Flour		599,753		179,926
Sugar		55,583		83,930
Vegetable oil		17,379		34,584
Others same as above		195,051		111,626
TOTAL		867,766		410,066
(without flour)		268,013		230,140
I. TEXTILES				
1. Values in Current Prices				
Wool fabrics		46,380	487,661	2,974,351
Cotton fabrics		23,495	210,959	2,884,223
Silk fabrics				395,825
Knitwear		12,261	120,852	979,160
Hats		11,808	164,215	408,967

Industrial Output in Romania and its Historical Regions, 1880 to 1930

Table D-5

	1913	1919	1929
String and cord	1,772	18,870	225,738
Readymades			187,227
Cotton wadding	96	5,288	92,813
Kerchiefs			94,089
Other			242,143
TOTAL	95,862	1,007,845	8,448,536
<i>2. Indices of Real Output</i>			
Wool fabrics	100.0	20	95.5
Cotton fabrics	100.0	50	345.1
Silk fabrics			
Knitwear	100.0	50	224.5
Hats	100.0	20	51.6
String	100.0	50	358.1
Readymades			
Cotton wadding	100.0	50	271.8
Kerchiefs			
Other			
TOTAL	100.0	31.8	196.4
<i>3. Values in Constant Prices at 1913 Levels</i>			
Wool fabrics	46,380	9,276	44,307
Cotton fabrics	23,495	11,748	81,086
Silk fabrics			7,708
Knitwear	12,261	6,131	27,528
Hats	11,808	2,362	6,092
String and cord	1,772	886	6,346
Readymades			5,264
Cotton wadding	96	48	2,609
Kerchiefs			2,645
TOTAL	95,862	30,451	188,301
J. LEATHER AND HIDES			
<i>1. Values in Current Prices</i>			
Tanning	52,338	585,779	1,759,902
Belts	1,462	8,668	
Gloves		1,010	854,470
TOTAL	79,852	923,461	2,614,372
<i>2. Indices of Real Output</i>			
Tanning			
Belts			
Gloves			
Footwear			
TOTAL		70	64.1
<i>3. Values in Constant prices at 1913 Levels</i>			
Tanning			
Belts			
Gloves			
Footwear			
TOTAL	79,852	55,896	51,192
K. MISCELLANEOUS PRODUCTS			
Bone buttons, etc.	163	430	
Rubber repairs	653	5,550	

Notes and Sources: General: (a) Values in current prices are from *Anuarul statistic 1922*, pp. 200-207; 1930, pp. 184-197; N.P. Arcadian, *Industrializarea României*, pp. 169-177 and 214-215.

Metals and Machinery: "Other" includes "electrical products" listed separately after 1925. The indices for 1919 are calculated from weight and value data for 15 product groups given in C.G. Rommenhoeller, *La Grande Roumanie*, pp. 244-254 (calculations are available from the author upon request); the range of estimates results from the alternatives of using 1913 prices, 1919 prices or physical weight.

The indices for ferrous metallurgy in 1924 and 1929 are based on the total of pig iron and ferro-alloys and steel ingots and castings reported in Ingmar Sventnilson, *Growth and Stagnation in The European Economy* (Geneva, 1954), p. 259 (from information submitted to the League of Nations). Values in constant prices of ferrous metallurgy are calculated from current price amounts in 1913 and the index of real output; values in constant prices for other are calculated by deflating values in current prices with the index of wholesale prices in Table 13.

Nonwood Building Materials: The index of cement output in real terms is based on an estimated production in 1913 in the Old Kingdom of 130,170 tons (*Enciclopedia României*, III, p. 900), which is expanded to 188,652 tons as estimated production in 1913 for the postwar area (based on estimated production in the former and new territories given in Rommenhoeller *op. cit.*, p. 333) and production estimates for 1919 in *Enciclopedia României*, III, p. 904, in Arcadian, *op. cit.*, p. 315. Two estimates for the values of output in constant prices of cement are based, in the first case, on moving the 1913 value forward by the production index and, in the second place, by deflating the 1929 values by the index of cement prices from Annex Table D-4. The other values in 1919 are derived by deflation, using two prices of raw materials for each product, as calculated from Rommenhoeller, *op. cit.*, pp. 331-345. The value are also derived by deflation for 1929, using the retail prices in Table D-5; "other" products are deflated using a simple average of prices in this branch.

Chemicals: The first index of refinery products is based on the simple unweighted tonnage of refinery products reported in Union Des Chambres de Commerce et d'Industrie de Roumanie, *La Roumanie Economique en 1926* (Bucharest, n.d.), pp. 84-85, and *Anuarul statistic 1930*, pp. 204-209. The second index for petroleum for this and the indices for soap and candles, soda and sulphur group are based on tonnages given in Rommenhoeller, *op. cit.*, pp. 280-281, and *Enciclopedia României*, III, p. 1016-1024. The indices for "other products" and for "total" in 1919 are based on weighting the tonnage figures for 10 product groups alternatively for prices of 1913 (the high figure) and of 1919 (data are from Rommenhoeller which should be noted as having an error in the tonnage of soap and candle products). The two indices for total output in 1929 are based on the alternative calculations explained in the following note. Figures in parentheses are based on values in 1913 moved forward by the indices of real output for soap and candles, soda products, and sulfur and sulfuric acid while other is based on deflating the 1929 value by the average index of chemical prices in Annex Table D-4. The sum of "other products" for 1929 is deflated by the average index of chemical prices in Annex Table D-4.

Wood Processing: In 1913 and 1919 in the yearbooks, wood and paper are together as one branch. The value of furniture production in 1919 is reported with a typographical error; it should read 229,478,100 lei, not 22,947,810 lei. The index of real output for 1919 is given by Lupu (ed.) *op. cit.*, p. 350. For 1929 the index of real output and the value of output in constant prices are both the result of deflating the 1929 value by the average wood price index in Annex Table D-4.

Paper: In the yearbooks, paper is included with wood in 1913 and 1919 and with printing thereafter; also included in paper above is the value of cardboard boxes for tobacco, listed under "miscellaneous" in the yearbooks. The index of paper output is based on the physical output of paper in 1913 and 1919 in R. Racovitza, *Industria hirtiei* (Bucharest, 1921), p. 44, and Arcadian, *op. cit.*, p. 215. Values of output in constant prices is based on the value in 1913 and the index of real output.

Printing: In the yearbooks, printing is included with "miscellaneous" in 1913 and 1919 and with paper thereafter. The index of real output is calculated by deflating the current value of output with the general price index in Table 13.

Food Products: Not all items in food products are necessarily comparable, for example, in the Old Kingdom in 1915 the gross value of rice and cereal cleaning was 6,222 thousand lei (*Anuarul statistic 1915-1916*, p. 194). The indices of total output include only items listed in constant values.

Sources of physical output, except for sugar and alcohol in 1913, are Rommenhoeller, *op. cit.*, pp. 284-300; Arcadian, *op. cit.*, p. 214; and Georgescu, *op. cit.*, p. 127. Sugar in 1913 and 1919 is from Rommenhoeller, but data for other years suffers disagreement among the sources and fluctuates widely from year to year. The estimates assume sugar production in 1929 of 140,342 tons, an average

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of the years 1927-30 from *Anuarul statistic 1931-1932*, p. 206 and from Arcadian, *op. cit.*, p. 214 moved over the same years by an index from Institutul românesc de Conjunctură, *Buletin Trimestral*, II:1 (1934), pp. 30-31. Alcohol in 1913 is from *Anuarul statistic 1930*, p. 217 (consumption in the Old Kingdom of 180,504 lei), Fellner, *op. cit.*, pp. 274-275 (production of 270,694 lei in Transylvania) and Waizner, *op. cit.*, p. 150 (production in Bucovina of 63,000 lei).

The indices required the following conversions from liras to kilograms: one lire of vegetable oil equals 0.917 kilograms; one lire of beer equals 1.014 kilograms; one lire of 45 proof alcohol equals 0.9726 kilograms. Price deflation is from indices in Annex Table D-4 with the following surrogate prices used; beer prices for vinegar deflation, spirit prices for alcoholic beverage deflation, beef prices for cheese and dairy deflation, and conserved meat prices for conserved food deflation.

Textiles: The output data of 1929 include several categories of products not listed in 1913 and 1919 (silk fabrics, readymades, etc.).

The indices of real output for 1929 are based on deflating current values of output; the price of wool fabric (postav) is used to deflate the values of wool fabrics and hats, while the price of cotton fabrics (chiffon) is used to deflate cotton fabrics, knitwear, string, readymades, kerchiefs.

An average of wool and cotton fabric prices is used to deflate silk fabric and "other". Data to connect 1913 and 1919 are particularly scarce. Rommenhoeller (p. 319) indicates that the wool industry in 1919/20 was about 20 percent of the prewar, while another source suggests that cotton was about 50 percent of prewar in 1920 (see U.S. Department of Commerce, *Rumania*, Washington, D.C., 1924, p. 126). Following these suggestions, wool fabrics and hats are assumed to be at an index of 20 in 1919 while other products are assumed at 50.

Leathers and Hides: Calculation of the value in constant prices is based on deflation by the retail price of shoes. Conditions in the industry in 1919 are unclear. In Lupu (ed.), *op. cit.*, p. 351, it is indicated that tanneries in 1919 were operation at less than 25 percent of capacity, yet data in Rommenhoeller (pp. 323-324) show tanneries using 35 percent more raw materials (by weight) in 1919 than in 1913. An increase in tanning possibly could reflect the difficulties in feeding animals and high slaughter rates. Also evidence on prices suggest that the price of hides and of tanned leather had increased only 9.5-10 times (see Annex Table D-4), a range when used for deflation results in a level of output in 1919 in constant prices of 15-20 percent more than in 1913.

Until better evidence is available the difference between a 25 percent level and a level of 115-120 percent is averaged at 70 percent, a level still higher than indicated in real terms for 1929.

Table D-6

ESTIMATES OF THE NET OUTPUT IN CONSTANT PRICES OF
THE MAIN BRANCHES OF FACTORY MANUFACTURING, 1913 AND 1924

Branch and sector	Current values*		1929 in b 1913 in Values (1,000 lei)	Growth	
	1913	1929 (1,000 lei)		Index	Percent
<i>Metals and Machinery</i>					
Ferrous metallurgy	35,893	902,934	40,057		
Other	28,490	3,431,078	113,611		
TOTAL	64,383	4,334,012	153,668	238.7	5.6
<i>Nonwood Building Materials</i>					
Cement	14,853	466,791	41,328 (18,384)		
Bricks	24,843	348,759	10,899		
Lime	5,570	37,479	1,965		
Other	8,818	635,716	24,940		
TOTAL	54,084	1,488,745	78,132 (56,188)	144.5 103.9	2.3 0.6
<i>Chemicals</i>					
Refinery products	128,203	2,782,533	209,289	163.2	3.1
Other products	54,981	1,388,945*	28,777 (34,998)		
Other products			(4,406)		
Soap and candles	28,583	195,340			
Soda products	12,184	183,519	(10,336)		
Sulfur and sulfuric acid	3,415	139,514	(2,329)		
Other	10,799	870,572	(18,037)		
TOTAL	183,184	4,171,478*	238,066	130.0	1.7
<i>Wood Processing</i>	99,993	2,466,681	61,822	61.8	-3.0
<i>Paper</i>	16,863	891,458	26,243	155.6	7.6
<i>Printing</i>	15,723	424,117	14,016	89.1	-0.7
* (Excluding 442,906 thousands of materials and explosive)					
<i>Textiles</i>					
Wool fabrics and hats	33,801	1,469,268	21,887		
Cotton fabrics, knitwear, string and cord, readymades and kerchiefs	24,201	1,721,020	48,384		

Table D-6

Branch and sector	Current values ^a		1929 in b 1913 in Values (1,000 lei)	Growth	
	1913	1929 (1,000 lei)		Index	Percent
Silk fabrics	—	165,013	3,213		
Other	—	103,124	2,008		
TOTAL	58,002	3,458,425	75,492	130.2	1.7
<i>Leather and Hides</i>	43,760	940,575	18,417	42.1	(-5.3)
<i>Food Products</i>					
Flour	170,581	877,698	24,442		
Bakeries	10,657	81,156	2,308		
Biscuits		42,321	1,203		
Macaroni	837	37,938	1,148		
Beer	42,503	893,528	28,992		
Spirits	16,698	284,395	5,422		
Alcoholic beverages	402	154,423	2,944		
Vinegar	6,509	21,848	709		
Sugar	30,769	1,936,082	55,903		
Sugar products	12,647	307,006	8,464		
Vegetable oil	6,943	310,852	8,945		
Cheese and dairy products	2,470	36,591	1,245		
Conserved meat and vegetables	14,070	125,754	3,932		
SUBTOTAL	315,086	5,109,592	145,657	46.2	(-4.7)
Grain cleaning		92,918			
Rice cleaning	1,936				
Starch	689				
Malt		2,858			
Coffee substitute	188	69,331		Not Calculated	
Dry ice		20,191			
Mineral water	1,452				
Salt processing	1,125				
Other		11,897			
<i>Miscellaneous Products</i>					
Bone buttons, etc.	163			Not Calculated	
Rubber repairs	653				

Notes and sources: (a) Values in current prices are calculated from sources given in Table D-5. (b) Current values in 1929 are deflated by the implicit price indices in Table D-5. (c) Using alternatives for carent output explained in Table D-6.

