A RECONSTRUCTION OF THE DEMOGRAPHIC HISTORY OF MODERN GREECE

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Introduction

MODERN Greece has a long tradition of population statistics. Even before the new State was officially born, a population count was ordered in 1828, with the dual aim of enumerating the people of that year as well as that of 1821, i.e. the year when the War of Independence began. Eleven such enumerations were conducted in subsequent years until 1861, when the first real census—including population characteristics—was taken. It was followed by nine more complete censuses, spaced at irregular but close to ten-year intervals, the last one being taken in 1951. Similarly the registration of births and deaths was first instituted, on a country-wide basis, in 1860.

Paradoxically, this long demographic activity does not seem to have played an important role in the life of the Nation. Until very recently the Administration showed little interest in the work of the statistical organization, and statistical data were treated as mere historical facts and not as components for planning social and economic development. The failure to recognize the value of national statistics and population analyses as factors for general progress may account for the poor quality of the data and the long delays in the publication of statistics. Furthermore, repeated interruptions of the statistical work occurred in times of national crises, which struck Greece in the form of many wars or prolonged periods of political and economic unrest during the years under review.

Consequently, the stock of the background statistical material, which may serve as a basis for a study of the population

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of Greece and the evaluation of its past and future trends, is restricted to the following two series of data:[2]

1. The age-sex composition of the population, as found in the censuses of 1861, 1870, 1879, 1889, 1896, 1907, 1920, 1928, 1940 and 1951, and

2. the records of an intermittent registration of vital events, covering the periods 1860-1885, 1921-1940 and 1950 to date.

Unfortunately, there are both quantitative and qualitative limitations of the data, the most pronounced of which are those due to an incomplete count of the universe intended to be measured in each case. For example, all the censuses taken prior to 1920, show an unlikely preponderance of males, in spite of the fact that the preceding male emigration should have reduced the numbers of this sex appreciably. Similarly, an under-registration of vital events resulted in rates which for most of the period, are too low and not compatible with the trend of population development as depicted in the census series.

Imperfect as this set of population statistics may be, it nevertheless provides a way of approach toward gaining some insight into the real structure and dynamics of the population. This is achieved by interlocking the census data in their true perspective, so that cohort variations may be followed in chronological sequence. Thus, the juxtaposition of the age-sex composition of successive censuses, against the common year of birth of individual cohorts helps in depicting their true course, so that errors committed during the enumeration may be distinguished from real population changes. Additional help in this respect is derived from the sex ratios by age groups, which, under normal conditions, vary in a more or less standard pattern.

From a cursory examination of Figure 1 it may be seen that

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[2] The schedules of the 1896 census were destroyed by fire before the sex-age structure of the population could be derived; the sex-age structure of the 1940 population was derived by a 10 per cent sample of the schedules which were later lost during the military occupation of the country. For sources *see:* STATISTIQUE ANNUAIRE DE LA GRÉCE, 1930–1939; STATISTICAL YEARBOOK OF GREECE, 1955–1957; and UNITED NATIONS POPULATION STUDIES No. 26; THE AGING OF POPULATIONS AND ITS ECONOMIC AND SOCIAL IMPLICATIONS. New York, 1957.
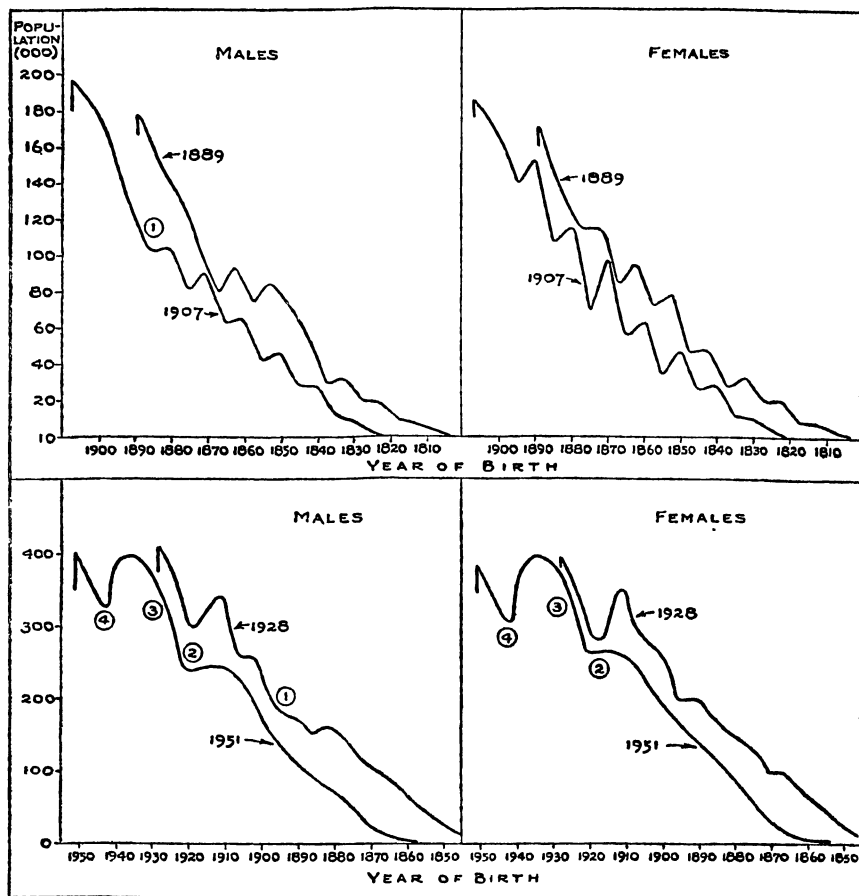
Fig. 1. Selected population profiles in quinquennial age groups. Greece, census returns of 1889, 1907, 1928 and 1951. (Circled numbers indicate abrupt population changes, *see* text.)

in addition to an obvious under-enumeration of the infant population in almost every census, at nearly all ages females were omitted on a much larger scale than males, in all censuses taken prior to the first World War. The reporting of age appears also to have been poor during this early period. The years of age ending in zero or five were strongly favored, especially for females, as is evident in the saw-edged profiles and the corresponding diagrams of sex ratios in Figure 2. Also, the thinning out of the male population in the ages around 20 years—that is the age group out of which the conscripts for
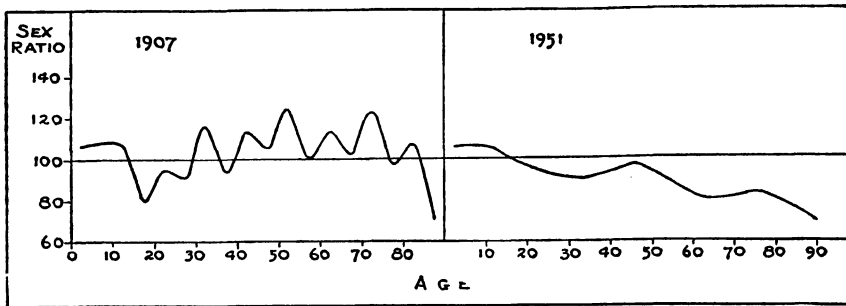
Fig. 2. Males per 100 females in quinquennial age groups. Greece, census of 1907 and 1951.

military service were chosen—appears to be the result of a strong bias against reporting this particular age. The presentation not only exposes the erratic nature of these irregularities but also provides some indication as to the probable order of magnitude of the error committed in each case.

Beginning with the 1907 census some of the irregularities in the profiles are repeated systematically in later censuses and are located *always at the same level as the year of birth of the affected cohort.* They reflect real population changes caused either by mass migratory movements or by severe disturbances in the balance of births and deaths. Some of these permanent deformities are marked in the graph and reflect: (1) mass overseas emigration of young males during the first two decades of this century, (2) decline of fertility during the five-year period prior to 1920, (3) accelerated fertility due to the influx of refugees in 1922–1924, and (4) a second curtailment of fertility which occurred during the second World War. As in the previous case, this presentation provides some indication as to the nature and the relative importance of the underlying demographic event, but that is the most one can get from reading the shape of successive population profiles.

A quantitative documentation of these population scars should be available from the returns of a registration system in which births, deaths, and migrants were promptly and accurately recorded. But none of the events mentioned above is substantiated by the relevant statistical data, since the regis-

tration system in Greece was either out of commission or poorly functioning at the time of their occurrence. In fact during the first period of enforcement of the registration of vital events, between the years 1860 and 1885, the quality of data produced never was very good and appears to have gradually deteriorated rather than improved. After a long interlude registration was resumed in 1921 but only after 1930 can returns be considered as virtually complete. The system collapsed again when the country was overrun by the Axis forces in 1941, and did not revive until after 1950. Thus, for the greater part of this period, including years of major demographic disturbances, the population of Greece was evolving in a vacuum, in which no direct information either on its trends or on its demographic mutilations could be obtained. The reconstruction of this more or less unknown demographic history and the filling in of some important demographic gaps are attempted in the following pages by making use of an indirect method developed a few years ago in the United Nations Secretariat.

THE METHOD

The main feature of this method consists in the fact that age and sex specific mortality varies, under normal conditions, in an orderly manner and in direct association with the life expectancy of the population concerned.[3] A standardized expression of this variation may be found in a series of *survival ratios,* computed for a number of model stationary populations with a predetermined life expectancy at birth. (*See* Appendix Table I) Though the mortality trends of actual populations at a given time may not fit exactly any of the theoretical patterns, experience shows that in the long run the sequence of the various cohorts—in the absence of migration—follows closely the general trend described by this theory.

[3] Among the literature so far published in this respect *see:* United Nations, AGE AND SEX PATTERNS OF MORTALITY, MODEL LIFE TABLES FOR UNDERDEVELOPED COUNTRIES. New York, 1955, XII, 9; United Nations, METHODS FOR POPULATION PROJECTIONS BY SEX AND AGE. New York, 1956, XII, 3; Valaoras, V. G.: Standard Age and Sex Patterns of Mortaltiy. *In* TRENDS AND DIFFERENTIALS IN MORTALITY. New York: Milbank Memorial Fund, 1956, pp. 133–149; and Valaoras, V. G.: A Comparative Study of Actual Versus Stationary Populations. *Bulletin of the International Statistical Institute,* 36, part 2, pp. 198–217.

In applying this method to the population of Greece, the returns of successive censuses for each sex separately were first graduated by plotting the data in single years of age, against the scale of year of birth of corresponding cohorts. When only quinquennial age groups were available, a conversion to single-year data was obtained by graphical graduations. Most of the errors arising from misstatement of ages could be easily identified and, therefore, eliminated by suppressing fictitious deflections of successive profiles from their expected quasi-parallel course. At the same time errors due to under-enumeration of persons in certain age groups became evident, together with their location in the scale of age and also their approximate order of magnitude.

Correction of these errors was achieved with the finding of the appropriate survival ratios pertaining to the affected cohorts at the given chronological period. The search for a suitable series of survival ratios which could fit the observed inter-censal population changes, proceeded in the following manner: Quinquennial age groups of the first census were projected five or ten years later and those of the second census were retroceded accordingly, until the returns of each census were duplicated with parallel series of corresponding theoretical data. The series of survival ratios which gave the closest conformity with the census data was chosen as the most likely mortality pattern that affected the population during the given period. Maximum conformity was sought particularly among age groups which normally are not affected by significant migratory movements.

Once the mortality pattern pertaining to each period was decided upon, estimates of population by quinquennial age groups were computed for the first day of each calendar year ending in zero or five. The waning of the cohorts with advancing age could then be followed along the axis of time, thus providing a continuous flow of population estimates, by sex and age groups, within periods of unchanged area for the country as a whole. A break of this continuity occurred whenever the

national boundaries were extended to include newly liberated provinces. In these cases the newly added population could be roughly estimated by comparing the population data of the enlarged area against those expected to occur, had the area never changed.

Estimates were prepared independently for each sex but those for females were later adjusted in certain cases to conform with a more plausible sex ratio by age groups, in accordance with international experience. This operation was particularly needed in the case of the earlier censuses in order to rectify the obvious under-enumeration of the females. Also, by a simple reversal of the process, the number of live births out of which sprang the estimated number of children under the age of five years, was derived by applying the corresponding survival ratio to the first quinquennial age group.

Data on net migration can also be derived from the same method. Since the survival ratios are taken to express the effect of a normal mortality alone, any systematic deviation of the theoretical data from those obtained in the census, can result from either an abrupt change in the mortality pattern or a sizable migration. An example in this respect was first found in the 1907 census, where the male population in the age groups between 10 and 30 years was significantly smaller than that derived by the survival ratios. If the hypothesis of an excess mortality affecting exclusively these age groups while sparing the rest of the population, is dismissed, then a mass emigration of young male workers remains as the only reasonable explanation of this population loss, and history corroborates this finding.

In a similar way the volume of the refugee population which flooded the country in 1922-1924 and that of the war losses during the period 1940-1949 were computed by bringing the two marginal population, i.e. the population at the beginning and at the end of the period, into contact at a certain specified date. The difference obtained was taken to express the estimated population involved in each particular event. It is worth noting that such estimates are possible only if the demographic

disturbance is sandwiched between two fairly reliable censuses, the returns of which can serve as guiding points for the computations. The lack of relevant reference data prevented an estimate of the population changes which occurred between 1910 and 1920. Finally, the 1951 census population was projected into the near future, under the assumptions of a slowly declining fertility and a normal sequence in the series of survival ratios.

The reliability of this method depends on the overall accuracy of the basic census data and the correct selection of the mortality patterns which are brought into action in successive periods. Even if both these factors were unblemished, the result obtained might still differ from reality, since the individualities of a living population may vary beyond the rigid limits set up in an artificial model, whose main function is to give only linear trends of mortality. However, in the case of Greece, where official statistics are not adequate, the method enables one to enlarge substantially the existing body of population data, eliminate most of their inherent errors and fill in statistical gaps, thus restoring a more or less coherent demographic series for the entire period. With due regard to its limitations, the method provides a useful tool for supplementing fragmentary demographic series, and thus, assists in the study of insufficiently documented populations.

THE FINDINGS

A continuous series of population estimates for Greece by sex and age groups is given in Appendix Table II, and Figures 3 and 4, covering the period between 1860 and 1965. The result obtained, though not perfect, is undoubtedly more informative and of a better quality than the original data on which it was based. Because of a tightly interlocked system of relationships, most of the random or systematic errors of the various censuses are cancelled out of the processed data. Furthermore, the regular sequence of these estimates makes it possible to reconstruct sufficiently well the demographic history of the country, including some turbulent periods during which important demo-
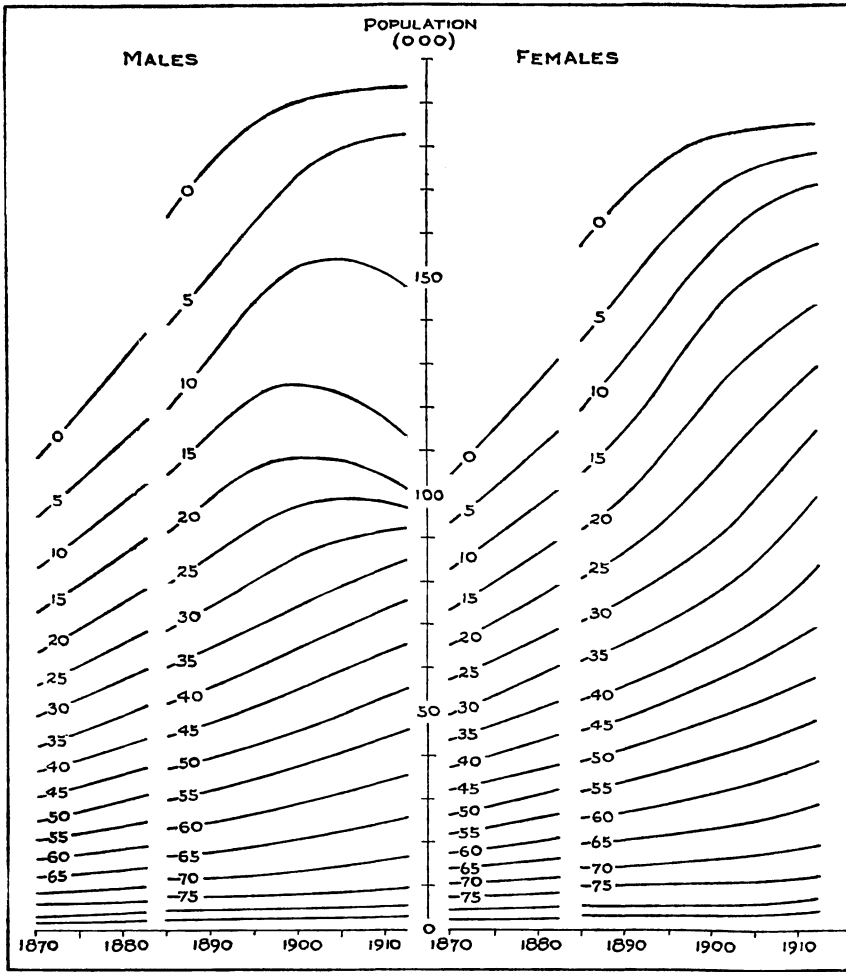
Fig. 3. Estimated population evolution by sex and age groups, Greece, 1870–1912. (0 = 0–4 years of age; 5 = 5–9 years; 10 = 10–14 years; etc.)

graphic events produced sharp deviations from the normal structure, and the dynamics of this population.

During this period the population of Greece underwent repeated and abrupt changes. The initial area of 47,516 square kilometers in 1860, grew to 132,562 in 1950, but this almost three-fold increase of the area was more than matched by a seven-fold increase of the total population. A large part of this increase—about 2.6 million persons—came as a result of the gradual integration within the national boundaries of sister
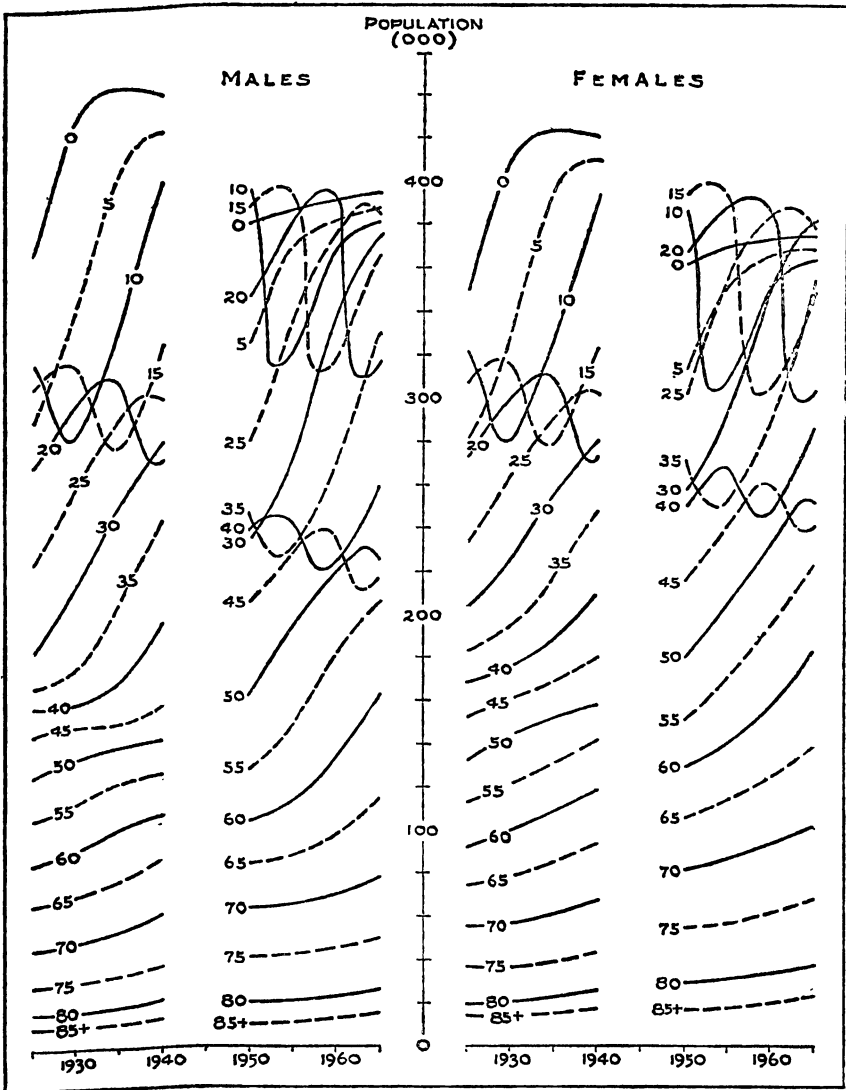
Fig. 4. Estimated population evolution by sex and age groups, Greece, 1925–1965. (0 = 0–4 years of age; 5 = 5–9 years; 10 = 10–14 years, etc.)

provinces previously under foreign domination. Furthermore the exchange of populations under the Treaty of Lausanne in 1923, brought into the country more than one million refugees from Asia Minor, Eastern Thrace, and Southern Bulgaria. Against these assets the population suffered repeated losses,

first, through a mass overseas emigration which depleted the male labor force in the early years of this century and, second, during the two World Wars which, for Greece lasted longer and proportionally cost more, in terms of lives lost, than for any other country taking part in these Wars. The combination of these events explains why the rate of population growth was never very high, being on the average slightly over 1 per cent per year.

1. *The Volume of the Abrupt Population Changes.* The estimated numbers of persons involved in some of the major population changes that occurred in Greece during this period, are given in Table 1. Thus, the addition of the Ionian Islands in 1864 and of Thessaly and Arta in 1881, increased the total population by 17 and 14 per cent, respectively. The intense overseas emigration which began at the turn of the century and continued unabated until after 1920, resulted by mid-year of

Table 1. Persons (in thousands) estimated to be involved in the specified population changes in Greece. (Year or period of reference is given in parenthesis.)

Age Groups	Ionian Islands Annexed in 1864	Thessaly and Arta Annexed in 1881	Cumulated Losses Due to Net Migration (June 30, 1912)		Refugee Immigration (1922–1924)		War Losses (1940–1949)	
			Males	Females	Males	Females	Males	Females
TOTAL	200.2	254.3	222.9	29.3	537.9	576.3	490.0	354.5
0– 4	30.1	37.9	—	—	52.1	49.6	60.4	57.6
5– 9	24.2	32.0	—	—	54.8	53.4	103.5	100.5
10–14	20.5	25.9	27.4	2.0	56.0	55.2	25.7	24.7
15–19	18.4	22.6	53.0	8.8	53.8	53.9	23.7	12.2
20–24	16.6	19.7	51.9	9.2	50.5	51.6	47.6	20.6
25–29	14.8	17.8	39.0	6.4	46.6	48.5	41.4	23.5
30–34	13.1	16.1	25.4	2.9	40.7	45.2	35.3	24.4
35–39	11.6	14.7	14.6	—	35.0	41.1	31.9	22.1
40–44	9.5	13.6	7.2	—	31.4	36.3	28.5	17.0
45–49	8.8	11.5	3.2	—	27.7	31.7	22.9	12.6
50–54	7.4	11.6	1.2	—	23.7	27.6	17.7	8.5
55–59	6.4	8.2	—	—	19.3	23.4	13.5	6.9
60–64	5.2	7.8	—	—	15.6	19.6	10.6	6.2
65–69	4.7	5.8	—	—	12.8	15.2	9.0	5.8
70–74	3.7	3.9	—	—	9.3	11.8	7.3	5.0
75–79	2.7	2.5	—	—	5.3	6.7	5.7	3.8
80+	2.5	2.7	—	—	3.3	5.5	5.3	3.1
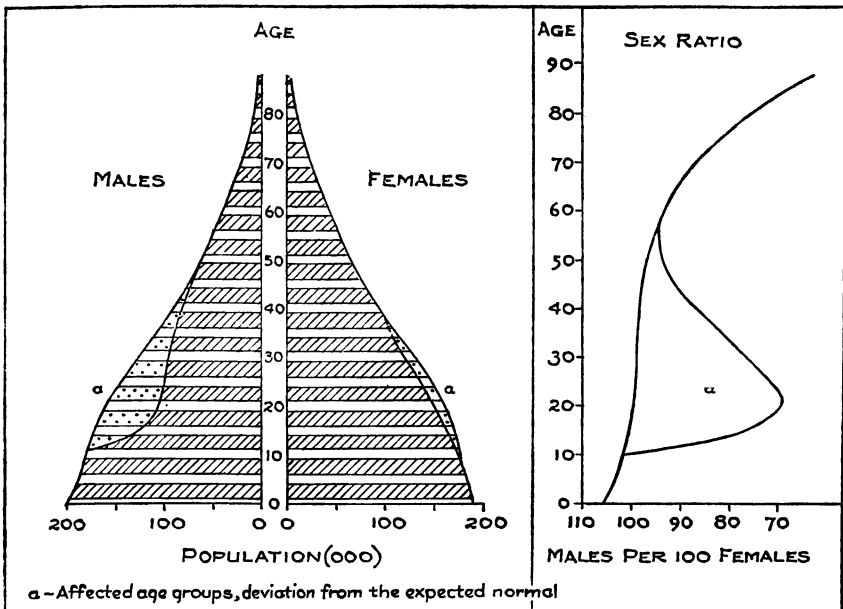
Fig. 5. Effect of emigration on the age structure and the sex ratio of the population of Greece, as of June 30, 1912. (a) = deviation from expected normal.

1912 in an 8.7 per cent reduction of the total population. No valid estimation of the total loss due to this emigration over its entire period of occurrence can be made at this time. However, its immediate effect upon the life of the nation appears to have assumed devastating proportions. Being highly selective as to sex and age groups, this emigration may be held responsible for the significant slackening of fertility and the general stagnation that afflicted the country, after the abortive war in 1897, until the beginning of the Balkan Wars in 1912. Figure 5 shows the large curtailment of the male population in the age group 15–40 and the dramatic disruption of the normal balance between the two sexes at this crucial age of the life span on which family formation and national production mostly depend.

Between 1912 and 1925, Greece experienced the most violent population changes in its history. Both the area and the population were more than doubled in the course of a long war which began successfully in 1912 and ended in defeat in 1922. Against

these gains, the population as a whole suffered considerable losses in addition to those caused by direct war action. In fact the data suggest a huge mortality among the civilian population, as the result of a widespread food shortage caused by an international blockade as well as of the influenza epidemic which swept the country in 1918–1919. Unfortunately, not even a rough estimate of the volume of these losses is possible, because quantitative data on any of the diverse factors involved are lacking.

The influx of refugees following the agreement on exchange of population between Greece, on the one hand, and Turkey and Bulgaria on the other, increased the 1925 population by 23 per cent. In the course of this heavy immigration, an unspecified number, probably a few hundred thousand, of persons of Turkish and Bulgarian extraction left the country. The settlement of such a formidable number of refugees, most of whom were completely destitute on their arrival, was almost too great to be borne by the frail economy of the small country. Nevertheless, the tenacity of the population together with some international assistance made it possible within a few years to turn this serious demographic adversity into a revitalizing factor that marks the beginning of a vigorous growth of both the population and the economic development of the country.

This turn of events was again interrupted by the second World War, which brought about a tripartite occupation of the country, a general famine, a prolonged communist uprising, and a systematic destruction of the national wealth. By 1950, the population was short by about 10 per cent of the expected total or, in actual numbers, by more than eight-tenths of a million (600,000 missing persons and 240,000 never born), because of excessive mortality, forced emigration and curtailed fertility.[4] Undoubtedly, the largest loss was caused by an acute

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[4] A frequent cancellation of the menstrual cycle among females in the reproductive age, observed in Athens during the acute phase of the famine, indicated that temporary sterility was largely responsible for the significant decline of fertility. *See:* Valaoras, V. G.: Some Effects of the Famine on the Population of Greece. Milbank Memorial Fund *Quarterly,* July, 1946, xxiv, No. 3, pp. 215–234.

food shortage during the Axis occupation and the resultant general famine, which plagued the nation for more than two calendar years, but losses also were due to direct war action and forced emigration such as the abduction, in 1948-1949, of tens of thousands of young children by the retreating Communists.

2. *The Rate of Population Growth.* A summary of the principal population characteristics at five year intervals, since 1860, is given in Table 2. The average rate of population increase, computed on homologous populations within each period, was over 1.5 per cent per year prior to 1900. It declined

Table 2. Summary of principal population characteristics, Greece, 1860–1965. (Numbers in thousands). Dependency ratio: Dependents in the age groups under 15 and over 65, per 100 persons in the age group 15–64.

Year	Total Population (January 1st)	Per Cent Annual Increase[1]	Males per 100 Females	Population in Age Groups			Per Cent in Age Groups			Dependency Ratio
				0–14	15–64	65+	0–14	15–64	65+	
1860	1,103.8		99.4	426.9	631.6	45.3	38.7	57.2	4.1	74.8
1865[2]	1,372.4	1.24	99.2	525.4	782.8	64.2	38.3	57.0	4.7	75.3
1870	1,474.5	1.49	99.3	567.3	840.1	67.1	38.5	57.0	4.5	75.5
1875	1,593.0	1.61	99.3	618.1	904.1	70.8	38.8	56.8	4.4	76.2
1880	1,727.8	1.69	99.3	676.1	976.7	75.0	39.1	56.5	4.4	76.9
1885[3]	2,121.3	1.61	99.3	832.3	1,194.7	94.3	39.2	56.3	4.5	77.6
1890	2,294.1	1.63	99.3	906.8	1,288.8	98.5	39.5	56.2	4.3	78.0
1895	2,473.2	1.56	98.7	974.7	1,394.6	103.9	39.4	56.4	4.2	77.3
1900	2,632.3	1.29	96.0	1,022.3	1,499.9	110.1	38.8	57.0	4.2	75.5
1905	2,760.2	.97	92.5	1,050.2	1,593.0	117.0	38.1	57.7	4.2	73.3
1910	2,860.7	.73	88.7	1,057.9	1,677.3	125.5	37.0	58.6	4.4	70.6
1915	..	..	..	..	..	..	..	..	..	..
1920[4]	4,550.4		96.5	1,565.0	2,690.4	295.0	34.4	59.1	6.5	69.1
1925[5]	5,951.9	1.26	96.4	1,931.5	3,647.7	372.7	32.4	61.3	6.3	63.2
1930	6,408.0	1.53	97.0	2,086.9	3,929.3	391.8	32.6	61.3	6.1	63.1
1935	6,886.5	1.49	97.5	2,340.8	4,125.7	420.0	34.0	59.9	6.1	66.9
1940	7,363.2	1.38	97.8	2,492.4	4,402.1	468.7	33.8	59.8	6.4	67.3
1945	..	..	..	..	..	..	..	..	..	..
1950[6]	7,545.5		94.4	2,164.7	4,864.2	516.6	28.7	64.5	6.8	55.1
1955[7]	7,930.3	1.02	95.3	2,120.2	5,265.5	544.6	26.7	66.4	6.9	50.6
1960[7]	8,344.7	1.05	96.0	2,240.2	5,514.4	590.1	26.8	66.1	7.1	51.3
1965[7]	8,754.7	.98	96.6	2,274.9	5,819.5	660.3	26.0	66.5	7.5	50.4

Note: (..) Data not available or not computed.
[1] Annual increase: average within period and same area.
[2] Territorial increase (Ionian Islands, annexed in 1864).
[3] Territorial increase (Thessaly and Arta annexed in 1881).
[4] Territorial increase (Epirus, Macedonia, Thrace, Aegean Islands and Crete, annexed in 1913-20). Indigenous population only, excluding persons later emigrated in exchange of refugees.
[5] Including refugees.
[6] Territorial increase (Dodecanese Islands annexed in 1947).
[7] Population projection.

sharply when the mass overseas emigration assumed substantial proportions, in spite of a still large biological balance resulting from the excess of births over deaths. Undoubtedly, this balance eventually had to follow the same downward trend, thus posing a serious question on the population's future, if these trends were to continue much longer. The outcome of the Balkan Wars enlarged considerably the demographic framework and although the migration losses continued for several more years, their effect upon the population became proportionally smaller.

However, the disastrous events which followed the first World War accentuated the decline in the rate of population increase, and may have stopped any increase. Only after the refugee immigration did the rate emerge again into a definitely positive phase, resuming, by 1930, its former level of 1.5 per cent per year. Since this turn of events was mostly due to the more prolific behavior of the refugees,[5] the gradual adaptation of these newcomers to the customs and the living conditions of the indigenous population resulted in a second decline of the rate of population growth which, in 1940, was at the level of 1.38 per cent. The rate fell again into a negative phase during the period of the second World War and then reversed to a slow upward trend to reach a level of about 1.0 per cent per year for the period after 1950.

3. *Sex and Age Composition.* The sex and age composition of the population also reflects its turbulent demographic history. Until the turn of the century both the sex ratio and the age composition were practically stable, with about 99 males per 100 females in the total population, a heavy proportion of children under 15 and very few old persons. Sizable deviations from this pattern began with the mass overseas emigration which reduced significantly the sex ratio and the proportion of children. As a result of subsequent events, most of which affected more males than females, even today the population of

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[5] *See:* Valaoras, V. G.: THE DEMOGRAPHIC PROBLEM OF GREECE AND THE EFFECT OF THE REFUGEE IMMIGRATION. Monograph in Greek, published in Athens, 1939.

Greece suffers from an unbalanced sex composition, and the male population in 1955 was short by about 150,000 persons from its expected normal number.

With respect to the age composition, an interesting trend had established itself with the consolidation of the population after the acclimatization of the refugees. On the eve of the Balkan Wars in 1912, the sex ratio dipped to the level of 87 males per 100 females and of every 100 persons there were on the average 36.5 children under the age of 15; 59.0 adults 15–64 years old and 4.5 old persons over the age of 65. The age composition was virtually the same in 1890, the three percentages were 39.5, 56.2 and 4.3, respectively. The proportion of children has subsequently been decreasing progressively while the proportion of the aged was increasing slowly. *See* Figure 6. In 1955 there were about 27 children and 7 old persons per 100 individuals of all ages, thus leaving a substantially increased balance of 66 persons in the working ages between 15 and 64 years. Such shifting in the age composition usually generates conditions which tend to favor the efficiency of the population. On the one hand it reduces the dependency burdens of the average family while on the other, it increases the volume of the potential labor force, thus promoting total productivity and economic development in general.

The relationship between "producers" and "consumers" is better illustrated in the so-called "dependency ratio," which expresses the number of dependents (those under 15 and over 65 years of age) per 100 persons in the age brackets of 15 to 64. Since the labor force is drawn from this last group of men and women in the working age, any change favoring this group at the expense of the other, is likely to bring forth an accelerated production, an increase in the volume of capital formation and a betterment of the level of living in general.

Up to the turn of the century there were 75 or more dependents per 100 persons in the working ages, a ratio obviously too high to allow for significant improvements in the levels of living. Because of the presence of a relatively large number of
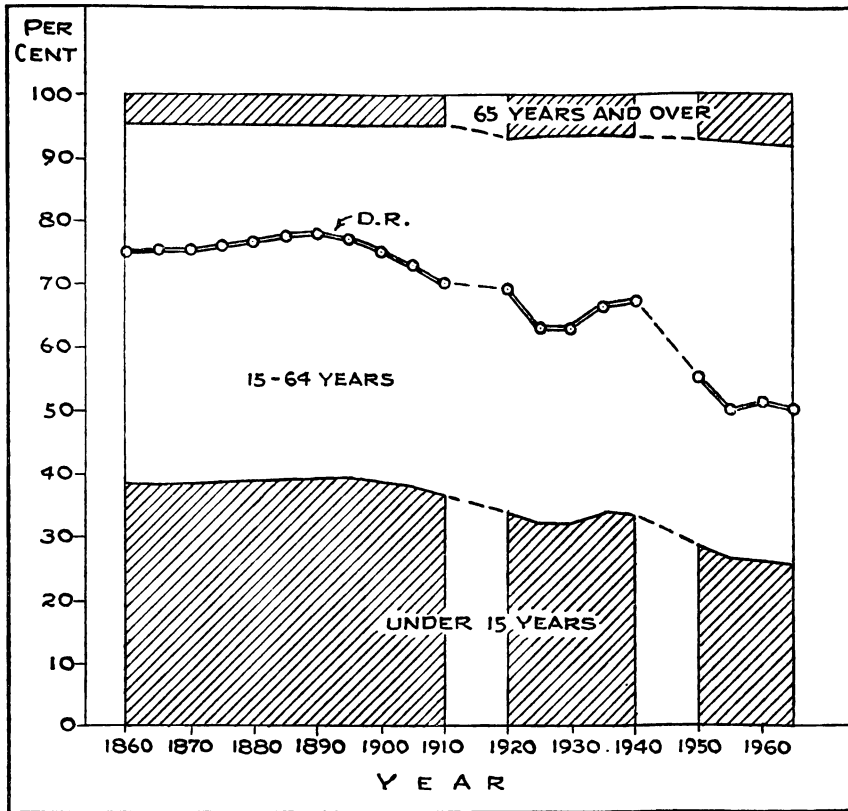
Fig. 6. Age composition of population and dependency ratio (D.R.), Greece, 1860–1965.

children, the energy of the "producers" was spent almost entirely in meeting the primary needs for food, shelter, and clothing, with little or no margin left for activities on which material expansion mostly depends. This margin was further reduced during the period of emigration, as it depleted heavily the most potent segment of the labor force, i.e. the male workers between the ages of 15 and 40 years. Only after the settlement of the refugees in 1930, did a lessening of the dependency burdens become evident and only after 1950 was this ratio reduced to a level of about one dependent for each man of the working age.

  These changes in the age composition reveal a trend toward population maturity, which sometimes is taken as a prerequisite of economic development. This "maturity" is the

result of a prolongation of the working life on the one hand, and the abandonment of a wasteful pattern of population replacement, on the other. These changes may be followed in the trends of the vital rates.

4. *The Vital Rates.* As one might expect, the crude rates of births and deaths were fluctuating at high levels during the early part of the period, but later they declined rather rapidly. *See* Table 3. Until the turn of the century, there were about 40 live births against 25 deaths per 1,000 population each year. Both these rates declined slightly during the period of intense emigration, and probably crossed each other abruptly during the second decade of this century. The interwar period is

Table 3. Estimated annual numbers (average within each quinquennial period) and approximate rates of vital events, Greece, 1860–1965.

Period	Estimated Numbers (000)						Rates				Life Expectancy at Birth (Both Sexes)
	Mid-Period Population	Live Births	All Deaths	Excess of Births	Infant Deaths	Net Migration	Live Births	All Deaths	Infant Deaths	Gross Reproduction[1]	
1860–64	1,138.0	43.9	30.2	13.7	8.7	—	38.6	26.5	198.2	..	35.7
1865–69	1,423.4	55.7	35.3	20.4	11.0	—	39.1	24.8	197.5	..	35.9
1870–74	1,533.7	61.1	37.4	23.7	12.0	—	39.8	24.4	196.4	..	36.2
1875–79	1,660.4	67.1	40.1	27.0	13.0	—	40.4	24.2	193.7	..	36.6
1880–84	1,797.4	73.3	45.5	27.8	14.0	—	40.8	25.3	191.0	..	37.1
1885–89	2,207.7	89.1	54.6	34.5	16.7	—	40.4	24.7	187.4	..	37.7
1890–94	2,383.9	93.0	55.6	37.4	17.0	− 1.6	39.0	23.3	182.8	..	38.5
1895–99	2,552.7	94.7	55.6	39.1	16.8	− 7.3	37.1	21.8	177.4	..	39.4
1900–04	2,696.2	95.0	55.5	39.5	16.4	−13.9	35.2	20.6	172.6	..	40.4
1905–09	2,810.4	94.5	57.1	37.4	15.7	−17.3	33.6	20.3	166.1	..	41.2
1910–14	..	..	..	..	..	..	..	..	..	..	..
1915–19	..	..	..	..	..	..	..	..	..	..	..
1920–24[2]	4,694.5	147.2	99.7	47.5	21.8	..	31.4	21.2	148.1	..	45.2
1925–29	6,180.0	200.5	107.7	92.8	26.5	− 1.6	32.4	17.4	132.2	2.31	48.2
1930–34	6,647.2	201.9	110.0	91.9	24.6	+ 3.8	30.4	16.6	121.8	2.12	50.3
1935–39	7,124.8	196.7	103.8	92.9	21.4	+ 2.4	27.6	14.6	108.8	1.88	52.8
1940–44	..	..	..	..	..	..	..	..	..	..	..
1945–49	..	..	..	..	..	..	..	..	..	..	..
1950–54	7,724.4	163.2	77.2	86.0	8.7	− 9.0	21.1	10.0	53.3	1.34	62.1
1955–59	8,124.0	162.0	77.2	84.8	6.8	− 1.9	19.9	9.5	42.0	1.21	65.0
1960–64	8,549.7	161.1	78.0	83.1	6.0	− 1.0	18.8	9.1	37.2	1.16	66.6

Notes: All data refer to population within the same area as in the initial year of each period. (—) Quantity nil or near zero. (. .) Not computed.
[1] Computations of GRR; period 1925–1940: in accordance with distribution of birth by age of mother of year 1928; period 1950–1965: in accordance with that of 1956.
[2] All numbers refer to population within the area of the Treaty of Lausanne but excluding population exchanged between 1922–1924.
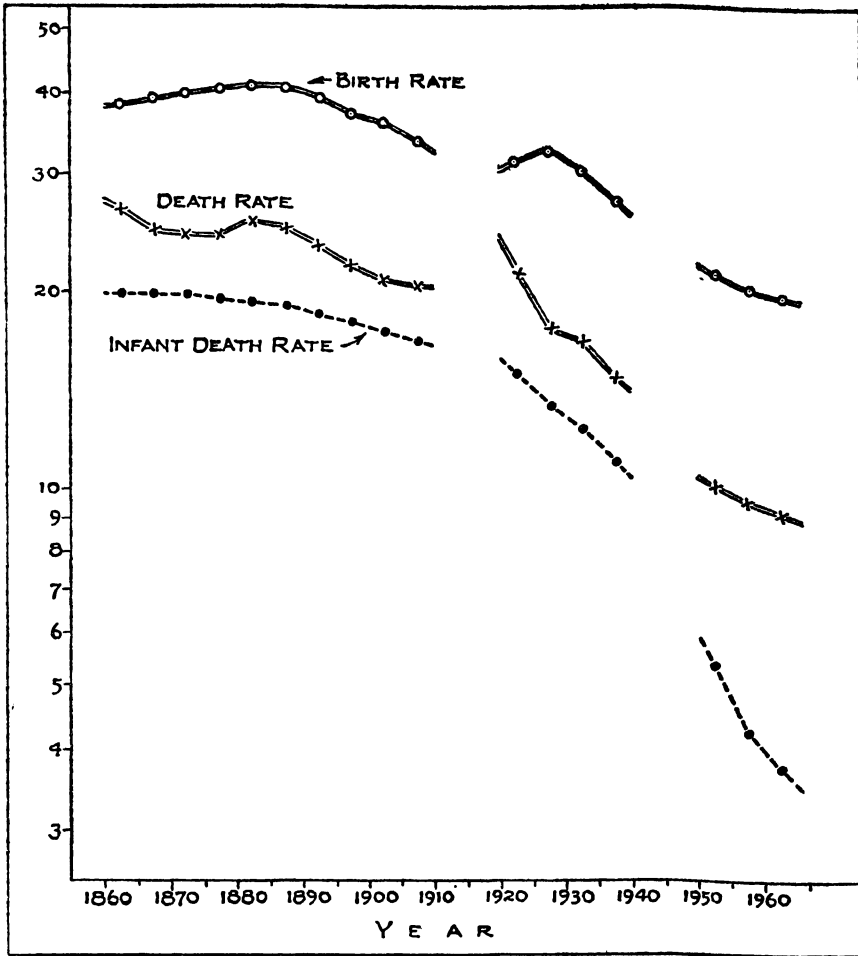
Fig. 7. Estimated birth and death rates per 1,000 population and infant death rates per 100 live births, Greece, 1860–1965. (Semilogarithmic scale.)

marked by a swift decline of mortality accompanied by a smaller reduction of fertility. After a temporary reversal of these trends during World War II, the decline was resumed in the years after 1950 from the level of about 20 live births and 10 deaths per 1,000 population. *See* Figure 7. In spite of these declines there still is an ample margin of population increase— some 80,000 persons per year—which in terms of life potentials can sustain an expanding economy more efficiently than the slightly larger increase which characterized the pre-war period.

The more refined rate of infant mortality shows a continuous downward trend from about 200 infant deaths per 1,000 live births in 1860, to about 45 in 1955. It represents a remarkable achievement of the people of Greece in their effort toward raising their standards of health, which today compare favorably with those of many other Western countries. The battle against premature death and the control of preventable death are well on their way toward success, as an overwhelming majority of deaths (more than two-thirds) now occur among persons over 50 years old, and deaths caused by infective and parasitic diseases have been reduced to an insignificant proportion of about 5 per cent of all deaths. Twenty years earlier, only one-third of the deceased were over 50 years of age, and one-fourth of all deaths were caused by diseases which could be prevented.

The aggregate result of this progress is reflected in the virtual doubling of the life expectancy at birth since 1860. Today the average new-born infant in Greece has a reasonable chance to celebrate its 65th birthday and this amounts to a gain of about 15 years of life over what an infant, born before 1940, could have expected. This, in combination with the fact that the average mother, in 1955, could achieve her task toward replenishing the population with only 1.2 baby girls instead of 2.1 needed in 1935 (the gross reproduction rates) exemplifies the long way this population has already covered in adapting itself more efficiently to the potentialities of its environment.

Comparison of these estimates with the official data may throw some light on the reliability of the method used. Reference to the limitations and the advantages of this method was made earlier. From this it may be deduced that while strict conformity between registered and theoretical data cannot always be expected, general levels and trends should agree with each other within a small margin of deviation. With these qualifications in mind an approximate estimate of the completeness of the registration of births and deaths is shown in Table 4.

Allowing for a margin of about 5 per cent error in the series

of the estimated rates, the overall variability of the completeness of the registration of vital events in Greece turns out to be as expected, save for the period after 1950. For this period it is difficult to explain why births are reasonably well registered while the registration of deaths is lagging far behind the expectation. A death rate higher than the official is nevertheless suggested by the tabulation of deaths by provinces as well as by the mid-year official population estimates by sex and age groups, already published for 1955 and 1956. Furthermore, since 1954, when the new Statistical Service of Greece began its full-scale operation, the annual numbers of deaths appear to be on the increase. Whether this is an indication of an improving coverage of deaths or whether other factors are responsible for this discrepancy is a matter for further research. In the meantime the results obtained by this analysis may be taken as a first approximation of the demographic history of Greece over the last 100 years. It tells a story of violent demographic reverses and interesting recoveries, which, in spite of the country's long tradition of population statistics, was little known in its main composites or its overall trends.

Table 4. Comparison between registered and estimated birth and death rates, in Greece, 1860–1957.

PERIOD	BIRTH RATE			DEATH RATE		
	Registered	Estimated	Per Cent Registered	Registered	Estimated	Per Cent Registered
1860–64(a)	28.7	38.6	74.4	20.6	26.5	77.7
1865–69	29.0	39.1	74.2	21.3	24.8	85.9
1870–74	28.3	39.8	71.1	21.1	24.4	86.5
1875–79	27.6	40.4	68.3	19.0	24.2	78.5
1880–84	23.1	40.8	56.6	16.8	25.3	66.4
1885–89(b)	34.7	40.4	85.9	24.3	24.7	98.4
1920–24(c)	20.2	31.4	64.3	15.6	21.2	73.6
1925–29	29.3	32.4	90.4	16.3	17.4	93.7
1930–34	30.0	30.4	98.7	16.6	16.6	100.0
1935–39	26.5	27.6	96.0	14.4	14.6	98.6
1950–54	19.4	21.1	91.9	7.2	10.0	72.0
1955–59(d)	19.4	19.9	97.5	7.4	9.5	77.9

Registration Period: (a) 1860, 1861 and 1864.
                            (b) 1889 and 1890 (provisional data.)
                            (c) 1921–1924.
                            (d) 1955–1957.

CONCLUSIONS

Some 130 years ago Greece, a tiny nation of not more than three-quarters of a million persons, began to shape its newly-won statehood, while eking out a poor livelihood in the midst of terrific odds. The time of one full generation was spent in the first *formative* stage, at the end of which the population reached one million. However, demographic data were practically non-existent and it is difficult to determine how much of that population increase was due to the return of former expatriates and how much to natural increase.

A second stage, that of a *mounting population pressure and territorial expansion,* began after 1860 and proceeded slowly until the second decade of this century, when the area and the population of Greece grew abruptly to more than double their former size. During most of this period and more specifically between 1880 and 1912, the pressure of a moderately growing population upon its limited resources, became increasingly evident. The chronic unemployment, wide-spread poverty, and social apathy were only partially alleviated by a mass overseas emigration. The basic problem was that of a growing disequilibrium between population and resources. It was only as a result of the subsequent territorial expansion and of a rudimentary industrial development, that a new outlook emerged and that further demographic deterioration of possibly grave national consequence was halted.

During the latter part of the inter-war period this population entered into its third stage of development, which may be labelled as one of *progressive maturity*. Notwithstanding the repeated setbacks suffered during this period, the population was gradually becoming more efficient in its age composition and its objectives, while the economy was oriented toward more realistic plans of development. New industries and skills were created under the impact and the stimulus of the many needs, which still were not fully met, and agricultural output was pushed to levels not hoped for a generation ago. The small

nation is now striving along a difficult road leading to a relative prosperity for its people.

Appendix Table I. Cohort survival ratios derived from model populations at different levels of life expectancy at birth, by sex. (BS: both sexes; M: males; F: females.)

Cohorts e:	BS: 35.0		BS: 50.0		BS: 65.0	
	M: 34.1	F: 35.7	M: 48.4	F: 51.4	M: 63.2	F: 66.6
Birth to 0– 4	.7470	.7646	.8468	.8667	.9413	.9528
0– 4 to 5– 9	.8713	.8725	.9405	.9433	.9850	.9873
5– 9 to 10–14	.9620	.9607	.9829	.9834	.9938	.9949
10–14 to 15–19	.9633	.9605	.9815	.9817	.9924	.9941
15–19 to 20–24	.9529	.9487	.9737	.9740	.9890	.9909
20–24 to 25–29	.9437	.9405	.9685	.9690	.9869	.9884
25–29 to 30–34	.9348	.9346	.9655	.9664	.9856	.9869
30–34 to 35–39	.9266	.9282	.9616	.9636	.9832	.9846
35–39 to 40–44	.9172	.9211	.9551	.9596	.9779	.9812
40–44 to 45–49	.9043	.9127	.9448	.9535	.9688	.9755
45–49 to 50–54	.8859	.9016	.9289	.9433	.9546	.9660
50–54 to 55–59	.8583	.8840	.9040	.9257	.9333	.9513
55–59 to 60–64	.8147	.8534	.8657	.8949	.9009	.9270
60–64 to 65–69	.7502	.7996	.8089	.8425	.8528	.8871
65–69 to 70–74	.6603	.7217	.7239	.7650	.7836	.8212
70–74 to 75–79	.5444	.6188	.6122	.6606	.6865	.7239
75–79 to 80–84	.4104	.4856	.4843	.5342	.5603	.5980
80–84 to 85–89	.2656	.3386	.3418	.3901	.4155	.4477

AS OF JANUARY FIRST	SEX	ALL AGES	AGE GROUPS						
			0–4	5–9	10–14	15–19	20–24	25–29	30–34
1965[1]	M	4,302.5	394.0	388.8	381.2	368.0	317.3	384.0	375.6
	F	4,452.2	375.2	371.1	364.6	352.5	306.7	377.0	382.4
1960[1]	M	4,087.5	392.9	383.1	370.3	320.2	388.2	380.0	335.7
	F	4,257.2	374.2	365.7	354.0	308.8	380.3	386.3	357.7
1955	M	3,869.0	388.7	372.5	322.6	392.4	384.9	340.4	272.9
	F	4,061.3	370.2	355.7	310.5	383.6	390.6	362.2	297.5
1950[2]	M	3,663.2	380.8	325.3	396.2	390.4	346.2	278.0	234.5
	F	3,882.3	362.7	312.8	386.9	395.5	367.9	302.8	258.0
1940	M	3,641.5	441.0	423.3	403.3	328.4	272.7	299.7	280.2
	F	3,721.7	420.0	409.0	395.8	326.4	273.5	302.1	283.0
1935	M	3,399.5	444.5	409.3	335.8	279.1	308.2	289.0	252.4
	F	3,487.0	423.3	397.4	330.5	278.4	309.7	292.2	256.8
1930	M	3,155.0	434.0	341.5	284.2	316.3	298.1	261.2	214.6
	F	3,253.0	413.3	332.8	281.1	316.2	300.5	264.9	225.7
1925[3]	M	2,921.2	365.7	289.6	322.8	306.7	270.3	222.8	184.0
	F	3,030.7	348.3	283.6	321.5	307.6	273.3	234.0	202.9
1920[4]	M	2,234.9	257.4	275.3	259.6	229.1	183.6	149.6	139.7
	F	2,315.5	245.2	269.1	258.4	226.6	191.9	163.9	150.4
1912[5]	M	1,347.5	193.7	182.6	147.4	113.1	100.4	96.8	92.0
	F	1,554.4	185.0	178.1	170.9	157.1	143.9	130.5	115.7
1910	M	1,345.0	193.4	182.1	150.5	117.1	103.9	98.4	91.4
	F	1,515.7	184.7	177.7	169.5	155.7	141.4	126.4	110.3
1905	M	1,326.0	192.7	179.6	153.9	122.5	107.5	99.0	89.1
	F	1,434.2	184.0	175.2	164.8	150.3	133.6	116.3	99.4
1900	M	1,289.4	190.3	173.2	152.1	124.2	108.9	98.0	86.7
	F	1,342.9	181.8	169.0	155.9	141.2	123.2	105.0	89.3
1895	M	1,228.5	185.5	163.2	145.6	122.5	106.7	94.1	80.5
	F	1,244.7	177.2	159.2	144.0	127.4	110.3	94.9	81.3
1890[6]	M	1,143.3	176.6	150.9	132.4	114.9	99.4	86.2	74.6
	F	1,150.8	168.7	147.2	131.0	114.8	99.9	86.9	75.3
1885[6]	M	1,057.0	163.9	138.5	119.8	104.4	91.2	79.9	69.7
	F	1,064.3	156.5	135.1	118.5	104.3	91.7	80.5	70.4
1880	M	861.0	131.6	112.6	98.7	86.5	75.5	65.9	57.3
	F	866.8	125.7	109.9	97.6	86.4	75.9	66.4	57.9
1875	M	793.7	119.5	103.3	90.7	79.9	69.7	61.0	53.2
	F	799.3	114.1	100.8	89.7	79.8	70.1	61.5	53.7
1870[7]	M	734.5	108.7	95.4	83.6	73.7	64.8	56.7	49.3
	F	740.0	103.8	93.1	82.7	73.6	65.1	57.2	49.8
1865[7]	M	683.4	100.8	88.1	77.5	68.2	60.1	52.9	46.2
	F	689.0	96.3	86.0	76.7	68.1	60.4	53.3	46.7
1860	M	550.3	81.3	71.8	63.4	55.5	49.0	43.2	37.6
	F	553.5	77.7	70.0	62.7	55.4	49.2	43.5	38.0

Appendix Table II. Estimated population (in thousands) of Greece by sex and age groups, 1860–1965.

[1] Projections based on 1951 census and official estimates for 1955 and 1956.
[2] Including Dodecanese Islands, annexed in 1947.

					AGE GROUPS					
35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
331.1	263.5	218.4	226.6	206.0	164.3	115.9	77.6	49.1	26.1	15.0
353.4	288.6	243.0	251.7	224.8	184.6	141.5	103.3	69.2	38.6	24.0
268.5	224.6	236.4	219.6	181.3	134.9	98.0	70.4	45.6	24.3	13.5
293.1	248.3	259.5	235.2	197.8	158.0	124.2	93.9	63.1	35.3	21.8
229.5	243.8	229.8	194.1	149.6	114.7	89.6	66.2	43.2	21.9	12.2
252.9	265.8	243.2	207.7	170.2	139.7	114.0	86.8	58.7	32.3	19.7
250.6	238.5	204.5	161.4	128.4	106.2	85.9	64.5	40.4	20.3	11.1
272.1	250.5	216.2	180.1	152.1	130.3	107.6	82.9	55.6	30.1	18.2
243.8	197.3	160.3	141.7	126.8	107.4	86.6	60.5	36.2	20.2	12.1
249.0	211.0	180.5	159.0	140.9	118.4	95.4	68.8	43.9	26.4	18.6
206.6	168.8	151.7	139.3	122.6	100.8	76.8	52.9	32.4	18.1	11.2
218.2	188.0	169.3	152.4	132.7	109.5	85.6	61.8	40.0	23.9	17.3
176.5	160.4	149.8	135.4	114.5	91.9	70.1	48.9	30.8	16.3	10.5
195.5	177.0	162.6	145.0	122.7	100.5	79.8	58.3	38.9	21.9	16.3
168.4	159.1	146.3	127.1	106.6	85.1	66.3	46.2	29.2	15.1	9.9
185.1	170.9	154.8	134.1	114.4	94.2	76.6	56.0	37.4	20.5	15.5
134.1	126.0	111.4	96.3	79.5	63.7	51.8	35.3	22.0	12.1	8.4
141.0	130.5	114.6	100.2	85.7	72.6	62.0	44.5	29.1	16.9	12.9
84.8	75.6	65.3	55.1	45.9	35.6	25.7	16.4	9.5	5.1	2.5
100.7	84.3	70.4	58.6	48.7	38.7	29.1	19.5	12.1	7.1	4.0
83.2	73.6	63.5	53.3	43.8	34.1	24.4	15.7	9.1	5.0	2.5
94.8	79.7	67.1	56.0	46.5	37.1	27.6	18.7	11.6	6.9	4.0
79.2	68.8	59.4	49.7	40.4	31.4	22.5	14.5	8.6	4.8	2.4
84.6	71.6	61.3	51.8	42.9	34.2	25.5	17.2	10.9	6.7	3.9
75.1	64.4	54.8	45.9	37.3	28.9	20.8	13.6	8.3	4.6	2.3
76.3	65.6	56.3	47.8	39.6	31.4	23.6	16.2	10.6	6.4	3.7
69.4	59.5	50.7	42.6	34.6	26.8	19.4	12.7	8.1	4.4	2.2
70.3	60.6	52.1	44.4	36.7	29.2	22.0	15.1	10.3	6.1	3.6
64.6	55.3	47.3	39.6	32.1	25.0	18.2	12.1	7.8	4.2	2.1
65.5	56.3	48.6	41.2	34.1	27.2	20.6	14.4	9.9	5.8	3.4
60.6	51.9	44.3	37.1	29.7	23.5	17.1	11.8	7.6	4.0	2.0
61.4	52.9	45.5	38.6	31.5	25.6	19.4	14.0	9.7	5.5	3.2
49.6	42.1	35.8	29.3	23.9	18.4	13.5	9.5	6.2	3.2	1.4
50.2	42.9	36.8	30.5	25.4	20.0	15.3	11.3	7.9	4.4	2.3
45.8	39.2	32.9	27.3	22.2	17.1	12.6	9.1	5.9	3.0	1.3
46.4	39.9	33.8	28.4	23.6	18.6	14.3	10.8	7.5	4.2	2.1
42.9	36.5	30.8	25.3	20.6	15.9	12.0	8.7	5.6	2.8	1.2
43.5	37.2	31.7	26.3	21.9	17.3	13.6	10.3	7.1	3.9	1.9
40.0	33.8	28.6	23.9	19.2	15.1	11.6	8.4	5.3	2.6	1.1
40.5	34.4	29.7	24.9	20.4	16.4	13.1	10.0	6.7	3.6	1.8
32.3	27.3	23.1	19.0	14.9	11.4	8.5	5.8	3.8	1.7	0.7
52.7	27.8	23.7	19.8	15.8	12.4	9.6	6.9	4.8	2.4	1.1

³ Including refugee population arrived in 1922–1924.
⁴ Including Epirus, Macedonia, West Thrace, Aegean Islands and Crete but excluding Moslems and other populations, later exchanged for the refugees.
⁵ As of June 30th, 1912.
⁶ Including Thessaly and Arta, annexed in 1881.
⁷ Including Ionian Islands, annexed in 1864.