
ARTICLES

Europe's Gross National Product: 1800-1975

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GENERAL INTRODUCTION¹

At a moment when national accounting concepts are being widely and rightly criticized as inadequate it is perhaps strange to present a set of estimates for the evolution of the national product of various regions of Europe. But until some other acceptable composite indicator is developed, the volume of national income, or product, remains the least inadequate single composite indicator of the growth of an economy. It is furthermore unlikely that any new indicator that may some day be adopted as a better measure of economic development would be suitable for retrospective calculations. On the other hand, a large number of new or revised series of historical national accounts have been made during the last ten years. Since for another study we have assembled a wide range of data enabling us to produce some estimates, we have decided that it would be useful to draw up a set of estimates on the evolution of gross national product for various regions.²

¹ I want to express my gratitude to Mr Harold Lubell for having so willingly agree to correct the most important language mistakes made in this text.

² The most complete series constructed hitherto is that calculated by A. MADDISON (*Growth and fluctuation in the World Economy 1870-1960*, in « Banca Nazionale del Lavoro, Quarterly Review », no 61, June 1962, pp. 127-195). MADDISON'S estimates are limited to Western Europe (and the United States and Canada) and go back to 1870 only.

The first step of this project is the object of this article, but we are in the process of finalizing similar calculations for: a) all the developed regions b) the less developed regions and c) for the entire world.³

The present paper is limited to the presentation of the results of our estimates and calculations; no elaborate conclusions will be drawn from those figures but only some general considerations of the main trends revealed. A more elaborate analysis of the problem of European economic growth in the XIXth century can be found in the author's book, *Commerce extérieur et développement économique de l'Europe au XIXe siècle*, which will appear at the end of 1976. The present article is divided into five parts. The division will be mainly chronological. The two main reasons for such a choice are: 1) to cover in sufficient detail the whole period would have meant providing tables which would be too cumbersome to present and to analyze; 2) because of the important territorial changes caused by the two world wars, we shall give not only present day territorial figures but also those for each of the major periods using data relating to the geographical boundaries of that time. The first and the most important part (part A) will be devoted to the presentation of our series for the XIXth century (1800-1913). The second part (part B) will be devoted to the presentation of our series for the period 1913-1950. Initially this exercise was not planned, since we expected to be able to use existing series, but these proved to be less complete (geographically as well as historically) than our data for the XIXth century, so we decided to construct new series. Part C will place the XIXth century evolution in a wider historical perspective and deals with Europe's gross national product for the period 1800-1975. The fourth part (part D) consists of a statistical appendix, while the fifth and last part (part E) contains a methodological appendix.

Although we have added this important methodological appendix, it is necessary to preface our discussion with certain general

³ Except for the developed regions, we shall not calculate annual series. Those series will be ready in the beginning of 1977.

methodological points. The concept used here is the gross national product at market prices. All series are expressed in 1960 US dollars and prices. This means that the figures for individual countries once converted into dollars have been adjusted in order to take into account the difference in price structures. But such a correction is not only very crude; it is also in certain respects arbitrary. However it would have been even more arbitrary to ignore those differences. As a base for the indices we have decided to take the yearly average of 1899-1901. The geographical definition of Europe followed in this study includes Russia (also the Asian part of Russia), but excludes European Turkey (1913 borders). For the definition of the other sub-regions, see section E 2 of the appendix. Figures that have a larger margin of error than the average of the other data will be presented in parentheses. But the absence of such parentheses does not imply that in every case the margin of error is negligible (see section E 8 of the appendix). It is obvious that if contemporary estimates of GNP in countries with elaborate statistical information still contain an important margin of error, this holds equally for our data. In general, the series after 1850 are relatively valid and, as we note at the bottom of the tables, it is obvious that the degree of "rounding" of the figures does not imply a correspondingly small margin of error. The decision to present un-rounded figures in tables (and often in the text) is based on the probability that some of our data may be used for further calculations, notably international comparisons, and in such a case figures which have been rounded up may often introduce additional margins of error. To simplify the text, GNP will stand here for gross national product at market prices; except when otherwise specified all GNP figures are expressed in 1960 US dollars and prices.

PART A - EUROPE'S GROSS NATIONAL PRODUCT, 1800-1913

This part, which is the most important and therefore the longest of this study, consists of three sections devoted to the volume of Europe's gross national product. The data on the value of

GNP are given in *table 20* in the statistical appendix together with the 1928-1973 data. The first section of the present part will be devoted to total and per capita GNP by region. The second will deal with data for individual countries and the last one will provide annual figures.

A 1) Volume of total and per capita G.N.P. by regions, 1800-1913

Table 1 summarizes the evolution of the volume of total and per capita GNP in Europe for the period 1800-1913. Since figures for 1800 have a greater margin of error than the rest, we shall exclude them from our commentary. This 1800 data should be seen as giving a rough indication of the situation around the beginning of the XIXth century.

Europe's growth in the XIXth century was slow and irregular, very slow if contemporary standards are applied as to-day an annual one or even two per cent increase in the per capita GNP is considered as stagnation. From 1830 to 1910 the volume of total European

TABLE 1

VOLUME OF THE EUROPEAN GROSS NATIONAL PRODUCT
AT MARKET PRICES

(in 1960 U.S. dollars and prices; three-year annual average, except for 1913)

	TOTAL Gross National Product			PER CAPITA Gross National Product		
	Millions 1960 \$	1899-1901 = 100	Annual rate of increase (%)	1960 \$	1899-1901 = 100	Annual rate of increase (%)
1800	(40,870)	(21.7)	—	(199)	(43.7)	—
1830	58,150	30.8	(1.18)	240	52.7	(0.63)
1840	67,000	35.5	1.43	260	57.1	0.81
1850	77,940	41.3	1.52	283	62.2	0.86
1860	91,070	48.3	1.57	310	68.0	0.90
1870	114,970	61.0	2.36	359	79.0	1.50
1880	126,980	67.4	1.00	366	80.4	0.18
1890	146,720	77.8	1.46	388	85.2	0.59
1900	188,530	100.0	2.54	455	100.0	1.61
1910	231,550	122.8	2.08	499	109.6	0.92
1913	256,850	136.2	3.52	534	117.3	2.29

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Indices and annual rates of growth have been calculated from unrounded figures.

GNP increased by 1.7 per cent per annum, and that of per capita GNP by 0.9 per cent. On the other hand, it is obvious that compared to previous centuries, performance in the XIXth century was very rapid. It is unlikely that per capita income increased by more than 0.2 - 0.3 per cent between 1500 and 1800. A 0.4 per cent increase would have meant that in 1500 the per capita GNP was 60 dollars (in prices of US in 1960), that is, a sum which would buy only 134 kg of bread if the entire income were spent on this item only.⁴ Such a quantity of bread would supply only 940 calories per day, whereas minimum requirements are over 2000 calories. Making crude estimate from mainly the per capita level of GNP in the backward European countries in about 1830, we would suggest a probable per capita GNP of \$ 160 - 180 for the beginning of the XVIth century, and of \$ 170 - 190 for the beginning of the XVIIIth century.

Economic growth was probably moderate between the beginning of the XIXth century and 1842-44. During this period, total GNP increased by some 1.2 - 1.3 per cent per annum, and the per capita increase was probably in the range of 0.5 - 0.7 per cent. But from 1842-44 to 1867-69 (data based also on the yearly index given in section A3 of this part), European total GNP increased by some 2.0 per cent which led to a per capita increase of some 1.2 per cent. Then followed a period of very slow growth which lasted until 1889-91. The annual increase in the total GNP was 1.0 per cent, and since population growth was of the order of 0.8 per cent per year, this slow growth implied a virtual stagnation in per capita income. Without going into details here it appears that this slowing down, which affected not only the United Kingdom whose "great depression" is very well known, but the rest of Europe even more severely, was due very largely to a rapid influx of American cereals. Those large imports of cereals (which were made possible by the abolition of European tariffs on food and the reduction of transport costs) were not compensated by

⁴ The average retail price of bread in the United States in 1960 was 20.3 cents per 1 lb: U.S. Bureau of the Census: *Historical Statistics of the United States, continuation to 1962 and revisions*, Washington, 1965 (p. 19).

increased exports of manufactured products to the United States, this country having greatly increased its tariffs on those products.⁵ The last part of the XIXth century saw more rapid growth. From 1889-91 to 1913, total GNP increased by 2.4 per cent per year and per capita GNP increased by 1.5 per cent.

The absolute level of European GNP per capita at the beginning of the XIXth century was relatively high when compared with the situation of the less developed countries in about 1960. Even if we exclude the United Kingdom, whose industrial revolution was then already some 70-90 years old, continental Europe's per capita GNP stood at some 230 dollars in 1830 (see table 2) and 190-200 dollars in 1800. The figure of 190-200 dollars can be taken as typifying pre-industrial Europe of the XVIIIth century. Asian and African GNP per capita in 1960 was around 160 dollars (US dollars and prices of 1960) and below 150 in 1950.⁶ This means that Europe's GNP per capita before industrialization began was some 30 per cent higher than that of Asia and Africa around 1950 when those regions also began to attempt to industrialize.

Table 2 and 3 provide us with a regional breakdown of the figures presented in table 1. Those tables provide us with a preliminary indication of the wide regional differences in the rate of growth during the XIXth century. We will also deal with this problem in section B of this part where data on individual countries will be given.

If we restrict ourselves to the XIXth century, economic growth was very slow in Eastern Europe and even more so in the Mediterranean countries. In those countries the yearly increase of per capita GNP between 1830 and 1910 was 0.4 per cent. On the contrary growth was very rapid (in term of XIXth-century standards) in the Nordic countries, where the comparable rate of growth was 1.3 per cent. Most of this difference is in fact concentrated in the second half of the XIXth century. Between

⁵ For more on this problem, see P. BAIROCH, *Commerce extérieur et développement économique de l'Europe au XIXe siècle*, Mouton, Paris-La Haye, 1976.

⁶ See P. BAIROCH, *The Economic Development of the Third World since 1900*, (chapter 10 Macro-economic Data, pp. 172-193), Methuen, London, 1975.

TABLE 2

VOLUME OF TOTAL AND PER CAPITA GROSS NATIONAL PRODUCT
AT MARKET PRICES BY REGIONS

(in 1960 U.S. dollars and prices; three years annual average, except for 1913)

	1800	1830	1860	1870	1880	1890	1900	1910	1913
TOTAL GNP (millions \$)									
Total EUROPE	(40,870)	58,150	91,070	114,970	126,980	146,720	188,540	231,550	256,850
Continental Europe	(37,160)	(49,910)	75,000	95,340	103,420	117,280	152,260	190,990	212,770
Europe less Russia	(31,860)	47,600	76,670	92,090	103,730	125,540	156,530	187,720	204,430
Western Europe	(24,910)	38,910	63,670	76,440	86,060	102,810	126,900	150,550	163,780
Highly industrialized Europe	(16,150)	26,300	46,530	58,490	67,490	83,260	105,330	125,940	135,590
Early industrialized countries ^a	(10,120)	18,505	32,900	40,770	46,108	55,103	67,172	77,155	81,969
Later industrialized countries ^b	(11,875)	(15,358)	24,269	29,900	34,478	44,494	58,364	73,643	80,470
Nordic countries ^c	(1,008)	(1,385)	2,398	2,915	3,729	4,696	6,298	8,288	9,749
Russia, Romania, Bulgaria	(10,004)	(11,670)	15,824	24,486	24,961	23,338	34,670	47,120	56,130
Mediterranean countries ^d	(7,301)	(10,467)	(14,536)	15,458	16,237	17,542	20,210	23,251	27,139
PER CAPITA GNP (\$)									
Total Europe	(199)	240	310	359	366	388	455	499	534
Continental Europe	(196)	228	283	330	331	344	408	455	489
Europe less Russia	(209)	264	360	403	426	479	548	602	639
Western Europe	(213)	276	384	431	456	509	583	638	678
Highly industrialized Europe	(211)	278	414	484	519	599	696	760	800
Early industrialized countries ^a	(209)	298	454	527	573	649	746	807	846
Later industrialized countries ^b	(219)	(252)	328	373	391	461	540	606	641
Nordic countries ^c	(193)	(210)	273	308	354	416	505	604	692
Russia, Romania, Bulgaria	(170)	(171)	180	247	224	187	250	287	324
Mediterranean countries ^d	(203)	(259)	(309)	310	308	307	332	355	393

^a Belgium, France, Switzerland, United Kingdom.

^b Austria-Hungary, Germany, Netherlands.

^c Denmark, Finland, Norway, Sweden.

^d Greece, Italy, Portugal, Serbia, Spain.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

1860 and 1910 the per capita increase was 0.28 per cent for the Mediterranean countries and 1.60 per cent for the Nordic countries.

Over the entire XIXth century the countries which industrialized early experienced probably a more rapid growth (always expressed in term of per capita GNP), and this was mainly due to the gains achieved by those countries in the first part of this period. But during the latter part of the nineteenth century the "recently industrialized countries" experienced a higher rate of growth. Thus between 1880 and 1913 the yearly rates of growth were 1.2 and 1.5 per cent respectively.

Before turning to the data for individual countries, let us see to what extent our new series modify previous knowledge of the rate of growth of the European economy. Since the most complete

TABLE 3

ANNUAL RATE OF GROWTH OF GROSS NATIONAL PRODUCT
AND POPULATION

(benchmark years are three-year annual averages)

	Total G.N.P.		Population		G.N.P. Per Capita	
	1830-1910	1860-1910	1830-1910	1860-1910	1830-1910	1860-1910
TOTAL EUROPE	1.74	1.88	0.82	0.92	0.92	0.96
Continental Europe	1.69	1.89	0.82	0.92	0.87	0.96
Europe less Russia	1.73	1.81	0.69	0.77	1.04	1.03
Western Europe	1.71	1.74	0.65	0.71	1.05	1.00
Highly industrialized Europe	1.98	2.01	0.70	0.78	1.26	1.22
Early industrialized countries ^a	1.80	1.72	0.54	0.55	1.25	1.16
Later industrialized countries ^b	1.98	2.24	0.87	1.00	1.10	1.24
Nordic countries ^c	2.26	2.51	0.92	0.90	1.33	1.60
Russia, Romania, Bulgaria	(1.76)	2.21	(1.10)	1.25	(0.64)	0.94
Mediterranean countries ^d	(1.00)	(0.94)	(0.60)	0.67	(0.39)	(0.28)

^a Belgium, France, Switzerland, United Kingdom.^b Austria-Hungary, Germany, Netherlands.^c Denmark, Finland, Norway, Sweden.^d Greece, Italy, Portugal, Serbia, Spain.*Sources:* Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

of the previous series are those of Maddison, we shall compare our series with his. But this can be done only for Western Europe, and for the period 1870-1913. According to Maddison's data, the annual rate of growth of the volume of total GNP was 2.1 per cent. Between 1870 and 1913, our series show a rate of growth of only 1.8 per cent. In terms of the more significant per capita growth rate, the difference is obviously even more important: 1.4 and 1.1 per cent respectively or a 22 per cent slower rate of economic growth. The main reason for this important difference lies in the downward revision of some countries' estimates (especially the United Kingdom data where the recent estimates by Feinstein show an annual growth rate of GNP per capita, some 29 per cent lower than the figures used by Maddison). Our lower figures are also due to the inclusion of a number of countries which are excluded from Maddison's index, and which generally experienced slower growth than the rest of Western Europe (mainly Spain, Portugal, Austria-Hungary). Thus economic growth in the nineteenth century was even slower than has been believed hitherto.

A 2) Volume of total and per capita GNP by country

Table 4 shows the evolution of the volume of total GNP for 19 major European countries.⁷ Despite her very low per capita GNP, for most of the nineteenth century Russia is the country with the biggest volume of GNP. But the United Kingdom's level is very close to that of Russia, and each of those countries represent between 14 and 18 per cent of Europe's total GNP. The relative share of the United Kingdom increased between 1800 and 1890, passing from some 9 per cent of Europe's total GNP to a maximum of 20.1 per cent for 1890 and falling back to 17.1 per cent in 1913. For the year 1700, if we postulate for the United Kingdom a per capita GNP 5 per cent higher than the European average, so

TABLE 4

VOLUME OF TOTAL GROSS NATIONAL PRODUCT AT MARKET PRICES

(in 1960 U.S. dollars and prices; three-year annual averages, except for 1913; territories of each period; figures in million dollars)

	1830	1840	1850	1860	1870 *	1880	1890	1900	1910	1913
Austria-Hungary	(7,210)	(8,315)	(9,190)	(9,996)	(11,380)	(12,297)	(15,380)	(19,400)	(23,970)	(26,050)
Belgium	(1,098)	(1,397)	1,809	2,302	2,882	3,256	3,804	4,800	6,308	6,794
Bulgaria	—	—	—	(388)	(616)	(611)	(908)	(970)	(1,165)	(1,260)
Denmark	(256)	(292)	(361)	476	612	788	1,095	1,544	2,031	2,421
Finland	(256)	(295)	(370)	(420)	(559)	(670)	(860)	(1,110)	(1,395)	(1,670)
France	8,582	10,335	11,870	13,328	(16,800)	17,381	19,758	23,300	26,869	27,401
Germany	(7,235)	(8,320)	10,395	12,771	16,697	19,993	26,454	35,800	45,523	49,760
Greece	—	(200)	(220)	(250)	(365)	(440)	(640)	(780)	(910)	(1,540)
Italy	(5,570)	(5,951)	(6,666)	7,466	8,275	8,745	9,435	10,820	12,598	15,624
Netherlands	(913)	(1,105)	1,318	1,502	1,823	2,188	2,660	3,164	4,150	4,660
Norway	(316)	(378)	(490)	642	728	886	1,041	1,286	1,601	1,834
Portugal	(860)	(945)	(985)	(1,100)	(1,175)	(1,270)	(1,360)	(1,550)	(1,710)	(1,800)
Romania	—	—	(760)	(836)	(950)	(1,100)	(1,350)	(1,700)	(2,125)	(2,450)
Russia	(10,550)	(11,200)	(12,700)	14,400	22,920	25,250	21,180	32,000	43,830	52,420
Serbia	—	—	—	(320)	(345)	(382)	(432)	(560)	(700)	(725)
Spain	(3,600)	(4,150)	(4,700)	(5,400)	(5,500)	(5,400)	(5,675)	(6,500)	7,333	7,450
Sweden	(577)	(617)	(729)	860	1,025	1,385	1,700	2,358	3,261	3,824
Switzerland	(580)	(700)	(930)	(1,200)	(1,460)	(1,920)	(2,100)	2,599	3,355	3,700
United Kingdom	8,245	10,431	12,591	16,072	19,628	23,551	29,441	36,273	40,623	44,074
EUROPE ^b	58,152	66,997	77,937	91,073	114,966	126,975	146,723	188,534	231,550	256,845

* For Germany and France: pre 1871 boundaries.

^b Including countries for which no figures are reported and small territories not listed above.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

⁷ Countries or territories of less than 100,000 inhabitants (in 1913) have been omitted.

that this country's share of Europe's GNP would have been around 8 per cent.

It is obvious that by itself the volume of total GNP has no important significance, and that the volume of GNP is not by itself the expression of the economic strength of a nation. In terms of total GNP China was probably until 1880-1900 the most important country. By this period, she was overtaken by the United States, which had overtaken Russia in about 1870. In statistical terms, restricting ourselves to GNP data, it is probable that one possible measure of the economic strength of a nation could be found in a formula combining per capita and total GNP.

Returning to Europe we can see that even inside that continent itself shifting of position and overtaking was a fairly common phenomenon. This results from often important differences in the rate of economic growth and, in some cases, from differences in the rate of demographic growth (for growth rates see table 5). The most important European countries are ranked below in order of their total GNP; with their share of European total GNP in parentheses.

1830	1913
1) Russia (18,1%)	1) Russia (20.4%)
2) France (14.8%)	2) Germany (19.4%)
3) United Kingdom (14.2%)	3) United Kingdom (17.2%)
4) Germany (12.5%)	4) France (10.7%)
5) Austria-Hungary (12.4%)	5) Austria-Hungary (10.1%)
6) Italy (9.6%)	6) Italy (6.1%)
7) Spain (6.2%)	7) Spain (2.9%)

This list confirms what we have noted in the previous section about the shift to the North of the economic centre of gravity of Europe. And this shift is also valid for the smaller European countries, as can be seen from the growth rates of the different countries (see table 5) to which we shall come back later.

Before comparing different countries' rates of growth, it is worth drawing the reader's attention to the fact that international comparisons in this field must take into account the relative lack of homogeneity in the various estimates. The method used in the

TABLE 5

ANNUAL RATE OF GROWTH OF GROSS NATIONAL PRODUCT
AND POPULATION

(benchmark years are three-year annual averages)

	Total G.N.P. *		Population *		G.N.P. Per capita	
	1830-1910	1860-1910	1830-1910	1860-1910	1830-1910	1860-1910
Austria-Hungary	(1.51)	(1.76)	0.72	0.78	(0.79)	(0.98)
Belgium	2.21	2.04	0.86	0.91	1.34	1.12
Bulgaria	—	(1.38)	—	0.87	—	(0.50)
Denmark	2.62	2.94	1.01	1.06	1.60	1.86
Finland	(2.14)	(2.43)	1.03	1.16	(1.10)	(1.26)
France	1.44	1.41	0.25	0.16	1.18	1.25
Germany	2.33	2.57	0.98	1.17	1.33	1.39
Greece	(1.98)	(2.62)	(1.30)	1.92	(0.67)	(0.69)
Italy	1.03	1.05	0.62	0.66	0.40	0.39
Netherlands	1.91	2.05	1.01	1.15	0.89	0.89
Norway	2.05	1.84	0.94	0.80	1.10	1.04
Portugal	(0.86)	(0.89)	0.67	0.77	(0.19)	(0.11)
Romania	—	(1.88)	—	1.02	—	(0.86)
Russia	(1.80)	2.25	(1.13)	1.27	(0.66)	0.96
Serbia	—	1.58	—	1.08	—	0.50
Spain	(0.89)	(0.61)	(0.46)	0.48	(0.43)	(0.13)
Sweden	2.23	2.70	0.82	0.73	1.40	1.96
Switzerland	(2.22)	2.08	0.73	0.81	(1.48)	1.25
United Kingdom	(2.01)	1.87	0.80	0.89	1.21	0.97
EUROPE	1.74	1.88	0.82	0.92	0.92	0.96

* Total annual increase including effects of territorial changes.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

reconstruction of past GNP data is not always uniform, and international price structures can be very divergent. For these reasons the margin of error in the data should be taken into account, so that in some, rather exceptional, cases a difference of even some 40 per cent between growth rates may result from opposite biases in the data. If we restrict ourselves to the period 1860-1910, when the data are more reliable, we can divide the European countries into three groups according to their per capita GNP growth. The first group, whose per capita rate of growth exceeded the European average by at least 15% is made up of 6 countries: Sweden (2.0% growth rate); Denmark (1.9%); Germany (1.4%); Switzerland and France (1.3%); and probably

Finland whose growth rate was probably around 1.1 - 1.4%. The second group of countries, which had a rate of growth less than 15 per cent above or below the European average, includes 7 countries: Belgium (1.1%); Norway, United Kingdom, Russia and Austria-Hungary (1.0%); Netherlands (0.9%); and probably Romania (0.9%). The 6 remaining countries experienced a rate of growth at least 15 per cent below the European average: Italy (0.4%); Bulgaria, Greece and Serbia where the rate of growth was in the neighbourhood of 0.5% and Spain and Portugal whose rate of per capita growth was probably only around 0.1 per cent.

For Portugal, the combination of a low rate of economic growth and slow population increase led to the sharpest decline for any country in its share of the European total GNP. Around 1800 it is probable that Portugal accounted for some 2.0 per cent of Europe's GNP (compared with probably 3 per cent around 1700). In 1860 this share was no more than 1.2 per cent and in 1913 0.7 per cent. On the other hand, another small country, Denmark, thanks to the combination of rapid population and economic growth, saw her share increase the most rapidly (0.4 per cent around 1800, 0.5 in 1860 and 0.9 per cent in 1913). The interesting fact is that both countries were, to a large extent, what we call "complementary economies" to that of the United Kingdom.

And since we are dealing with small countries it should be noted that, in general, their economic growth in the XIXth century was more rapid than in the larger ones. Per capita GNP in the small countries increased by 1.0 per cent annually from 1830 to 1910 (1.1 per cent for the period 1860-1910) compared to 0.9 per cent for the larger countries (0.9 per cent for the period 1860-1910). Among the small countries, those who followed a policy of complementarity with the United Kingdom (Denmark, Finland, Norway, Portugal), experienced much slower growth than those small countries that followed a policy of industrial competition (Belgium, Switzerland and Sweden). For the period 1860-1910 (for which the data are more reliable) per capita GNP of complementary small countries increased by 0.8 per cent per annum against 1.4 per cent for the competing countries.

The comparison made in table 5 destroys a persisting myth: that of France's very slow economic growth. It is obvious that the figures are not really comparable, but even taking this into account, France still remains in the leading group. The probable reason for the creation of this myth is the combination of three elements: very slow demographic growth (the slowest in Europe and for any developed country), a fact which is very often overlooked in international comparisons; the early start of France's industrialization when compared to other big European continental countries; and finally the fact that while France's industrial growth has been a little slower than that of countries like Germany, her agricultural production has increased more rapidly. And this has an important impact on international comparisons since those are more often based on industrial data which are generally more early available. In addition, it should not be forgotten that in 1871 France lost Alsace-Lorraine, which was among her most developed regions, to her major competitor.

There appears to be no significant correlation between the rate of population growth and that of per capita GNP. For the period 1860-1913, for which the data are more reliable, the coefficient of correlation between those two variables is 0.156 (0.256 if the calculation is limited to 13 countries for which the data have a lower margin of error).

The United Kingdom remained throughout the XIXth century the country with the highest per capita GNP. But, especially after 1880-1890, a small group of countries were closing the gap rapidly. This is the case of Denmark, Switzerland, Belgium and Germany. But, if the United Kingdom remained until 1913 the country whose GNP per capita was probably the highest in Europe, she had lost this place in world terms by about 1870-1880 when the United States overtook her. Somewhere between 1890-1900, the United Kingdom ceded second place to Canada. On the eve of the first World War, the per capita GNP in the United States was some 40 per cent higher than in the United Kingdom. Inside continental Europe there were more cases of a country overtaking another in terms of per capita GNP than of total GNP.

TABLE 6

VOLUME OF PER CAPITA GROSS NATIONAL PRODUCT BY COUNTRIES
(in 1960 U.S. dollars and prices; three-year annual averages, except for 1913)

	1830	1840	1850	1860	1870*	1880	1890	1900	1910	1913
Austria-Hungary	(250)	(266)	(283)	(288)	(305)	(315)	(361)	(414)	(469)	(498)
Belgium	(295)	(345)	411	490	571	589	630	721	854	894
Bulgaria	—	—	—	(210)	(220)	(210)	(250)	(260)	(270)	(263)
Denmark	(208)	(225)	(256)	294	340	396	502	633	739	862
Finland	(188)	(205)	(227)	(241)	(313)	(327)	(368)	(425)	(451)	(520)
France	264	302	333	365	(437)	464	515	604	680	689
Germany	(245)	(267)	308	354	426	443	537	639	705	743
Greece	—	(200)	(215)	(230)	(250)	(260)	(290)	(300)	(325)	(322)
Italy	(265)	(270)	(277)	301	312	311	311	335	366	441
Netherlands	(347)	(382)	427	452	506	542	586	614	705	754
Norway	(280)	(305)	(350)	401	421	464	523	577	673	749
Portugal	(250)	(255)	(260)	(275)	(270)	(270)	(270)	(287)	(290)	(292)
Romania	—	—	(190)	(200)	(210)	(230)	(246)	(275)	(307)	(336)
Russia	(170)	(170)	(175)	178	250	224	182	248	287	326
Serbia	—	—	—	(220)	(230)	(240)	(250)	(260)	(282)	(284)
Spain	(263)	(288)	(313)	(346)	(329)	(323)	(321)	(351)	370	367
Sweden	(194)	(198)	(211)	225	246	303	356	454	593	680
Switzerland	(276)	(315)	(391)	(480)	(549)	(676)	(705)	785	895	964
United Kingdom	346	394	458	558	628	680	785	881	904	965
EUROPE	240	260	283	310	359	366	388	455	499	534

* For Germany and France: pre 1871 boundaries.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

But the most important trend in this respect is the strong increase in the inequality of the inter-European distribution of income, since generally the poorest countries experienced the slowest rates of growth. At the beginning of the XIXth century the three "richest" countries had an average GNP per capita some 45 per cent above that of the three "poorest", for 1860 this gap has increased to about 160 per cent, and by 1913 it stood at some 240 per cent. The three "richest" countries around 1800 were probably the United Kingdom and two out of the following four countries: the Netherlands (including Belgium), Switzerland, Portugal and France; in 1913 this group was formed by the United Kingdom, Switzerland and Belgium. In view of the margin of error of the data, Denmark with a GNP per capita 4 per cent below that of Belgium can also be included in this group. Portugal which was probably among the five richest countries around 1800 was among the three or four poorest in 1913.

TABLE 7

COEFFICIENT OF VARIATION OF PER CAPITA GROSS NATIONAL PRODUCT
AT CONSTANT PRICES FOR 19 EUROPEAN COUNTRIES

	Coefficient of variation (per cent)	Annuaire increase of the coefficient of variation (per cent)
1830	22.6	—
1840	25.8	1.34
1850	29.8	1.44
1860	34.6	1.51
1870	36.0	0.39
1880	39.4	0.90
1890	41.3	0.48
1900	41.7	0.09
1910	42.5	0.19
1913	43.3	0.58

In general the dispersion of national levels of income increased strongly during the nineteenth century. Table 7 shows the evolution of the coefficient of variation of the per capita GNP for 19 European countries between 1830 and 1913. The inequality of income distribution increases throughout this entire period. However, the decades 1860-1870 and 1870-1890 and 1890-1910 are in this respect more positive than the others.

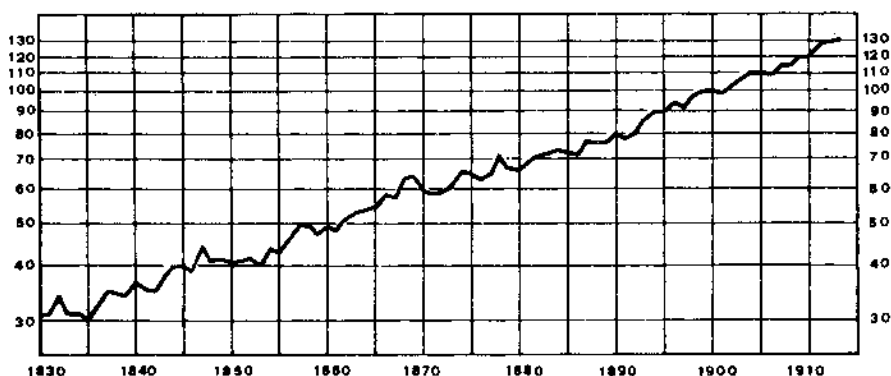
Together with this increase in the inequality of income levels inside Europe, it is obvious that the gap between the per capita GNP of Europe (and also the other developed regions) and that of the Third World countries increased rapidly during the XIXth century. From our still provisory figures for the Third World countries, in 1800 the per capita GNP of Europe was some 20 per cent higher than that of the Third World. By 1830 this gap had probably reached about 50 per cent. This gap began to exceed 100 per cent around 1860, and around 1900 it was close to 210 per cent, reaching even 240 per cent in 1913. Part of this increasing gap was due to a probable decline in the volume of per capita GNP in the Third World countries between 1800 and 1880-1900. Between 1890-1900 and 1910-13, there was probably a slight improvement in the situation.⁸ Around 1910-13 the gap

⁸ Figures for GNP of Third World countries in the XIXth century are taken from research which we have not yet entirely finalized, and which will probably be ready by the beginning of 1977.

between the three or four richest countries among the developed regions and that of Asia and Africa was about 1100-1200 per cent, or, in other terms, the gap was in the range of 1 to 12 or 1 to 13.

A 3) Annual data on the volume of total GNP 1830-1913

The statistical data on which graph 1 is based can be found in table 21 in the statistical appendix. We shall not revert here to the periodisation of European economic growth since we have dealt with this aspect in section A 1. The present analysis is restricted to the problem of short-term fluctuations in total GNP.



Graph 1. Annual Volume of Gross National Product of Europe: 1899-1901 = 100 (semi-logarithmic-scale)

As might be expected, economic growth becomes more stable as we progress into the nineteenth century. The variance in annual growth rates becomes gradually smaller (see table 8) but this evolution is not regular, the 1830's being notably more stable than the 1840's which is strongly affected by the sharp fluctuation of the years 1839-1843 and 1846-1849. The gradual and relatively important attenuations of the economic fluctuation is largely due to the decrease in the relative importance of agricultural production in total GNP and the rise in the relative importance of the service

sector. By its nature agricultural production is very unstable, where on the contrary the service sector is very stable.⁹ Without going into much detail, since this is a problem which lies outside the scope of this article (and which we expect to deal with more thoroughly in a later study), it is worth noting here that besides the diminishing role of agriculture in total production, agriculture itself also became, for a large number of reasons, more stable during the nineteenth century. In France the variance of the annual growth rates in the volume of gross agricultural production is as follows: 1834-53: 73.4; 1854-73: 125.4; 1874-93: 76.4 and 1894-1913: 53.5. The decrease is stronger in Germany: 1854-73: 24.1; 1874-93: 20.9; and 1893-1919: 8.8. For the United Kingdom it is more irregular: 1856-74: 7.4; 1874-93: 65.0; 1894-1913: 15.8.

TABLE 8

VARIANCE OF THE ANNUAL GROWTH RATE IN THE VOLUME OF TOTAL GROSS NATIONAL PRODUCT

	Ten-year periods from 01 to 00	Ten-year periods from 06 to 05	Average of the two periods
<i>France - United Kingdom</i>			
1831-40 or 1836-45	29.25	16.87	23.06
1841-50 or 1846-55	47.98	51.53	49.76
1851-60 or 1856-65	26.30	20.21	23.26
1861-70 or 1866-75	24.43	24.43	24.43
<i>Belgium - France Germany</i>			
<i>United Kingdom</i>			
1851-60 or 1856-65	22.39	16.05	19.22
1861-70 or 1866-75	17.06	15.17	16.12
1871-80 or 1876-85	10.72	7.54	9.13
<i>Europe less Russia</i>			
1861-70 or 1866-75	14.52	14.16	14.34
1871-80 or 1876-85	7.11	4.67	5.89
1881-90 or 1886-95	4.28	4.38	4.33
1891-00 or 1896-05	4.05	4.46	4.25
1901-10 or 1904-13	5.92	5.43	5.67

⁹ On these problems, although based on rather older series, see P. BAIROCH, *Le Rôle du tertiaire dans l'atténuation des fluctuations économiques*, in « *Revue d'Economie Politique* », N. 1, 1968 (pp. 1-49).

In table 8, in order to have a better indication of the changes in the stability (or instability) of the curve of the volume of total GNP, we have calculated the variance of annual growth rates for homogeneous regions which overlap in time.¹⁰ If we link those variances, we obtain the following probable evolution for Europe (less Russia)

1831-40 - 1836-45	17.0	1871-80 - 1876-85	5.9
1841-50 - 1846-55	36.6	1881-90 - 1886-95	4.3
1851-60 - 1856-65	17.1	1891-00 - 1896-05	4.3
1861-70 - 1866-75	14.3	1901-10 - 1904-13	5.7

PART B - EUROPE'S GROSS NATIONAL PRODUCT 1913-1950

Since the data we shall give here are largely the result of personal computations and research, and therefore contain a number of new series, we have decided to present the data in more detail than those for the period 1950-1975. Another reason beyond those mentioned in the general introduction for not analyzing the 1913-1950 data together with those of the XIXth century lies in the exceptional characteristics of this 37 year period of which some 28 at least can be considered as "abnormal". Indeed the two world wars affected the European economy to an extent that bears no comparison to any war of the XIXth century, nor probably even with the Napoleonic wars of the beginning of the XIXth century.¹¹ To those 12 years of war another 6 to 8 years can be added as the period of reconstruction. The 9 depression years between 1930 and 1938 are also without parallel as far as post-industrial revolution economic history is concerned. To those 27/29 years, the 2-3 years of hyper-inflation (1922-24) could also be added.

Part B contains two sections, but we shall begin with the

¹⁰ This was preferable, since our index for Europe is based on a varying number of countries according to the periods.

¹¹ Two years after the end of military hostilities, the volume of Europe's GNP was 21 per cent below the level achieved in the year preceding those hostilities in the case of the first World War and in the case of the Second World War 18 per cent below, and 0.3 per cent above in the case of the 1870-71 war (in this last case, on the basis of the GNP of continental Europe less Russia).

annual data in view of the sharp short-term fluctuations. Section B 2 will deal with the volume of total and per capita GNP by country. Data on the current value of GNP for this period is given in table 20 of the statistical appendix together with the XIXth century and the 1950-1973 data. Data by region will be presented in part C (section 1).

B 1) Annual data on the volume of European GNP 1913-1950

As in the case of our XIXth century annual data, the annual figures have been adjusted on the basis of the more complete data which we have calculated for particular years. But the adjustments have been very slight, since the 16 countries on which the annual index has been based represent some 91 per cent of total European GNP. (See methodological appendix). Table 9 gives the data for Europe, and for Europe excluding the USSR, since this country's evolution has been very divergent from the rest of Europe — a divergence which is obviously linked directly or indirectly to the new economic regime which this country adopted in October 1917. For this reason we shall restrict our analysis to this last series (i.e. Europe less USSR) and it should be noted that both for 1913 and 1946-50 the USSR territorial definition is here the one relevant to the 1920-1938 period.

The major characteristics of the 1913-1950 period are the sharp fluctuations and the over-all low rate of growth. If we take 1913-1946, the period covering the two wars and the 1929 depression, the annual rate of growth in the volume of the GNP of Europe (less the USSR) is only 0.57 per cent. Since population increased between those two dates by some 0.5 per cent per year, per capita growth is almost nil for those 33 years as a whole compared to 1.2 per cent for the 33 years preceding 1913, and close to 5.0 per cent for the 29 years following 1946. Even if we take the 1913-1950 period, the annual per capita increase is only 0.5 per cent.

The instability was mainly due to the economic impact of the wars. At the end of both world wars, the volume of total GNP was some 25 per cent below that achieved immediately before

YEARLY DATA ON THE VOLUME
OF EUROPEAN GROSS NATIONAL PRODUCT AT MARKET PRICES
(territorial definition from 1920-1939 period)

	Europe			Europe less USSR		
	in millions of 1960 \$	1899-1901 = 100	annual rate of variation %	in millions of 1960 \$	1899-1901 = 100	annual rate of variation %
1913	256,840	136.2	—	213,380	131.7	
1920	202,620	107.5	— 3.33 ^a	181,140	111.8	— 2.31 ^a
1921	203,520	107.9	0.44	181,780	112.2	0.35
1922	216,190	114.7	6.23	192,780	119.0	6.05
1923	220,240	116.8	1.88	195,460	120.7	1.39
1924	239,860	127.2	8.91	212,830	131.4	8.89
1925	257,430	136.5	7.33	224,830	138.8	5.64
1926	265,180	140.7	3.01	228,920	141.3	1.82
1927	279,950	148.5	5.57	241,930	149.3	5.68
1928	292,540	155.2	0.03	249,040	153.7	2.93
1929	298,960	158.6	2.20	254,160	156.9	2.06
1930	297,350	157.7	— 0.54	249,560	154.0	— 1.81
1931	287,420	152.5	— 3.34	235,710	145.5	— 5.55
1932	285,600	151.5	— 0.63	230,130	142.1	— 2.36
1933	294,080	156.0	2.97	240,080	148.2	4.32
1934	307,040	162.9	4.41	250,090	154.4	4.17
1935	324,230	172.0	5.60	263,160	162.4	5.22
1936	345,660	183.3	6.61	275,480	170.1	4.68
1937	362,850	192.5	4.97	291,120	179.7	5.67
1938	376,950	199.9	3.88	300,980	185.8	3.39
1939	397,700	210.9	5.50	318,640	196.7	5.87
1946	301,870	160.1	— 3.86 ^a	257,180	158.8	— 3.02 ^a
1947	325,880	172.8	7.95	268,870	166.0	4.55
1948	359,950	190.9	10.45	287,900	177.7	7.08
1949	390,380	207.1	8.45	309,600	191.1	7.54
1950	428,000	227.0	9.64	333,260	205.7	7.64

^a Not over the preceding calendar year but over the preceding year in the table.
Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error.

the war (from the Europe-less-USSR data). For all Europe, this decline was stronger (some 30 per cent) for the First World War than for the Second (some 27 per cent). Reverting back to Europe-less-USSR data, we can see that the recovery was much more rapid after the Second World War than after the First. It took some 5-6 years to regain the pre-1914 level and only four years to regain the pre-1940 level. The large amount of aid provided, together with the absence of war reparations, are probably the main reasons for this difference.

Apart from the effects of the two wars, the instability of this period was also due to the 1929 depression, since the 1921-1930 decade is not much more unstable than the pre-1913 decades. The variance for 1921-1929 annual growth rates is 7.91. But for the period 1926-1935 this variance reaches 11.82 which is the highest rate of instability since the period 1860-1913 (see section A 3 and Table 8).

As far as the post-1929 depression is concerned, for Europe (excluding the USSR which was not touched by it), the lowest annual level was reached in 1932 with a volume of GNP 9.0 per cent below that of 1929. But this decrease does not show the real amplitude of the decline, since for a number of countries the highest level in volume of GNP was reached before or after 1929 (i.e. 1928, 1930 or even 1931) and the lowest in some cases before or after 1932 (1931, 1933, 1934 or even 1935). For these reasons, the European figures, as such, cannot be compared to those of the United States where the dip was of some 31 per cent between 1929 and 1933.¹² In order to provide a better measure of the extent of the depression, we have calculated a weighted average of the decline for individual countries regardless of the period involved. In this case, the drop is of 12.3 per cent for Europe (excluding the USSR) and of 14.5 per cent for the industrialized countries of Europe.¹³ If we exclude the United Kingdom whose 1929 level was very low, the decrease reaches 18.2 per cent.¹⁴

¹² According to the series used, this decline ranges from 28.7 to 33.0 per cent. See U.S. Bureau of Economic Analysis, *Long Term Economic Growth 1860-70*, Washington D.C., 1973, pp. 183.

¹³ In this case Belgium, Czechoslovakia, France, Germany, Sweden, Switzerland and the United Kingdom.

¹⁴ For the countries for which the volume GNP figures are relatively good, the periods from peak to trough and the percentage decline of the volume of total GNP are as follows (in %):

Austria	1929-1933:	22.5	Netherlands	1930-1934:	13.0
Belgium	1928-1932:	16.4	Norway	1930-1931:	7.9
Czechoslovakia	1929-1935:	18.2	Sweden	1930-1932:	11.9
Denmark	1931-1932:	4.5	Switzerland	1930-1932:	6.0
France	1929-1933:	17.4	United Kingdom	1929-1931:	5.8
Italy	1929-1930:	3.9			

The 1929 depression was not only the worst since at least the beginning of the XIXth century, but also the longest. It was not until 1935 that Europe regained her 1929 volume of GNP. In previous recessions and in the recessions following the Second World War, it never took more than 2-3 years to regain the level of the peak year, but for the 1929 depression, it took, as we have seen, 6 years to regain this level. But contrary to the impression given by the general literature on the depression, economic growth was fairly rapid even after the 1929 level had been achieved again. Thus between 1934 and 1938 total GNP increased by 4.7 per cent per year.

This leads us to a more general remark about the pace of economic growth during this period. It is obvious that the slow growth in the period 1913-1946, or even 1913-1950, is due to the effects of two wars and to the amplitude of the 1930s depression. But if we exclude those periods, we see that economic growth has been very rapid compared to the pre-1913 tempo. For the two periods of 1920-1929 and 1934-1938 taken together, we find a yearly 4.1 per cent increase for the total GNP of Europe (less USSR) which means a 3.2 per cent per capita increase. In the nineteenth century the most rapid increase during a 10-year period was that of the 1903-1913 period, with a per capita annual increase of GNP of 1.5 per cent.

*B 2) Volume of total and per capita GNP by individual countries:
1913-1950.*

We have concentrated our computations and estimates by countries on a number of indicative years chosen either by criteria of the economic significance of those years or on the ground of the availability of other macro-economic data with which readers may want to compare the GNP data. All the data used in this section are based on 1920-1938 territorial definitions of the countries. And this also applies to the 1913 and 1950 figures given here. The number of countries for which data are provided is increased from 19 to 24 due to the creation of new states. Since the very short-term features of evolution in this period have been dealt in

TABLE 10

VOLUME OF TOTAL GROSS NATIONAL PRODUCT AT MARKET PRICES
(in 1960 U.S. dollars and prices; national boundaries of 1919-1938 even for 1913 and 1950)

	1913	1925	1928	1929	1933	1937	1938	1950
Austria	4,564	4,314	4,750	4,799	3,728	4,150	(4,320)	5,005
Baltic countries	—	(2,298)	(2,500)	(2,527)	(2,457)	(2,705)	(2,760)	—
Belgium	6,848	7,658	9,088	8,822	7,856	8,789	8,501	10,086
Bulgaria	(1,150)	(1,613)	(1,780)	(1,731)	(1,609)	(2,468)	(2,628)	(3,070)
Czechoslovakia	(4,323)	(6,822)	(7,950)	(8,171)	(7,119)	(8,040)	(8,050)	(9,720)
Denmark	2,566	2,893	3,254	3,326	3,498	3,929	3,947	5,454
Finland	(1,670)	1,910	2,100	2,022	(2,350)	3,281	3,339	4,117
France	29,030	36,262	37,226	40,508	35,450	39,536	39,284	47,454
Germany	45,850	45,002	53,077	49,876	47,282	69,428	77,178	(64,000)
Greece	(1,890)	(2,340)	(2,500)	(2,450)	(3,350)	(4,100)	(4,200)	3,371
Hungary	(2,876)	(3,025)	(3,440)	(3,643)	(3,506)	(4,080)	(4,157)	(5,230)
Ireland	(1,900)	(1,862)	(1,936)	(1,946)	(1,862)	(1,890)	(1,907)	2,209
Italy	16,242	18,510	20,019	20,641	20,345	23,485	23,701	28,167
Netherlands	4,660	6,696	7,653	7,845	6,205	7,954	7,987	10,304
Norway	1,834	2,370	2,670	2,887	3,071	3,727	3,812	5,403
Poland	—	(7,325)	(10,570)	(10,877)	(10,887)	(12,515)	(12,885)	—
Portugal	(1,800)	(2,046)	(2,098)	(2,150)	(2,807)	(2,600)	(2,634)	3,220
Romania	—	(5,123)	(5,750)	(5,830)	(5,527)	(6,380)	(6,780)	—
Spain	7,450	9,498	9,459	10,567	9,722	9,150	8,511	10,219
Sweden	3,824	4,627	5,061	5,484	5,060	6,662	6,908	12,067
Switzerland	3,700	(4,300)	(4,900)	5,139	5,036	5,062	5,063	6,415
United Kingdom	42,175	43,700	46,035	47,398	46,299	55,444	56,103	68,032
USSR	(43,450)	32,600	43,500	(44,800)	(54,000)	(71,732)	(75,964)	(95,800)
Yugoslavia	(3,465)	(3,870)	(4,400)	(4,631)	(4,195)	(4,862)	(5,221)	(5,720)
EUROPE	256,845	257,434	292,540	298,964	294,081	362,854	376,947	428,000

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

the previous section, we shall limit ourselves here to the 1913-1929 and 1929-1938 periods.

In the period 1913-1929 overall economic growth was very unequal. The rather slow growth for Europe as a whole was mainly due to the very poor performance of three out of the four major economic powers: Germany, the United Kingdom and the USSR. These three countries taken together experienced practically a zero rate of per capita growth. If we exclude them, for the rest of Europe growth was quite rapid: 0.85 per cent in per capita terms, which is close to the rate achieved in the XIXth century. As a general rule (but there are numerous exceptions) countries with a slow rate of growth during the 1913-1929 period experienced a rapid rate of growth during the 1929-1938 period, so that for the entire 1913-1938 period the dispersion of the rate of growth for individual countries is much smaller than for the

TABLE 11

ANNUAL GROWTH RATES IN THE VOLUME OF TOTAL AND PER CAPITA
GROSS NATIONAL PRODUCT

	TOTAL Gross National Product			Gross Nat. Prod. PER CAPITA		
	1913-29	1929-38	1913-38	1913-29	1929-38	1913-38
Austria	0.31	— 1.16	— 0.22	0.35	— 1.31	— 0.25
Baltic countries	—	0.98	—	—	0.75	—
Belgium	1.60	— 0.41	0.87	1.30	— 0.87	0.51
Bulgaria	(2.59)	(4.75)	(3.36)	(0.95)	(3.60)	(1.89)
Czechoslovakia	4.06	— 0.16	2.51	0.70	— 0.74	0.18
Denmark	1.63	1.92	1.74	0.58	1.12	0.77
Finland	1.20	5.73	2.81	0.79	4.97	2.28
France	2.10	— 0.34	1.22	2.19	— 0.53	1.20
Germany	0.52	4.97	2.10	0.11	4.30	1.60
Greece	(1.64)	(6.17)	(3.25)	(1.21)	(4.70)	(2.45)
Hungary	1.49	1.42	1.46	0.83	0.69	0.78
Ireland	0.15	— 0.22	0.01	0.51	— 0.22	0.24
Italy	1.51	1.54	1.52	0.99	0.73	0.89
Netherlands	3.31	0.20	2.18	1.83	— 1.02	0.80
Norway	2.88	3.14	2.97	2.03	2.57	2.22
Poland	—	1.90	—	—	0.67	—
Portugal	(1.12)	(2.28)	(1.53)	(0.58)	(1.02)	(0.74)
Romania	—	(1.69)	—	—	(0.42)	—
Spain	2.21	— 2.38	0.53	1.35	— 3.29	— 0.35
Sweden	2.23	2.60	2.39	1.74	2.25	1.93
Switzerland	2.07	— 0.17	1.26	1.71	— 0.54	0.90
United Kingdom	0.73	1.89	1.15	0.26	1.45	0.68
USSR	0.19	6.04	2.26	— 0.66	5.09	1.37
Yugoslavia	1.83	1.34	1.65	1.15	0.06	0.72
EUROPE	0.95	2.61	1.55	0.42	1.81	0.92

Sources: See tables.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

1929-1938 period. The coefficient of variation of the per capita growth rate is 204 per cent for the 1929-1938 period and 78 per cent for the 1913-1938 period.

It is worth noting that during the 1929-1938 depression the fascist economies were not the only ones with a favourable performance as far as economic growth is concerned. For the 1929-1938 period (see table 11) two or three countries (excluding the USSR) had a rate of growth close to or above that of Germany and eleven countries (excluding the USSR and Portugal) had a

rate of growth close to or above that of Italy. Taking the period 1913-1938, we can see that Germany ranked only sixth as far as growth performance is concerned and Italy ninth (out of 21 European countries for which we have data for this period). Among the big European countries, the United Kingdom had the slowest growth rate during the 1913-1938 period. And since this country was the "richest" in 1913, the United Kingdom's favourable rank in terms of per capita GNP changed drastically during this period (see Table 12). In 1913 only one country had a per capita GNP within 10 per cent of that of the United Kingdom; in 1938 four countries were in such a position.

TABLE 12
VOLUME OF PER CAPITA GROSS NATIONAL PRODUCT IN CURRENT PRICES
(in 1960 U.S. dollars and prices; national boundaries of 1919-1938 even for 1913 and 1950)

	1913	1925	1929	1933	1938	1950
Austria	681	655	720	553	(640)	721
Baltic countries	—	(443)	(468)	(451)	(501)	—
Belgium	894	985	1,098	952	1,015	1,167
Bulgaria	(263)	(304)	(306)	(270)	(420)	(423)
Czechoslovakia	(524)	(504)	(586)	(501)	(548)	(785)
Denmark	862	845	945	963	1,045	1,277
Finland	(520)	578	590	(666)	913	1,027
France	695	893	982	846	936	1,137
Germany	757	712	770	716	1,126	(834)
Greece	(322)	(393)	(390)	(506)	(590)	445
Hungary	(372)	(365)	(424)	(396)	(451)	(560)
Ireland	(611)	(624)	(662)	(629)	(649)	744
Italy	441	480	517	492	551	590
Netherlands	754	909	1,008	753	920	1,019
Norway	749	863	1,033	1,075	1,298	1,652
Poland	—	(245)	(350)	(332)	(372)	—
Portugal	(292)	(320)	(320)	(398)	(351)	383
Romania	—	(316)	(331)	(296)	(343)	—
Spain	367	426	455	403	337	367
Sweden	680	765	897	816	1,097	1,712
Switzerland	963	(1,020)	1,265	1,223	1,204	1,368
United Kingdom	996	970	1,038	995	1,181	1,352
USSR	(326)	232	(293)	(340)	(458)	(585)
Yugoslavia	(284)	(302)	(341)	(292)	(339)	(350)
EUROPE	534	515	571	543	671	749

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

Despite this and other relative changes, inequality of per capita GNP increased during this period, although this increase was moderate. The coefficient of variation for the 21 European countries' per capita GNP which stood at 41.5 per cent in 1913 passed to 43.5 per cent in 1938, that is a 0.19 per cent yearly increase. This figure compares favourably with those of the XIXth century (see table 7) where on average the coefficient of variation increased by 0.79 per cent yearly between 1830 and 1913.

PART C - EUROPE'S GROSS NATIONAL PRODUCT 1800-1975

The main purpose of the last part of the text is to present and to analyse very briefly the long-term evolution of the volume of GNP. In some aspects, this part also serves as a summary of the two preceding parts. Section C 2 will be devoted to the annual volume data of the total GNP for Europe and Western Europe. Data for current values of total GNP by regions for the entire period 1800-1973 are given in table 20 in the statistical appendix.

C 1) Volume of total and per capita GNP by regions and individual countries 1800-1975

Even if this has become a commonplace, we shall begin with a few words about the exceptional characteristics of post-Second World War economic growth (see table 13). From 1946 to 1975 the annual increase of European GNP per capita has been 4.8 per cent. Even if we take the more normal period 1950-1973, we still have a 4.5 per cent growth rate. This 4.5 per cent has to be compared with a rate of 0.9 per cent for the period 1800-1913 and 0.9 per cent also for the 1913-1950 period. In fact, from the moment that per capita GNP reached its 1937 level (i.e. 1947) up to 1975, Europe's per capita GNP increased by some 250 per cent; while between 1800 and 1948 this increase was only about 225 per cent. In other words in Europe (and also more or less in the other developed countries) per capita GNP made more

progress in the last 28 years than the 150 years preceding those 28 years. If we postulate for the period 1750 to 1800 a 0.4 per cent yearly increase in per capita GNP (which is rather a high figure) this implies that in the last 28 years — that is roughly a generation — GNP per capita increased as much as in the preceding 175 years, or roughly six and a half generations.

TABLE 13

VOLUME OF EUROPEAN GROSS NATIONAL PRODUCT AT MARKET PRICES
(in 1960 U.S. dollars and prices; three-year annual averages for pre 1913 data)

	TOTAL Gross National Product			PER CAPITA Gross National Product		
	Billions 1960 \$	1899-1901 = 100	Annual rate of growth	1960 \$	1899-1901 = 100	Annual rate of growth
1800	(40.9)	(21.7)	—	(199)	(43.7)	—
1830	58.2	30.8	1.2	240	52.7	0.6
1860	91.1	48.3	1.5	310	68.1	0.9
1890	146.7	77.8	1.6	388	85.2	0.8
1900	188.5	100.0	2.5	455	100.0	1.6
1913	256.9	136.2	2.4	534	117.3	1.2
1920	202.6	107.5	— 3.3	422	92.8	— 3.3
1929	299.0	158.6	4.4	571	115.1	2.4
1938	376.9	199.9	2.6	671	123.5	1.8
1946	301.9	160.1	— 2.7	549	120.8	— 2.8
1950	428.0	227.0	9.1	749	164.5	8.0
1960	739.8	392.4	5.6	1,157	254.4	4.5
1970	1,283.3	680.6	5.7	1,828	401.8	4.7
1973	1,491.3	791.0	5.1	2,077	456.5	4.3
1975*	1,568.8	832.1	2.6	2,157	474.1	1.9

* Provisional figures, but with less than 0.3 per cent margin of error compared to final figures; based on data available in May 1976.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

For more detailed figures, for the 1800-1913 period: see table 1; for the 1913-1950 period: see table 9. The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures.

From the beginning of the XIXth century until 1975, the volume of total GNP has been multiplied some 38 times. On a yearly basis this means a 2.1 per cent increase. Europe in 1975 had an overall volume of GNP which was probably some ten times greater than that of the entire world in around 1800.¹⁵

¹⁵ Our provisional estimate for the entire world GNP around 1800 is 160 billion dollars. Our estimates for the world will be finalized around the beginning of 1977.

But since European population increased during this period from some 205 to 727 millions, or on average a 0.73 per cent annual increase, per capita GNP was by 1975 some eleven times higher than in 1800. So for the 1800-1975 period per capita GNP has increased by 1.4 per cent per year. And, as we have noted above, a great part of the increase has taken place the last 25-30 years. This also means that by to-day's standards XIXth century economic growth was very slow.

The very rapid economic growth in the last decades, since it has not been matched by a similar evolution in the Third World countries, has caused a sharp increase in the gap between the per capita incomes of Europe and of the Third World. We have seen at the end of section A 2 that in 1913 Europe's per capita GNP was probably 3.4 times higher than that of the Third World countries; around 1975 this figure has risen to 6 or 7 times, even if one excludes the probability that Third World GNP growth figures are overestimated.¹⁶

The very rapid increase in the per capita GNP of Europe, even if it does not imply a corresponding improvement in the real level of living, largely explains the profound and rapid changes in the social and economic structure we have witnessed since the beginning of the XIXth century and especially these last 30 years. It would have been very useful had we been able to attempt to assess how far this rapid increase in the per capita GNP has changed income distribution, but this is another problem which we cannot go into here. We shall restrict ourselves to the distribution by regions and countries.

Table 14 shows the long-term evolution of total and per capita GNP for the economic or geographical regions of contemporary importance. In cases where there have been significant territorial changes due to the wars, we have adjusted the figures so that in fact even pre-1950 data are related to post-1950 regions.

¹⁶ On this question see S. KUZNETS, *Problems in Comparing Recent Growth for Developed and less Developed Countries*, in «Economic Development and Cultural Change», vol. 20, n. 2, January 1972 (pp. 185-209).

TABLE 14

VOLUME TOTAL AND PER CAPITA GROSS NATIONAL PRODUCT
AT MARKET PRICES

(in 1960 U.S. dollars and prices; three-year annual averages for pre-1913 data)

	Europe	Western Europe	Continental Europe	Europe less the USSR ^a	Common Market ^b	Eastern Europe
TOTAL G.N.P.						
(millions \$)						
1800	(40,870)	(24,910)	(28,160)	(33,390)	(16,580)	(15,960)
1830	58,150	38,910	39,360	49,400	27,680	19,240
1860	91,070	63,670	75,000	79,130	46,460	27,400
1900	188,540	126,900	152,260	162,000	94,940	61,640
1913	256,840	163,780	212,770	213,380	121,590	93,060
1925	257,430	179,830	211,870	224,830	144,420	77,600
1929	298,960	200,510	249,620	254,160	160,230	98,450
1933	294,080	189,160	245,920	240,080	149,690	104,920
1938	376,950	231,560	318,940	300,980	187,350	145,390
1950	428,000	274,360	357,760	322,580	218,070	153,640
1960	739,810	441,120	648,570	538,660	352,720	298,690
1970	1,283,260	716,260	1,163,900	882,560	559,340	567,000
1973	1,491,290	815,860	1,358,820	1,019,910	633,186	675,430
PER CAPITA						
G.N.P. (dollars)						
1800	(199)	(213)	(196)	(206)	(207)	(180)
1830	240	276	228	257	282	(190)
1860	310	384	283	349	400	214
1900	455	583	408	534	625	314
1913	534	678	489	628	725	389
1925	515	710	469	626	791	315
1929	571	771	525	685	858	374
1933	543	707	500	628	782	384
1938	671	839	624	760	954	509
1950	749	909	690	787	1,014	569
1960	1,157	1,350	1,111	1,268	1,524	955
1970	1,828	2,023	1,809	1,923	2,224	1,630
1973	2,077	2,259	2,062	2,178	2,467	1,861

^a For pre 1925 data based on 1925 territorial definition of the USSR.

^b In its 1975 definition: Belgium, Denmark, France, Germany (Western), Ireland, Italy, Luxembourg, Netherlands and United Kingdom.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. For more detailed figures: for the 1800-1913 period see tables 2 and 3, for 1913-1950 period see table 9.

To analyse in detail and to compare the evolution of each of these regions would lead us well beyond the limits of the space within which we wish to restrict this study. We shall restrict ourselves to the two main political regions — Western and Eastern Europe. The gap between the per capita income of these two regions increased rapidly till the 1930's. Western Europe's per capita GNP which was some 60 per cent higher than that of Eastern Europe around 1830 was more than twice as high around 1925. But even by 1938 this gap had been reduced to some 65 per cent. At present (or more precisely by 1973) there was only a 20-30 per cent gap. However, the problem of the margin of error in the data should not be forgotten, and this is especially true in the case of the Eastern European national accounts data (see on and also the methodological appendix).

Tables 15 and 16 present two series of total GNP by countries. Table 15 is a summary of the preceding sections, since it gives data for the geographical definitions of each country during each of the periods shown in the table. Table 16 on the contrary gives the evolution of each country's GNP taking 1970 geographical boundaries as constant.

The main purpose of table 15 is to show the changes that occurred in the European distribution by country not only as they resulted from differences in economic growth rates, but also as a consequence of the territorial changes arising mainly from the two world wars. Leaving aside the total disappearance of Austria-Hungary as a major country, the main changes concern the United Kingdom and the USSR. The United Kingdom, mainly because of its slow growth during the period 1870-1875, saw her share in total European GNP decrease rapidly. In 1860 this country represented 17.6 per cent of Europe's GNP, in 1929 this share had fallen to 15.9 per cent, and to only 9.0 per cent in 1970 (and in 1973 to 9.6 per cent). The USSR which, due to her large population, has been throughout this period, the leading country in term of total GNP, saw this position strengthened especially after 1929 passing from 15 per cent of Europe's GNP at this time to some 25 per cent in 1950, some 32 per cent in 1973, and probably some 33 per cent in 1975.

TABLE 15

VOLUME OF TOTAL GROSS NATIONAL PRODUCT AT MARKET PRICES:
GEOGRAPHICAL BOUNDARIES AT THE DATES GIVEN
(in millions of 1960 U.S. dollars and prices)

	1830	1860	1913	1925	1950	1970
Austria				4,799	5,005	13,774
Hungary	(7,210)	(9,996)	26,050	(3,643)	(5,230)	(16,300)
Belgium	(1,098)	2,302	6,794	8,822	10,086	13,582
Bulgaria	—	(590)	(1,260)	(1,731)	(3,070)	(12,400)
Czechoslovakia	—	—	—	(8,171)	(9,720)	(31,000)
Denmark	(256)	476	2,421	3,326	5,454	12,200
France	8,582	13,326	27,401	40,508	47,454	134,299
Germany (west)					46,529	159,336
Germany (east)	7,235	12,771	49,760	49,876	(10,500)	(36,100)
Greece	—	(440)	(1,540)	(2,450)	3,371	12,665
Italy	(5,570)	7,466	15,624	20,641	27,599	83,540
Netherlands	(913)	1,502	4,660	7,845	10,304	27,722
Norway	(316)	642	1,834	2,887	5,403	12,117
Portugal	(860)	(1,100)	(1,800)	(2,150)	(3,320)	8,324
Romania	—	(836)	(2,450)	(5,830)	(5,200)	(21,200)
Spain	(3,600)	(5,400)	7,450	10,567	10,219	33,163
Sweden	(557)	860	3,824	5,484	12,067	25,955
Switzerland	(580)	(1,200)	3,700	5,139	9,870	15,464
United Kingdom				47,398	68,038	115,422
Ireland	8,245	16,072	44,074	1,946	2,209	3,935
USSR	(10,810)	14,820	54,090	(44,800)	(105,420)	(400,700)
Baltic countries	—	—	—	(2,527)	—	—
Finland	(256)	(420)	(1,670)	2,022	4,117	11,182
Poland	—	—	—	(10,877)	(13,800)	(47,300)
Yugoslavia	—	(320)	(725)	(4,631)	(5,720)	20,750
EUROPE	58,152	91,073	256,845	298,964	428,000	1,283,256

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

In the case of the USSR, as for other Eastern countries, it should be noted that the GNP figures contain a considerable margin of error. This is due to the important differences in the methods of national accounting and in the price structures (see section E 11 of the methodological appendix). The figures presented here are mainly Western estimates which as a general rule show slower rates of growth than the official figures even if they remain in comparative terms quite high. But it is obvious that in general

VOLUME OF TOTAL GROSS NATIONAL PRODUCT AT MARKET PRICES;
CONSTANT 1970 GEOGRAPHICAL BOUNDARIES
(in millions of 1960 U.S. dollars and prices)

	1830	1860	1913	1929	1950	1960	1970	1973
Austria	—	—	4,564	4,799	5,005	8,680	13,774	16,318
Belgium	(1,107)	2,320	6,848	8,822	10,086	13,582	22,121	25,839
Bulgaria	—	(580)	(1,150)	(1,731)	(3,070)	(5,900)	(12,400)	(15,130)
Czechoslovakia	—	—	(4,323)	(8,171)	(9,720)	(20,310)	(31,000)	(35,500)
Denmark	(271)	505	2,566	3,326	5,454	7,558	12,200	13,642
Finland	(256)	(420)	(1,670)	2,022	4,117	6,660	11,182	13,051
France	8,736	13,503	29,030	40,508	47,454	76,260	134,299	157,912
Germany (west)	(4,175)	7,321	27,110	29,485	46,529	98,706	159,336	178,065
Germany (east)	—	—	—	—	(10,500)	(23,580)	(36,100)	(41,510)
Greece	—	—	(1,890)	(2,450)	3,371	5,980	12,665	15,793
Hungary	—	—	(2,876)	(3,643)	(5,320)	(9,560)	(16,300)	(19,300)
Ireland	—	—	(1,900)	1,946	2,209	2,604	3,935	4,496
Italy	(5,674)	7,605	15,915	20,225	27,599	48,535	83,540	93,017
Netherlands	(913)	1,502	4,660	7,845	10,304	16,290	27,722	31,371
Norway	(316)	542	1,834	2,887	5,403	7,448	12,117	13,845
Poland	—	—	—	—	(13,800)	(26,340)	(47,300)	(61,440)
Portugal	(860)	(1,100)	(1,800)	(2,150)	3,220	4,550	8,365	10,676
Romania	—	—	—	—	(5,200)	(10,650)	(21,200)	(28,320)
Spain	(3,600)	(5,400)	7,450	10,567	10,219	16,030	33,163	40,876
Sweden	(557)	860	3,824	5,484	12,067	16,926	25,955	27,759
Switzerland	(380)	(1,200)	3,700	5,139	6,415	9,870	15,464	17,111
United Kingdom	(6,600)	14,396	42,175	47,398	68,032	88,640	115,422	127,974
USSR	(9,623)	13,135	47,813	(49,300)	(105,420)	(201,150)	(400,700)	(471,380)
Yugoslavia	—	—	(3,465)	(4,631)	(5,720)	11,000	20,750	(24,770)
EUROPE	58,152	91,073	236,845	298,964	428,000	739,809	1,283,256	1,491,294

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

official growth rates overestimate real growth and this can be easily proved. In the case of the USSR if we accept the official data from 1913 to 1973 the per capita material product has been multiplied by 34.5 in volume.¹⁷ As we have seen for 1913 we estimated for Russia a GNP per capita of 326 dollars (as everywhere in this text, in 1960 US dollars and prices). Even if we postulate that this figure is overestimated by 20 per cent, which would bring the Russian figures below the lowest level of any European country, this would imply for 1973 a GNP per capita of 9000 dollars. Such a figure is almost three times higher than the Swedish 1973 per capita GNP (some 3400 dollars); in 1973 Sweden was the country with the highest per capita income in Europe and the second or third highest among all the developed countries.

¹⁷ CLARKE, R. A., *Soviet Economic Facts, 1917-1970*; London, 1972 (page. 6). *Economic Survey of Europe in 1973*; United Nations, New York, 1974 (page 75).

TABLE 17

ANNUAL GROWTH RATES OF THE VOLUME OF TOTAL
GROSS NATIONAL PRODUCT AT MARKET PRICES;
CONSTANT 1970 GEOGRAPHICAL BOUNDARIES (percentages)

	1830-1913	1913-1950	1950-1973	1830-1973	1913-1973
Austria	1.56 ^a	2.50	5.27	—	2.15
Belgium	2.22	1.05	4.17	2.23	2.24
Bulgaria	(1.44) ^b	2.69	(7.18)	(2.91) ^c	(4.39)
Czechoslovakia	—	2.21	(5.79)	—	(3.57)
Denmark	2.75	2.06	4.06	2.78	2.82
Finland	(2.29)	2.47	5.14	(2.79)	3.49
France	1.46	1.34	5.37	2.03	2.83
Germany (west)	2.28	1.47	6.00	2.66	3.19
Germany (east)	—	—	(6.16)	—	—
Greece	—	1.58	6.95	—	3.60
Hungary	—	1.68	(5.76)	—	(3.22)
Ireland	—	0.41	3.14	—	1.45
Italy	1.25	1.50	5.42	1.98	2.99
Netherlands	1.98	2.17	4.96	2.50	3.23
Norway	2.14	2.96	4.18	2.68	3.43
Poland	—	—	(6.71)	—	—
Portugal	(0.89)	(1.58)	5.35	(1.78)	(3.01)
Romania	—	—	(7.65)	—	—
Spain	(0.88)	0.86	6.21	(1.71)	2.88
Sweden	2.35	3.15	3.69	2.77	3.36
Switzerland	2.26	1.50	4.36	2.39	2.59
United Kingdom	2.26	1.30	2.79	2.09	1.87
USSR	(1.95)	(2.16)	(6.73)	(2.76)	(3.89)
Yugoslavia	—	(1.36)	(6.58)	—	(3.33)
EUROPE	1.81	1.39	5.58	2.29	2.97

^a Austria-Hungary.

^b 1860-1913.

^c 1860-1973.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

The data presented in table 16 concern total GNP in terms of constant 1970 geographical boundaries, which enables us to calculate long-term economic growth (see table 17).

For all European countries, without exception, economic growth has been more rapid in the 1950-1973 period than in any previous period of similar duration, and for most it has been much more rapid: out of the fifteen countries for which relatively valid long-

term comparisons can be made, ten experienced during these 23 years a rate of growth at least twice as high as in earlier periods (and three more than 80 per cent higher). Only the United Kingdom, which experienced during these last decades the slowest rate of growth of any European country, had a rate of growth which was not very different from that of earlier periods.

The period 1913-1950 which for Europe as a whole was strongly affected by the two wars and the Great Depression (see Part B), witnessed wide disparities in individual countries' performances. The coefficient of variation of the rate of increase for the fifteen countries, which is 29.6 per cent for the 1830-1913 period and 21.1 per cent for the 1950-1973 period, is 36.7 per cent for the 1913-1950 period. Besides this wide disparity some countries experienced a more rapid growth during these troubled years than in the preceding period. These wide differences are not only attributable to the differing impact of the wars, but also to the great differences in growth performance during the Great Depression.

Table 18 brings together the data on the volume of per capita GNP in terms of constant 1970 territories. The pre-1950 figures cannot be compared with those in the other tables since a number of these countries underwent important territorial changes.

Recent rapid economic growth, contrary to what had happened before, has led to a more equal distribution of income per capita within Europe. The "poorest" countries experienced more rapid growth between 1950-1973 than the "richest". The coefficient of variation of the volume of per capita GNP has declined from 49.5 per cent in 1950 to 34.6 per cent in 1970 and 31.1 per cent in 1973.¹⁸ This tendency to a more equal distribution of per capita income has also been accompanied by numerous cases of over-taking. The United Kingdom (in its post-1921 definition),

¹⁸ For the period 1913-1950 this coefficient of variation is as follows in term of 1970 territorial boundaries (for 21 countries; in per cent).

1913	40.6
1929	43.8
1950	47.2

For the comparable XIXth century data see table 7.

TABLE 18

VOLUME OF PER CAPITA GROSS NATIONAL PRODUCT AT MARKET PRICES;
CONSTANT 1970 GEOGRAPHICAL BOUNDARIES
(in 1960 U.S. dollars and prices)

	1830	1860	1913	1929	1950	1960	1970	1973
Austria	—	(390)	681	720	721	1,232	1,855	2,168
Belgium	(295)	490	894	1,099	1,167	1,484	2,295	2,654
Bulgaria	—	(210)	(263)	(306)	(423)	(750)	(1,461)	(1,755)
Czechoslovakia	—	—	(521)	(586)	(785)	(1,488)	(2,163)	(2,438)
Denmark	(208)	294	862	945	1,277	1,650	2,475	2,716
Finland	(188)	(241)	(520)	590	1,027	1,503	2,428	2,797
France	264	365	695	583	1,137	1,669	2,645	3,029
Germany (west)	(245)	354	791	795	931	1,781	2,627	2,873
Germany (east)	—	—	—	—	(571)	(1,368)	(2,116)	(2,445)
Greece	--	(230)	(322)	(390)	445	718	1,440	1,769
Hungary	—	—	372	424	(560)	(958)	(1,576)	(1,851)
Ireland	—	—	(611)	662	744	919	1,334	1,474
Italy	(265)	301	441	517	590	978	1,557	1,694
Netherlands	(347)	452	754	1,008	1,019	1,418	2,127	2,334
Norway	(280)	401	749	1,032	1,652	2,078	3,125	3,495
Poland	—	—	—	—	(556)	(891)	(1,454)	(1,842)
Portugal	(250)	(275)	(292)	(320)	383	514	954	1,247
Romania	—	—	--	—	(319)	(579)	(1,047)	(1,360)
Spain	(263)	(343)	367	455	367	529	986	1,179
Sweden	(194)	225	680	897	1,712	2,263	3,226	3,411
Switzerland	(276)	(480)	963	1,265	1,368	1,841	2,468	2,661
United Kingdom	(360)	584	996	1,038	1,352	1,686	2,079	2,284
USSR	(170)	178	326	(293)	(585)	(939)	(1,651)	(1,887)
Yugoslavia	--	(220)	(284)	(341)	(339)	599	1,019	(1,182)
EUROPE	240	310	534	571	749	1,157	1,828	2,077

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

which had the highest per capita GNP in 1913, moved to the third place in 1929, and to the twelfth place in 1973 (out of 24). Spain and Portugal despite their recent rapid economic growth were still in 1973, as was the case during most of the 70 preceding years, the two poorest countries in Western Europe.

Despite the fact that the 1960 level of GNP has been corrected to allow for differences in price structures, it is obvious that the differences in GNP per capita do not express in each case correctly the real income or production, since the evolution of short-term prices can in 10-15 years imply significant changes. This is the reason why we have decided also to give a set of estimates of 1965 per capita gross domestic product based on the method of physical indicators, and which to our knowledge are the most

complete and recent published data based on this method. The figures for the European countries in 1965 are shown below.¹⁹

1965 data expressed in "1965 average dollar prices"

Austria	1459	Italy	1190
Belgium (& Luxembourg)	1886	Netherlands	1796
Bulgaria	877	Norway	1668
Czechoslovakia	1427	Poland	989
Denmark	1820	Portugal	733
Finland	1585	Romania	697
France	1616	Spain	939
Germany (West)	1913	Sweden	2171
Germany (East)	1437	Switzerland	1863
Greece	758	United Kingdom	1929
Hungary	1015	USSR	1053
Ireland	1239	Yougoslavia	692

Table 19 represents the annual growth rates of the volume of per capita GNP by countries. Sweden is the country whose long term (1830-1973) rate of growth has been the most rapid, some 2.0 per cent. Without going into a detailed analysis, which is not the purpose of this essay, it is obvious that one of the reasons for this rapid growth lies in the fact that Sweden did not participate in the two world wars and that, unlike Switzerland, her large natural resources and her access to the sea made it possible for her to experience rapid growth during the two world wars.²⁰

The other Nordic countries also achieved very rapid growth: 1.8-1.9 per cent. On the other hand we find Spain and Portugal with the slowest rate of growth: some 1.0 per cent. The comparison of those two groups of countries shows already that, over the very long-term, growth rates of the per capita increases in GNP tend

¹⁹ Sources: International Comparisons of Real Income Capital formation and Consumption. Chapter 4 of *Economic Survey of Europe in 1969*, Part One. Economic Commission for Europe of the United Nations, New York 1971, pp. 139-152.

²⁰ The annual growth rate of total GNP between 1913 and 1920 was 1.8 per cent (Switzerland probably 0.6 per cent) and between 1939 and 1946 4.1 per cent (Switzerland 0.7 per cent).

TABLE 19

ANNUAL GROWTH RATES OF THE VOLUME OF PER CAPITA
GROSS NATIONAL PRODUCT AT MARKET PRICES; CONSTANT 1970
GEOGRAPHICAL BOUNDARIES (percentages)

	1830-1913	1913-1950	1950-1973	1830-1973	1913-1973
Austria	(1.06) ^a	0.15	4.90	1.53 ^c	1.95
Belgium	1.34	0.72	3.64	1.55	1.83
Bulgaria	(0.43) ^a	(1.29)	(6.38)	(1.90) ^b	(3.21)
Czechoslovakia	—	1.10	(5.05)	—	(2.60)
Denmark	1.73	1.07	3.34	1.81	1.93
Finland	(1.23)	1.86	4.45	(1.91)	2.84
France	1.17	1.34	4.35	1.72	2.48
Germany (west)	1.41	0.48	5.02	1.74	2.19
Germany (east)	—	—	(6.53)	—	—
Greece	(0.65) ^c	0.88	6.18	(1.82) ^d	2.88
Hungary	—	1.11	(5.34)	—	(2.71)
Ireland	—	0.53	3.02	—	1.48
Italy	0.62	0.79	4.69	1.31	2.27
Netherlands	0.94	0.82	3.67	1.34	1.90
Norway	1.19	2.16	3.31	1.78	2.60
Poland	—	—	(5.35)	—	—
Portugal	(0.19)	(0.74)	5.27	(1.13)	(2.45)
Romania	—	—	(6.51)	—	—
Spain	(0.40)	0.00	5.21	(1.05)	1.96
Sweden	1.52	2.53	3.04	2.03	2.72
Switzerland	1.52	0.95	2.94	1.60	1.71
United Kingdom	1.23	0.83	2.31	1.30	1.39
USSR	(0.79)	(1.59)	(5.22)	(1.70)	(2.97)
Yugoslavia	(0.48) ^a	(0.48)	(5.58)	(1.50) ^b	(2.41)
EUROPE	0.97	0.92	4.53	1.52	2.29

^a 1860-1913.

^b 1860-1973.

^c 1840-1913.

^d 1840-1973.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

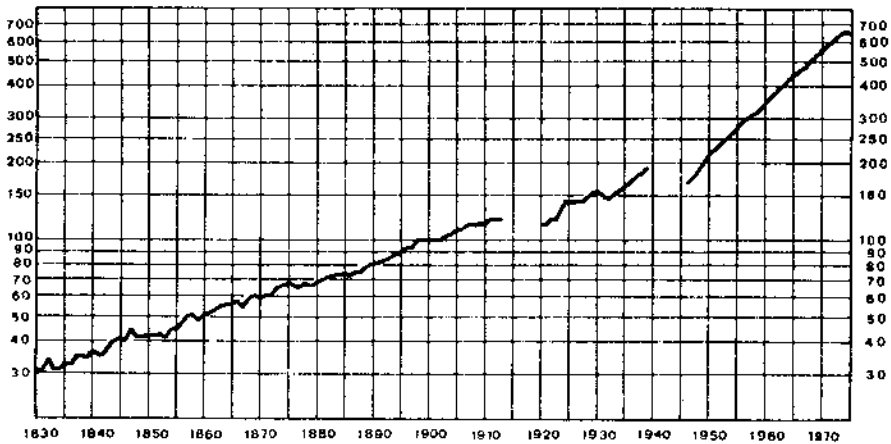
The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

to be more uniform than for shorter periods. The disparities in the rates of growth for the individual countries for this very long period (1830-1973) is rather limited, the coefficient of variation of the rate of growth being only 17.5 per cent. This is due mainly to the fact that in the last two and a half decades practically

all the countries whose growth performance was low until the 1950's have experienced higher rates of economic growth than the rest of Europe.

C 2) Annual data of the volume of Europe's total GNP 1830-1975

This article, for which we began to assemble materials in 1969, one of the two best years as far as Western European growth for the period 1951-1975 is concerned, was completed at the very end of 1974 and the beginning of 1975 when the ghost of the 1929 depression was making the headlines in the newspapers. Therefore it is only just that this brief analysis of the annual data be devoted to the problem of the evolution of the stability of economic growth.



Graph 2. Yearly Volume of Gross National Product of Western Europe; 1899-1901 = 100 (semi-logarithmic scale)

As we have seen in sections A and B, economic fluctuations as a general rule have become more and more mild. This is also the case for the last 30 years even if we include the 1974-1975 depression which, in fact, is the most severe of the last 29 years. This attenuation in the fluctuation of annual growth rates of the volume of GNP is readily apparent in the sharp reduction in the

variance of annual growth rates in this aggregate. This variance has developed in the following way for Western Europe²¹

1854-1883	13.77 (excluding the 1870-73 period)
1884-1913	4.60
1921-1939	11.79
1947-1975	3.47 (1.48 for the 1950-1973 period)

Graph 2 presents the evolution of total GNP for Western Europe (actual figures can be found in table 22 in the statistical appendix).

PART D - STATISTICAL APPENDIX

This statistical appendix includes tables which either are not commented on in the text or which include data presented in the for of graphs. The tables presented here are:

Table 20 Value of total GNP in current dollars by region, 1800-1973

Table 21 Annual volume of total GNP of Europe, 1830-1913 (1899-1901 = 100)

Table 22 Annual volume of total GNP of Western Europe 1830-1975 (1899-1901 = 100)

²¹ For shorter-term evolution, see table 8 for the XIXth century and section B₁ for the 1920-1939 period. For Western Europe in the last 29 years this variance has been as follows:

1951-60	1.73	1947-55	2.28
1961-70	0.81	1956-65	1.20
		1966-75	5.38

CURRENT VALUES OF TOTAL GROSS NATIONAL PRODUCT
AT MARKET PRICES(millions of dollars; current prices and current exchange rates; pre-1913 data:
three-year annual averages)

	Europe	Western Europe	Continental Europe	Europe less the USSR *
1800	(13,065)	(7,964)	—	(10,184)
1830	14,660	9,808	(12,310)	12,000
1840	15,801	10,816	(13,061)	13,159
1850	16,324	11,273	13,309	13,663
1860	22,368	15,638	18,148	18,831
1870	30,341	20,172	24,601	24,291
1880	32,508	22,032	26,014	26,556
1890	36,731	25,737	29,081	31,428
1900	48,223	32,457	38,109	40,038
1910	65,369	42,502	53,518	52,995
1913	75,163	47,928	61,741	59,823
1925	107,740	76,614	83,734	94,093
1928	125,040	87,396	100,260	106,450
1929	125,850	88,531	100,820	106,990
1933	106,490	72,515	85,532	86,938
1937	176,270	115,630	147,900	141,430
1938	181,730	117,620	157,730	145,110
1950	(236,280)	151,460	(197,880)	178,090
1960	(561,980)	335,090	(487,760)	409,180
1970	(1,412,140)	788,580	(1,286,180)	970,980
1973	(2,462,250)	1,347,050	(2,243,530)	1,683,960

* Russia before 1925.

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. Figures in parentheses have a higher margin of error than other figures for the same periods.

Implicit GNP deflator

On basis 1899-01 = 100 the implicit G.N.P. deflator for Western Europe is the following:

1800	(125.0)	1880	100.0	1928	175.3	1960	297.0
1830	98.6	1890	97.9	1929	172.6	1970	430.4
1840	92.2	1900	100.0	1933	149.9	1973	645.5
1850	81.9	1910	110.4	1937	199.9		
1860	96.0	1913	114.4	1938	198.6		
1870	103.2	1925	166.6	1950	215.8		

TABLE 21

VOLUME OF TOTAL GROSS NATIONAL PRODUCT AT MARKET PRICES
OF EUROPE (1899-1901 = 100)

Year		Year		Year		Year		Year	
1830	30.84	1847	44.63	1864	53.82	1881	69.49	1898	97.70
1831	31.26	1848	41.54	1865	54.51	1882	71.86	1899	99.84
1832	34.19	1849	41.61	1866	58.30	1883	72.47	1900	100.89
1833	31.08	1850	41.07	1867	57.94	1884	73.44	1901	99.25
1834	31.18	1851	41.30	1868	63.99	1885	72.36	1902	103.36
1835	30.04	1852	41.87	1869	64.56	1886	71.72	1903	106.45
1836	32.64	1853	40.01	1870	59.95	1887	77.25	1904	110.44
1837	35.15	1854	43.70	1871	58.81	1888	76.36	1905	110.38
1838	34.97	1855	43.28	1872	58.98	1889	76.30	1906	109.57
1839	34.33	1856	45.91	1873	60.84	1890	79.21	1907	114.64
1840	36.95	1857	49.22	1874	65.79	1891	77.89	1908	114.90
1841	35.52	1858	49.25	1875	64.85	1892	79.84	1909	119.89
1842	35.26	1859	47.04	1876	63.31	1893	85.62	1910	121.11
1843	37.72	1860	49.59	1877	65.04	1894	89.25	1911	127.62
1844	40.08	1861	48.59	1878	70.70	1895	90.10	1912	129.62
1845	40.41	1862	51.08	1879	66.42	1896	93.58	1913	136.23
1846	38.66	1863	52.87	1880	65.96	1897	91.82		

Sources: Author's computations and estimates; see methodological appendix.

Notes:

For 1920-1950 data see table 9.

The degree of rounding off of the figures does not imply a correspondingly low margin of error.

TABLE 22

VOLUME OF TOTAL GROSS NATIONAL PRODUCT AT MARKET PRICES
OF WESTERN EUROPE (1899-1901 = 100)

Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
1830	30.66	1860	50.98	1890	81.99	1920	116.25	1950	216.21
1831	31.15	1861	50.79	1891	81.48	1921	114.64	1951	229.52
1832	34.14	1862	53.46	1892	82.62	1922	122.12	1952	236.70
1833	31.10	1863	55.55	1893	84.89	1923	123.95	1953	249.14
1834	31.26	1864	55.99	1894	87.91	1924	135.96	1954	262.05
1835	33.21	1865	56.20	1895	89.42	1925	141.71	1955	278.58
1836	32.88	1866	57.76	1896	93.00	1926	144.69	1956	291.55
1837	34.44	1867	54.52	1897	93.54	1927	149.36	1957	304.26
1838	35.41	1868	58.48	1898	99.32	1928	153.60	1958	311.55
1839	34.84	1869	60.57	1899	99.61	1929	158.01	1959	326.34
1840	37.58	1870	59.43	1900	100.33	1930	156.21	1960	347.62
1841	36.16	1871	60.79	1901	100.05	1931	148.85	1961	367.10
1842	35.96	1872	60.81	1902	100.64	1932	145.44	1962	383.72
1843	38.52	1873	62.77	1903	103.74	1933	149.07	1963	401.83
1844	40.98	1874	66.71	1904	105.97	1934	155.22	1964	426.70
1845	41.38	1875	67.59	1905	110.21	1935	162.78	1965	445.83
1846	39.48	1876	65.33	1906	111.17	1936	169.23	1966	463.53
1847	45.63	1877	65.87	1907	115.67	1937	178.13	1967	479.03
1848	42.52	1878	67.53	1908	115.18	1938	182.48	1968	505.07
1849	42.63	1879	66.27	1909	117.49	1939	191.76	1969	536.36
1850	42.14	1880	67.37	1910	116.57	1940	—	1970	564.44
1851	42.42	1881	69.75	1911	122.45	1941	—	1971	584.62
1852	43.05	1882	71.69	1912	126.55	1942	—	1972	609.54
1853	41.17	1883	73.09	1913	129.63	1943	—	1973	642.74
1854	45.02	1884	73.76	1914	—	1944	—	1974	659.43
1855	44.63	1885	73.88	1915	—	1945	—	1975	646.46
1856	47.40	1886	72.15	1916	—	1946	166.78		
1857	50.87	1887	75.93	1917	—	1947	174.44		
1858	50.94	1888	77.38	1918	—	1948	186.78		
1859	48.72	1889	79.55	1919	—	1949	200.86		

Sources: Author's computations and estimates; see methodological appendix.

Notes:

The degree of rounding off of the figures does not imply a correspondingly low margin of error. The 1973-1975 data should be considered as provisional figures. Margin of error compared to final figures; 1973 data: less than 0.1 per cent; 1974 data: less than 0.2 per cent; 1975 data: some 0.3 per cent.

PART E - METHODOLOGICAL APPENDIX

In order to make it easier to locate a specific methodological problem, we have decided to break down this appendix into a large number of sections which are listed below:

- E 1 - General description of the methodology
- E 2 - Geographical definitions
- E 3 - Corrections for differences in price levels
- E 4 - Corrections for the medium trends of annual indexes
- E 5 - Estimates for pre-1946 Western Europe data
- E 6 - Estimates in current values
- E 7 - Population data
- E 8 - Probable margins of error
- E 9 - 1800-1913 volume data; methodology and sources
- E 10 - 1920-1950 volume data; methodology and sources
- E 11 - 1950-1975 volume data; methodology and sources

The sections E 9 and 10, being the most important ones, are subdivided into sub-sections that are described at the beginning of each of those sections. General methodological aspects (such as index linking, significance of a Paasche index, etc.) will not be discussed in this appendix since explanations may be found in any introduction to statistics.

E 1) General presentation of the methodology

All the series we have calculated concern the gross national product at market prices for which we use the abbreviation G.N.P. in the text. The concept of gross national product at market prices is based on what is now called the former S.N.A. (System of National Accounts) adopted by the Statistical Commission of the United Nations for the use of national statistical authorities and for the « international repertory of comparable national accounting data ». We have not adopted the new S.N.A. for the simple reason that some 99 per cent of the pre-1970 data and practically 100 per cent of the pre-1950 data are available in the former S.N.A. The new S.N.A. which was adopted in 1968 is only beginning to be progressively implemented in 1973-1975. Furthermore, for the present purpose the differences between the two concepts are negligible.

We have calculated, in fact, three different series of G.N.P. data:

1) volume of G.N.P., expressed in 1960 US dollars and prices, for all European countries (and regional totals) for twenty bench-mark years or periods (around 1800: 1829-31, 1839-41, 1849-51, 1859-61, 1869-71, 1879-81, 1889-91, 1899-01, 1909-10, 1913, 1925, 1928, 1929, 1933, 1937, 1938, 1950, 1970 and 1973);

2) annual indices of the volume of G.N.P. for Europe and sub-regions of Europe for the period 1830-1975;

3) current value (expressed in current US dollars) of G.N.P. for Europe and sub-regions of Europe for bench-mark periods (the same as for volume, except 1925, 1929, 1933 and 1937).

Since the series in current values pose different (and much easier) problems, we shall concentrate here on the volume series; for the current value series see section E 6.

The starting point for the estimates of the volume of GNP is the 1960 level of GNP of each of the European countries. But in view of the often major differences in price structures which are not expressed by the exchange rates, those 1960 levels have been corrected for differences in price levels according to the various available estimates; for these corrections see section E 3. From this corrected 1960 basis (expressed in 1960 US dollars and prices) we calculated the volume of the other bench-mark periods either through (or a combination of):

1) existing retrospective series on the volume of GNP or for another national accounting aggregate close to the GNP;

2) personal estimates of the probable evolution of the volume of the GNP.

Since the two World Wars caused important geographical modifications and since for a large number of countries we still do not have good series for GNP volume, we have used a number of indirect indicators (and other data to evaluate each country's level of total GNP for 1899-01, 1928 and also to a large extent (for Eastern countries) for 1950 and 1970. It should be noted that the 1950-1975 estimates have led us to revise some of the

1928 estimates and in the same way the 1928 estimates led us to revise some of the 1899-01 estimates (and since we decided to perform the 1920-1975 calculation after we finished those for the XIXth century, this implied numerous revisions of our entire data and of tables already prepared). As the problems raised by each of those estimates are very different they will be treated separately: see sections E 9 (1800-1913 volume data), E 10 (1920-1950 volume data) and E 11 (1950-1975 volume data).

The annual indices of GNP volume are Paasche-type indices, and since the coverage and the sources are quite different according to the periods, we shall give more details on those indices in each of the sections devoted to the different periods (E 9, E 10 and E 11). Here we should note that, in view of the fact that the benchmark data on GNP are more complete and therefore more valid, we have corrected the annual medium-term trends series using the benchmark periods evolution as a basis; see section E 4.

E 2) Geographical definitions

Europe: Europe as defined in this study includes Russia (or the USSR), but excludes Turkey. Russia (or the USSR) excludes Finland but includes the Asian part of the country, since as a general rule there are no separate statistics for this region of Russia (at least GNP statistics). Turkey is defined in this study by its 1913 boundaries. This means that even in the pre-1913 data the parts of the Ottoman Empire which were not yet independent have been included in Europe.

Continental Europe: Europe less the United Kingdom and Ireland after 1920.

Highly Industrialized Europe: Belgium, France, Germany, Sweden, Switzerland and the United Kingdom.

Western Europe: Europe less Albania, Bulgaria, Czechoslovakia, Germany (Eastern), Hungary, Poland, Romania and USSR.²² For pre-1946 data and methods of estimation of GNP and population aggregates for this region, see section E 5.

²² As this is done by most, if not all, statistical services of the international organizations, Yugoslavia is here included in Western Europe.

E 3) Correction for differences in price levels

All our absolute figures are expressed in 1960 US dollars and prices. This means that the GNP figures for individual countries have been translated into 1960 dollars by use of the 1960 exchange rate but also expressed in 1960 US prices. It is obvious that the exchange rates very seldom express the real price relations of the different countries' GNP. This is a very important problem to which the first systematic attempt to find a solution was made by Colin Clark in the first (1940) edition of his book *The Conditions of Economic Progress*. But apparently Clark's data were not based on specific price inquiries, a task well beyond the possibilities of an isolated or even a small research team. More comprehensive was the work done by Milton Gilbert in the framework of the OECD.²³ Another approach that can be used is the one based on indirect physical indicators; in this respect the first more systematic research was carried out by Beckerman.²⁴

For our corrections we used Gilbert's data (adapted to 1960 by Beckerman) for the 9 countries on which these are available (Austria, Belgium, Denmark, France, Germany (Western), Italy, Netherlands, Norway and the United Kingdom). It should be noted however that the United Kingdom ratio was slightly modified (reduced by less than 1 per cent). For the 8 other Western European countries we used an average of the main estimations available²⁵ which were often quite divergent.

²³ M. GILBERT and Associates, *Comparative National Products and Price Levels*; OECD, Paris 1958.

²⁴ W. BECKERMAN, *International Comparisons of Real Incomes*; OECD, Paris 1966.

²⁵ W. BECKERMAN, *op. cit.*

J. P. DELAHAUT and E. S. KIRSCHEN, *Les revenus nationaux du monde non-communiste*, in « Cahiers Economiques de Bruxelles », N. 10, April 1961, Brussels (pp. 145-176).

D. H. NIEWIAROSKI, *The Level of Living of Nations: Meaning and Measurement*, in « Estadística Journal of the Inter-American Statistical Institute »; Vol. XXIII, N. 86, March 1965, Washington (pp. 3-31).

Statistisches Jahrbuch für die Bundesrepublik Deutschland, 1964 (cited by W. BECKERMAN, *op. cit.*).

E 4) Corrections of the medium-term trends of annual indexes

All our annual indexes as they are presented in the various tables and graphs have been corrected in order to take into account the availability of more complete data for bench-mark years. The difference in the annual growth rates of the two series was calculated for each index and each period between two bench-mark years, the longest of these periods being 10 years. The ratios so obtained were applied to each annual growth rate of the annual indexes and the new yearly growth rate applied to the previous year's corrected figure of the yearly index. As a general rule except for the pre-1850 data, this correction was a minor one since the periods were rather short and the coverage of the yearly indexes fairly wide.

E 5) Estimates for pre-1946 Western Europe data

For the general and present definition of Western Europe see E 2. We shall deal with the problem of the pre-1946 data in two separate periods: 1920-1939 and 1830-1913.

1920-1939 period: Since there exist estimates (for GNP and population) for this period for Western Germany, the problem of the territorial changes resulting from World War II is very limited if we consider Eastern and Western Europe as entities. Indeed except for the case of Germany, most of the important changes did not affect the Western borders of what became Eastern European countries. The only significant modification of those "Western" borders concern the transfer to Russian sovereignty of territories that belonged to Finland between 1920 and 1939. But the population of those territories moved in the majority to other regions of Finland so that in GNP terms this modification implied a change in Western Europe well below 0.1 per cent of its GNP and we decided to neglect it. So for the 1920-1939 period Western Europe is defined as follows: all Europe less Albania, Bulgaria, the Baltic countries, Czechoslovakia, Hungary, Romania, Poland, the USSR and all Germany, but plus Western Germany.

1830-1913 period: The 1830-1913 evolution of total GNP and total population of Western Europe is based on the evolution of these for a group of countries and parts of countries whose geographical definition comes very close to that of Western Europe. This group comprises all Europe less Bulgaria, Romania, Russia and those parts of Austria-Hungary and of Germany which became later part of Eastern European countries.

For Austria-Hungary we made the calculation of these proportions on the basis of population data. On the basis of 1913 and post-1920 territory population figures for 1913 of the following countries: Austria-Hungary, Austria, Serbia and Italy, we were able to calculate the population of pre-1913 Austria-Hungary in Western Europe.²⁶ This represents 30.3 per cent of the 1913 population of Austria-Hungary. On the basis of partial GNP data we postulated that the parts of Austria-Hungary that remained in the "West" had on average a 10 per cent higher per capita GNP than the rest. Thus the part of Austria-Hungary that became "Eastern Europe" represented 66.7 per cent of this country's GNP and 69.7 per cent of its population.

For Germany the data are more complete and this calculation was performed both on population and on GNP data.²⁷ The result was that 41 per cent of 1913 Germany's GNP and 44.7 per cent of its population later became part of Eastern European countries.

The 1913 level so obtained was compared with the figure we calculated from the post-1920 level and the annual index based on constant territory data for 14 Western countries representing some 95 per cent of total GNP of Western Europe. There is a 1 per cent difference between the two approaches. We took as the probable 1913 level the average of the two estimates, and the pre-1913 figures were adjusted accordingly.

²⁶ Population data: *International Statistical Year-Book, 1927*; League of Nations, Geneva 1928.

²⁷ *Bevölkerung und Wirtschaft. Langfristige Reihen 1871-1957 für das Deutsche Reich und die Bundesrepublik Deutschland*; Statistik der Bundesrepublik Deutschland Band 199, Stuttgart 1958.

Das Deutsche Volkseinkommen vor und nach dem Kriege; Einzelschriften zur Statistik des Deutschen Reichs; N. 24, Berlin 1932.

E 6) Estimates in current values

We calculated an implicit price deflator for each of the benchmark years by comparing for the countries for which the data were available the volume of total GNP expressed in 1960 US dollars and prices and the value of total GNP converted in dollars at the current rates of exchange.²⁸ The sources for current GNP data are the same as for volume data (see E 9 a, E 10 c, and E 11). The implicit price deflator (linked together) was applied to the regional GNP figures.

The implicit price deflator for the period 1800-1840 is based on France and the United Kingdom only. From 1850 Germany has been added. From 1860 Denmark, Italy, Norway and Sweden are also added. For 1910-1913 Austria, Hungary, Belgium, Netherlands, Spain and Switzerland are also included. For the 1925-1938 period (except the USSR) the coverage is almost complete. For the 1950-1975 period the coverage is complete for Western Europe and we have applied the same deflator for Eastern countries, which is an arbitrary but inevitable approximation.

E 7) Population data

The 1800-1913 population data we used for calculating per capita figures (and growth rates of population) were assembled for the author's study: *Commerce extérieur et développement économique de l'Europe au XIXe siècle* (op. cit.). All the figures are mid-year estimates.

For the 1920-1975 period we used (besides the sources of GNP data) United Nations publications and mainly:

— Estimates of mid-year population 1920-1960 in *Demographic Yearbook*, 1960; New York 1961.

— Estimates of mid-year population 1950-1970 in *Demographic Yearbook*, 1970; New York 1971.

²⁸ Based on material assembled for a study on the XIXth and XXth centuries exchange rates of all countries. Study prepared, under our direction by E. HILBE and M. ROBERT.

— *Monthly Bulletin of Statistics*, United Nations, New York; Vol. XXX, N. 5, May 1976.

E 8) Probable margins of error

The problem of estimating the margins of error of a collection of GNP data for individual countries is a very delicate one since as a general rule the probable margins of error of the individual series are not stated.²⁹ Nevertheless we decided that it was worth attempting such an estimate. We decided to calculate the probable margin of error of our series by attributing margins of error to individual series. This has been done by comparing the methods of computation and the availability of basic data for each of the countries and for each of the periods. We fixed (in part arbitrarily) the range of those probable margins of error of individual countries data to a minimum of 20 per cent and to a maximum of 30 per cent for the 1830 data; 12 and 28 per cent for the 1860 data; 12 and 23 per cent for the 1900 data; 10 and 20 per cent for the 1920-1938 data and 7 and 20 per cent for the post-1950 data. In this last case the 7 per cent was uniformly applied to all Western European countries and the 20 per cent to all Eastern European countries.

We considered our own estimates for the different countries as one statistical entity since these cannot be considered as independent estimates. The data for other countries were treated as independent estimates since none was calculated by the same person or group of persons. This implies that the errors are completely independent of each other so that errors in the aggregate tend to equal the square root of the sums of squares of the individual country's errors.

²⁹ One of the exceptions is the estimate of the margin of error of the United States' 1919-1938 data made by Simon KUZNETS. If the compensation of the constituent errors is taken into account the margin of error of those series lies in the neighbourhood of 10 per cent (S. KUZNETS, assisted by E. JENKS, *National Income and its Composition, 1919-1938*; National Bureau of Economic Research, New York 1941. Vol. II, Chapter 12: Reliability of the Estimates: pp. 501-537).

Since our annual series were adjusted to the more complete data, the margins of error we shall provide here below apply to both series. These margins are as follows (the first figure after the data is the probable margin of error, expressed in per cent, of the data for total Europe and the second for Europe less Russia or for Western Europe for post-1938 data): 1830, 8.6 and 9.8; 1860, 6.8 and 6.3; 1900, 5.9 and 4.4; 1928, 4.3 and 3.7; and 1950-73, 5.3 and 2.6 (in this case the second figure is for Western Europe).

Those margins of error do not take into account the obvious fact that it is very arbitrary to measure such long term changes. The profound modification that took place in the structure of production and consumption and the very important changes in relative prices strongly affect such data. It is therefore arbitrary to assimilate the growth in the volume of GNP to real economic growth and even more to economic development. But as a crude yard-stick of economic growth the volume of GNP still remains the least incomplete and the least inadequate single indicator.

E 9) 1800-1913 volume data, methodology and sources

For general elements see section E 1. Here we shall examine the following points specially related to the 1800-1913 period:

- E 9 a - Determination of the 1899-1901 level of GNP of individual countries.
- E 9 b - Personal estimates of GNP evolution.
- E 9 c - Annual index of total GNP.
- E 9 d - Sources of national account data.

E 9 a) Determination of the 1899-1901 level of gross national product of individual countries

According to the nature of the available information on GNP data, the 19 European countries were divided into four groups³⁰ for which entirely different approaches were used to estimate the

³⁰ In fact, there is a fifth group comprising the very small countries and territories such as Malta, Iceland, Gibraltar, etc. (and the part of Greece that became Greek territory after 1913) representing some 1% of Europe's population, for which a per capita income similar to that of the European average was postulated.

1900 GNP level expressed in 1960 US dollars and prices (for the correction of differences in price levels, see section E 6 of this appendix).

GROUP A comprises those countries for which the data on the evolution of the volume of the GNP, between 1900 and 1960, is sufficiently reliable to enable the calculation of the 1900 level of total GNP from the 1960 corrected level. This means that not only are the GNP series valid, but also there is no important change in the geographical definition of those countries between those two dates. The countries included in this group are: Belgium, Denmark, France, Italy, Netherlands, Norway, Sweden, Switzerland, and the United Kingdom.³¹ The total GNP in 1900 of those 9 countries represents some 46 per cent of Europe's total GNP.

GROUP B comprises those countries for which the 1900-1960 GNP data are either completely lacking or insufficient to allow calculation along the lines used for countries of group A. This group is made up of the following countries: Bulgaria, Finland, Greece, Portugal, Romania and Serbia. The total GNP (in 1900) of those 6 countries represents only some 3.5 per cent of Europe's total GNP. For this group B, a dual approach has been used.

For the first approach a series of 12 indirect indicators of the 1900 level of per capita development of all European countries was calculated or estimated. Those indicators are: percentage of the total economically active population engaged in agriculture; general crude death rates; infant mortality rates; per capita figures for the following data: special exports, consumption of cereals; consumption of cocoa; consumption of coffee and tea; consumption of sugar; consumption of iron; consumption of raw cotton; number of letters sent and railway passengers.³² For each of these indi-

³¹ In this calculation Ireland was included in the United Kingdom even after 1920.

³² Main sources used for those data are the elements assembled for our study P. BAIROCH, *Commerce extérieur et développement économique de l'Europe au XIXe siècle* (op. cit.), complemented by:

G. SUNBARG, *Aperçus statistiques internationaux*; Stockholm 1908.

cators³³ and for each of these countries, the situation was compared with those of countries of group A whose economic, social and geographical structure was then close. From this comparison, the probable level of GNP per capita was extrapolated and an average was made of those 12 different GNP per capita levels.

The second approach was based on Mulhall's calculation of European countries' earning (or income) per capita.³⁴ As in the previous approach the GNP per capita was extrapolated by comparing countries of group B with results of the calculation for countries of group A.

The average of the two approaches was retained as the probable level of GNP per capita and total GNP was calculated by multiplying this figure by the 1900 population (for population data see section E 7 of this appendix).

GROUP C includes Germany and Austria-Hungary for which sufficiently reliable GNP series are available (especially for Germany) but where there is an important break in the geographical definition. The total GNP of those two countries represents some 29 per cent of Europe's GNP.

For those two countries the approach used in the case of group B was supplemented by two complementary estimates. The first one consisted of an extrapolation of the total GNP of the 1900 boundaries derived from the calculated 1900 level of the part of the country included in the 1960 boundaries. For Germany, this can be easily done since estimates of the different geographical areas are available.³⁵ For Austria-Hungary we made a rather crude

The Working Population and its Structure (under the direction of P. BAIROCH by T. DELDYKE, H. GELDERS, J.-M. LIMBOR); Brussels and New York 1968.

Annuaire statistique de la France (retrospective sections).

Statistiques internationales du mouvement de la population d'après les registres d'Etat civil; Vol. 1, Paris 1907; Vol. 2, Paris 1913.

³³ For a few countries, it was impossible to calculate all the 12 indicators listed above.

³⁴ See M. G. MULHALL, *Industries and Wealth of Nations*; London 1896 (pp. 391 and 272).

³⁵ For the 1913-1920 break, see mainly: *Das Deutsche Volkseinkommen und nach dem Kriege*; Berlin 1932.

For the 1936-1946 break, see mainly: *Bevölkerung und Wirtschaft Langfristige*

guess. The 1900 GNP per capita for Austria proper (1900 definition) was estimated to be 5% below that of Austria (1960 definition). For the rest of the country, we retained a GNP per capita 30 per cent below that of Austria (1900 definition). The second estimate consisted of a calculation of the relative importance of these countries' agricultural and industrial production, compared to countries of group A. For agriculture we had already relatively good figures of the gross total production expressed in direct calories.³⁶ For industrial (including mining) production we used an estimation of the relative share of the European countries that we calculated for the elaboration of a weighted European index of industrial production.³⁷

The average of those four approaches was retained; it should be noted that the dispersion of the result was very small especially for Germany (minimum = -10% of the average, maximum = +10% of the average).

GROUP D also includes two countries: Russia and Spain. The statistical situation of this group is very close to group B. But since those are countries of greater economic importance (Russia represents some 17 per cent of Europe GNP and Spain some 3 per cent), it was decided that in addition to the dual approach used for countries of group B, the approach based on value of agricultural and industrial production (as for group C)

Reihen 1871-1957 für des Deutsches Reich und die Bundesrepublik Deutschlands; Stuttgart 1958.

For minor adjustments often not taken into account (Sarre, West Berlin) we used population figures.

³⁶ P. BAIROCH, *Niveaux de développement économique de 1810 à 1910*, in « *Annales, Economies, Sociétés, Civilisations* », 20e année, N. 6, Dec. 1965 (pp. 1091-1117).

The figures for Austria-Hungary not included in the above mentioned study were calculated for the present study.

³⁷ See the author's book: *Commerce extérieur et développement économique de l'Europe*; op. cit.

The final share of each country was based on four different indicators: a) Male labour force in manufacturing (corrected for differences in productivity). b) Value of production of iron, coal and cotton industry (plus estimated consumption corrected for type of final products). c) Industrial value of production for 1894 (adjusted to 1900 level by use of production indexes). M. G. MUMFALL, *Industries*, (op. cit.). d) Estimate of manufacturing production for 1899 (A. MALZER, *Industrial Growth and World Trade*; Cambridge 1965).

would also be applied. Furthermore for Russia two additional estimates were performed; one based on an available estimate of Russia's 1913 GNP in current prices.³⁸ This estimate was compared to other countries' data and, taking into account the 1900-1913 evolution and an arbitrary correction for the purchasing power of the rouble (prices were presumed to be some 15-20 per cent lower in Russia than in the more developed countries), the 1900 level was obtained. The other estimate is the rather arbitrary postulate³⁹ that the per capita GNP of Russia in 1900 was 15 per cent below that of Italy.

It should be noted that for Spain we also applied the method used for group A, since we have a series of estimates of the volume of national product going back to 1906.

All the results obtained through the different approaches were compared with Colin Clark's data⁴⁰ when these were available for this period. And, as we noted in section E 1, the calculation of 1928 data led us to revise some of the 1900 figures.

E 9 b) Personal estimates of GNP evolution for countries and periods for which no national accounts data are available (1830-1913)

Those estimates concern the following countries and periods: Austria-Hungary: before 1900; Belgium: before 1840; Bulgaria: entire period; Denmark: before 1860; Finland: entire period; Germany: before 1850; Greece: entire period; Italy: before 1860; Netherlands: before 1850; Norway: before 1860; Portugal: entire period; Romania: entire period; Russia: before 1860; Serbia: before 1910; Sweden: before 1860; Switzerland: before 1900. For these countries and periods, we calculated what might be called an indicator of the volume of total GNP. This indicator is

³⁸ Based on M. E. FALOUS, *Russia's National Income, 1913. a Revaluation*, in « *Economica* », Vol. XXXV, N. 137, February 1968 (pp. 52-67).

³⁹ Based however on the various available indicators.

⁴⁰ M. A. COLLIER CLARK, *The Conditions of Economic Progress*, 3rd edition, London 1960.

based mainly on the evolution of the volume of agricultural and industrial production.

As far as the volume of agricultural production is concerned, we already possessed data for a number of countries and periods which we had calculated for a previous study.⁴¹ We completed those calculations for the missing periods and countries. As far as the volume of industrial production is concerned we used, when available, indices of industrial production. But in most of the cases we had to rely on more limited data. For all European countries and for the period 1830-1913, we had already assembled in our study on European development in the XIX century⁴² data on production of raw iron (and after 1870, steel) and coal, and on the consumption of raw cotton. Those data together with other less uniform data (production of other textiles; consumption of iron, etc.) were used to construct an indicator of industrial production.

A weighted average of those two sectors was made. The weight used in each country was based on those of comparable countries for which we have this information and on labour force statistics.⁴³ Labour force statistics were also used for making allowance in some cases for the service sectors. In some cases we also used the volume of exports⁴⁴ as an additional and partial indicator.

E 9 c) Annual indices of total GNP: 1830-1913

The indices we have constructed are Paasche type indices. The base weight used is the 1899-01 volume of total GNP.

Before going over to the statistical coverage of the indices we like to draw the attention to the fact that the medium term trends (10 or less years) of all the indices have been corrected on the basis

⁴¹ P. BAIROCH, *Niveaux de développement de 1810 à 1910*, op. cit.

⁴² P. BAIROCH, *Commerce extérieur et développement économique de l'Europe au XIXe siècle* (op. cit.).

⁴³ On the basis of data assembled in *The Working Population and its Structure*, op. cit.

⁴⁴ For these data see P. BAIROCH, *European Foreign Trade in the XIXth Century. The Development of the Value and Volume of Exports (Preliminary Results)*, in the « Journal of European Economic History »; Vol. 2, N. 1, Spring 1973 (pp. 5-36).

of the complete figures derived from our calculation for the benchmark years or periods; on this see section E 4 of this appendix.

We shall describe here the coverage of the index of GNP for Europe and for Europe (less Russia). The coverage of the other indices, if needed, can be derived from the indications given below and the data in table 4. Thus, for the short term fluctuations, the index is based on the following country's indices:

— 1830 to 1846: France and the United Kingdom (or some 31 per cent of Europe's total GNP and some 37 per cent of Europe less Russia).

— 1846 to 1860: to the above countries Belgium is added from 1846 and Germany from 1850 (or some 47 per cent of Europe and some 56 per cent of Europe less Russia).

— 1860 to 1913: to the countries of period 1850-1860 are added (in some cases in 1861) Italy, Denmark, Norway, Sweden and Russia (or some 80 per cent of Europe and some 74 per cent of Europe less Russia). But again (see above) the medium trends have been adjusted.

E 9 d) Sources of national accounts data used for the 1800-1913 period

For other data the main sources were provided in the preceding pages. Here we shall list by country the sources used and, where needed, additional information.

Austria-Hungary

A. KAUSEL, *Oesterreichs Volkseinkommen, 1913 bis 1963*, in « *Monatsbericht des Oesterreichischen Institutes für Wirtschaftsforschung* »; N. XIV, Sonderheft; Vienna 1965.

I. T. BEREND and G. RANKI, *Nationaleinkommen und Kapitalakumulation in Ungarn, 1867-1914*, in « *Social Economic Researches on the History of East Central Europe* »; Budapest 1970 (pp. 11-34).

A. ECKSTEIN, *National Income and Capital Formation in Hungary, 1900-1950*, in S. Kuznets (edit.) « *Income and Wealth* »; Series V, London 1955 (pp. 152-223).

L. KATUS, *Economic Growth in Hungary during the Age of Dualism, 1867-1913*, in « Social Economic Researches on the History of East Central Europe »; Budapest 1970 (pp. 35-128).

Belgium

J. GADISSEUR, *Contribution à l'étude de la production agricole en Belgique de 1846 à 1913*, in « Revue Belge d'Histoire Contemporaine »; IV, N. 1-2, 1973 (pp. 1-48).

Denmark

K. BJERKE and N. USSING, *Studier over Danmarks Nationalprodukt, 1870-1950*; Copenhagen 1958.

France

J. C. TOUTAIN, *Le produit intérieur brut de la France de 1789 à 1970*; to be published.

Germany

W. G. HOFFMANN (with the collaboration of F. GRUMBACH and H. HESSE), *Das Wachstum der Deutschen Wirtschaft Seit der Mitte des 19. Jahrhunderts*, Berlin 1965.

Italy

G. FUA, *Notes on Italian Economic Growth, 1861-1964*; Milan 1965.

Netherlands

J. TEIJL, *Nationale Inkomen van Nederland in de periode 1850-1900*, in « Economisch-en Sociaal-Historisch Jaarboek »; Vol. 34, s'Gravenhage 1971 (pp. 232-262).

Het Nationale Inkomen van Nederland 1921-1939, in « Der monografieën van Nederlandse Conjonctuur », N. 7, Utrecht 1948.

Nationale Rekeningen 1964; Hilversum 1965.

Norway

J. BJERKE, *Langtidslinjer I Norsk Okonomi, 1865-1960*; Oslo 1966.

Russia

R. W. GOLDSMITH, *The Economic Growth of Tsarist Russia, 1860-1913*, in « Economic Development and Cultural Change »; Vol. 9, N. 3, April 1961 (pp. 441-475).

Goldsmith does not provide yearly data on GNP. We based our figures on the average growth rates per period provided by Goldsmith to which we applied the annual fluctuation of the com-

bined volume of agricultural and industrial production (using approximative weight provided). In order to reduce the sharp annual fluctuations, we calculated a two-yearly average where the preceding year's weight is 20 per cent of the current year.

Serbia

I. VINSKI, *National Product and fixed Assets in the Territory of Yugoslavia, 1909-1959*, in P. DEANE (edit.) « Studies in Social and Financial Accounting »; Series IX of « Income and Wealth »; London 1961 (pp. 206-233).

Spain

H. PARIS-EGUILAZ, *Renta Nacional, inversión y consumo en Espana, 1939-1959*; Madrid 1960.

Sweden

O. JOHANSSON, *The Gross Domestic Product of Sweden and its Composition, 1861-1955*; Stockholm 1967.

Switzerland

U. ZWINGLI and E. DUCRET, *Das Sozialprodukt als Wertmesser des langfristigen Wirtschaftswachstums*, in « Revue suisse d'Economie politique et de statistique »; Vol. 100, N. 1-2, March-June 1964 (pp. 328-368).

United Kingdom

P. DEANE, *New Estimates of Gross National Product of the United Kingdom, 1830-1914*, in « The Review of Income and Wealth »; Series 14, N. 2, June 1968 (pp. 95-112).

C. H. FEINSTEIN, *National Income Expenditure and Output of the United Kingdom, 1855-1965*; Cambridge 1972.

E 10) 1920-1950 volume data; methodology and sources

For the general elements see section E 1. Here we shall examine the following points specifically related to the 1920-1950 period.

- E 10 a - Determination of the 1928 level of GNP of individual countries.
- E 10 b - Personal estimates of GNP evolution (1925-1939).
- E 10 c - Annual index of total GNP (1920-1950).
- E 10 d - USSR 1920-1939 data.
- E 10 e - Sources of national account data (1920-1950).

E 10 a) Determination of the 1928 level of GNP of individual countries

According to the nature of the available information on GNP data the 24 European countries⁴⁵ were divided into three groups for which entirely different approaches were used to estimate the 1928 level of GNP expressed in 1960 US dollars and prices (for the correction of differences in price levels, see section E 6 of the appendix).

GROUP A comprises those countries for which the data on the evolution of the volume of GNP between 1928 and 1960 is sufficiently reliable to enable us to calculate the 1928 level from the 1960 level (in some cases supplemented by the calculation of the 1928 level from the 1899-1901 level). The countries included in this group are Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom. Those 12 countries account in 1928 for some 69 per cent of Europe's total GNP and some 81 per cent of the GNP of Europe (less the USSR).

GROUP B comprises countries for which the 1928-1960 GNP series are not reliable enough to allow estimates by the method used for countries of group A. This group B comprises the following countries: the Baltic countries; Bulgaria, Finland, Greece, Czechoslovakia, Hungary, Ireland, Poland, Portugal, Romania and Yugoslavia.

Four different approaches were used here, but only two of these were applied to all the countries. Those two approaches are the indirect indicators method and calculation of the volume of GNP. As far as the indicators are concerned, we proceeded as from the 1899-1901 level (see section E 9 a) and the indicators used were almost the same (we added consumption of energy (including wood) and the number of cars, we replaced iron by steel and did not use the raw cotton and exports indicators).

⁴⁵ The three Baltic countries (Estonia, Latvia and Lithuania) were treated as one country.

Our calculation of the volume of 1928 GNP was rather complicated and was performed for all the European countries. As for the 1899-1901 estimate, the core of this calculation lies in the estimates of the volume of agricultural and industrial production. The volume of agricultural production was based on the following production data (1928, or averages according to the product: 1925-29 or 1927-29): all cereals, hops, potatoes, meat, milk, sugar, wine, tobacco, wool, flax and hemp. We calculated meat production using the number of the principal species of livestock and appropriate ratios (according to the country): percentage of animals slaughtered and the weight per animal.⁴⁶ The weighting used for calculating total agricultural production was the direct calorific content of each crop⁴⁷ and for non-food products we estimated an arbitrary calorific content on the basis of the relative price levels. The total volume of calories produced was translated into terms of 1960 US dollars and prices by applying a price per calory derived from the average of the countries for which we had both this calculation and the value of agricultural production. For industrial production we relied on available estimates. We used the average of three estimates of the value (or relative value) of industrial production: that of Wagenfuhr,⁴⁸ of the League of Nations⁴⁹ and of Maizels.⁵⁰ And by using the same method as for agriculture (see above) we were able to estimate the volume of 1928 industrial production expressed in 1960 US dollars and prices. The volume of total GNP was obtained by adding to the total of agricultural and industry a percentage of other activities based on the situation of comparable economies for which we had the data.

The third approach was possible for all the countries of group B

⁴⁶ The sources for the basic data are various issues of the *Statistical Year-book of the League of Nations* (Geneva) and of « *Annuaire International de Statistique agricole* »; Rome.

⁴⁷ See our article: *Niveaux de développement économique de 1810 à 1910*, op. cit., for these items.

⁴⁸ R. WAGENFUHR, *Die Industriegewirtschaft Entwicklung-Stendenzen. Der Deutschen und Internationalen Industrieproduktion: 1860 bis 1932*, in « *Viertel Jahrshefte zur Konjunkturforschung* »; Vol. 31, 1933, Berlin (pp. 5-70, especially p. 54).

⁴⁹ *La production mondiale et les prix, 1935-1936*; Geneva 1936 (p. 21).

⁵⁰ A. MAIZELS, *Industrial Growth and World Trade*; Cambridge 1965 (p. 535).

except for Portugal, the Baltic countries, Finland, Romania and Yugoslavia. It consisted in the utilization of the Clark⁵¹ estimates of real income or real product. The fourth and last method was the one used for the group A countries i.e. 1928 level derived from 1960 level and GNP evolution; this was possible for Czechoslovakia, Finland, Greece and Yugoslavia. An average of those four methods was made but gave more weight to the calculation of the volume of GNP and to Clark's figures.

GROUP C is made up of one country: the USSR. For this country, although we also made the estimates according to the methods used for group B countries, we relied essentially on the estimates of Bergson,⁵² Colin Clark,⁵³ and Nove⁵⁴ which all tend to agree that the 1928 level was very close to the 1913 level (if we consider the same territorial area). Official data are obviously more optimistic and suggest that the 1913 level was reached again in 1926-27.⁵⁵

E 10 b) Personal estimates of GNP evolution for countries for which these data are lacking (1925-1938)

Here we shall restrict ourselves to the bench-mark years; for the annual data (and for 1946-1950 annual data) see point E 10 c below. Our own estimates for this period only concern a limited share of total GNP of Europe: some 7 per cent. The countries concerned are Bulgaria, Portugal, Poland and Romania. In some other cases the 1925 data were also estimated. The method used was the same as for the XIXth century see E 3 b) but the data both for agriculture and industry were more complete. We also carried out our own estimates for the USSR. For these see point E 10 d below.

⁵¹ C. CLARK, *The Conditions of Economic Progress*; 3rd edition, London 1960.

⁵² A. BERGSON, *The Real National Income of Soviet Russia since 1928*; Cambridge (Mass.) 1961 (especially pp. 7-8).

⁵³ C. CLARK, *The Conditions . . .*; op. cit. (pp. 247).

⁵⁴ A. NOVE, *An Economic History of the USSR*; London 1969 (chapter 4 and 6).

⁵⁵ See M. DOBB, *Soviet Economic Development since 1917*; 5th edition, London 1960 (p. 230); and R. A. CLARKE, *Soviet Economic Facts, 1917-1970*; London 1970 (pp. 6-8 and 10).

E 10 c) early indices of total GNP 1920-1950

We constructed two series of annual indices, one covering the 1920-1939 period and the other the 1946-1950 period. The 1920-1939 indices are based on the following countries: Austria, Belgium, Czechoslovakia, Denmark, France, Germany, Hungary, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom, Yugoslavia and the USSR. These 16 countries represent some 91 per cent of Europe's GNP. The 1946-1950 indices are based on the same countries as the 1920-1939 indices plus Bulgaria, Finland, Greece and Poland (but instead of Germany only Western Germany). These 20 countries represent about 95 per cent of Europe's GNP. For the 1920-1939 indices the weights used are the 1929 total GNP figures and for the 1946-1950 indices the 1950 GNP figures.

As in the case of the XIXth century indices, those of this period are also Paasche type indices and their medium-term trends are also corrected on the basis of more complete figures (see section E 7). But for this period the indices are not only an aggregation of existing country indices. We have completed the series for a number of countries and periods with our own estimates.

These personal estimates were made by the same methods as for the bench-mark periods (see E 4 b and E 3 b), but, as a general rule, the data available was more complete and we tried to be as comprehensive as possible. The countries and periods for which we drew up those estimates are as follows: Austria (1947), Belgium (1939 and 1946-47), Bulgaria (1946-47), Czechoslovakia (1946-47), Hungary (1921-23 and 1948), Germany (1920-24 and 1946-48), and Greece (1946). For the USSR see below.

E 10 d) USSR 1920-1939 data

As we mentioned in the text (see section C 1) the Soviet accounting statistics present a number of important problems which prevent us from using the "official" data as such.

For the 1928-1950 period we decided to base our data on Begron's⁵⁶ estimates, retaining the average of the series in 1937 and 1950 prices (for the 1928-1937 period we also took into account the 1928 price series). The missing years in this 1928-1950 period were interpolated by using official series on the volume of gross material product⁵⁷ and figures on the evolution of crops.

For the 1920-1928 period the starting point was the 1928 figures for which the 1913 level (on the basis of the same geographical boundaries) was retained (see above section E 10 a, group C). We estimated the levels for other years using as the main element the existing data on the volume of agricultural and industrial production⁵⁸ and the official data on the volume of material product. On the base 1929 = 100, the figures we adopted for the evolution of the volume of total GNP are as follows:

1920:	36.6	1925:	72.8
1921:	31.5	1926:	81.9
1922:	42.9	1927:	85.3
1923:	50.4	1928:	97.1
1924:	54.3		

For the comparison of 1928 and 1913 levels see above (section E 10 a, group C).

E 10 e) Sources of national accounts data (1920-1950)

For other data the main sources were indicated in the preceding pages. Besides the sources given below by country for the 1938-1950 period, in many cases (including countries not listed below) we used the data provided in *National Income Statistics, 1938-*

⁵⁶ A. BERGSON, *The Real National Income* . . . ; op. cit. (especially p. 180).

⁵⁷ R. A. CLARKE, *Soviet Economic Facts, 1917-1970*; London 1972 (p. 6).

⁵⁸ Based on data assembled by R. A. CLARKE (op. cit.) and A. NOVE (op. cit.) and also on the basis of Dessirier index (J. DESSIRIER, *Indices comparés de la production industrielle et de la production agricole de divers pays de 1870 à 1928*, in « Bulletin de la Statistique générale de la France »; Vol. 18, Oct.-Dec. 1928 (pp. 65-110).

1948, (United Nations, New York 1950) and *Statistics of National Income and Expenditures* (United Nations, New York 1955).

For the following countries: Austria, Denmark, Italy, Netherlands, Norway, Spain, Sweden, Yugoslavia (Serbia) see sources for 1800-1913 period (E 9 d).

Belgium

C. CARBONNELLE, *Recherches sur l'évolution de la production en Belgique de 1900 à 1957*, in « Cahiers Economiques de Bruxelles », N. 3, April 1959 (pp. 353-377).

Bulgaria

A. TCHÁKALOFF, *The National Income and Outlay of Bulgaria, 1924-1945*; Sofia 1946; p. 114 (corrected by using retail prices).

Czechoslovakia

F. L. PRYOR, Z. P. PRYOR, M. STADNIK and G. J. STALLER, *Czechoslovak Aggregate Production in the Interwar Period*, in « The Review of Income and Wealth »; Série 17, N. 1, March 1971 (pp. 35-59).

Finland

E. H. LAURILA, *Finlands nationalinkomst åren 1926-1949*, in « Statistika Oversikter »; Vol. XXV, N. 11-12, Nov.-Dec. 1950; Helsinki 1951 (pp. 48-61).

France

See sources for 1800-1913 period (E 9 d: France). And *Annuaire statistique de la France* (Résumé Rétrospectif), 1966; Paris 1966 (including Sauvy's series, page 556).

Germany

See source for 1800-1913 period (E 9 d: Germany). And *Bevölkerung und Wirtschaft. Langfristige Reihen 1871-1957 für das Deutsche Reich und die Bundesrepublik Deutschland*. Statistik der Bundesrepublik Deutschland, Band 199; Stuttgart 1958.

Greece

National Income Statistics, 1938-1948; op. cit. The current value figures were deflated by using retail prices (source: *Statistical Year-book* of the League of Nations; Geneva, various issues).

Hungary

A. ECKSTEIN, op. cit. (see sources for 1800-1913 period E 9 d: Austria and Hungary).

Ireland

J. NEENAM, *The Irish Economy since 1922*; Liverpool 1970 (pp. 58-61).

Switzerland

Annuaire Statistique de la Suisse, 1941, Bern 1942 (page 358).

Annuaire Statistique de la Suisse, 1948, Bern 1949 (pp. 422-425).

Comptes Nationaux de la Suisse pour les années 1938 et 1948 à 1963, in « Vie Economique. Rapports économiques et de statistique sociale »; Vol. XXXVII, N. 9, Sept. 1964, Bern; pp. 387-394 (especially page 392 corrected figures).

United Kingdom

C. H. FEINSTEIN, op. cit. (see sources for 1800-1913 period E 9 d: United Kingdom).

E 11) 1950-1975 volume data; methodology and sources

The basic data for this period involved considerably fewer personal estimates and calculations than the pre-1950 periods. To simplify we have to separate Western and Eastern Europe.

Data for Western Europe. All the data used on the evolution of the volume of GNP of Western European countries (for definition of Western Europe see E. 2) is based essentially on OECD (Organisation for Economic Co-operation and Development) publications and mainly:

National Accounts of OECD countries, 1950-1968; OECD Paris 1970. Also of the same series 1960-1970; Paris 1972. And 1962-1972; Paris 1974.

Main Economic Indicators; OECD, Paris; May 1976 issue.

OECD Economic Outlook; OECD, Paris; N. 18, December 1975.

For 1975 data these sources were supplemented by information provided by the press (mainly the *Financial Times*, *Le Monde* and the *Neue Zürcher Zeitung*).

Furthermore we have adjusted the post-1972 data for the *total* of Western Europe since these cannot yet be considered as final and, since it appears — as Glejser and Schavey⁵⁹ have demonstrated — that developed countries' provisional GNP figures present a systematic downward bias. On the basis of the data provided by Glejser and Schavey; and by the comparison of OECD provisional and final data for Europe for the 1968-73 period, we adjusted the 1972-74 data. We increased the provisional (as reported in 1976) 1972 data by 0.05 per cent; the 1973 data by 0.10 per cent, and the 1974 data by 0.15 per cent. We did not adjust the 1975 data since it is probable that a downward bias is less probable in periods of slow growth or stagnation.

For bench-mark year data on individual countries we used our corrected figures (see E 3) to which OECD series on the volume of GNP were applied. For the yearly index we used OECD series, but we corrected the trends on the basis of our bench-mark year figures (this correction was very minor).

Data for Eastern Europe. As is the case for pre-1950 USSR data, the conversion of Eastern Europe's national account data into the western system presents a very delicate problem. And it is obvious that the figure we have finally retained contains an important margin of error (see section E 8).

The 1970 bench-mark figures are based on the following sources. As basic data we decided to use the EEC (Economic Commission for Europe) estimates based on the indirect indicators method.⁶⁰ We calculated first the average gap of those data compared to our per capita GNP in 1960 dollars and prices. And the 1970 figure was obtained by multiplying each country's EEC figures by this ratio (1.14) and by the volume evolution of gross material

⁵⁹ H. GLEJSER and P. SCHAVEY, *An Analysis of Revisions of National Account data for 40 Countries*, in the «Review of Income and Wealth»; Series 20, N. 3, September 1974 (pp. 317-332).

⁶⁰ *International Comparisons of Real Income Capital Formation and Consumption*, in «Economic Survey of Europe in 1969»; United Nations, New York 1970 (pp. 139-152). 21 indicators are used for this estimate which is made for almost all developed countries.

product between 1965 and 1970 (and by the 1970 population figure).

The 1950 bench-mark figures are based on two series of estimates. The first one is based on the determination of the 1950 level derived from estimates of pre-1940 data and on the evolution between those periods. The second approach is based on the 1970 data and on the 1950-1970 evolution of the volume of the material product. But as a general rule, we have reduced by an arbitrary 20 per cent⁶¹ the growth rate of the material product in order to take into account the omitted sectors and the difference in price structures.

For the 1970-1975 evolution we based ourselves on the 1970 data to which the growth rates of the volume of material product were reduced by 10 per cent. The sources for the growth rates (for the entire 1950-1975 period) are mainly the publication of the Economic Commission for Europe:

Economic Survey of Europe; United Nations, Geneva-New York; various issues.

Economic Bulletin for Europe; United Nations, Geneva-New York, various issues.

Statistical Indicators of short-term Changes in ECE Countries; United Nations, Geneva, various issues.

Yearbook of National Accounts Statistics; United Nations, New York, various issues. And the preceding volumes entitled: *Statistics of National Income and Expenditure*; United Nations, New York.

Monthly Bulletin of Statistics; United Nations, New York, vol. XXX, N. 5, May 1976.

⁶¹ Not a reduction of 20 points, but of 20 per cent of the growth rates; i.e. in the case of a 20 per cent reduction, a 10 per cent growth becomes an 8 per cent growth rate.