

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

*part I - 1880 to 1915 **

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1. Introduction

Industrialization may mean different processes to different users of the term. It can suggest merely an increase in the levels of those production activities called "industrial" or be reserved for situations where the shares of those activities in total produce rise. Those activities called "industrial" may be restricted to the narrowest possible category to manufacturing or processing in factory establishments. Alternatively to factory manufacturing may be added mining and extraction, electrical power generation (and other public utilities such as water processing), artisan and household processing or manufacturing and construction. However the term might be more precisely delineated for statistical purposes, one thing is clear. It has had a considerable appeal to Romania's ruling politicians since the onset of the country's independence from Ottoman Turkey in 1880. This includes the first "industrializers" among the leaders of the National Liberal Party who dominated governments for all save a few years from 1880 to 1928, to those around the throne of Carol II who ruled during most of the 1930s and to the communists centered on Gheorgin-Dej and Ceausescu who have dominated Romania since 1948.

Despite the obvious appeal of industrialization to the country's rulers, Romania remains to this day designated by the World Bank

* Part II - 1910 to 1930, will appear in a future issue of this journal.

as a "developing country", one of the few left in Europe. Only recently did the share of its labour occupied in industry and construction approach a half of the total. Thus, the present condition of the country suggests a relatively shorter period of successful pursuit of industrialization. A lack of success could hardly be attributed to the most recent of the country's industrializers. Their official statistics claim average rates of growth of about 12 percent a year from 1950 to 1980. And even with some downward adjustment in western recalculations, the country's industry registers a relatively high 8-9 percent average annual growth rate.¹ Compared to other countries in the same period the rates are high, but not higher than neighbouring Turkey, Yugoslavia or Greece and not nearly as high as those of Taiwan or South Korea.²

Given the facts above, it is natural to assume that Romania's precommunist industrializers either failed to stimulate the country's productive forces with appropriate policies or could not overcome the difficulties of Romania's international environment. A relatively accurate record of Romania's industrial growth for the 1930s shows an annual average rate in real terms of about 3.0 percent a year. The growth was slower than in neighboring Bulgaria and Greece, as well as some other European countries facing similar constraints on foreign markets and capital flows following the Great Crisis.⁴ Still Romania was hardly the worst performer;

¹ More details on Romania's performance since 1950 may be found in the author's "Romania's Economy at the End of the 1970's: Turning the Corner on Intensive Development," in *East European Economic Assessments Part I - Country Studies*, 1980. A Compendium of Papers Submitted To The Joint Economic Committee, Congress of the United States (Washington, DC, 1981), pp. 251-298.

² For comparisons, see the World Bank, *World Tables*, 1st Edition (1980), pp. 376-377.

³ When measured from 1929 to 1939 an average rate for total industry of 2.9 is recorded while manufacturing shows 3.1 percent. See *Anuarul Statistic 1939 and 1949*, p. 499 and Liliana Georgescu, *Localizarea și structura industriei românești* (Bucharest, 1941), p. 97.

⁴ See JOHN R. LAMPE and MARVIN R. JACKSON, *Balkan Economic History 1550-1950: From Imperial Borderlands to Developing Nations* (Bloomington, Indiana: Indiana University Press, 1982), pp. 482-491.

its performance relative to other countries was little below that following 1950.⁵

To trace Romania's record back even further carries it into the domains of the National Liberal Party. Then the international environment changed from a relatively good one in the 1920s to a poor one during and immediately after the First World War and to a better one again in the years from 1880 to 1913. As one moves back into these periods the existing record of Romania's industrial growth dims or becomes more confused in any case. The nature of the record and its possible clarification is the subject of this paper. That is, the paper is chiefly concerned with the evidence for calculating growth rates of Romanian industry in two periods before 1930. First considered is the record for Romania before the First World War, but only for the part called the Old Kingdom, from 1860 to 1915. Then an attempt is made to link the territories of regions to become greater Romania from 1913 to 1930.

The reader less interested in calculations and in the historiography of Romanian economic statistics deserves to be told what the evidence suggests about industrialization in earlier Romania. From 1913 to 1930 greater Romania seems to have performed more poorly than in the 1930's. It would not have in the most optimistic alternative record more than a 2.0 percent average growth rate and in the most pessimistic one it could have failed even to recover what it had achieved before the war. In contrast, before the war Romania's Old Kingdom was generating industrial growth at rates averaging as high as 6-8 percent in real terms. During this time all the countries recorded in Mitchell's compendium were growing at 3-4 percent a year, save the United Kingdom. Just how long Romania generated these relatively high rates is an important question. The relatively meager information

⁵ For comparative data see B.R. MITCHELL, *European Historical Statistics 1750-1970* (New York: Columbia University Press, 1976), pp. 356-357. There, for example, from 1929 to 1938 Finland records 4.9 percent per year, Ireland 4.6 percent and Sweden 4.8 percent.

assembled here indicates that they could well have been sustained from as far back as 1880. In what follows the reader may judge or, better, be drawn to some of the obvious research tasks that can place the record of industrial growth in Romania, one way or the other, on firmer ground.

2. Indicators of Industrial Growth in the old Kingdom of Romania, 1860 to 1915

The measurement of industrial growth is normally done in terms of the real or physical volume of production. This is done either by adding together a sufficiently representative set of output series of individual products (flour, cement, etc.) or by deflating current values of output by some sort of price index. In Romania's case industrial output as far back as 1860 has been "appreciated", but it was measured in a reliable statistical collection only in 1901-02. The numbers are shown in Table 1 where they have been taken from one of the more interesting efforts of Romania's generation of socialist economists, by M.A. Lupu, one-time rector of the Academy of Economic Studies in Bucharest.

According to Lupu's estimates, Romanian industry averaged a relatively moderate pace of growth in the second half of the last century, but appears to have stepped up the growth rate to rather high levels, 7.3-8.4 percent per year, in a decade preceding the First World War. Naturally these tentative conclusions are subjected to a host of qualifications. Three will be considered.

First, Lupu's data, presented in so-called "gold lei", are uncorrected for changes in Romania's internal prices. Second, the lack of intermediate observations leaves much doubt about the seeming distinctive differences of the two periods in his study. If, for example, most of the growth from 1862 to 1902 were after 1880, that would result in relatively high rates, approaching 5-6 percent per year, in this period. Another distortion would result if 1901-1902 were years of recession or depression. If so, recorded growth would have been understated before 1901-1902 and over-

TABLE I
ROMANIA'S INDUSTRIAL OUTPUT AS ESTIMATED
BY ROMANIAN PROFESSOR MARIN LUPU

Value	1862-66	1901-02	1912-13
	(lei values in current prices) ^a		
GROSS OUTPUT			
Factory Manufacturing ^b	90,277,351	231,650,401	518,912,000
Mining ^c	10,000,000	16,077,000	105,977,000
Artisan ^d	40,000,000	108,810,000	160,000,000
Household		5,000,000	25,000,000
TOTAL GROSS PROFIT	140,277,351	361,537,401	809,889,000
NET OUTPUT^e			
Factory Manufacturing	27,600,000	86,500,000	209,900,000
Mining	6,000,000	11,300,000	42,400,000
Artisan	24,000,000	79,700,000	111,000,000
Household			
TOTAL NET OUTPUT	57,600,000	177,500,000	350,300,000
GROWTH RATE^e			
	1862-66 to 1901-02	1901-02 to 1912-13	
GROSS OUTPUT			
Factory Manufacturing	2.5	8.4	
Mining	1.3	20.8	
Artisan			
Household	2.8	5.0	
TOTAL GROSS OUTPUT	2.5	8.4	
NET OUTPUT			
Factory Manufacturing	3.1	9.1	
Mining	1.7	14.1	
Artisan			
Household	3.2	3.7	
TOTAL NET OUTPUT	3.0	7.3	

Notes: (a) Lupu designates his values as "gold lei", but they are current prices for the period before the First World War. (b) Data for 1862-66 are from the census of industrial establishments of 1860 as published in *Analele statistice*, 1860-63; those for 1901-02 are from the *Ancheta industrială din 1901-1902*; data for 1912-13 include 429.4 million lei for "encouraged" establishments, to which was added 28.6 million lei of sugar and 60.912 million lei of tobacco products. (c) Mining output in 1862-66 is based on income from land; data for other periods cover the values of salt and petroleum output. (d) In the absence of data for 1862-66, Lupu estimates an annual output of 50 lei from each of 80,000 peasant families; for 1901-02, the figure includes an estimated output of 2,000 lei from each of 54,405 artisan establishments counted in *Ancheta industrială din 1901-1902*; the figure for 1912-13 is based on the same output per artisan unit and 80,000 units. (e) Based on subtracting "material expenses" (purchases of material inputs and fuels, plus depreciation) from gross output; except for purchases of materials and fuels for factory establishments in 1901-02 and 1912-13 (which are reported data), the figures are estimated by Lupu. (f) Annual average percentage growth is based on 38 years for the first period and 10 years for the second period.

Source: Marin Lupu, "Studii privind dezvoltarea economică României în perioada capitalismului," *Studii și cercetări economice*, 1967 (Bucharest), pp. 325-333.

stated for the following period. Third, there is some question about the comparability of data in the categories of industry applied by Lupu. The category of "factory manufacturing" in 1901-1902 probably was more inclusive than in 1912-1913. This error would have negated part of the effect of the second error.

Another important implication of Lupu's data is that factory manufacturing did not seem to grow at the expense of artisan and household industry. Granted the latter grew more slowly, but growth, not absolute reduction, is suggested. Table 2 reinforces this conclusion. Artisan employment, as indicated by those in "workshops" in 1901-02 and 1912-13 increased significantly. Also, the employment data in Table 2 reinforces the overall growth pattern suggested by Table 1. The average annual growth of total industrial employment appears to have been 1.6-1.9 percent from 1860 to 1901-02 and nearly 6 percent from 1901-02 to 1912-13. Again, to a warning is necessary that the apparent increase in growth rates after 1901-02 is the result of having only one intermediate observation.

The Number of Factory Establishments in Industry, 1860 to 1902. In order to judge the possibility either of growth being concentrated in the second part of the period from 1860 to 1900 or of 1901-02 being an unusual point in time, especially recessed or developed, Figures 1 and 2 may be considered. Figure 1 indicates the annual change in the number of "factory" establishments in Romania according to the estimations of N.I. Paianu, in 1906 the head of the department of industry and patents in Romania's Ministry of Agriculture, Industry, Trade and Domains. Figure 2 records the number of establishments surviving in 1902 which were founded each year from 1860 to 1902, according to the *Survey of Industry in 1901-1902* published in 1904. The supporting information for both figures is more completely explained in Annex A. The reader is warned, as explained in the annex, that the two sets of records incorporate different concepts of a "factory establishment".

Regardless of this difference the two figures indicate similar

TABLE 2
INDICATORS OF PERSONS OCCUPIED IN INDUSTRY

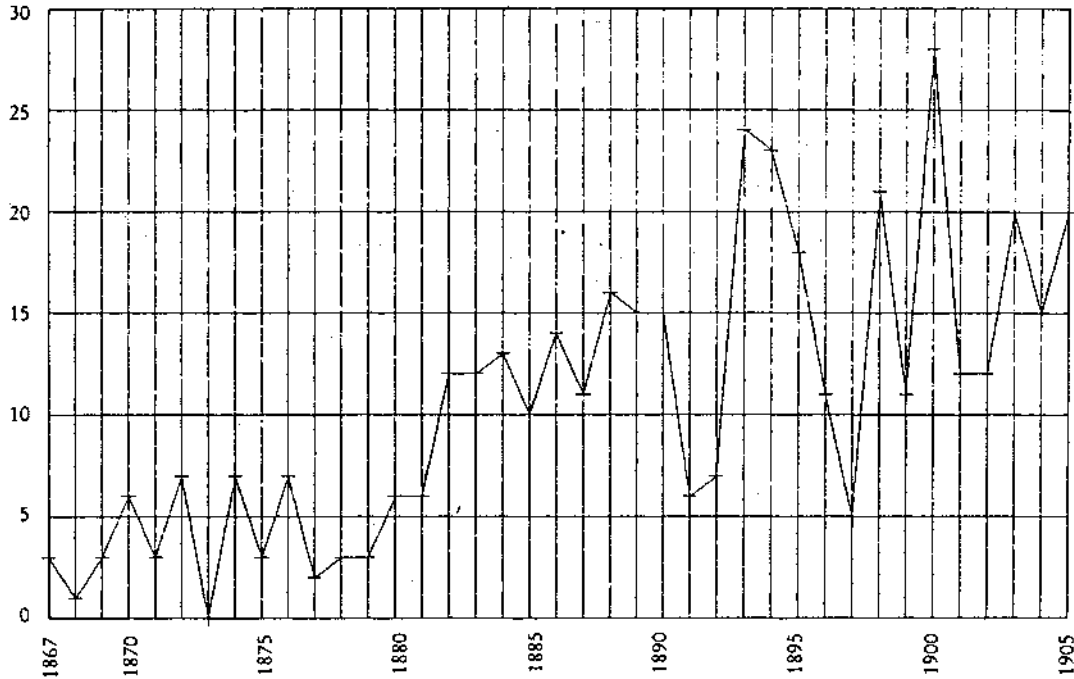
1. Population census of 1859-1860 and industrial survey of 1863:		
	Artisans	59,869
	Workers	23,192-28,252
	TOTAL	83,061-88,121
2. Industrial survey of 1901-1902:		
	Factories	39,746
	Workshops	97,755
	Special	17,853
	Extraction	6,568
	TOTAL	169,198
3. Survey of workshops of 1 April 1908:		
	Workshops	127,841
4. Estimates of "large-scale" establishments in 1911:		
	Manufacturing	46,280
	Railroads	18,556
	Mines and Quarries	2,562
	Petroleum	7,496
	TOTAL - "large scale"	74,894

Notes: (a) These data are usually referred to as for 1860. The survey of industrial establishments in 1863 was done on the basis of information collected in the census. The uncertainty in the number of workers arises because of questions concerning both the status of persons-worker or proprietor, and the branch of activity-industrial or non-industrial. The data were not published in a separate volume, but in issues of the periodical, *Analele statistice*, 13-16 (Bucharest, 1863). (b) Data from the population census were subsequently published in several volumes. The labor force data appeared in Dr. I. Teodorescu, *Statistica profesiunilor din România, după recensământul general al populației, din 1 ianuarie 1913* (Bucharest: Ministerul Industriei și Comerțului, Direcția Generală a Statisticii, 1923).

Sources: Nicolae Marcu, "Cu privire la data 'Recensământului stabilimentelor industriale' efectuat sub conducerea lui Dionisiu Pop Martian," *Revista de statistica*, 1:1964 (Bucharest); N.N. Constantinescu, *Din istoricul formării și dezvoltării clasei muncitoare din România* (Bucharest, 1959), pp. 135, 137, 194, 331; N.P. Arcadian, *Industrializarea României* (Bucharest, 1936), pp. 88, 122; P. Bairoch et al, *The Working Population and Its Structure*, Volume I (Bruxelles, 1968), p. 113.

patterns in the development of factory industry in Romania. The period up to about 1880, Romania's official independence from Ottoman Turkey, witnessed a steady, but relatively small increase in the number of industrial establishments. The unusually large number of foundings in 1870 shown in Figure 2 resulted from the seven workshops of the Romanian railway service recorded that

FIGURE 1

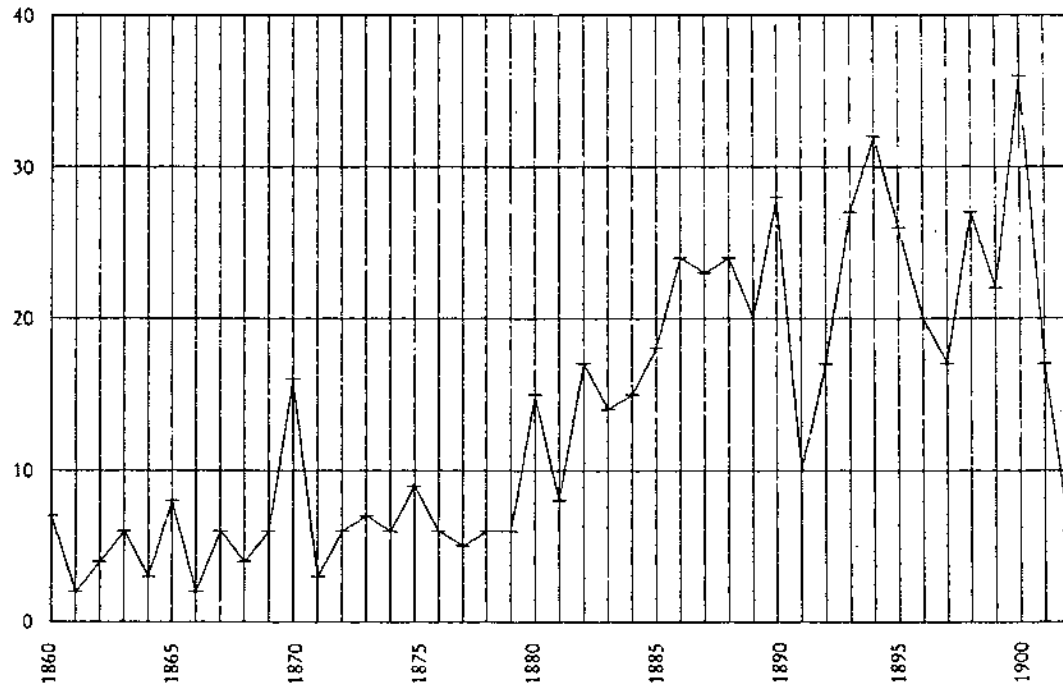
ANNUAL CHANGE IN THE NUMBER OF "FACTORY" ESTABLISHMENTS¹

Notes: (a) "Factory" establishment in this figure is that used by N.I. Paianu; it is not the same as that used in Figure 2.

Source: Annex Table A-1.

FIGURE 2

YEAR OF FOUNDING OF "FACTORY" ESTABLISHMENTS^a SURVIVING IN 1902



Notes: (a) Definition of "factory" establishment is that used in the *Survey of Industry of 1901-1902*; it is not the same as that used in Figure 1.
Source: Annex Table A-2.

year. In both figures, a clear trend of increases in the absolute number of new establishments each year sets in about 1879 or 1880. Actually referring to data recorded in Annex Table A-1, an average annual rate of increase in establishments of nearly 7 per cent can be observed. Assuming that each new factory was a constant size in terms of industrial production and that no factory experienced growth or retardation after its founding then the (assumed) average annual growth rate of output would also have been 7 per cent. *It may be concluded that Romania's first spurt of relatively rapid industrial growth took place beginning with its formal political independence in 1880.*

Evidence in Table 1 suggests that the trend of high growth rates continued for more than thirty years to the eve of the First World War. It remains to consider the evidence in Table 1 with more care. However, before doing so note may be taken of another set of impressions in Figures 1 and 2. They indicate a similar pattern of fluctuations noted by the following low points: 1877-79, 1891-92, 1896-97, and 1901-02. The last set of dates indicates clearly that industrial output recorded in the *Survey of Industry of 1901-02* may easily understate the extent of industrial development. Therefore, the growth rates for 1860 to 1901-02 in Table 1 may be biased downward. This means, as well, that the growth rates in Table 1 for 1901-02 to 1912-13 are likely to be biased upwards. But those growth rates are subject to other qualifications which now must be considered.

The Output From Factory Manufacturing, 1901-02 to 1915. The first relatively accurate and comprehensive record of Romania's industry is found in the *Survey of Industry in 1901-1902*. It covers both small-scale manufacturing and mining-extraction as well as larger-scale manufacturing. For establishments in the latter activity which are best identified as "factories", some 625 in all, the Survey supplies, albeit at levels more aggregated, amounts of inputs of employees,⁶ capital and horsepower. Also supplied are the

⁶ Actually only 620 factories recorded capital and 621 labour. See *Ancheta*, II, pp. 69 and 118.

values of gross output, fuels used and materials used from which can be calculated a reasonable estimate of new output or value added. The data, in the relatively disaggregated terms used subsequently in calculations, are reported in the Tables of Annex B.

The Survey becomes an important benchmark in Romanian economic history, although one that can easily be confused. Subsequent enumerations were not done for comparable categories, as Table 3 shows. In spite of their incomparability, some writers have not always taken adequate care to so mark them. The result is usually a mistaken impression of Romania's growth, not only in the period before the First World War, but more unfortunately, in the period following it.⁷

One source of confusion in the activity levels of Romania's early industry is the changing coverage of the laws to encourage it. Table 4 indicates some of the problem. When the first general encouragement law was passed in 1887 some 83 establishments met its minimums of either 50,000 lei capital or 25 workers. While 83 met the minimum size definitions for a factory, only 30 establishments were granted protection.⁸ Some not granted encouragements were in the excluded categories of flourmills, breweries and distilleries. They only began to receive protection in 1906, as shown in Table 4. Some others may have initially failed the secondary conditions of the law of 1887 (see Table 3), but subsequently matched them. By 1903, some establishments would have seen their initial encouragement, given for 15 years, lapse; hence, following this date, the annual number of approvals would have included some reapplications. As noted, flourmills, breweries and distilleries began to be approved in 1906 even though many had been founded many years earlier. Then, according to data of

⁷ Three examples may be cited: DAVID MITRANY, *The Land and the Peasant in Romania* (New Haven, CN: Yale University Press, 1931), pp. 371-373; N.N. Constantinescu and V. AXENCIUC, *Capitalismul monopolist in România* (Bucharest, 1962), p. 7; and DEMETRIUS LEONTIES, *Die Industrialisierung Rumaniens bis zum zweiten Weltkrieg* (Munich: Societas academica dacoromana, 1971), pp. 186 and 194.

⁸ N.P. Areadian, *Industrializarea României*, p. 117.

TABLE 3

ALTERNATIVE CRITERIA FOR LARGE-SCALE OR FACTORY ESTABLISHMENTS IN ROMANIAN INDUSTRY

1. The Industrial Encouragement Law of 1887. ^a	Establishments having (1) either at least 50,000 <i>lei</i> capital or at least 25 workers per day for at least 5 months per year; (2) the use of machines and modern means in fabrication; (3) management by persons with specialized knowledge; and (4) two-thirds of the workers of Romanian citizenship for a period of five years. Flourmills, breweries and distilleries were excluded. Sugar mills were covered under special legislation.
2. The Survey of Industry in 1901-1902.	"Large-scale" establishments were defined as (1) those using mechanical means of production or machines powered by water, gas, petroleum, gasoline or electricity; and (2) some larger work-shops (for example, producers of readymade clothing were included if more than five workers were employed even if they used no motors).
3. The Industrial Encouragement Law of 1906.	Removed the exclusion of flourmills, breweries, and distilleries.
4. The Industrial Encouragement Law of 1912. ^b	Defined as "large-scale" those establishments using either (a) at least 5 horsepower of motors; or (b) at least 20 workers in addition to technical and administrative personnel.
5. "Large-scale" (mare) establishments in Romania after the First World War.	Manufacturing establishments using (a) motors of over 20 horsepower; or (b) 10 workers.

Notes: (a) according to a count of "encouraged" establishments at the end of February 1893, of the 110 establishments reporting capital, some 18 had less than 50,000 *lei* and, of the 102 establishments reporting labour, some 17 had fewer than 25 workers. (b) "Encouragements" were also provided under this law for (1) artisan workshops which used at least four journeymen or masters as well as artisan cooperatives with a capital of 2,000 *lei* and at least 10 workers or working-members, and (2) village cooperatives and enterprises which used 20 workers either at one site or from households (in "putting-out" systems).

Sources: L. Colescu, *Ancheta industrială din 1901-1902* (Bucharest, 1904) Vol. I, p. VII; N.P. Arcadian, *Industrializarea României* (Bucharest, 1936), pp. 114-130; N.N. Costantinescu (ed.), *Din istoricul formării și dezvoltării clasei muncitoare din România* (Bucharest, 1959), pp. 188-189, 194-196, 274-276; D. St. Emilian, *L'Industrie en Roumanie* (Bucharest, 1919), pp. 14-38; Nicolas Zenopol, *La Richesse de la Roumanie* (Bucharest, 1916), pp. 33-35.

Emilian, with the lower requirements of the new law on encouragement of 1912, at least 179 already existing establishments were approved in 1912.⁹ Some 64 establishments receiving status under the new law were built that year. The main point in all these observations is that neither the number of establishments approved for encouragement nor the numbers approved and existing over the years, as shown in Table 4, are reliable indicators of Romanian industrial development.

The problems of comparability for the purpose of growth rate calculations are focused more clearly in Table 5. Consider first the several categories of establishment identified in the *Survey of Industry in 1901-1902*. Only 182 of 625 "factory" establishments had been approved for encouragement. Some 42 of those not encouraged were in this category because they were publicly owned. Of the 401 private, nonencouraged establishments, 72 were flourmills, 13 were breweries and 35 were distilleries. In addition, 7 were covered by special laws for the sugar industry.

A question arises about how many of the remaining 274 were too small or otherwise too weakly developed to be encouraged. Altogether, including public establishments and those in the exempted industries listed, there were (1) 264 or 42.2 percent that failed to employ at least 25 workers; (2) 179 or 28.6 percent that did not have at least 50,000 lei capital; and (3) even 123 or 19.7 percent without any use of motors.

However, these three categories are not inclusive; that is, for example, one of the establishments with less than 50,000 lei capital might well have employed more than 25 workers. Unfortunately, the *Survey* does not identify which of the 179 establishments with less than 50,000 lei capital also employed less than 25 workers and, consequently, would have failed both of the principal criteria for encouragement under the 1887 law.

⁹ The figure of 179 is a minimum assuming that no establishments approved at the end of 1911 and added in 1912, 1913 and 1914 were discontinued. The figure is derived by subtracting from 847 the numbers of 495 and 173 (newly built enterprises in 1912, 1913 and 1914 - see Table 4). D. St. Emilian, *L'Industrie en Roumanie* (Bucharest, 1919), p. 38.

TABLE 4
ACTIVITY UNDER ROMANIA'S INDUSTRIAL LAWS, 1887 to 1915
Establishments Requesting "Encouragement"

Year	Chemicals and Petrol		Metals and Construction		Textiles and Clothing		Paper and Printing		Other Food	
	A	D	A	D	A	D	A	D	A	D
1887	4	—	13	—	9	—	2	—	2	—
1888	4	—	10	—	8	—	1	—	3	—
1889	—	—	3	—	5	—	3	—	1	—
1890	6	—	9	—	2	—	1	—	2	—
1891	1	—	10	—	6	—	—	—	1	—
1892	1	—	4	1	1	1	—	—	—	—
1893	3	—	16	2	4	—	1	—	5	—
1894	5	1	11	2	5	—	1	1	2	1
1895	2	7	7	1	1	1	—	—	4	—
1896	5	1	7	1	1	—	1	—	4	—
1897	2	4	4	2	4	1	1	—	3	—
1898	—	1	5	1	2	2	1	—	3	—
1899	8	—	9	2	—	—	1	—	3	—
1900	4	1	10	2	—	1	2	—	2	—
1901	4	—	14	2	5	—	2	1	2	—
1902	2	—	5	1	5	—	2	—	—	—
1903 ^b	2	1	6	—	9	—	1	—	3	—
1904	3	1	10	—	4	1	2	—	3	1
1905	4	—	18	—	8	—	3	—	8	1
1906 ⁱ	7	—	27	1	13	—	4	—	4	—
1907	10	—	42	—	23	—	1	1	2	—
1908 ^a	(1)	(—)	(24)	(1)	(17)	(1)	(2)	(—)	(6)	(1)
1909										
1910										
1911										
1912 ^j										
1913										
1914										
1915										

A = Approved For "Encouragement"

B = Disapproval

Notes and Sources: (a) Numbers in parenthesis are for only part of the year of 1908, reported in *Anuarul statistic 1908* (Bucharest, 1909), p. 452; data for 1908 and after are from N.P. Arcadian, *Industrializarea României*, p. 121; (b) Reported in *Buletinul ministerului agriculturii, industriei, comerçului și domeniilor* (Bucharest, 1892 (1893), pp. 724-759; (c) Reported in *Ancheta industrială din 1901-1902*; however, according to the *Buletin statistic al României*, V: 2, 1900-1901 (Bucharest, 1901), p. 175, there is a table giving 190 encouraged establishments (this number does not count 8 more actually included in the table, but covered by special laws for the sugar industry); (d) Reported in N.I. Paianu, *Industrial mare, 1866-1906*; this figure has erroneously been cited as for 1906, but both Paianu (pp. 45 and 58) and Emilian (p. 26) identify it as 1904; more confusion comes from *Buletin statistic al României*, series III, 1910:9-10, pp. 318-325, which says that 281 encouraged establishments existed at the end of 1905; (e) Reported in Arcadian, *Industrializarea României*,

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segue - TABLE 4

Year	Flour-mills		Distilleries		Breweries		Totals		Cumulative Totals		Encouraged in Operation
	A	D	A	D	A	D	A	D	A	D	
1887	-	1	-	2	-	-	30	3	30	3	30
1888	-	-	-	-	-	-	26	-	56	3	
1889	-	-	-	-	-	-	12	-	68	3	
1890	-	-	-	-	-	-	20	-	88	3	
1891	-	-	-	-	-	-	18	-	106	3	
1892	-	-	-	-	-	-	6	2	112	5	
1893	-	-	-	-	-	-	29	2	141	7	115 ^b
1894	-	-	-	-	-	-	24	5	165	12	
1895	-	-	-	-	-	-	14	9	179	21	
1896	-	1	-	-	-	-	19	3	198	24	
1897	-	1	-	-	-	-	14	8	212	32	
1898	-	-	-	-	-	-	11	4	223	36	
1899	-	-	-	-	-	-	21	2	244	38	
1900	-	-	-	-	-	-	18	4	262	42	
1901	-	-	-	-	-	-	27	3	289	45	
1902	-	-	-	-	-	-	14	1	303	46	182 ^c
1903 ^h	-	-	-	-	-	-	21	1	324	47	
1904	-	-	-	-	-	-	22	3	346	50	294 ^d
1905	-	-	-	-	-	-	42	1	388	51	
1906	6	-	2	-	1	-	65	1	453	52	
1907	16	-	1	-	2	-	97	1	550	53	
1908 ^a	(13)	(-)	(-)	(-)	(1)	(-)	86	(2)	(55)		
1909							60				
1910							27				472 ^e
1911							46				495 ^f
1912 ^j							64 ^f				
1913							45 ^f				
1914							64 ^f				847 ^g
1915											

A = Approved For "Encouragement"
B = Disapproval

p. 122; (f) Reported in D. St. Emilian, *L'Industrie en Roumanie*, pp. 31 and 38, and includes only new establishments, but not establishments already in existence when they were approved for "encouragement" under the new law of 12 February 1912; Emilian (p. 38) gives 847 as the number of encouraged establishments in 1914; however, the statistical yearbook, *Anaurul statistical României 1915-1916* (Bucharest, 1919), p. 192 gives this number as being as of 31 December 1915, while Arcadian (p. 130 and facing table) gives both dates; (h) the original law gave encouragement for 15 years; (i) "approvals" may also include extensions of original privileges; (j) Under the 1906 law, flourmills, breweries and distilleries are eligible; (k) Establishments were now eligible under the reduced standards of the 1912 law (see Table 3).

TABLE 5
COMPARISON OF SUMMARY INDICATORS OF ROMANIAN
FACTORY INDUSTRY; 1901-02 to 1915

Sources	Establishments (no.)	Employment (persons)	Horse Power (h.p.)	Capital	Output	
					Gross (1,000 lei)	Net
1. Survey of Industry in 1901-1902	625	39,746	45,211	247,389	229,746	99,731
of which:						
establishments with less than 25,000 capital	101			1,318 ^a		
establishments with less than 50,000 capital	179			4,071 ^a		
establishments with less than 25 workers	172	1,212				
establishments with less than 15 workers	264	2,779				
establishments without motors	123					
of which:						
encouraged establishments	182					
private nonencouraged establishments	401					
public nonencouraged establishments	42			64,788 ^a		
2. Paianu's Estimates for 1904	471	37,635	49,766	214,359	273,103	117,237
of which:						
encouraged establishments	294	23,462	27,036	114,044	102,580	31,748
private nonencouraged establishments	126	4,431	13,874	54,732	86,299	14,651
public nonencouraged establishments	52	9,742	8,856	48,583	84,224	70,838
3. Encouraged Establishments of 1910	472	46,280	73,919	281,390	350,936	122,992
4. Lupu's estimates for 1912-13:						
of which:					518,912	206,872
encouraged establishments of 1912					429,400	147,960
sugar industry					28,600	10,000
tobacco industry					60,912	48,912
5. Establishments in 1915	851	60,937	126,666	361,227	584,105	
of which:						
encouraged establishments of 1915	847	58,871	119,166	329,227	547,105	190,223
sugar industry	4	2,066	7,500	32,000	37,000	

Notes: (a) Five establishments, including two public, did not report the value of capital.

Sources: L. Colescu, *Anchetă industrială din 190-1902* (Bucharest, 1904), Vol. I, Calculations; N.I. Paianu, *Industria mare 1866-1906* (Bucharest, 1906), calculations; N.P. Arcadian *Industrializarea României* (Bucharest, 1936), pp. 133 and 130; Marin Lupu, "Studii privind dezvoltarea economică României în perioada capitalismului" *Studii și cercetări economice* (Bucharest, 1967), p. 333.

The collection of industrial statistics published by Paianu in 1906 seems to have been based on selected establishments that were large enough to have qualified for "encouragement". That is, his list is assumed to be more restrictive than the *Survey* in 1901-1902. Among its 126 nonencouraged establishments were 85 flourmills, 12 breweries, and 28 distilleries. Its list of encouraged establishments had increased to 294, or 111 more than in the *Survey* and, unfortunately, more than would be accounted for by the data in Table 4 on approvals of encouraged status during 1903 and 1904. Hence, the actual dates of reference of the data remain a question.

Item 3 in Table 5, the number of encouraged establishments in 1910 has been increased by the inclusion of qualifying flourmills, breweries and distilleries (of which some are indicated in Table 4). Items 4 and 5 covering factory establishments in 1912 and 1915 are assumed to be based on the law for industrial encouragement of 1912. As indicated in Table 3, above, they would have included establishments with either 5 horsepower or 20 workers (excluding technical and administrative personnel). A more complete listing of Romanian industry in 1915 is found in Table 6.

TABLE 6
AN INVENTORY OF ROMANIAN INDUSTRY IN
1915, ACCORDING TO N. XENOPOU

Category	Estimated value of Capital investment
1. 847 factories encouraged by the state	329,226,733 lei
2. Establishments owned by the state	80,000,000 lei
3. Private nonencouraged establishment including:	42,700,000 lei
4 sugarmills	
23 distilleries	
11 breweries	
10 petrol refineries	
50 tanneries	
4. 4,816 peasant flourmills	44,000,000 lei
5. Petroleum extraction, without refineries	353,656,949 lei
6. 56,000 artisan workshops	140,000,000 lei
7. 2,184 lumber mills and lime furnaces	11,000,000 lei
8. Mines and quarries	9,000,000 lei
TOTAL	1,014,583,682 lei

Source: N.P. Arcandian, *Industrializarea României*, (Bucharest, 1936), p. 138.

The criteria for the data of 1915 are more inclusive than those for the data of 1910 and probably also Paianu's data for 1904. That is, growth based on such comparisons would have an upward bias. At the same time, the criteria for the data of 1915 are less inclusive than those used in the *Survey of 1901-1902*.¹⁰ The *Survey* includes both (1) publicly owned establishments and (2) some private establishments having fewer than 20 workers and 5 horsepower, that is, too small to qualify for encouragement under the law of 1912. Hence, a comparison of outputs recorded in Table 5 for the *Survey in 1901-02* and in 1915, ignoring any question of price inflation, would give a downward bias to growth.

Tables 7 and 8 are presented to show the results of more detailed calculations in Annex B which are made to adjust the coverage of the *Survey* to that of 1915 data. The adjustments remove, first, the output estimated from publicly owned establishments and, second, the output estimated from small establishments. However, in neither case could this be done with great accuracy.

The output of public establishments in most sectors is identified with relative ease because at the disaggregated level of calculations in Annex B public establishments were all or nearly all a sector reported in the *Survey*. In cases where this was not the case, the share of output from public establishments is assumed equal to the share of capital of public establishments. The results are shown in Table 7. Public establishments were only a small 6.7 percent of total establishments. But in terms of output they provided a large 25.9 percent of gross output and a surprising 43.8 percent of net output.

The source of most public-establishment output in Table 7 are simple to identify. It is found in the metals branch, 52.6 percent of the gross and 55.1 percent of the net of the branch. Here it may be attributed to the repair shops of the state railroad system. It is also

¹⁰ Emilian noted that one of the effects of the 1912 law was to add many relatively small establishments located in towns and villages. At least 80 were small flourmills, which counted 48 of the 64 units added in 1914. Emilian, *L'Industrie en Roumanie*, p. 38.

TABLE 7

ESTIMATED OUTPUT IN FACTORY MANUFACTURING IN
1901-1902 FROM PUBLIC AND PRIVATE ESTABLISHMENTS

Branch and Sector	Establishments			Output in Current Prices (1,000 lei)					
	Reported	Government	Private	Reported		Public		Private	
				Gross	Net	Gross	Net	Gross	Net
Mineral Materials	32	1	31	6,434	4,536	203	157	6,231	4,379
Metals	75	17	58	17,487	9,439	9,192	5,204	8,295	4,235
Woodworking	72	1	71	18,304	7,910	(a)	(a)	18,304	7,910
Textiles	66	1	65	14,738	5,133	2,212	327	12,526	4,806
Food	191	10	181	131,395	57,887	45,083	37,640	86,310	20,247
Flourmills	72	1	71	60,156	9,461	3,177	773	56,979	8,688
Sugar	7	0	7	13,607	6,242			13,607	6,242
Other	114	9	105	57,362	41,184	41,908	36,867	16,224	5,317
Chemicals	105	3	102	22,998	8,523	1,060	462	21,938	8,061
Petroleum	70	0	70	11,370	4,974			11,370	4,974
Other	35	3	32	11,628	3,549	1,060	462	10,568	3,087
Leather	25	1	24	9,660	3,146	1,560	521	8,100	2,625
Paper and Printing	39	2	37	10,449	5,421	718	422	9,731	4,999
Miscellaneous	20	6	14						
Electric Power	18	12	(b)	(b)					
Other	2	0	2	185	76			185	76
TOTAL	625	42	583	231,650	102,071	60,030	44,733	171,620	57,328
Shares (Percent)	100.0	6.7	93.3	100.0	100.0	25.9	43.8	74.0	56.2

Notes: (a) it was not possible to find data to adjust for the one state-owned saw mill. (b) Output data for electric power plants was not given in the Survey.

Sources: Annex B.

found in the "other" sector of the food branch where it comes mostly from two tobacco-products establishments. In these establishments, net output was a very high 89.5 percent of gross output. The explanation is found, of course, in the state monopoly of these products and the setting of their market prices to serve the fiscal needs of the government. Net output was only a small component of factor cost and a large indirect tax. The relatively undeveloped state of Romania's factory manufacturing in 1901-02 is shown by this fact, that about one-third of its net output came from tobacco products.

Table 8 shows the estimated output from (too) small establish-

TABLE 8
ESTIMATED OUTPUT OF FACTORY INDUSTRY IN 1901-1902
FROM SMALL-SCALE AND LARGE-SCALE ESTABLISHMENTS

Branch and Sector	Estimated Output of Establishments with Less Than 15 Workers and 24,000 Lei Capital		Estimated Output "Large Scale" Establishments	
	(1,000 lei)		(1,000 lei)	
	Gross	Net	Gross	Net
Mineral Materials	36	24	6,195	4,355
Metals	257	146	8,039	4,089
Woodworking	325	142	17,979	7,768
Textiles	374	155	12,152	4,651
Food	3,288	745	83,022	19,502
Flourmills	2,303	406	54,676	8,282
Sugar	0	0	13,607	6,242
Other	985	339	15,239	4,978
Chemicals	2,607	1,119	19,331	6,942
Petroleum	2,531	1,107	8,839	3,867
Other	76	12	10,492	3,075
Leather	214	69	7,886	2,556
Paper and Printing	92	49	9,639	4,950
Miscellaneous*			185	76
TOTAL	7,193	2,449	164,427	54,879
Shares (percent)	4.2	4.3		

Notes: (a) Includes 1 brush factory with output of 50,000 and 33,000 and 1 factory for cotton wadding with output of 135,000 and 43,000.

Sources: Annex B.

ments that is subtracted from private establishment output to arrive at the finally adjusted data for 1901-02. In this case the ideal would have called for eliminating the output of establishments having neither 20 workers nor 5 horsepower. But the ideal adjustment could not be done for several reasons. First, establishments were not cross-referenced by both size of employment and size of horsepower. Second, they were not indicated at all by size of horsepower categories, so that capital was used as a proxy for horsepower. Third, in neither case, employment nor capital, was output of the size groups indicated. In consequence, the adjustment went as follows. The percentage of total employment was calculated for establishments with less than 25 workers and the percentage of total capital was calculated for establishments with less than 25,000 lei capital. The simple average of the two percentages was calculated and the resulting percentage of output was eliminated from the output of private establishments of each branch or sector. Again the calculations, as shown in Annex B, are done for relatively disaggregated categories of industry. The result, shown in Table 8, is a relatively small downward adjustment of output for 1901-02.

Adjustments For Price Inflation From 1901-02 to 1915. Once the categories of establishments being prepared have been brought to some roughly comparable state, it remains to find a way to correct for any inflation of Romanian prices. A simple procedure has been used because the data on Romanian prices during this period appears restricted. The relatively few available and applicable price series are shown in Table 9. Obviously, more research on Romanian prices would be merited. In Table 10 the price indices derived from Table 9 are applied to a deflation of each sector's output in current prices of 1915. The result suggests that Romania experienced an average inflation of industrial prices, weighted by the branch shares of output, of 41.7-45.2 percent overall or an annual average rate of about 2.9 percent from 1901-02 to 1915.

The Estimated Growth of Industrial Output from 1901-02 to

TABLE 9
 PRICES OF SELECTED PRODUCTS FROM MANUFACTURING,
 1901-05, 1906-10 AND 1911-15

	Prices Lei per 100 kg.			Index		
	1901-05	1906-10	1911-15	1901-05	1906-10	1911-15
Mineral Materials						
Lime	7.61	2.00	2.31	100	25	29
Bricks	1.20	1.30	1.30	100	108	108
Cement ^a				100		84
Metals						
Iron plate	38.00	32.00	33.00	100	84	86
Sheet iron	18.40	20.00	21.00	100	108	114
Copper	150.00	100.00	160.00	100	66	106
Wood						
Construction wood	7.20	10.00	12.80	100	138	177
Textiles						
Cotton fibre	184.00	350.00	350.00	100	190	190
Raw wool	150.00	120.00	168.00	100	80	112
Food						
Wheat flour	23.06	25.00	35.73	100	108	155
Sugar	34.00	35.00	39.00	100	103	117
Other ^b				100		143
Chemicals						
Petroleum	3.00	3.58	7.29	100	119	243
Salt ^c				100		100
Soap ^d				100		120
Leather						
Crude oxhides	155.40	140.00	155.00	100	90	99
Sole leather	450.00	350.00	440.00	100	77	97
Paper						
Paper ^e				100		73

Sources: Except as noted prices are from *Buletinul statistic al României*, Seria IV, Volume IV:3 (1920), p. 105; (a) Calculated by dividing the index of output in current prices (as given in the Survey of 1901-02 and the Statistical Yearbook of 1915-16 by the index of production in tons (as given in Annex Table C-1); (b) Calculated as the simple average of changes in Bucharest food prices from 1901-02 to 1910 from *Anuarul statistic al României 1915-1916*, p. 160, linked to an index in food prices (including soap, wine and țuica) for 1910 through 1914 from *Buletinul statistic al României*, Series IV, Volume XVI:6-7 (1921), pp. 186-187. The first calculation gave an index of 128 (1901-02 = 100) while the latter index in 1914 showed 112 (1910 = 100); (c) Based on salt prices given in *Anuarul statistic al României 1915-1916*, p. 206; (d) Based on Bucharest soap prices for 1911-1914 in *Anuarul statistic al României 1915-1916*, p. 160; (e) Calculated from output values and physical outputs from sources noted in (a) above.

1915. The estimates of output by sectors in 1915 now "deflated" to price levels of 1901-02 in Table 10 may be compared to their counterparts for 1901-02 in Table 8. This comparison, in both overall indices and annual average rates of growth, is presented in Table 11. There we see a range of growth rates, in net terms, from the rather low 2.3 percent per year of flourmilling to the very high 13.5 percent per year of petroleum refining. The average overall growth rate of real output of Romanian factory manufacturing was a high 7.9 percent.

The calculated growth rates in Table 11, 7.1 percent gross and 7.9 percent net, are quite similar to the growth rates calculated from the Lupu data in Table 1 above, 8.4 percent and 7.3 percent, respectively. However, it must be emphasized that they are not growth rates of the same phenomena. First, Lupu's end period is

TABLE 10
THE OUTPUT OF FACTORY ESTABLISHMENTS
IN MANUFACTURING, 1915

	Price Index ^a	In Current Prices (1,000 lei)		In Constant Prices ^d (1,000 lei)	
		Gross	Net	Gross	Net
Mineral Materials	95 ^c	21,377	13,276	22,502	13,975
Metals	102 ^b	42,354	14,588	41,524	14,302
Wood	177	56,674	26,323	32,019	14,872
Textiles ^b	151 ^b	45,844	20,943	30,360	13,870
Food		215,140	67,132	150,069	49,170
Flourmills	155	115,477	17,182	74,501	11,085
Sugar	117	37,794	20,303	32,303	17,353
Other	143	61,869	29,647	43,265	21,732
Chemicals		154,725	53,002	70,342	24,176
Petroleum	243	141,323	48,671	58,158	20,029
Other	110	13,402	4,562	12,184	4,147
Leather	98 ^b	24,630	3,517	25,133	3,589
Paper and Printing	73	20,885	9,519	28,610	13,040
TOTAL	(145)	581,629	208,300	400,558	146,994

Notes: (a) From Table 9, as indicated; (b) Simple average of prices in the category in Table 9; (c) Index derived by deflating product components by their own separate prices; (d) Prices at estimated 1901-02 levels.

1912, not 1915. Second, he added output for tobacco products in 1912, whereas the calculation in Table 11 is based on its elimination. It may be noted that Lupu has no correction for the output of the railroad repair yards. Third, Lupu makes no correction for obvious inflation of internal Romanian prices¹¹ on the mistaken assumption that values in current prices were also constant prices because the *leu* was maintained at a constant external value in gold. As a consequence, the closeness of industrial growth rates in Tables 1 and 11 are a result of offsetting differences.

TABLE 11
ESTIMATED GROWTH OF REAL OUTPUT FROM FACTORY
MANUFACTURING FROM 1901-02 TO 1915 (in "1915" prices)

Sector	Index for 1915 (1901-02 = 100)		Average Annual Growth Rate (percent) ^a	
	Gross	Net	Gross	Net
Mineral Materials	363.2	320.9	10.4	9.4
Metals and Metal Working	516.6	349.8	13.5	10.1
Wood Products ^b	177.6	190.6	4.5	5.1
Textiles ^b	247.1	295.5	7.2	8.7
Food	180.8	252.1	4.7	7.4
Flourmills	163.3	133.8	2.4	2.3
Sugar	237.4	278.0	6.9	8.2
Other	283.9	416.5	8.4	11.6
Chemicals	363.9	348.3	10.4	10.1
Petroleum	658	517.9	15.6	13.5
Refining	658.0	517.9	15.6	13.5
Other	116.1	134.9	1.2	2.3
Leather	318.7	140.4	9.3	2.6
Paper and Printing	296.8	263.4	8.7	7.7
TOTAL	243.6	267.9	7.1	7.9

Notes: (a) The geometric growth rate of 13 years; (b) The respective bases in 1901-02 include the attribution of two establishments from the miscellaneous category, one to wood products and one to textiles.

Sources: Calculated from Tables 8 and 10.

¹¹ The output of sugar refineries is added in both cases; however, Lupu also fails to consider several other public establishments included in the *Survey*, but not in the output of encouraged industry in 1912 (some examples are a large bakery, a mill for making military uniforms, arsenals, etc. - see Annex Table B-1).

Because the growth rates in Table 11 exclude the output of public establishments it is logical to ask what might be the impact of including their output. Unfortunately, only partial data are available. The average sales of tobacco products in fiscal years 1900-1901 and 1901-02 was 3,954 metric tons and rose to 9,067 metric tons in 1915-1916.¹² If production assumed to have growth at a similar rate, this would have recorded an average growth rate of 6.6 percent per year, barely below the average in Table 11. Railroad repair shops were another major set of public establishments. Their employment increased from 2,008 in the *Survey* to 3,540 in fiscal year 1914-1915, or an annual average rate of 4.8 percent. Their total cost of production rose from 4,063 thousand lei in the *Survey* to 13,735 thousand lei in fiscal year 1914-15, or an annual average rise of 10.7 percent in current prices. If this is deflated by the average rates for industry estimated in Table 10 one arrives at a figure of about 7.5 percent. Either way, the growth rate is not far away from average in Table 11.¹³

Figure 3 is the last evidence to be presented on Romanian industrial development before the First World War. It reflects data assembled in Annex C on physical output series, one set for products of manufacturing and one for products of extractive industries. In both cases, physical outputs have been valued in 1902 prices (or unit values) and aggregated together.

The available series on manufactured products is far from a complete or even a reliable sample. The values of the six products in current prices were only 16.3 percent of total manufacturing output in 1902 and 37.2 percent in 1915 (see Table 5). As suggested by their rising share of the total output, their average annual growth rate is also higher than the total from Table 11, a figure of 10.9 percent compared to the overall growth rate of 7.1 percent. The higher growth rate of the six products shows the strong influence of refined petroleum products.

¹² *Annual statistic al României 1915-1916*, p. 212 and 1922, p. 234.

¹³ Fiscal 1914-1915 data are from *Anuarul statistic 1915-1916*, p. 127.

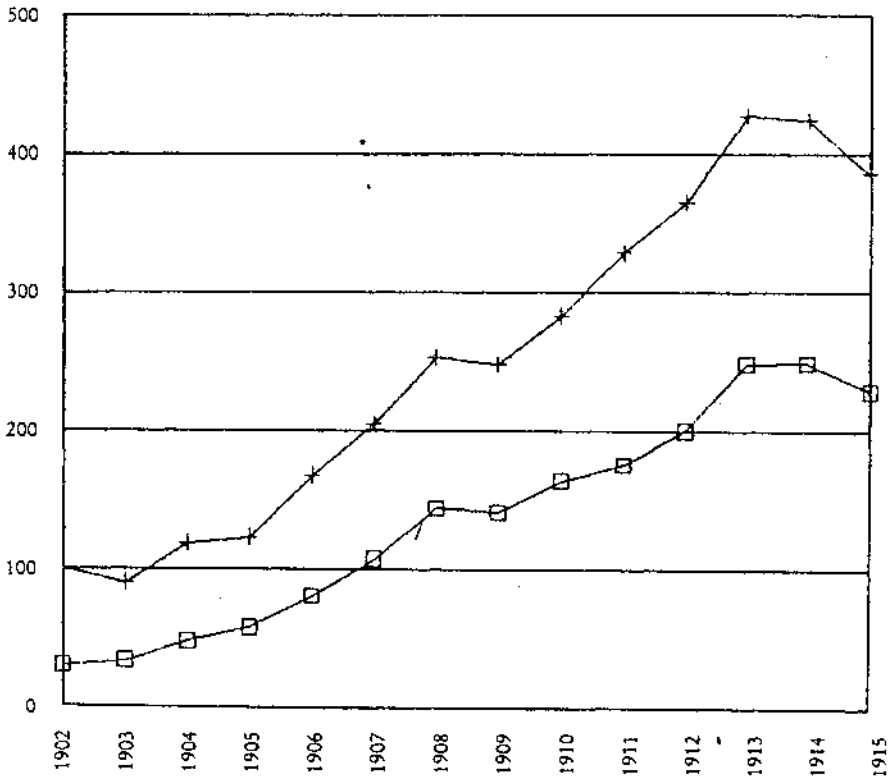
The calculations for Romanian extractive industries are relatively complete since there was almost no metallic ore production in the Old Kingdom. The growth rate in this case is 10.3 percent a year from 1902 to 1915, although a significantly higher average of 14.4 percent was realized from 1902 to 1913. The petroleum branch was far more dominating in extraction than in manufacturing.

TABLE 12A
ESTIMATED GROWTH RATES OF REAL OUTPUT FROM FACTORY
MANUFACTURING, 1901-02 to 1915 (in "1915" prices)

Sector	Prices Index	Output in 1901-02 In 1915 Prices (1,000 lei)		Average Annual Growth To 1915 (percent)	
		Gross	Net	Gross	Net
Mineral Materials	95	5,885	4,137	Same as Table 11	
Metals and Metal working	102	8,199	4,171		
Wood Products	177	31,823	13,749		
Textiles ^b	151	18,350	7,023		
Food		122,460	27,271		
Flourmills	155	84,748	12,837		
Sugar	117	15,920	7,315		
Other	143	21,792	7,119		
Chemicals		33,020	12,780		
Refining	243	21,479	9,397		
Other	110	11,541	3,383		
Leather	98	7,728	2,505		
Paper and Printing	73	7,036	3,614		
TOTAL		234,501	75,250	7.2	8.1

Source: Calculated from Tables 10 and 11.

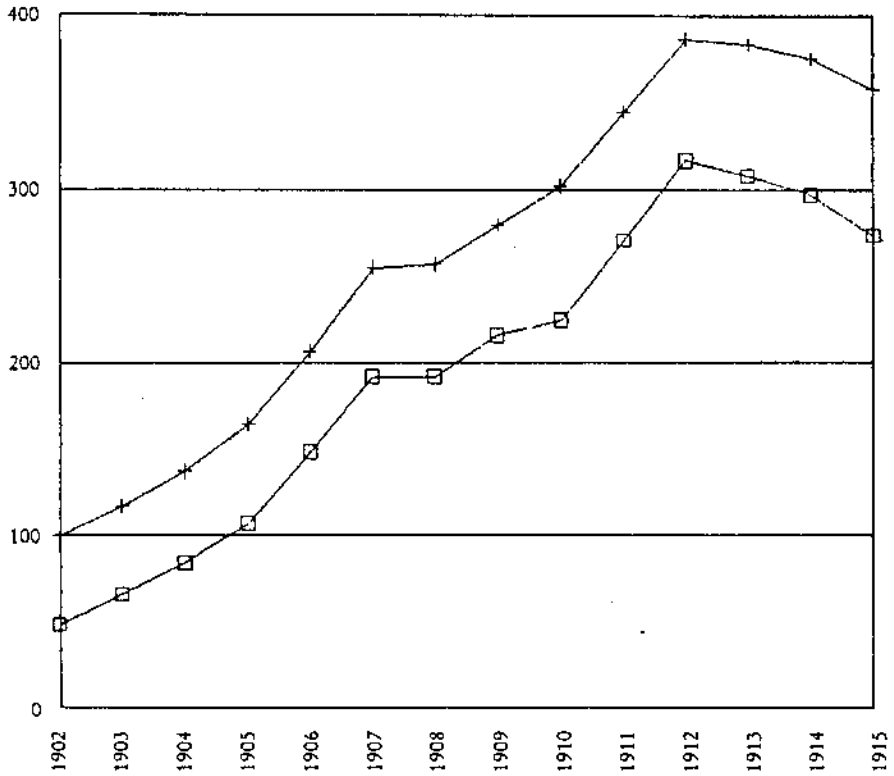
FIGURE 3-A
GROWTH INDICES BASED ON PHYSICAL
OUTPUT OF SIX MANUFACTURED PRODUCTS*



+ all six products
□ refined petroleum

Notes: (a) Alcohol, beer, sugar, paper, cement, and refined petroleum.

FIGURE 3-B
GROWTH INDICES BASED ON PHYSICAL
OUTPUT OF EXTRACTIVE INDUSTRIES^a



+ all products
□ crude oil

Notes: (a) Crude oil, salt, coal, natural gas, and quarry products.

Sources: Annex Tables C-1 and C-2.

ANNEX A

EVIDENCES OF THE DATES OF ORGANIZATION
OF FACTORY ESTABLISHMENTS, 1860 to 1910

In Figure A-1 is reproduced an original diagram from N.I. Paianu, *Industria mare 1866-1906* (Bucharest 1906), p. 28. Paianu was the head of the Department of Industry and Patents of the Romanian Ministry of Agriculture, Industry, Trade and Domains. The basis of the diagram is not explained in Paianu's work. Presumably it is his appreciation of the number of factory ("large" scale) establishments, based, it is hoped, on records of the ministry available to him.

(Diagram A-1)

Paianu's diagram was read by means of an electronic digitizer. It proved to have been accurately and consistently drawn and reproduced. The results of this operation are presented in Table A-1 and in Figure 1 of the text.

Table A-2 presents another kind of evidence of the organization of factory establishments in Romania. The *Survey of Industry in 1901-1902* (Ancheta industrială din 1901-1902) included the dates of founding of 615 of the 625 so called "large scale" (*mare*) establishments covered by the *Survey*. These data have been organized in Table A-2 and form the basis for Figure 2 in the text. Table A-2 differs from Table A-1 in two ways.

First, Table A-2 only indicates "surviving" establishments, not actual numbers of establishments formed in any year. For example, an establishment formed in 1881 and dissolved in 1891 would not show up in the table. Table A-1, by contrast, should show actual net formations each year (new formations minus dissolutions), to the extent of accuracy of Paianu's estimates.

Second, Table A-2 is based on a more inclusive definition of "factory establishment" than is the basis for Table A-1. This is shown easily by the fact that the *Survey of Industry in 1901-1902* counted 625 establishments whereas Paianu counted only 383 establishments in 1901 and 395 in 1902. Paianu's criteria for inclusion were probably those of the law on encouragement of industry. Differences in the standards of inclusion in this law and in the *Survey of Industry* are discussed in the text.

FIGURE A-1

Legend in 1906

- 293 Encouraged Establishments
- 126 Unencouraged Establishments
- 52 Public Establishments

- 471 Total

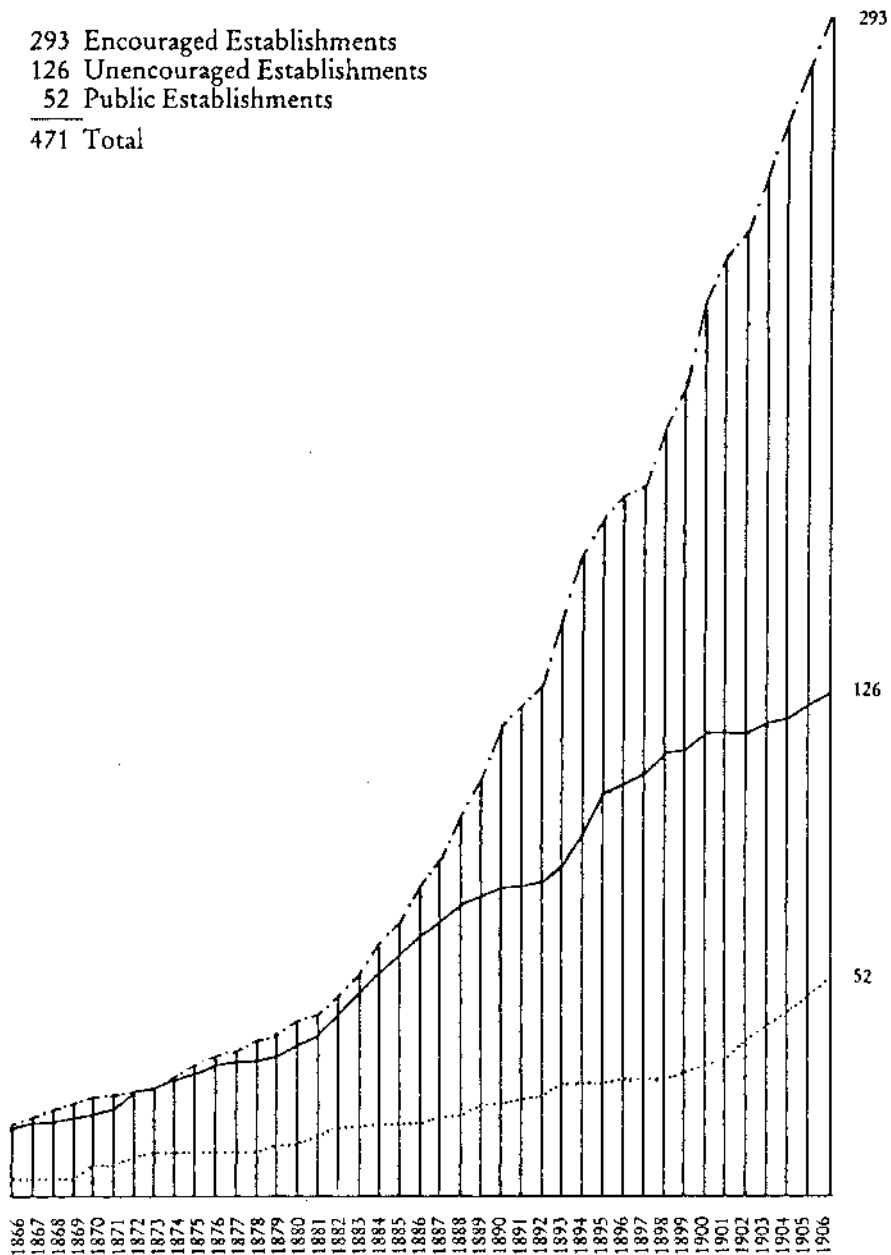


TABLE A-1
THE ESTIMATED NUMBER OF FACTORY ESTABLISHMENTS
IN ROMANIAN INDUSTRY, ACCORDING TO N.I. PAIANU

Year	Encouraged Establishments ^a	Nonencouraged Establishments ^b	State Establishments	Total Establishments	Year	Encouraged Establishments ^a	Nonencouraged Establishments ^b	State Establishments	Total Establishments
1886	18	17	4	39	1887	83	69	19	171
1867	20	18	4	42	1888	94	72	20	187
1868	21	18	4	43	1889	104	75	23	202
1869	22	20	4	46	1890	117	77	23	217
1870	24	20	8	52	1891	122	77	24	223
1871	25	22	8	55	1892	127	78	25	230
1872	26	26	10	62	1893	145	82	27	254
1873	26	26	10	62	1894	159	90	28	277
1874	30	29	10	69	1895	167	100	28	295
1875	32	30	10	72	1896	174	103	29	306
1876	35	33	11	79	1897	177	105	29	311
1877	36	34	11	81	1898	192	111	29	332
1878	39	34	11	84	1899	202	111	30	343
1879	40	35	12	87	1900	224	115	32	371
1880	43	38	12	93	1901	234	115	34	383
1881	44	40	15	99	1902	240	116	39	395
1882	49	45	17	111	1903	255	118	42	415
1883	55	51	17	123	1904	266	119	45	430
1884	63	55	18	136	1905	279	122	49	450
1885	68	60	18	146	1906	293	126	52	471
1886	77	65	18	160					

Notes: (a) Paianu's estimate of the number of establishments which might have been encouraged by the Romanian law of 1887 on industrial encouragement; (b) Mainly flourmills, but also including other establishments for processing raw materials from domestic agriculture.

Source: Estimated from Diagram A-1 by means of an electronic digitizer. Errors may be as much as one or two digits.

TABLE A-2

YEAR OF FOUNDING OF "FACTORY" ESTABLISHMENTS
EXISTING IN 1902 BY BRANCH OF INDUSTRY

	Before																					
	1860	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880
1. Food & Tobacco ^a	13	3		4	1	2	3		3	3	1	2		2	2	3	4	2	1	1	1	3
Flourmills	3	1		1			1		2	1		1					2	1	1		1	1
Graincleaners																						
Breweries	1	1		1	1						1				1							
Distilleries	7	1				1	2			1		1				1		1				2
Sugar and Glucose																1				1		
Other	2			2		1			2	2				2	1	1	2					
2. Metal Processing	5	1			1		1	1	2		2	7	1	2	1					1		2
3. Chemicals ^b	3	2	2		4			1			1	5	1	1		2	3	2	3		1	5
Petrol Processing	1	2	1		4			1			1	4	1	1		1	1	1	2		1	5
4. Wood Processing	1													1	1	1					2	2
5. Textiles & Ropes ^c		1					1														1	1
6. Clothing & Footwear ^d									1						1		1				1	1
7. Leather & Hides									1						1		1				1	1
8. Paper & Printing	4						1						1		1			2				3
9. Ceramics & Bricks							1				1											
10. Glass																						1
11. Mineral Materials	1																				1	
12. Public Utilities ^e										1							1					
	28	6	2	4	6	3	8	2	6	4	6	16	3	6	7	6	9	6	5	6	6	15

segue Table A-2

	Before																				Total		
	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900		1901	1902
1. Food & Tobacco ^a	4	8	7	5	6	9	7	4	3	6	2	6	8	14	11	3	5	9	1	10	4		188
Flourmills	3	3	6		4	4	4	3	2	2		1	2	7	5	2	1	3	1	3			72
Graincleaners							1			1		2	1		1		1			2	2		11
Breweries				1		1	1							1		1		1		1			13
Distilleries		2		3	1						1	2	1	2	5			1			2	1	35
Sugar and Glucose																	2			2	1		7
Other	1	3	1	1	1	4	1	1	1	3	1	1	4	4			1	4		2	1		50
2. Metal Processing		2	1	2			3	2	2	7	2		6	5	2	1	3	4	2	1	2		75
3. Chemicals ^b	2	2		2	4	2	10	2	2	3	2	1	5	2	3	5	2	3	7	7	2	3	109
Petrol Processing	1	1		1	4	2	5	2	1	1	2	1	2	1		4	2	3	4	3	1	2	70
4. Wood Processing			2	1		1	1	7	4	1	1	1	2	1	1	4	1	3	4	8	3	1	55
5. Textiles & Ropes ^c		1	2	1	3	5	1	1		1		2		2	1	2	1		1	3	1	1	33
6. Clothing & Footwear ^d	1		1	2	1	2		2	1		1	2	2		1		2		2		1		30
7. Leather & Hides		1		1	2	3		5	1	1		1		1		2	1			1			25
8. Paper & Printing	1	3	1		1			1	3	5	1	2		1	2	1	1	1	2		2		40
9. Ceramics & Bricks					1	1				1		1		1	2		1	2	1				13
10. Glass									2		1				1			1					6
11. Mineral Materials					1	1				2		1	1	2	1	1		1		3			16
12. Public Utilities ^e				1					2	1			3	3		1		3	2	3	2	1	24
	8	17	14	15	18	24	23	24	20	28	10	17	27	32	26	20	17	27	22	36	17	6	615

Table 2-A contains the following reclassifications from the source:

Notes: (a) Four waterworks listed under the food industry are reclassified to public utilities; (b) Two gas works listed under chemicals are reclassified to public utilities, two drycleaning plants listed under clothing are reclassified to chemicals; (c) One brush factory and one cotton waste factory listed under miscellaneous are reclassified to textiles and ropes; (d) The date of founding of one factory was deleted from survey data; (e) Includes 18 electric generating stations listed under miscellaneous.

Source: L. Colescu, *Anchetă industrială din 1901-1902*, Vol. 1 (Bucharest: Ministerul agriculturii, comerțului, industriei și domeniilor, serviciul statisticii generale, 1904).

ANNEX B

ADJUSTMENT OF THE DATA FROM THE SURVEY OF INDUSTRY
OF 1901-1902 TO CONFORM TO THE APPROXIMATE STANDARDS
OF
THE 1912 LAW ON INDUSTRIAL ENCOURAGEMENT

The purpose of this annex is to provide a detailed source of the more important information from the Romanian *Survey of Industry of 1901-1902*. The basic data are found in Table B-1 (taken from the following pages of Volume I: production—part A, pages 94-96; capital—part A, pages 74-66; and part B, pages 76-81; horsepower—part B, pages 84-86; workers—part B, pages 110-115; materials—part B, pages 91-93; fuels—part B, pages 88-89; ownership—part A, pages 72-63).

Table B-2 is the basis for the first adjustment of data 1901-1902 for comparability to the data of 1915. This adjustment attempts to eliminate the output of public establishments. From the *Survey of Industry* it was possible to identify the output of only a few sectors as "all public". In other cases adjustment was based on the share of capital of public establishments. Employment by public establishments could not be identified. As in the case of the estimated output of small establishments, the estimated output of public enterprises is subtracted from the amounts given for each sector in the *Survey* in order to obtain adjusted data.

Table B-3 presents, at a relatively disaggregated level, information on small establishments which would be candidates for exclusion under the stricter definition of "factory" used in the 1912 law on industrial encouragement. It shows (a) the number of establishments under certain sizes by employment and the numbers employed by each group; and (b) the numbers of establishments under certain sizes by amount of capital and the amount of capital used by each group. The table also indicates the number of establishments without motors; however, this datum was not subsequently used.

Table B-4 presents the basic calculations for exclusion. First, there is calculated the percentage of employment and of capital of the respective totals (employment and capital) of establishments falling into the various size groups. The *Survey of Industry* did not indicate the amount of capital used by establishments of different employment size categories. Hence, it is assumed that output to be excluded for purposes of comparability should be some weighted percentage of (1) the employment share of small establishments by employment-size, plus (2) the capital share of small establishments by capital size. Two calculations were made. The first uses the simple average of establishments with less

than 15 workers and of establishments with less than 25,000 *lei* capital. The second is based on the simple average of establishments with less than 25 workers and of establishments with less than 50,000 *lei* capital. Only the former is used in subsequent adjustments. Hence, the last columns in Table B-4 are amounts obtained by multiplying the output (gross and net) of the respective sector in text Table 7 by the estimated share of establishments employing less than 15 workers and less than 25,000 *lei* capital. The resulting sums are subtracted from data in Table 7 to obtain adjusted output data for 1901-1902.

TABLE B-1

FACTORY ESTABLISHMENTS ACCORDING TO
THE SURVEY OF INDUSTRY, 1901-1902

Industry Branch	Number of Establishments	Number of Employees	Establishment With Motors	Horsepower of Motors	Capital	Gross Production 1,000 lei	Cost of Materials	Cost of Fuels	Net Production
1. Ceramics	13	1,040	13	833	5,968	2,258	132	375	1,751
2. Glass	6	516	6	106	948	2,245	424	187	1,634
a. glass	5	492	5	96	919	2,022	340	184	1,499
b. windows	1	34	1	10	28	223	85	3	136
3. Building Materials	13	812	12	1,555	5,236	1,931	394	386	1,151
a. cement, lime, plaster	10	725	10	1,543	4,876	1,719	316	384	1,019
b. cement and plaster casting	2	57	1	8	297	191	68		123
c. stoneworks	1	30	1	4	63	21	10	1	9
4. Wood and Furniture	72	6,752	64	6,247	14,530	18,304	10,340	54	7,910
a. lumbermills	54	5,746	54	5,623	11,465	15,864	9,445		6,419
b. carpentry and furniture	15	916	9	614	3,016	2,351	872	54	1,425
c. window works	2	36			10	44	17		28
d. containers	1	54	1	10	38	45	7		38
5. Tanning and Leather	25	1,144	20	503	2,813	9,660	6,413	101	3,146
6. Textiles	31	2,346	25	1,745	11,810	6,456	4,112	199	2,145
a. woollen	14	1,046	14	1,360	9,139	3,607	2,232	145	1,330
b. cotton, hemp and linen mills	7	556	6	192	1,221	1,113	778	28	307
c. lacemakers	1	26			21	60	23		37
d. knitting mills	5	370	4	38	656	742	535	9	181
e. rope makers	4	348	2	155	773	934	525	18	391

Table B-1 continued

Industry Branch	Number of Establishments	Number of Employees	Number of Establishments With Motors	Horsepower of Motors	Capital	Gross Production 1,000 lei	Cost of Materials	Cost of Fuels	Net Production
7. Clothing	35	1,750	10	174	3,534	8,282	5,193	102	2,988
a. clothing makers	7	359	2	36	296	3,575	2,805	27	743
b. laundry and cleaners	2	117	2	31	660	300	80	20	200
c. dye workers	2	52	1	4	71	320	237	13	70
d. furriers	1	80			220	567	284		283
e. hatmakers	7	267	4	31	465	879	472	10	397
f. artificial flowers	1	40			12	55	10		45
g. ties, corsets and umbrellas	4	132				605	301		304
h. footwear	7	558	1	62	1,572	1,752	892	25	860
i. button makers	4	154	1	10	239	229	111	6	1,116
8. Metalworking	75	7,226	73	2,902	29,287	17,487	7,071	977	9,439
a. carriage works	2	84	2	10	376	171	65	19	86
b. locksmiths	3	182	3	19	307	454	167	13	274
c. industrial, agricultural and household fabrications	26	1,285	26	605	5,726	4,112	1,573	268	2,271
d. tin works	3	301	3	36	951	658	394	57	207
e. iron furniture and stoves	5	242	4	47	437	680	207	15	458
f. railroad repair and construction	8	2,008	7	330	7,022	4,063	2,027	187	1,849
g. shipyards	3	543	3	268	2,237	1,977	624	133	1,220
h. file works	1	15	1	6	45	41	2	3	35
i. nail and wire work	4	157	4	440	1,033	1,362	856	24	482
j. copper smiths	3	45	3	26	121	122	79	10	33
k. galvanizers	1	2	1	2	2	28	3	1	24
l. zinc works	2	101	2	18	465	363	183	10	334

Table B-1 continued

Industry Branch	Number of Establishments	Number of Employees	Establishment With Motors	Horsepower of Motors	Capital	Gross Production 1,000 lei	Cost of Materials	Cost of Fuels	Net Production
m. copper and bronze casting	2	61	2	18	140	158	53	8	97
n. instruments	5	135	5	167	822	226	76	17	134
o. armouries	2	882	2	572	7,714	2,658	607	172	1,878
p. training workshops	5	1,183	5	339	1,890	416	156	39	221
9. Food Industry	191	9,810	181	18,990	110,761	131,395	68,833	4,675	57,887
a. flourmills— Category I	61	2,035	61	9,060	24,090	57,976	47,600	1,275	9,100
b. flourmills— Category II	11	122	10	640	1,382	2,180	1,783	36	360
c. grain cleaning	11	92	11	1,259	27,448	108		63	44
d. waterworks	3	31	3	592	7,250	318		56	262
e. mineral water	16	315	16	165	1,854	1,446	551	44	851
f. breweries	13	260	10	820	7,677	1,653	393	172	1,087
g. bakeries	9	231	9	101	1,079	2,677	2,048	103	526
h. cafeterias	5	124	3	36	867	1,357	684	41	632
i. conserved food	11	353	10	175	1,253	2,458	1,620	40	798
j. flour pasta	3	73	3	46	325	262	168	14	80
k. distilleries	31	1,108	31	1,421	10,212	5,200	3,263	1,086	851
l. alcoholic beverages	4	42	1	5	298	486	185	4	296
m. sugar and glucose	6	3,001	6	4,408	21,032	13,443	5,603	1,684	615
n. rahat and halva	3	53	3	22	209	450	321	17	119
o. sugar products	1	59	1	75	636	164	67	12	86
p. tobacco products	2	1,880	2	154	4,830	40,947	4,470	21	36,456
q. coffee surrogates	1	31	1	12	320	270	75	7	188
10. Chemical Industry	105	2,569	43	1,436	31,476	22,998	13,254	1,220	8,523
a. glue works and item (17) ^b	2	176	2	185	690	596	329	99	168

Table B-1 continued

Industry Branch	Number of Establishments	Number of Employees	Establishment With Motors	Horsepower of Motors	Capital	Gross Production 1,000 lei	Cost of Materials	Cost of Fuels	Net Production
b. paints, soaps, candles and item (1) ^b	18	618	11	76	1,961	4,626	3,470	64	1,092
c. items (6) and (7) ^b	6	197	6	569	1,411	2,110	1,711	94	305
d. petroleum refining	70	741	15	303	11,305	11,370	5,536	860	4,974
e. gas works	2	153	2	34	12,170	3,593	1,470	n.a.	1,123
f. gunpower works	2	123	2	130	2,432	560	275	69	216
g. match factories	1	409	1	70	1,031	500	245	9	246
h. toothpicks	1	43	1	35	243	257	65	11	181
i. item (18) ^b	3	109	3	34	233	330	123	14	193
11. Paper	13	1,346	12	3,965	8,557	5,057	2,429	296	2,332
a. paper and cardboard	8	999	8	3,934	7,780	4,128	1,823	283	2,022
b. paper products	5	347	4	31	777	929	606	13	310
12. Printing	26	1,572	23	328	7,071	5,392	2,202	110	3,080
13. Miscellaneous	20	423	19	6,428	15,390	(c)			(c)
a. brush factories	1	43			7	50	19		31
b. electric works	18	355	18	6,416	15,293	(c)		453	(c)
c. cotton wadding	1	25	1	12	90	135	85	5	45
		37,325							

Notes: (a) As calculated from unrounded data; (b) Some titles in the copy of original materials were illegible; numbers in parentheses are item numbers in the original; (c) Not available.

TABLE B-2

PERCENTAGE SHARES OF PUBLIC
ESTABLISHMENTS INCLUDED IN TABLE B-1

Sector	Type of Establishment	Number of	Amount of	Percent of	Output	(1,000 lei)*
		Establishment	Capital	Total Capital	Gross	Net
		(1)	(2)	(3)		(4)
1	ceramic	1	538,000	9.01	203	157
4 a	lumber mill	1	n.a.			
5	tannery	1	n.a.		1,560	521
7 a	clothing/uniforms	1	155,000	5.23	2,212	327
8 a	wagon making	1	188,788	50.24	86	43
8 f	railroad	7	6,604,117	94.05	4,063	1,849
8 g	boat repair and construction	2	2,087,615	93.34	1,840	1,136
8 n	instruments	1	583,000	70.91	151	89
8 o	arsenals and armouries	2	7,713,894	100.00	2,658	1,878
8 p	shops of vocational schools	4	1,791,906	94.81	394	209
9 a	flourmills	1	1,358,033	5.64	3,177	773
9 c	grain docks and cleaning	2	26,915,000	98.06	108	44
9 d	waterworks	2	5,250,000	72.41	318	262
9 g	bakeries	3	208,867	19.36	535	105
9 p	tobacco products	2	4,829,612	100.00	40,947	36,456
10 f	gunpowder	2	2,431,592	100.00	560	216
10 g	matches	1	1,031,272	100.00	500	246
12	printing	2	955,949	n.a.	718	422
13 b	electric works	6	2,145,332	14.03	n.a.	n.a.
		42	64,787,900	26.00	60,030	44,733

Notes: (a) Obtained by multiplying the shares in column (3) by output for each sector as given in Table B-1.

TABLE B-3

SMALLER ESTABLISHMENTS INCLUDED
IN ANNEX TABLE B-1

Industry Branch (See Table B-1)	Establishments with			Employment by establishments in			Establishments with		Capital by establishments		Establishments Without Motors (11)
	less than 15 employees (1)	15-19 employees (2)	20-24 employees (3)	Column (4)	Column (5)	Column (6)	less than 25,000 in capital (7)	25-49,999 in capital (8)	Column (9)	Column (10)	
1	1		2	12		45	3	1	36,500	33,500	0
2								2		72,500	0
a								1		43,700	0
b								1		28,800	0
3	2		1	15		21	1	1	19,000	26,000	1
a	2		1	15		21	1	1	19,000	26,000	0
b											1
c											0
4	4	4	5	49	61	107	7	10	85,000	366,900	8
a	2	2	4	27	30	87	2	8	34,000	280,500	0
b	2	1		22	15		3	1	41,000	42,000	6
c		1	1		16	20	2		10,000		2
d								1		38,400	0
5	5		2	39		48	3	6	52,700	241,500	5
6	3	3	3	23	52	64	8	3	118,500	100,000	6
a	3	2	3	23	33	64	6	2	82,500	65,000	0
b		1			19				1	35,000	1
c							1		21,000		1
d							1		15,000		1
e											2

Industrial Output in Romania and its Historical Regions

Table B-3 continued

Industry Branch (See Table B-1)	Establishments with			Employment by establishments in			Establishments with		Capital by establishments		Establishments
	less than 15 employees (1)	15-19 employees (2)	20-24 employees (3)	Column (4)	Column (5)	Column (6)	less than 25,000 in capital (7)	25-49,999 in capital (8)	Column (9)	Column (10)	Without Motors (11)
7	1	1	4	13	16	93	13	4	172,000	126,000	15
a		1	1		16	24	5		79,300		5
b											0
c								2		71,000	1
d											1
e	1			13			2	1	16,500	25,000	3
f							1		12,000		1
g			1		23						4
h			1			23	4	1	42,200	30,000	6
i			1			23	1		22,000		3
8	16	7	2	147	115	41	7	14	88,287	458,700	2
a											
b											
c	9	6		88	100		2	7	27,000	222,500	
d											
e			1			20	1	1	18,757	30,000	1
f							1		18,030		1
g	1			4							
h		1			15			1		45,000	
i											
j	2			20				2		69,000	
k	1			2			1		2,000		
l								1		32,000	
m	1			5			1		13,500		
n	2		1	18		21	1	2	9,000	60,200	
o											
p											

Table B-3 continued

Industry Branch (See Table B-1)	Establishments with			Employment by establishments in			Establishments with		Capital by establishments		Establishments
	less than 15 employees	15-19 employees	20-24 employees	Column	Column	Column	less than 25,000 lei capital	25-49,999 lei capital	Column	Column	Without Motors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
9	63	19	14	478	320	305	14	20	222,000	730,485	10
a	13	4	7	112	67	148		1		35,000	
b	9	1		72	19			2		74,500	1
c	8			34			3	2	36,000	78,000	
d	3			31							
e	11	2		75	32		2	8	24,000	273,525	
f	7	1		42	16		1	1	18,000	27,000	3
g	2	3	1	18	52	24	4		75,000		
h	2			23			2		38,000		2
i	4		2	44		44		4		152,860	1
j		1			17						
k	5	4		85	89		1		44,000		
l	2		10	32		1	1	21,000	45,600	3	
m	2		15			1		10,000			
n											
o											
p											
q											
10	60	3	6	313	52	132	38	10	498,962	355,950	62
a		1	3		15	65	1	3	14,000	115,000	7
b			1	11		23					
c	1		2	298	18	44	37	7	484,962	270,950	55
d	58	1									
e											
f											
g											
h											
i	1	1		4	19						

Table B-3 continued

Industry Branch (See Table B-1)	Establishments with			Employment by establishments in			Establishments with		Capital by establishments		Establishments Without Masters (11)
	less than 15 employees (1)	15-19 employees (2)	20-24 employees (3)	Column (4)	Column (5)	Column (6)	less than 25,000 in capital (7)	25-49,999 in capital (8)	Column (9)	Column (10)	
11			1			32	1		18,000		1
a											
v			1			32	1		18,000		1
12	5		2	47		42		6		201,000	3
13	12		2	76	31		1	1	7,000	39,900	1
a							1		7,000		1
b	12		2	76	31			1		39,800	
c											
TOTALS	172	53	39	1,212	647	920	96	78	1,317,949	2,752,835	114

TABLE B-4
 PERCENTAGE SHARES OF SMALLER
 ESTABLISHMENTS INCLUDED IN ANNEX TABLE 1
 (Calculated From Tables B-3 and 7)

Sector	Percent of Labour in Establishments With Employees of			Percent of Capital in Establishments With Capital of		Average Shares of Establishments		Estimated Output (1,000 lei) of Establishments with Less Than 15 Workers and 25,000 capital	
	Less than 15 (1)	15-19 (2)	20-24 (3)	Less than 25,000 (4)	25-49,999 (5)	Less than 15 workers and 25,000 capital (6) ^b	Less than 25 workers and 50,000 capital (7) ^c	(Gross) ^d (8)	(Net) ^d
1	1.15		4.33	0.61	0.56	0.88	3.33	18	14
2									
					4.76		2.38		
					100.00		50.00		
3									
	2.07		2.90	0.04	0.05	1.06	2.53	18	10
4									
	0.47	0.52	1.51	2.97	2.45	1.72	3.96	273	110
	2.40	1.64		0.14	0.14	1.27	2.16	30	18
		44.40	56.60	100.00		50.00	100.00	22	14
					100.00		50.00		
5									
	3.41		4.20	1.87	8.59	2.64	9.04	214	69
6									
	2.20	3.15	6.12	0.90	0.07	1.55	6.22	56	21
		3.41			0.29		1.85		
				100.00		50.00	50.00	30	18
				2.29		1.15	1.15	8	3

Industrial Output in Romania and its Historical Regions

Table B-4 continued

Sector	Percent of Labour in Establishments With Employees of			Percent of Capital in Establishments With Capital of		Average Shares of Establishments		Estimated Output (1,000 lei)		
	Less than 15 (1)	15-19 (2)	20-24 (3)	Less than 25,000 (4)	25-49,999 (5)	Less than 15 workers and 25,000 capital (6) ^b	Less than 25 workers and 50,000 capital (7) ^c	of Establishments with Less Than 15 Workers and 25,000 capital (Gross) ^d (8)	(Net) ^d (9)	
9	a	5.50	3.29	7.27		0.15	2.83	8.11	1,641	299
	b	59.02	15.57			5.39	29.51	39.99	662	107
	c	(state enterprises)								
	d	(state enterprises)								
	e	23.81	10.16		1.29	14.76	12.55	25.01	182	107
	f	16.15	6.15		0.23	0.35	8.19	22.88	135	89
	g	7.79	22.51	10.39		6.95	3.90	23.82	104	16
	h	18.55			4.38		11.47	11.47	311	45
	i	12.46		12.46		12.19	6.23	18.56	104	34
	j		23.29					11.65		
	k		7.67	8.03		0.43		8.07		
	l	23.81	76.19		7.05	15.31	15.43	61.18	75	46
	m	28.30			4.78		16.54	16.54	74	2
n										
o										
p										
q										
10	a									
	b		2.42	10.52	9.71	5.86	0.36	9.76	17	4
	c	5.58		11.68			2.79	8.63	59	8
	d	40.22	2.43	5.94	4.29	2.40	22.26	27.64	2,531	1,107
	e	(state enterprises)								
	f									
	g									
	h									
	i									
	j	3.67	17.43				1.84	10.55	6	4

Industrial Output in Romania and its Historical Regions

Table B-4 continued

Sector	Percent of Labour in Establishments With Employees of			Percent of Capital in Establishments With Capital of		Average Shares of Establishments		Estimated Output (1,000 lei) of Establishments with Less Than 15 Workers and 25,000 capital	
	Less than 15	15-19	20-24	Less than 25,000	25-49,999	Less than 15 workers and 25,000 capital	Less than 25 workers and 50,000 capital	(Gross) ^d (8)	(Net) ^d
	(1)	(2)	(3)	(4)	(5)	(6) ^b	(7) ^c		
11									
a									
b			6.34	2.32		1.16	4.33	11	3
12	2.99		2.67		0.25	1.50	2.96	81	46
13									
a				100.00		50.00	50.00	25	16
b	(electric power)								
c									

Notes: (a) For sector designations, see Table B-1; (b) The average of columns (1) and (4); (c) The average of columns (3) and (5); (d) Obtained by multiplying the shares in column (6) by the respective sector's outputs from Table B-1 after subtracting the estimated output of public establishments in Table B-2.

ANNEX C

CALCULATIONS OF GROWTH BASED ON AVAILABLE
PHYSICAL OUTPUT INDICATORS FOR
MANUFACTURING AND EXTRACTION, 1900 TO 1915

Romanian agencies began to calculate industrial output indices based on physical production series only in the 1920s. The available series for the Old Kingdom have been collected in Tables C-1 and C-2. In each case, the physical output series are weighted by prices or unit values for 1902 and then aggregated.

Both series are obviously heavily influenced by petroleum production. But, whereas the index for extraction covers a relatively complete list of output, the index for manufacturing is relatively incomplete. The series includes only 16.3 percent of total gross output in 1902 and 37.2 percent in 1915.

TABLE C-1

INDUSTRIAL GROWTH ESTIMATES FROM AVAILABLE
SERIES OF PHYSICAL OUTPUT

Marvin R. Jackson

Year	Alcohol ^b (1,000 l)	Beer ^b (1,000 l)	Sugar ^c (tons)	Paper ^d (tons)	Cement (tons)	Refined Petroleum (tons)	Total Value (index)
1916	11,073	32,869	24,750		60,000	1,662,224	
1915	13,680	32,460	25,770	17,000	133,000	1,624,107	384.9
1914	18,050	29,894	32,928	16,143	155,000	1,770,081	423.7
1913	19,679	32,407	34,758	18,350	135,145	1,765,183	426.9
1912	15,601	26,531	32,557	16,366	144,173	1,422,176	365.1
1911	11,620	17,622	50,003	13,707	93,189	1,243,570	329.1
1910	12,626	18,623	27,697	11,701	85,293	1,160,517	283.2
1909	12,884	18,606	24,955	9,110	76,572	998,133	249.1
1908	18,295	17,848	23,530	9,000	66,575	1,020,362	253.2
1907	11,846	13,452	29,097	7,321	52,347	763,297	204.6
1906	10,872	11,167	28,586	6,411	36,617	574,688	167.3
1905	10,477	8,643	18,731	5,393	25,526	411,563	122.9
1904	13,493	7,795	25,138	3,359	19,786	339,987	118.7
1903	18,641	5,961	15,010	1,312	16,808	236,459	90.4
1902	12,845	4,822	25,869	5,449	14,129	208,830	100.0
1901	8,242	5,310	18,721		8,430	160,717	
1900	14,768	8,066	8,354		12,780		
1899	31,026	9,079			26,436		
<i>Unit Values in 1902 in let^e</i>							
	0.493	0.343	0.520	757.5	121.92	54.541	
	liter	liter	kg	ton	ton	ton	

Table C-1 continued

VALUES IN COSTANT PRICES (1,000 lei) OF 1902

Year	Alcohol ^b (1,000 l)	Beer ^b (1,000 l)	Sugar ^c (tons)	Paper ^d (tons)	Cement (tons)	Refined Petroleum (tons)	Total Value (index)
1915	6,744	11,134	13,400	12,878	16,215	88,433	148,804
1914	8,899	10,254	17,123	12,228	18,898	96,381	163,783
1913	9,702	10,773	18,074	13,900	16,477	96,114	165,140
1912	7,691	9,100	16,930	12,397	17,578	77,437	141,133
1911	5,729	6,044	26,001	10,383	11,362	67,712	127,231
1910	6,225	6,388	14,402	8,864	10,399	63,190	109,468
1909	6,352	6,382	12,977	6,901	9,336	54,348	96,296
1908	9,019	6,122	12,236	6,818	8,117	55,559	97,871
1907	5,840	4,614	15,130	5,546	6,382	41,562	79,074
1906	5,360	3,830	14,865	4,856	4,464	31,292	64,667
1905	5,214	2,965	9,740	4,085	3,109	22,410	47,523
1904	6,652	2,674	13,072	2,544	2,414	18,512	45,868
1903	9,190	2,045	7,805	994	2,048	12,875	34,957
1902	6,332	1,654	13,452	4,128	1,719	11,371	38,656
1901	4,063	1,821	9,735		1,024	8,751	

Notes and sources: (a) Unit values are calculated from total output values in the *Survey of Industry in 1901-1902* and the physical output in the table; (b) The amounts of alcohol and beer are amounts sold for consumption as given in *Anuarul Statistic al României 1915-1916* (Bucharest, 1919), p. 209 and 1922 (Bucharest, 1923), p. 231. In other sources they have been identified as production (See, for example, N.N. Constantinescu, *Aspecte ale dezvoltării capitalismului premonopolist în România* (Bucharest, 1957), p. 182; (c) Sugar output from N.N. Constantinescu, *Aspecte ale dezvoltării capitalismului premonopolist în România*, p. 182, and George Ioanitiu and Camil Calmuschi, *Industria zaharului în România* (Bucharest, 1936), pp. 34-35; (d) Paper output in George Ionitiu and Nicolae Costache, *Industria hârtiei în România* (Bucharest, 1929), pp. 67 and 132; (e) Cement output until 1906 from *Enciclopedia României*, Vol. III (Bucharest), p. 900, and George Ionațiu and Nicolae Costache, *Industria cimentului în România* (Bucharest, 1932), p. 36; (f) Output of refined petroleum is based on quantities of petroleum used in refineries from *Anuarul statistic 1915-1916*, p. 200 and 1922, p. 216.

TABLE C-2

GROWTH OF OUTPUT FROM ROMANIA'S EXTRACTIVE INDUSTRIES

Marvin R. Jackson

Year	Crude Oil (1,000 tons)	Salt (1,000 tons)	Coal (1,000 tons)	Natural Gas (consumed) (1,000 m ³)	Quarries (1,000 m ³)	Total (index)
1916	1,250	133	299	92,941	250	288.0
1915	1,643	141	254	106,221	320	358.0
1914	1,784	126	230	115,012	398	375.7
1913	1,848	121	225	103,880	553	383.8
1912	1,899	115	196	82,080	353	386.9
1911	1,625	130	165	69,945	343	344.5
1910	1,346	149	147	32,700	468	302.0
1909	1,294	123	161	1,407	406	280.1
1908	1,151	129	128	248	357	256.9
1907	1,151	124	144	60	264	252.1
1906	890	116	130		256	206.6
1905	640	117	125		301	164.3
1904	504	109	122		168	137.3
1903	394	105	132		171	117.1
1902	287	110	104		163	100.0
1901	233	107	104			89.5
1900	227	105	63			86.1
<i>Prices in 1902 in lei</i>						
	40.00	100.07	8.28	0.017	0.54	
	ton	ton	ton	m ³	m ³	

Table C-2 continued

VALUES IN CONSTANT PRICES (1,000 lei) OF 1902

Year	Crude Oil	Salt	Coal	Natural Gas (consumed)	Quarries	Total (index)
1916	50,000	13,309	2,476	1,580	135	67,500
1915	65,720	14,110	2,103	1,806	173	83,912
1914	71,360	12,609	1,904	1,955	215	88,043
1913	73,920	12,108	1,863	1,766	299	89,956
1912	75,960	11,508	1,623	1,395	191	90,677
1911	65,000	13,009	1,366	1,189	185	80,749
1910	53,840	14,910	1,217	556	253	70,776
1909	51,760	12,309	1,333	24	219	65,645
1908	46,040	12,909	1,060	1	193	60,203
1907	46,040	12,409	1,192		143	59,784
1906	35,600	11,608	1,076		138	48,422
1905	25,600	11,708	1,035		163	38,506
1904	20,160	10,908	1,010		91	32,169
1903	15,760	10,507	1,093		92	27,452
1902	11,480	11,008	861		88	23,437
1901	9,320	10,707	861		(80)	20,968
1900	9,080	10,507	522		(80)	20,189

Sources: *Anarul statistic al României 1915-1916*, pp. 196, 202, 205, 206; and 1922; *Buletinul statistic al României*, XII:38-39 (1915), pp. 642-643; *Statistica minieră 1920*, pp. 90-91 and 110.

