

SOME EXAMPLES OF SCHOOL ENROLMENT PROJECTIONS FROM MORE DEVELOPED COUNTRIES

1. NATURE OF THIS CHAPTER

In this chapter we shall cite some examples of work done in recent years on school enrolment projections in some of the educationally more developed countries. While it must be remembered that the particular methods used in each country may not be entirely applicable to another country, and the problems of estimating future school enrolment in a developing country are in many ways more difficult than in the more developed countries, there is nevertheless much that can be learned from a study of how the work is done in different countries. Furthermore, the methods employed in estimating or projecting future school enrolment, in the countries from which we have selected our examples, are basically quite similar - as we shall see presently - but the various ways in which these basic methods are applied to the particular situations are interesting to observe. It is hoped that a study of these examples will help the technician in less developed countries to understand better the general methodology as presented and illustrated in the present Manual, to have more confidence in his own work, and to strive for better results as he continues in his endeavours.

For convenience, and mainly because we have the information readily available, we shall take our examples from three countries only: the United States, New Zealand, and France. This does not mean that similar work has not been done in other countries, but limitations of time and space compel us to restrict our selection to these examples. In the case of the United States, we shall cite two examples of school enrolment projections at the national level, one example of work done by a regional organization interested in the educational development of a group of States, and one example of enrolment projections for a single State and its component local areas. For New Zealand, we shall in particular compare the results of two projections made about ten years apart with actual enrolment data from recent reports, and note how closely the projections have approximated actual enrolment. France offers an example of a long-term projection covering a period of 30 years, made in the face of a proposal for the prolongation of the period of compulsory education.

2. SCHOOL ENROLMENT PROJECTIONS IN THE UNITED STATES

(a) *Bureau of the Census*¹

In a country like the United States, where education at the first and second levels had become fairly universal, any changes in future school enrolment will be the result mainly of changes in the size of the school-age population. The Bureau of the Census not only keeps close watch on the factors which influence the size, composition and distribution of the population as a whole, but also pays particular attention to the changes in the educational characteristics of the population: school attendance, literacy and educational attainment. Based on census enumeration and current sample surveys of households, it has published special reports on these topics from time to time. Projections of school enrolment were first published in 1949, and again in 1953.²

The most recent report on this subject, entitled "Illustrative projections to 1980 of school and college enrolment in the United States", was published in June 1961.³ Whereas the earlier reports covered school enrolment only at the first two levels of education (kindergarten through high school) and for relatively short periods of time (through 1960 and 1965), the latest report includes also higher education and extends the period of projection approximately 20 years into the future.

Starting with three series of population projections, based on alternative assumptions of

1. We are indebted to Mr. Jacob S. Siegal, Chief, Populations Estimates and Projections Branch, Bureau of the Census, for permission to quote from the Bureau's publications consulted by us and used for the present study.
2. United States. Bureau of the Census. *Current population reports*, Series P-25, No. 18, February 14, 1949, "Forecasts of population and school enrolment in the United States: 1948 to 1960"; *Current population reports*, Series P-25, No. 85, December 7, 1953, "Projections of school enrolment in the United States: 1953 to 1965".
3. United States. Bureau of the Census. *Current population reports*, Series P-25, No. 232, June 22, 1961, "Illustrative projections to 1980 of school and college enrolment in the United States".

future trends in fertility, and four series of projections on school enrolment rates by age, the report presents eleven projections of school enrolment by level of education for 1980, as shown in table VII-1.

It may be seen from table VII-1 that the choice of a particular population series has the most effect on the size of enrolment projections at the elementary school level (since the elementary school pupils of 1980 have not yet been born), but that the size of the projected college enrolment varies much more according to the choice of assumptions regarding future enrolment rates (since most of the college students of 1980 have already been born, and college

enrolment rates may be subject to large increases as compared with the limited possibilities for increase at the lower levels).

Of course one is confronted here with the "embarrassment of choice", as to which of the eleven series should be used for purposes of educational planning. Some help is given by the report itself which presents the greatest detail for four of the eleven series: II-A, II-C, III-A, and III-C. A summary of these four projections, at five-year intervals, 1965, 1970, 1975 and 1980, together with comparative estimates for 1950, 1955, and 1960, is reproduced here as table VII-2.

Table VII-1. United States: *Projections of school enrolment for the civilian non-institutional population 5 to 34 years old, by level of school: 1980*

(In thousands. Figures are for fall of year)

Enrolment series ¹	Total enrolment	Elementary school or kindergarten	High school	College
II-A	75 102	48 696	17 388	9 018
II-B	73 383	48 683	16 943	7 757
II-C	70 828	47 936	16 385	6 507
II-D	69 267	47 928	15 847	5 492
III-A	66 290	41 797	15 678	8 815
III-B	64 629	41 788	15 264	7 577
III-C	62 245	41 151	14 752	6 342
III-D	60 748	41 140	14 258	5 350
IV-A	57 419	34 861	13 959	8 599
IV-B	55 809	34 852	13 568	7 389
IV-C	53 598	34 322	13 089	6 187

1. Population series II implies a continuation to the end of the projection period of the fertility levels experienced in the 1955-1957 period; series III implies a decline from the 1955-1957 fertility level to the 1949-1951 level by the middle of the projection period, with fertility then remaining constant to 1980; series IV implies a decline from the 1955-1957 level to the 1942-1944 level by 1965 to 1970, and then a leveling off. These alternatives are combined with the following assumptions about enrolment rates: series A implies a continued increase in enrolment rates by age with some leveling off by future dates; series C assumes that enrolment percentages will remain constant at the 1955-1957 average annual level to 1980; series B represents a trend in enrolment rates roughly intermediate between series A and C; series D assumes that enrolment rates may drop for a while at the upper high school and college ages.

Source: United States. Bureau of the Census. *Current population report*, Series P-25, No. 232.

For these four series the report gives annual projections, by level of school and sex, for the entire period 1960-1980, but cautions the reader that "annual changes in enrolment implied by the enrolment projections are not offered as reliable esti-

mates in themselves", since "*estimates of annual change in enrolment are subject to considerably greater error than the enrolment projections*". (Italics are ours).

The general method used in these projections, as explained in the report, "involved projecting enrolment rates by single year of age and sex for October of each year to 1980 and applying these rates to projections of the population by single years of age and sex". With regard to the distribution of total enrolment by level of school, "the assumption was made that, within each age group, the average percentage distribution by level of enrolment for 1958-1960 would remain unchanged to 1980". A detailed table giving projections of school enrolment

by level of school, age and sex, for 1965, 1970, 1975, and 1980 is reproduced in part as table VII-3.

The report points out that information obtained from reports of school systems and institutions of higher learning (such as is found in the Biennial Survey of the Office of Education), is not strictly comparable to the data collected by the Bureau of the Census through household interviews, because of differences in definitions, time references, etc. This observation should be borne in mind when we proceed to look at our next example, taken from published and unpublished sources of the Office of Education.

Table VII-2. United States: *School enrolment by level of school, estimated 1950 to 1960, and projected 1965 to 1980*

(In thousands. Figures are for fall of year)

Level of education and enrolment series	Estimated			Projected			
	1950	1955	1960	1965	1970	1975	1980
<i>All school levels</i>							
II-A	30 276	37 426	46 259	54 360	60 344	66 721	75 102
II-C				52 488	57 286	62 834	70 828
III-A				54 360	58 739	61 659	66 290
III-C				52 488	55 731	57 867	62 245
<i>Elementary school or kindergarten</i>							
II-A	21 406	27 086	32 441	35 755	38 430	42 411	48 696
II-C				35 402	37 915	41 764	47 936
III-A				35 755	36 825	37 558	41 797
III-C				35 402	36 360	37 001	41 151
<i>High school</i>							
II-A	6 656	7 961	10 249	13 226	14 894	15 985	17 388
II-C				12 711	14 110	15 042	16 385
III-A				13 226	14 894	15 776	15 678
III-C				12 711	14 110	14 838	14 752
<i>College or profes- sional school</i>							
II-A	2 214	2 379	3 570	5 379	7 020	8 325	9 018
II-C				4 375	5 261	6 028	6 507
III-A				5 379	7 020	8 325	8 815
III-C				4 375	5 261	6 028	6 342

Source: United States. Bureau of the Census. *Current population reports*, Series P-25, No. 232, "Illustrative projections to 1980 of school and college enrolment in the United States".

Table VII-3 United States: *School enrolment for the civilian non-institutional population 5 to 34 years old, by level of school, age and sex, estimated 1960 and projected 1965, 1970, 1975 and 1980.*¹

(In thousands. As of October 1)

Date and age (years)	Male			Female		
	Elementary school or kindergarten	High school	College	Elementary school or kindergarten	High school	College
<i>1960</i>						
<i>(estimate)</i>						
5 and 6	3 292	-	-	3 146	-	-
7-13	12 780	294	-	12 216	331	-
14-17	635	4 514	99	364	4 507	123
18-21	4	339	1 237	2	200	852
22-24	-	8	411	-	16	98
25-34	-	29	592	2	11	158
<i>1965</i>						
5 and 6	3 559	-	-	3 438	-	-
7-13	14 015	296	-	13 413	338	-
14-17	824	5 885	129	485	5 724	159
18-21	7	532	1 924	5	305	1 303
22-24	2	30	637	1	18	186
25-34	2	57	819	4	41	222
<i>1970</i>						
5 and 6	3 971	-	-	3 828	-	-
7-13	14 890	329	-	14 252	377	-
14-17	921	6 616	145	542	6 430	178
18-21	8	599	2 496	6	345	1 632
22-24	3	43	926	1	27	272
25-34	3	75	1 080	5	53	291
<i>1975</i>						
5 and 6	4 538	-	-	4 373	-	-
7-13	16 324	340	-	15 601	389	-
14-17	973	7 065	158	572	6 860	195
18-21	9	687	2 887	6	393	1 871
22-24	3	50	1 063	1	31	309
25-34	4	101	1 459	7	69	383
<i>1980</i>						
5 and 6	5 257	-	-	5 063	-	-
7-13	18 738	384	-	17 900	439	-
14-17	1 074	7 693	167	631	7 462	204
18-21	9	716	3 047	7	407	1 960
22-24	4	55	1 180	1	34	339
25-34	4	117	1 677	8	81	444

1. Series II-A. (Similar details are given in the source for Series II-B, II-C, II-D, III-A, III-B, III-C).

Source: United States. Bureau of the Census. *Current population reports*, Series P-25, No. 232.

(b) *Office of Education*¹

The U.S. Office of Education, in the Department of Health, Education, and Welfare, publishes the *Biennial Survey of Education* and other current reports on education in the United States. In recent years it has also engaged in projections of future school

enrolment. A report containing projections for the school years 1964-1965 to 1979-1980, at five-year intervals, was published in 1962.²

This report presents four series of projections, based on alternative assumptions, which are summarized as follows:

<i>Steps</i>	<i>Series A</i>	<i>Series B and B'</i>	<i>Series C</i>
1. Population by age group	Fertility constant at 10 per cent over 1955-1957 level	Fertility constant at 1955-1957 level	Fertility constant at 1955-1957 level
2. Percentage of population enrolled in grades K-12, by age group	Higher than 1950-1960 trend	Projection of 1950-1960 trend	Constant at 1957-1959 level
3. Split of K-12 enrolment between K-8 and 9-12, by age group	Projection of 1950-1960 trend	B: Projection of 1950-1960 trend	Constant at 1957-1959 level
4. Split of K-8 and 9-12 enrolment between public and non-public	Projection of 1950-1960 trend	B: Projection of 1950-1960 trend B': Constant at 1957-1959 level	Constant at 1957-1959 level
5. School-year enrolment as percentage of fall enrolment, by level and control	Constant at average for 1955-1956 and 1957-1958	Same as Series A	Same as Series A
6. Enrolment in 50 States and the District of Columbia as percentage of enrolment in 48 States and the District of Columbia, by level and control		Same for all Series: Constant percentage for each level by control (grades K-8 and 9-12, public and non-public)	

A comparison of these alternative assumptions with those stated in the Bureau of the Census report shows that the Series A projection of the Office of Education (involving an increase in the fertility level) would tend to be higher than any of the Census Bureau projections as published in their report (which assume constant and declining levels of fertility). Series B and B' of the Office of Education would tend to be roughly similar to the Series II-A and II-B projections of the Bureau of the Census. Exact correspondance is to be found between Series C of the Office of Education and Series II-C of the Census Bureau, both based on identical assumptions. Finally, all the series III and IV of the Census Bureau projections, based on declining levels of fertility, would tend to be lower than any of the Office of Education series, which are based on constant and increasing fertility.

Apart from these differences due to their basic assumptions, the Census Bureau figures refer to

enrolment as of October 1 of each year; the Office of Education report presents both fall enrolment and school-year enrolment. The latter, which includes all pupils enrolled during the school year, is by definition higher than fall enrolment, which counts only those pupils who enter school at the beginning of the school year. Furthermore, the Office of Education, which receives its data from State and local school systems, may include some double counting of pupils who attend more than one school during the same school year. On the other hand, the Bureau of the Census, which bases its figures on the results

1. We are indebted to Mr. Kenneth A. Simon, Chief, Reference, Estimates and Projections Section, Office of Education, for consultations and for permission to quote from the reports used in this study.
2. United States. Department of Health, Education, and Welfare. Office of Education. *Enrolment in public and non-public elementary and secondary schools, 1950-1980*, by Kenneth A. Simon.

of household sample surveys, admits that these figures may be subject to sampling variability.

There are also a few formal differences in presentation between the two reports. The Census Bureau report gives enrolment projections by age and sex, and by three levels of education: elementary school or kindergarten, high school, and college. The Office of Education report does not show separate figures for each sex, but shows a further distribution between public and non-public schools.

Keeping in mind these factors of non-comparability between the two reports, we shall now give some further attention to details presented in the report of the Office of Education, in order to understand more clearly its methodology.

Step 1. Projections of the school-age population. The Office of Education used two series of population projections provided by the Bureau of the Census (Series I and II), relating to the civilian non-institutional population, as of 1 October, in 48 States and the District of Columbia, as shown in table VII-4. As noted above, Series I of the population estimates was used as basis for enrolment projection Series A; while Series II of the population estimates was used for enrolment projections Series B and C.

Step 2. Projections of the percentage of population enrolled in school. Adopting three alternative assumptions on future trends in school enrolment as percentage of each age group, the Office projected these percentages up to the fall of 1979 in three series, as shown in table VII-5. For persons aged 20 years and over, it was assumed that a certain number, between 100,000 and 200,000, would be enrolled in grades 9-12 during the period covered by the projections.

Step 3. Distribution of projected enrolment by level of education. It was assumed that the proportion of pupils at each age to be found enrolled in kindergarten, grades 1-8 and 9-12 would either: (a) change according to the trend observed during the 1950-1960 period; or (b) remain constant at the 1957-1959 level. It was further assumed that a constant

number of pupils aged 13-19 would be enrolled in grades 1-8 each year. The results are shown in table VII-6.

Step 4. Distribution of projected enrolment between public and non-public schools. The distribution of total enrolment, at each level of education, between public and non-public schools was assumed either: (a) to continue the trend observed during the 1950-1960 period; or (b) to remain constant at the 1957-1959 level. It will be observed that under the first assumption the proportion of total enrolment in non-public schools will further increase; but that under the second assumption there will be no further increase in this proportion. The projections based on these assumptions are shown in table VII-7.

Step 5. Conversion of fall enrolment projections to school-year enrolment. Thus far the projections have been made in terms of fall enrolment, because the basic data on population and enrolment were taken from Census Bureau sources. In order to make the enrolment projections more comparable to the current statistics of the Office of Education, the fall enrolment figures were converted to school-year basis by assuming a constant relationship between fall enrolment and school-year enrolment for each level of school, public and non-public. As expected, the school-year enrolment had been found to be generally higher than the fall enrolment, with one unexplained exception. The ratios of school-year enrolment to fall enrolment, based on an average, of two years' experience - 1955-1956 and 1957-1958 - were found to be as follows:

Public schools		Non-public schools	
	%		%
Kindergarten	117.6	Kindergarten to grade 8	100.8
Grades 1-8	103.2	Grades 9-12	104.6
Grades 9-12	96.6		

These ratios were applied as constant multipliers in converting the projected fall enrolment figures to school-year enrolment.

Table VII-4 United States : *Estimated and projected population 5-19 years of age, by age groups, 1949-1979*¹

(In thousands)

Age Group	Estimated population ²		Projected population ³			
	1949	1959	Series I		Series II	
			1969	1979	1969	1979
5	2 773	3 934	4 972	6 604	4 499	5 974
6	2 874	3 844	4 851	6 413	4 393	5 815
7-9	7 266	10 964	14 011	18 110	12 866	16 467
10-13	8 805	13 806	17 345	21 751	16 588	19 808
14-15	4 147	5 460	7 929	10 055	7 929	9 116
16-17	4 126	5 447	7 522	9 491	7 522	8 630
18-19	4 062	4 353	6 644	8 509	6 644	7 852

1. Civilian non-institutional population, as of 1 October, in 48 States and the District of Columbia.
2. Based on data in U.S. Bureau of the Census, *Current population reports*, Series P-20 and P-25, 1949-1959.
3. Based on data in U.S. Bureau of the Census, *Current population reports*, Series P-25, No. 187, Nov. 10, 1958; and unpublished data of the Bureau.

Source : United States. Department of Health, Education, and Welfare. Office of Education. *Enrolment in public and non-public elementary and secondary schools, 1950-1980.*

Table VII-5 United States : *Fall enrolment in grades K-12 of regular public and non-public schools, as percentage of population, by age groups, 1949-1979*

Age Group	Estimated Percentage ¹		Projected percentage ²					
	1949	1959	Series A		Series B, B'		Series C	
			1969	1979	1969	1979	1969	1979
5	55.1	62.9	74.5	83.0	69.5	73.9	62.3	62.3
6	96.2	97.5	99.0	99.8	98.6	99.5	97.4	97.4
7-9	98.5	99.4	99.7	99.8	99.5	99.5	99.5	99.5
10-13	98.7	99.4	99.7	99.8	99.5	99.5	99.5	99.5
14-15	93.5	97.5	99.8	99.8	98.9	99.5	97.2	97.2
16-17	66.4	79.1	87.8	92.0	85.1	88.6	77.7	77.7
18-19	9.3	9.7	11.8	12.5	10.3	10.3	10.3	10.3

1. Based on data in U.S. Bureau of the Census, *Current population reports*, Series P-20 and P-25, 1949-1959.
2. Series A: higher than 1950-1960 trend; Series B and B': based on 1950-1960 trend; Series C: constant at 1957-1959 level.

Source : see table VII-4.

Table VII-6 United States: *Fall enrolment in kindergarten, grades 1-8, and grades 9-12 of regular public and non-public schools, as percentage of total K-12 enrolment, by age groups, 1949-1979*

Estimated or Projected	Year	Level	Age groups								
			5	6	7-9	10-13	14-15	16-17	18-19	20 and over	
<i>Estimated</i>	1949	Kindergarten	60.8	1.1	0	0.0	0.0	0.0	0.0	0.0	0
		Grades 1-8	39.2	98.9	100	95.1	24.3	3.8	0.5 ¹	0	
		Grades 9-12	0.0	0.0	0	4.9	75.7	96.2	99.5	100	
	1959	Kindergarten	78.7	2.2	0	0.0	0.0	0.0	0.0	0.0	0
		Grades 1-8	21.3	97.8	100	96.7	17.5	1.8	0.2 ¹	0	
		Grades 9-12	0.0	0.0	0	3.3	82.5	98.2	99.8	100	
<i>Projected: Series A, B, B'</i>	1969	Kindergarten	87.9	3.8	0	0.0	0.0	0.0	0.0	0.0	0
		Grades 1-8	12.1	96.2	100	95.9	12.7	0.9	0.2 ¹	0	
		Grades 9-12	0.0	0.0	0	4.1	87.3	99.1	99.8	100	
	1979	Kindergarten	91.8	4.1	0	0.0	0.0	0.0	0.0	0.0	0
		Grades 1-8	8.2	95.9	100	96.2	9.8	0.4	0.2 ¹	0	
		Grades 9-12	0.0	0.0	0	3.8	90.2	99.6	99.8	100	
Series C	1969 and	Kindergarten	77.1	2.8	0	0.0	0.0	0.0	0.0	0.0	0
		Grades 1-8	22.9	97.2	100	95.9	17.6	2.0	0.2 ¹	0	
	1979	Grades 9-12	0.0	0.0	0	4.1	82.4	98.0	99.8	100	

1. Projected as a constant number. About 22,000 persons aged 18-19 are enrolled in grades 1-8 each year

Source : see table VII-4

Table VII-7 United States: *Fall enrolment by level, public and non-public, as percentage of total enrolment at each level, of regular public and non-public schools, 1949-1979*

Level of school	Public or non-public	Estimated Percentage ¹		Projected Percentage ²		
		1949	1959	Series A and B		Series B' and C
				1969	1979	1969 and 1979
Kindergarten	Public	86.6	82.6	80.2	78.6	80.7
	Non-public	13.4	17.4	19.8	21.4	19.3
Grades 1-8	Public	88.3	84.0	81.1	79.0	84.4
	Non-public	11.7	16.0	18.9	21.0	15.6
Grades 9-12	Public	91.1	89.1	87.7	86.4	89.5
	Non-public	8.9	10.9	12.3	13.6	10.5

1. Based on data in U.S. Bureau of the Census, *Current population reports*, Series P-20 and P-25, 1949-1959.

2. Series A and B: based on 1950-1960 trend; Series B' and C: Constant at 1957-1959 level.

Source : See table VII-4.

Table VII-8 United States: *School-year enrolment in grades K-8 and 9-12 of regular public and non-public day schools, 1949-1950 to 1969-1970.*¹ (Numbers are in thousands. *Projections, Series B, as of March 1962; revised March 1963*)

School year	Total public and non-public		Public		Non-public	
	K-8	9-12	K-8	9-12	K-8	9-12
			<i>Actual</i>		<i>Estimated</i>	
1949-1950	22 199	6 433	19 464	5 752	2 735	681
1951-1952	23 947	6 573	20 770	5 908	3 177	665
1953-1954	26 262	7 071	22 649	6 315	3 613	756
1955-1956	28 317	7 735	24 413	6 901	3 904	834
1957-1958	30 120	8 833	25 801	7 895	4 319	938
1959-1960	32 242	9 520	27 602	8 485	4 640	1 035
			<i>Estimated</i>			
1960-1961	33 300	10 000	28 400	8 900	4 900	1 100
1961-1962	33 800	10 700	28 700	9 500	5 100	1 200
1962-1963	34 800	11 600	29 400	10 300	5 400	1 300
			<i>Projected</i>			
1963-1964	35 500	12 300	30 000	10 900	5 500	1 400
1964-1965	36 100	12 800	30 500	11 400	5 600	1 400
1965-1966	36 700	13 000	31 000	11 600	5 700	1 400
1966-1967	37 300	13 300	31 500	11 800	5 800	1 500
1967-1968	37 800	13 600	32 000	12 000	5 800	1 600
1968-1969	38 300	14 000	32 400	12 400	5 900	1 600
1969-1970	38 800	14 400	32 800	12 800	6 000	1 600

1. Does not include residential schools for exceptional children, subcollegiate departments of institutions of higher education, and Federal schools for Indians.

Source: United States. Department of Health, Education and Welfare. Office of Education. Division of Educational Statistics (Reference, Estimates and Projections Section).

Table VII-9 United States: *Total fall and first-time fall college enrolment to 1975: aggregate U.S., actual 1950-1962; projected 1963-1975. (Numbers rounded to thousands. Projections as of October 1962)*

Fall of	Total fall enrolment			First-time fall enrolment		
	Total	Men	Women	Total	Men	Women
<i>Actual:</i>						
1950	2 297	1 569	727	517	320	197
1951	2 116	1 399	718	472	280	192
1952	2 148	1 387	761	537	324	213
1953	2 251	1 432	818	572	345	227
1954	2 469	1 575	893	631	387	245
1955	2 679	1 747	931	675	418	257
1956	2 947	1 928	1 019	723	446	277
1957	3 068	2 003	1 065	730	445	284
1958	3 259	2 110	1 148	781	469	312
1959	3 402	2 174	1 228	827	491	336
1960	3 610	2 271	1 339	930	543	387
1961	3 891	2 424	1 467	1 026	596	430
1962	4 207	2 603	1 604	1 039	602	437
<i>Projected:</i>						
1963	4 419	2 743	1 676	1 117	669	448
1964	4 810	2 980	1 830	1 313	791	522
1965	5 257	3 254	2 003	1 426	859	567
1966	5 708	3 527	2 181	1 444	869	575
1967	6 117	3 772	2 345	1 454	872	582
1968	6 442	3 958	2 484	1 492	892	600
1969	6 721	4 111	2 610	1 535	916	619
1970	7 007	4 268	2 739	1 581	940	641
1971	7 326	4 453	2 873	1 628	964	664
1972	7 663	4 654	3 009	1 668	985	683
1973	8 006	4 864	3 142	1 700	1 002	698
1974	8 354	5 083	3 271	1 737	1 022	715
1975	8 677	5 286	3 391	1 762	1 035	727

Source: United States. Department of Health, Education and Welfare. Office of Education, Division of Educational Statistics (Reference, Estimates and Projections Section).

Step 6. *Conversion of incomplete national figures to projections for total United States.* This step in computation was necessitated by the fact that Alaska and Hawaii, which became the 49th and 50th States of the Union in 1959, were not previously included in national population and school statistics relating to the United States as a whole. Hence, separate projections had to be made for these two new States and the results added to projections prepared for the 48 States and the District of Columbia. Final results were therefore presented for the 50 States and the District of Columbia, in two tables, relating to (a) school-year enrolment, and (b) fall enrolment, in four alternative series A, B, B', and C, as explained above.

The reader who may be interested in these detailed tables should consult the original report of the Office of Education. However, since the publication of that report, the Office of Education has revised its estimates for 1959-1960 enrolment and its projections for the 1965-1980 period, based on the Series B', which we have reproduced in table VII-9. In addition, a series of annual projections for college enrolment, showing separately the total fall enrolment and the fall enrolment of first-time students, have also been prepared subsequently to

the publication of the above-mentioned report. These projections, for the period 1963 to 1975, together with actual enrolment data for the years 1950 to 1962, are reproduced in table VII-9.

(c) *Southern Regional Education Board*¹

Among various organizations in the United States concerned with the development of education on a regional basis, we shall take one example of school enrolment projections made for a number of States within a given region. The Southern Regional Education Board is primarily interested in the development of higher education in fourteen States, all situated in the Southern part of the United States.² These States are distinguished mainly by the fact that they have large proportions of non-white population, involving some peculiarly difficult problems of education.

1. We are indebted to Mr. E.F. Schietinger, Research Associate, Southern Regional Education Board, who kindly supplied us with the relevant publications used in the present study, and gave us permission to quote therefrom.
2. Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia.

Table VII-10 United States, Southern Region: *Ratio of college enrolment to population aged 18-21 years in 1940 and 1952*

State	White		Negro	
	1940	1952	1940	1952
Alabama	10.8	14.3	4.7	7.8
Arkansas	8.4	13.8	2.8	7.0
Florida	10.1	20.4	4.4	6.3
Georgia	11.6	16.4	4.1	6.8
Kentucky	10.5	13.1	6.1	3.9
Louisiana	19.6	21.7	3.8	8.4
Maryland	15.4	26.6	3.6	8.5
Mississippi	14.7	18.8	1.2	3.1
North Carolina	12.3	14.2	5.5	9.2
Oklahoma	19.7	25.0	4.7	3.8
South Carolina	13.7	16.9	3.6	4.6
Tennessee	11.5	15.9	8.8	10.8
Texas	16.6	23.6	6.9	12.1
Virginia	13.8	14.6	5.7	7.6
Southern Region	13.7	18.5	4.5	7.4

Source: Southern Regional Education Board. *Some methods for projecting school and College enrolments.*

Table VII-11 Alabama: *Illustrative ratio projections of regular session college enrolment for white students, 1951-1952 to 1969-1970*

Year	College age population	Per cent in college	Estimated enrolment
1951-1952	136 021	14.3	19 477
1952-1953	137 339	14.7	20 189
1953-1954	137 233	15.1	20 722
1954-1955	137 020	15.5	21 238
1955-1956	137 458	15.8	21 718
1956-1957	135 333	16.2	21 924
1957-1958	135 199	16.6	22 443
1958-1959	138 106	17.0	23 478
1959-1960	139 923	17.4	24 347
1960-1961	147 134	17.8	26 190
1961-1962	154 041	18.1	27 881
1962-1963	155 588	18.5	28 784
1963-1964	154 873	18.9	29 271
1964-1965	161 932	19.3	31 253
1965-1966	166 285	19.7	32 758
1966-1967	170 082	20.1	34 186
1967-1968	176 184	20.5	36 118
1968-1969	172 603	20.9	36 074
1969-1970	170 459	21.3	36 308

Source: See table VII-10.

A report on "Future school and college enrolments in the Southern region", was published in 1954, accompanied by a manual describing some of the methods used, and adjustments made, in arriving at the "best possible enrolment forecasts for each State in the Southern Regional Education Compact for as many future years as could be dealt with accurately".¹ The manual sets forth in considerable detail the methods used in the course of the work in making the enrolment projections; it provides an interesting example of testing the efficacy of two different methods commonly used, namely, the "enrolment ratio" method and the "cohort survival" method.

The use of the "enrolment ratio" method for projecting college enrolment is illustrated in tables VII-10 and VII-11, reproduced from the above-mentioned work. Table VII-10 shows the ratio of college enrolment to the population aged 18-21 years in 1940 and in 1952, for each of the Southern States, separately for the white and Negro population. Table VII-11 shows how the future college enrolment for white students in the State of Alabama was projected up to 1969-1970 by assuming a uniform increase each year of the enrolment ratio.

The use of the "cohort-survival" method to project public school enrolment is illustrated in tables VII-12 and VII-13, relating to reported enrolment in

white elementary schools from 1940-1941 to 1951-1952, from which "survival-rates" between grades are computed. The steps in the whole process of preparing enrolment projections by this method are set out in the manual. An essential feature of this procedure is to relate the number of recorded births seven years earlier to the reported enrolment in grade 2 of a given year. It was found that births "survived" to first grade enrolment six years later resulted in survival rates subject to too much fluctuation as compared with the grade-to-grade survival rates. It was also recommended that recorded births be adjusted for under-registration (that is, allowance must be made for the fact that recorded births generally fall short of the actual number of children born, the amount of under-registration depending on the efficacy of the birth registration system). Furthermore, adjustment must be made according to regulations of the State concerning the minimum age at which children are admitted to school. For example, if a child must be six before 1 October to be admitted to school in September, the adjustment would consist of taking 1/4 of the previous year's births and 3/4 of the current year's births.

1. Southern Regional Education Board. *Some methods for projecting school and college enrolments*, by John K. Folger. Atlanta, 1955.

Table VII-12 Alabama: *Enrolment by grade in white elementary schools, 1940-1951*

School year	Number of pupils by grade							
	1	2	3	4	5	6	7	8
1940-1941	56 258	45 835	48 143	47 033	46 851	44 431	38 707	30 729
1941-1942	55 654	46 602	45 400	46 350	44 889	43 563	40 787	32 133
1942-1943	54 609	46 718	45 577	44 221	44 810	42 024	40 538	34 287
1943-1944	54 024	45 460	44 614	43 562	41 945	40 942	38 603	32 687
1944-1945	54 763	44 998	43 857	43 172	41 335	38 572	37 726	31 774
1945-1946	53 721	45 821	44 225	42 637	41 256	38 762	36 405	32 333
1946-1947	52 513	45 015	44 373	42 568	40 850	38 368	36 460	31 140
1947-1948	52 042	45 717	44 164	43 250	41 446	38 747	36 753	31 726
1948-1949	52 711	46 142	44 345	42 726	41 861	39 228	37 274	32 228
1949-1950	64 053	47 162	45 185	43 054	41 710	39 998	38 043	33 282
1950-1951	45 495	56 881	46 280	43 982	41 938	40 205	38 724	33 699
1951-1952	47 957	42 411	54 828	44 818	42 726	40 352	38 979	34 422

Source: See table VII-10.

Table VII-13 Alabama: *Grade cohort "survival rates" computed from enrolment data by grade, in white elementary schools, 1940-1951*

Between school years	Survival rates ¹ from grades						
	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8
1940 and 1941	.8284	.9905	.9628	.9544	.9298	.9180	.8302
1941 and 1942	.8394	.9780	.9740	.9668	.9362	.9306	.8406
1942 and 1943	.8325	.9550	.9558	.9485	.9137	.9186	.8063
1943 and 1944	.8329	.9647	.9677	.9489	.9196	.9214	.8231
1944 and 1945	.8367	.9828	.9722	.9556	.9378	.9438	.8570
1945 and 1946	.8379	.9684	.9625	.9581	.9300	.9406	.8554
1946 and 1947	.8706	.9811	.9747	.9736	.9485	.9579	.8702
1947 and 1948	.8866	.9700	.9674	.9679	.9465	.9620	.8769
1948 and 1949	.8947	.9793	.9709	.9762	.9555	.9698	.8929
1949 and 1950	.8880	.9813	.9734	.9741	.9639	.9681	.8858
1950 and 1951	.9322	.9639	.9684	.9714	.9622	.9695	.8889

1. Survival rates are computed by dividing the enrolment in a given grade by the enrolment in the next lower grade the year before. For example, grade 1 enrolment in 1940-1941 was 56,258; grade 2 enrolment in 1941-1942 was 46,602. Dividing 46,602 by 56,258 gives .8284.

Source: See table VII-10

Finally, by means of a linear regression equation, or simply by taking an average of the survival rates computed for a selected number of years, these rates may be projected into the future; applying the projected rates to the present enrolment by grade, and the number of births suitably adjusted, results in estimates of future enrolment.

It is interesting to note that the author of this regional study had tried the two methods thus outlined - the "enrolment ratio" method and the "cohort survival" method - on certain school enrolment data for a short-term projection of public school enrolment, and had found that the error of estimation was on the whole much greater by the ratio method than by the

cohort method. He gave two examples of his comparison between the two methods. Table VII-14 reproduces one of his examples, based on estimated enrolment by grade, for white and Negro schools in North Carolina, compared with actual enrolment, for 1951 and 1952. The difference between the two methods is quite substantial for grades 10 to 12 in white schools and for grades 8 to 11 in Negro schools. For total enrolment in grades 1-12, Negro schools, the estimated enrolment by the "ratio" method was 11 to 12 per cent below the actual enrolment, whereas the results of the "cohort" method were off by less than 1.5 per cent.

Table VII-14 North Carolina: *Percentage errors in estimation of school enrolment in White and Negro schools, 1951 and 1952, by two different methods.*¹

Grade	White schools				Negro schools			
	1951		1952		1951		1952	
	Ratio method	Cohort method	Ratio method	Cohort method	Ratio method	Cohort method	Ratio method	Cohort method
1	- 2.3	- 1.6	- 1.7	- 4.8	- 10.7	+ 5.9	- 7.7	+ 7.2
2	- 6.3	+ 1.3	- 0.1	- 0.2	- 9.9	- 7.0	- 6.1	- 1.1
3	+ 0.2	- 0.9	- 4.2	+ 0.8	- 4.8	- 0.1	- 7.6	- 5.0
4	- 1.6	- 1.5	- 1.8	- 1.6	- 7.6	- 2.5	- 6.6	+ 0.3
5	- 1.3	- 1.3	- 0.2	- 2.5	- 4.7	- 1.2	- 4.4	- 3.6
6	- 3.3	- 2.1	- 0.9	- 2.6	- 6.4	- 0.8	- 8.4	- 2.1
7	- 5.2	- 2.9	- 4.2	- 3.8	- 1.0	- 3.5	- 7.6	- 4.8
8	+ 4.8	- 2.3	+ 1.7	- 5.1	- 16.3	- 3.8	- 19.5	+ 2.8
9	- 0.6	- 1.2	+ 0.1	- 1.7	- 35.6	- 6.9	- 33.9	- 1.0
10	+ 12.0	0.0	+ 10.8	- 0.8	- 38.9	- 3.5	- 39.6	- 9.2
11	- 13.8	- 0.2	- 16.9	+ 1.2	- 34.5	- 6.6	- 38.6	- 7.7
12	+ 3.3	- 1.0	+ 12.9	+ 3.2	+ 1.7	- 0.8	+ 1.0	- 4.4
Total	+ 1.5	- 1.2	- 0.4	- 1.8	- 11.4	- 1.3	- 12.2	- 1.4

1. Estimates for 1951 and 1952 were based on data up to 1950, then compared with actual enrolment in 1951 and 1952. Minus sign indicates that estimate was lower than actual enrolment, the latter being the base for all percentages.

Source: See table VII-10.

In dealing with college enrolment projections, one difficulty in applying the cohort survival method is due to the fact that it is usually not possible to separate college students into clearly defined classes. However, the U.S. Office of Education regularly reports the number of students enrolled for the first time in institutions of higher education

(that is, the entering class of college students) as well as total fall enrolment of all college students. This information, together with data on the number of graduates from high school each spring, makes it possible to project college enrolment by a modified cohort-survival method, which may be described as follows:

Step 1. Compute the ratio of graduates from high school entering college the following fall. If information is not available on the number of high school graduates, this can be estimated from reported enrolment in grade 12 (last year of high school).

Step 2. Add up the entering groups of first-time college students in four successive years (since the normal duration of the college course is four years), and divide into the total enrolment reported for the last of the four years. The resulting ratio indicates the proportion of students entering college for the first time during those four years who have not dropped out up to that time.

Step 3. Project the ratio of college entrants to high school graduates for the future years, based on an average of the observed ratio for a number of years in the past. (In the illustrative example, as reproduced in table VII-15, this average was taken over the four most recent years, neglecting the higher ratios found for the earlier years due to the large influx of college students under the educational benefits provided for veterans of the Second World War).

Step 4. Project the ratio of total fall enrolment to first-time enrolment cumulated over four successive years. (In the example given, this was also done by taking an average over four years).

Step 5. Compute the first-time-in-college enrolment for the projection years, using projected numbers of high school graduates and the projected ratios of college entrants to high school graduates.

Step 6. From the projected first-time college enrolment and the projected ratios resulting from step 4, compute the total fall enrolment for the projection years.

These steps may be followed more clearly by referring to the illustrative example in table VII-15, for the State of North Carolina.

A further extension of this method was made to project the number of students graduating from college with bachelor's degrees, based on a ratio of the number of such graduates to the entering cohort of first-time college students four years earlier.

Table VII-15 North Carolina: *Projection of fall enrolment in college, by modified cohort-survival method, 1947-1948, 1959-1960*

School year	Graduates from high school (previous spring)	First-time college students (fall enrolment)	Col. 2 divided by Col. 1	First-time students in 4 successive years	Total fall enrolment	Col. 5 divided by Col. 4
	(1)	(2)	(3)	(4)	(5)	(6)
1947-1948	26 512	13 976	.526	.	.	.
1948-1949	26 025	12 358	.475	.	.	.
1949-1950	28 277	12 693	.449	.	.	.
1950-1951	30 485	12 747	.418	51 774	43 998	.850
1951-1952	30 812	11 709	.380	49 507	40 482	.818
1952-1953	32 040	13 198	.412	50 347	41 765	.830
1953-1954	33 000 ¹	13 731	.416	51 385	42 840	.834
<i>Projected:</i>						
1954-1955	34 500	14 145	.410	52 783	44 000	.833
1955-1956	35 600	14 596	.410	55 670	46 400	.833
1956-1957	37 000	15 170	.410	57 642	48 000	.833
1957-1958	37 300	15 293	.410	59 204	49 300	.833
1958-1959	40 800	16 728	.410	61 787	51 500	.833
1959-1960	44 200	18 122	.410	65 313	54 400	.833

1. Estimated.
Source: see table VII-10.

(d) *State of California*

To our knowledge, similar work on projections of school and college enrolment has been done in many of the States and some of the cities and other local areas¹. We shall, however, confine ourselves to citing only one more example, since the methods used or described in most of the studies are generally quite similar, based either on projections of the school enrolment ratio or of the cohort survival ratio, with various adaptations to suit local conditions and circumstances. For reasons of convenience, we shall take the work done in the State of California, one of the largest States of the United States, with a rapidly growing population and a well-developed system of public and private education at all levels.

In 1954, the Department of Finance of the State of California published a report² containing projections of public school enrolment to 1960 for elementary schools and to 1965 for high schools, for the State as a whole. In addition, projections for local areas within the State were made of elementary school enrolment up to 1958 and of high school enrolment up to 1961. The number of future graduates from public high schools was estimated for the whole State to 1965-1966, and for each of the local areas to 1964-1965.

For an over-all view we shall first take a look at the recorded and projected enrolment in California public schools, grades K-12, over a period of 34 years between 1924 and 1960, as shown in Chart VII-1. The solid lines show actual recorded enrolment, on a school-year basis from 1924-1925 to 1946-1947, and on fall enrolment basis (as of 31 October) from 1947 to 1953. Projections on fall enrolment basis are shown by the broken lines for the period 1954 to 1960. The line in the lowest part of the chart shows recorded and projected enrolment in the kindergarten; the next line shows total enrolment in elementary schools (grades K-8); the highest line shows the total enrolment in elementary and high schools (grades K-12). Since the chart is drawn on an arithmetic scale, equal distances on the vertical represent equal numbers of pupils. Hence the distance between the bottom of the chart and the first line represents the varying size of kindergarten enrolment; the distance between the first and the second line represents the size of enrolment in grades 1-8; and the distance between the second and the top line represents the size of enrolment in grades 9-12.

In tables VII-16, which is adapted from the original report, total school enrolment, as recorded for 1947-1953 and projected for 1954-1960, is distributed by level of school. Elementary school enrolment is further distributed by three categories: kindergarten pupils, graded pupils in grades 1-8, and special pupils as defined. For high school enrolment, figures are shown separately for graded pupils in grades 9-12,

and special pupils as defined. All pupils specifically reported as "adults" or in "classes for adults" are excluded. The high school enrolment is shown projected to 1965.

Table VII-17, also adapted from the report, shows for selected years, the enrolment (recorded or projected) by grade from K (kindergarten) through 12, with totals for grades 1-8 and 9-12 which correspond to the respective figures in table VII-16, account being taken of the fact that special pupils are excluded from table VII-17.

Projections were also made for graduates from public high schools. These projections, together with recorded numbers of graduates for previous years, are shown in table VII-18.

The original report also contains the various projections of enrolment and graduates by fourteen areas into which the State is divided. They are known as "college enrolment areas", since they were first defined for purposes of college enrolment projections. An example of detailed tabulation of enrolment (recorded or projected) by these "college enrolment areas" is given in table VII-19, showing graded enrolment in public high schools, grades 9-12, recorded for 1947-1953, and projected for 1954-1961. (A further division of some of the "college enrolment areas" into subareas is also shown in the report, which we have not reproduced here).

It is stated in the report that the projected enrolments were derived primarily by means of extrapolated "grade progression" ratios. From recorded data on enrolment by grade it was possible to follow each group of pupils in its "progression" through the public education system from one grade to the next. Enrolment records for grades K-12 of California public schools are currently tabulated on 31 October and 31 March of each year. Using the October reports of graded enrolment in grades K-8, grade-progression ratios for the period 1946-1953 were calculated. These ratios were analysed for trend in two ways, described as follows:

The first type of analysis, which may be termed the cross-sectional approach, provided an opportunity for examining the relationship between civilian migration and enrolment changes. It was noted that the grade progression ratios for grades 2-3 through 7-8, for the years 1946-1947 through 1952-1953, tended to show an essential similarity of pattern. This may be seen from Chart VII-2, reproduced from the report, which shows three lines representing the grade

1. For example, the States of California, New York, Michigan, Minnesota, Illinois, Indiana, Pennsylvania, Washington; the metropolitan areas of New York, Chicago, Miami, and others.
2. California. State Department of Finance. *Projections of public school enrolment in California to 1960 and 1965*, by Carl M. Frisen

progression ratios calculated for 1946-1947, 1948-1949, and 1950-1951. It was found that the topmost line, showing grade progression ratios all above 1.00, corresponded to a period of highest estimated net migration to the State, while the lowest line, showing grade progression ratios mostly below 1.00, portrayed the situation during a period believed to

to have had the smallest net gain of population through civilian migration.¹

1. Provisional estimates of net civilian migration to California during the three selected periods were: (1946-1947) 220,000; (1948-1949) 100,000; (1950-1951) 270,000.

Table VII-16 California: *Enrolment in public elementary and high schools, 1947-1965*
(In thousands)

Year ¹	Total enrolment	Elementary			High school	
		Kinder- garten	Graded (1-8)	Special ²	Graded	Special ³
<i>Recorded:</i>						
1947	1 453.1	109.9	968.8	12.5	349.7	12.2
1948	1 533.9	122.1	1 030.7	15.8	353.3	12.0
1949	1 617.0	132.3	1 092.4	17.5	365.5	9.2
1950	1 689.4	137.2	1 150.9	18.0	373.0	10.4
1951	1 836.7	185.4	1 230.3	19.0	390.9	11.1
1952	1 965.1	178.0	1 337.5	20.1	416.5	13.0
1953	2 131.3	212.8	1 434.0	21.4	450.4	12.6
<i>Projected:</i>						
1954	2 298.5	221.0	1 557.4	23.0	483.4	13.7
1955	2 447.0	219.0	1 670.8	24.2	518.6	14.4
1956	2 594.4	233.0	1 754.3	25.1	566.6	15.4
1957	2 748.6	251.0	1 839.8	26.1	615.3	16.4
1958	2 912.0	268.0	1 940.8	27.6	658.4	17.2
1959	2 063.0	270.0	2 055.8	29.2	690.3	17.7
1960	3 193.4	270.0	2 134.7	30.3	739.4	19.0
1961	.	.	.	.	775.6	19.9
1962	.	.	.	.	838.0	21.5
1963	.	.	.	.	898.4	23.0
1964	.	.	.	.	921.3	23.6
1965	.	.	.	.	957.7	24.0

1. As of 31 October.

2. Includes ungraded and postgraduate pupils, pupils in special day and evening classes, and pupils in special classes for physically handicapped and mentally retarded minors.

3. Includes pupils in compulsory continuation classes, special pupils in regular classes, and pupils in special classes for physically handicapped and mentally retarded minors.

Source: California. State Department of Finance. *Projections of public school enrolment in California to 1960 and 1965.*

Table VII-17 California: *Enrolment by grade, public elementary and high schools, selected years, 1947-1965*¹

(In thousands)

Grade	1947	1950	1953	1957	1960	1965
<i>Elementary:</i>						
K	109.9	137.2	212.8	251.0	270.0	.
1	161.7	185.2	221.7	270.0	309.0	.
2	137.2	170.5	215.1	247.9	300.3	.
3	130.7	162.3	180.7	252.2	281.6	.
4	119.0	140.6	179.2	248.1	261.1	.
5	111.5	131.1	177.2	217.8	247.2	.
6	104.4	126.6	168.3	221.9	253.6	.
7	104.0	120.8	151.3	191.7	256.8	.
8	100.3	113.8	140.6	190.2	225.0	.
<i>High school:</i>						
9	98.9	109.4	137.4	190.3	231.8	272.4
10	94.7	102.3	126.0	177.1	192.3	254.0
11	83.9	88.1	104.0	137.4	169.4	231.5
12	72.1	73.2	83.0	110.5	146.0	199.9
<i>Totals:</i>						
1-8	968.8	1 150.9	1 434.0	1 839.8	2 134.7	.
9-12	349.7	373.0	450.4	615.3	739.4	957.7
K-12	1 428.4	1 661.1	2 097.2	2 706.1	3 144.1	.

1. As of 31 October of each year indicated.

Source: see table VII-16.

Table VII-18 California: *Graduates from public high schools, 1925-1926 to 1965-1966*

School year	Graduate	School year	Graduate	School year	Graduate
<i>Recorded:</i>		<i>Recorded:</i>		<i>Projected:</i>	
1925-1926	23 992	1940-1941	70 301	1953-1954	83 100
1926-1927	26 852	1941-1942	67 712	1954-1955	90 500
1927-1928	29 011	1942-1943	61 507	1955-1956	98 200
1928-1929	31 520	1943-1944	54 606	1956-1957	105 800
1929-1930	35 236	1944-1945	55 777	1957-1958	110 500
1930-1931	40 117	1945-1946	63 060	1958-1959	120 100
1931-1932	44 157	1946-1947	72 659	1959-1960	137 900
1932-1933	48 503	1947-1948	73 465	1960-1961	146 000
1933-1934	49 316	1948-1949	73 916	1961-1962	148 200
1934-1935	51 728	1949-1950	73 992	1962-1963	149 700
1935-1936	54 213	1950-1951	74 026	1963-1964	177 800
1936-1937	55 100	1951-1952	74 645	1964-1965	174 900
1937-1938	61 417	1952-1953	77 780	1965-1966	199 900
1938-1939	67 599	.	.	.	.
1939-1940	69 353	.	.	.	.

Source: see table VII-16.

Table VII-19 California: *Graded enrolment in public schools, grades 9-12 by college enrolment areas, 1947-1961*

(In thousands)

Year ¹	The State	College enrolment areas ²													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Recorded:</i>															
1947	349.7	3.1	3.1	5.9	60.2	16.6	3.6	17.2	22.6	21.9	9.0	9.3	139.8	17.1	20.3
1948	353.3	3.2	3.2	6.2	60.2	17.4	3.6	17.3	23.5	21.6	9.5	9.5	140.9	17.8	19.3
1949	365.5	3.4	3.4	6.5	61.4	17.9	3.7	18.2	24.6	23.1	10.0	9.7	145.0	18.4	20.3
1950	373.0	3.6	3.3	6.7	62.0	18.2	3.8	18.6	26.0	23.4	10.3	10.0	147.0	18.7	21.1
1951	390.9	3.9	3.6	6.9	64.9	19.4	4.1	19.2	27.5	23.9	10.7	10.4	154.3	20.1	22.2
1952	416.5	4.3	3.8	7.5	68.4	21.0	4.3	20.3	29.8	25.2	11.4	11.3	163.6	21.7	23.8
1953	450.4	4.8	3.8	8.0	73.5	23.0	4.7	21.8	33.0	26.1	12.2	11.9	177.8	23.6	26.0
<i>Projected:</i>															
1954	483.4	5.2	4.0	8.5	77.6	24.6	4.9	22.9	36.4	27.1	13.3	12.6	192.5	26.0	27.9
1955	518.6	5.6	4.2	9.0	82.1	26.1	5.2	23.9	40.1	27.9	14.2	13.4	208.7	28.1	30.1
1956	566.6	6.1	4.4	9.5	88.9	27.8	5.4	25.3	44.9	28.8	15.2	14.3	232.1	30.7	33.1
1957	615.3	6.6	4.6	10.0	95.4	29.8	5.6	26.7	50.1	29.7	16.2	15.5	255.2	33.6	36.3
1958	658.4	7.0	4.6	10.4	101.1	31.9	5.7	28.2	54.8	30.3	16.8	16.3	275.6	36.2	39.6
1959	690.3	7.3	4.6	10.5	105.0	33.3	5.7	29.0	58.7	30.5	17.0	16.8	290.9	38.2	42.8
1960	739.4	7.6	4.7	10.6	113.2	36.1	5.7	30.0	64.6	31.1	17.4	18.1	311.6	41.2	47.5
1961	775.6	8.3	4.9	10.8	118.3	38.0	5.9	31.0	68.8	31.4	17.5	18.5	327.7	43.3	51.3

1. As of 31 October.

2. Defined for purposes of college enrolment projections.

Source: see table VII-16.

Assuming that the volume of net civilian migration was the primary factor determining the level of elementary school grade-progression ratios in any year, the author proceeded to the next step, which was a year-to-year comparison of these ratios for each grade separately. This may be termed the longitudinal approach, as it seeks to trace the pattern of changes in the ratios through time. Chart VII-3, also reproduced from the report, illustrates this type of analysis, where recorded and projected ratios for the movement of pupils from grade 4 to grade 5 have been plotted for a thirty-year period. In reading this chart, it should be borne in mind that the ratios plotted for the earlier years were based on total school-year enrolment by grade; while beginning with the 1945-1946 ratio the basis for calculation was shifted to the use of 31 October enrolment data.

Though a detailed analysis of the relationship of these ratios to the volume of net migration was not feasible, due to lack of independent estimates of annual migration data it appeared to the author of the report that the peaks and dips shown in chart VII-3 tended "to coincide with similar points in a charting of the numbers of people added to California's population through migration". A comparison of the ratios for other grades suggested to him that, "for grades involving pupils of compulsory attendance age, migration is the major factor determining grade-progression ratio changes".

However, ratios for grades K-2 were found to deviate from this pattern, possibly because of the influence of other factors being more important, such as the growing popularity and availability of kindergarten facilities and changes in the tendency of school authorities to retard first grade pupils. Therefore, in preparing estimates of future enrolment for kindergarten and grade 1, extrapolation was made of observed trends in the relationship between number of births and enrolment in these grades. The pattern of progression ratios from grade 1 to grade 2 was adjusted on the basis of expected school policy regarding retardation.

For grades 2-8, projections of grade progression ratios were made on the assumption that the volume of migration would tend to decrease from the peak period immediately after the outbreak of the Korean War.

At the high school level, it was believed that factors other than migration also had an important part, such as the increase of opportunities for employment and the drafting of boys into military service - factors which could explain the difference in pattern observed for boys and girls separately. Therefore, projections of grade progression for grades 9-12 were based on stable ratios derived from an examination of the 1946-1953 observations.

According to these various assumptions, future school enrolment grade by grade was estimated by moving each grade forward from its 1953 enrolment to 1960 or graduation, using anticipated grade-progression ratios.

A separate study was made of pupils classified in special categories such as ungraded pupils, those in special classes for the physically handicapped and mentally retarded, and special pupils in regular classes. These pupils represented about 1.5 per cent of total enrolment at the elementary level and 2.5 per cent at the high school level. Since these percentages were found to have changed little over a number of years, it was assumed that they would remain approximately the same throughout the projection period.

Projections of graded enrolment for the college enrolment areas and sub-areas were derived in the same way as the figures for the State as a whole, but the sums of the local area projections were adjusted to agree with the independently obtained totals for the State.

The author had made a short-range test of the grade-progression technique and of the basic assumptions underlying these projections by a comparison of recorded enrolment for October 1953 with two sets of projections, one prepared in February 1952 and the other in April 1953. The highest errors were found in the two projections of kindergarten enrolment, which were approximately 5 and 2 per cent below the recorded enrolment. The other projections of enrolment by grade were found in error by amounts ranging from less than 1 per cent in most cases to between 2 and 3 per cent in three instances.

Now that nearly ten years have passed since the projections published in the 1954 report were prepared, we are naturally interested to know how they compare with recorded figures which have become available in the meantime. A comparison of projected and recorded enrolment in public elementary schools, to 1960, and in public high schools, to 1961, is shown in tables VII-20 and VII-21. It is not surprising that the error of projection tends to rise as the date of recorded enrolment moves farther away from the time when the projections were prepared. On the whole, the error also tends to be greater for projections of high school enrolment than for projections of elementary school enrolment.¹

1. We are indebted to Mr. Carl Frisen, author of the report, and to Mr. Walter P. Hollmann, Senior Research Technician for Population Studies, California State Department of Finance, who kindly supplied us with both a copy of the report and the recorded enrolment data which we have used for comparison.

Table VII-20 California: Comparison of projected and recorded enrolment in public elementary schools (grades K-8), 1954-1960

Year	Total enrolment ¹		Error of Projection (Per cent)	Graded enrolment ²		Error of Projection (Per cent)
	Recorded (thousands)	Projected		Recorded (thousands)	Projected	
1954	1 787.7	1 801.4	+ 0.8	1 764.5	1 778.4	+ 0.8
1955	1 916.7	1 914.0	- 0.1	1 891.7	1 889.8	- 0.1
1956	2 048.8	2 012.4	- 1.8	2 021.1	1 987.3	- 1.7
1957	2 175.6	2 116.9	- 2.7	2 144.8	2 090.8	- 2.5
1958	2 291.5	2 236.4	- 2.4	2 257.6	2 208.8	- 2.2
1959	2 445.2	2 355.0	- 3.7	2 407.6	2 325.8	- 3.4
1960	2 561.0	2 435.0	- 4.9	2 519.2	2 404.7	- 4.5

1. Includes ungraded, postgraduates, physically handicapped, and mentally retarded.

2. Excludes above categories of special pupils.

Sources: Recorded enrolment from *California statistical abstract, 1962*; projected enrolment from *Projections of public school enrolment in California to 1960 and 1965*.

Table VII-21 California: Comparison of projected and recorded enrolment in public high schools (grades 9-12), 1954-1961

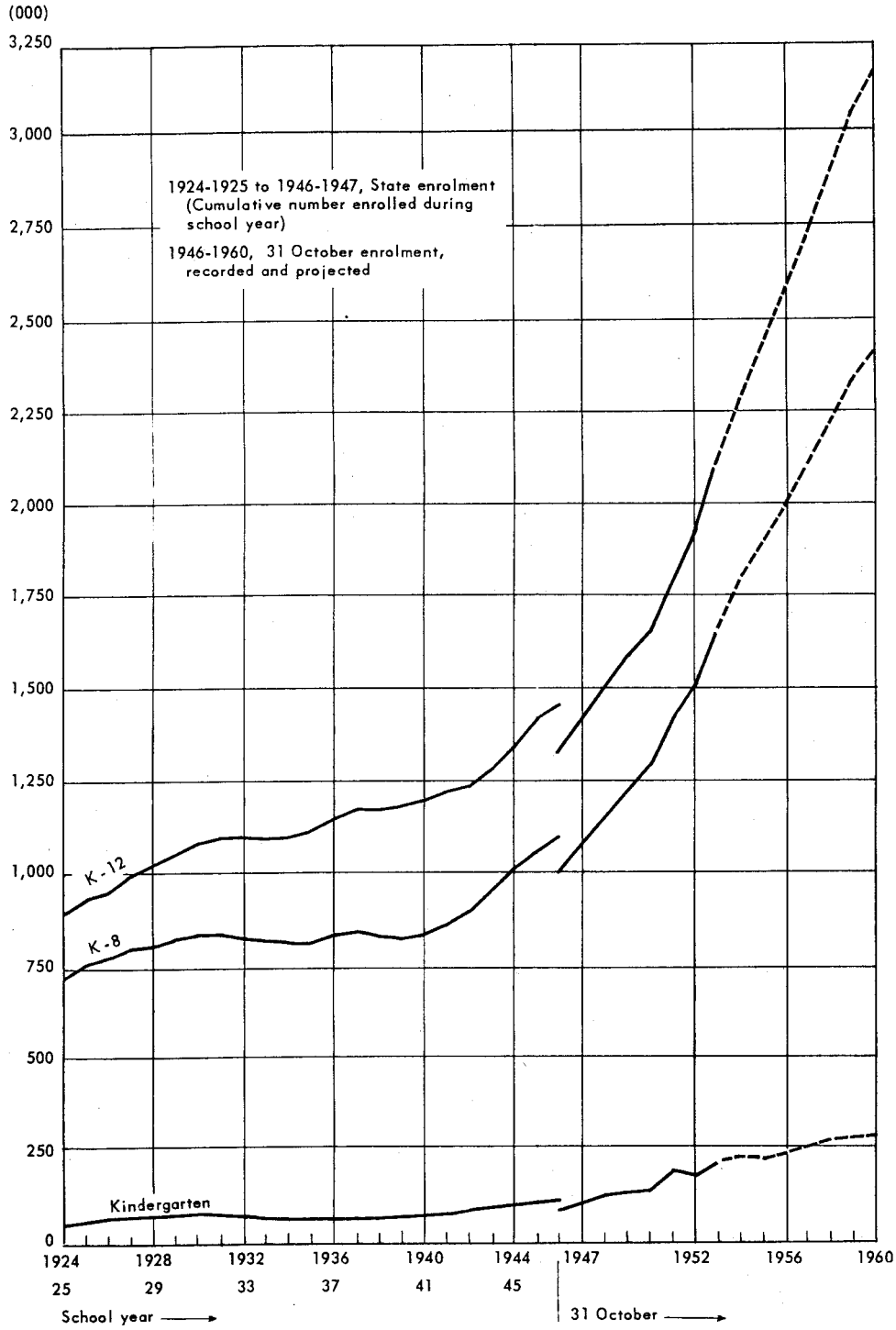
Year	Total enrolment ¹		Error of Projection (Per cent)	Graded enrolment ²		Error of Projection (Per cent)
	Recorded (thousands)	Projected		Recorded (thousands)	Projected	
1954	495.0	497.1	+ 0.4	484.0	483.4	- 0.1
1955	531.4	533.0	+ 0.3	520.2	518.6	- 0.3
1956	585.7	582.0	- 0.6	572.8	566.6	- 1.1
1957	649.2	631.7	- 2.7	634.5	615.3	- 3.0
1958	702.2	675.6	- 3.8	686.5	658.4	- 4.1
1959	745.5	708.0	- 5.0	729.7	690.3	- 5.4
1960	807.1	758.4	- 6.0	785.2	739.4	- 5.8
1961	877.3	795.5	- 9.3	850.9	775.6	- 8.8

1. Includes pupils in continuation classes, physically handicapped and mentally retarded.

2. Excludes above categories of special pupils.

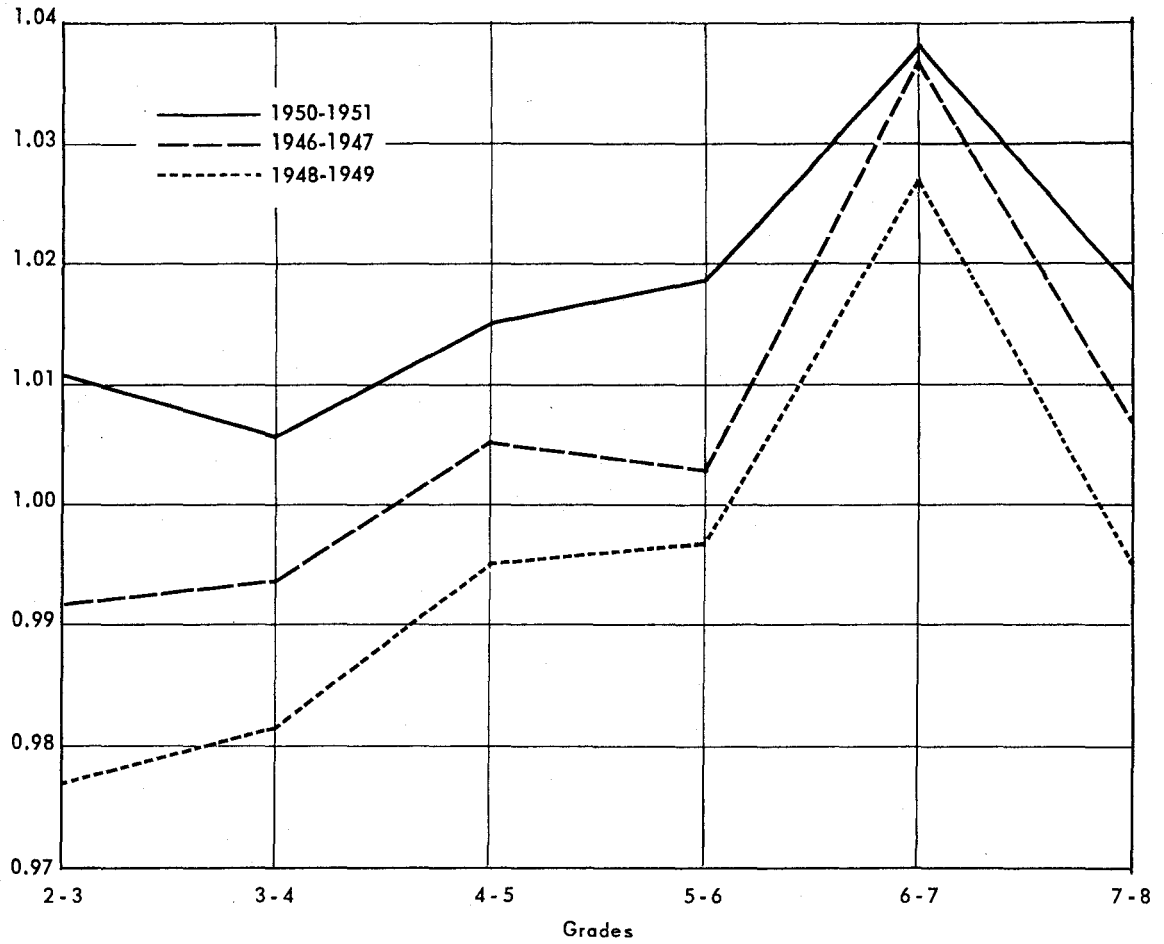
Sources: see table VII-20.

Chart VII-1. California: Graded enrolment in public schools
(grades K-12), 1924-1960



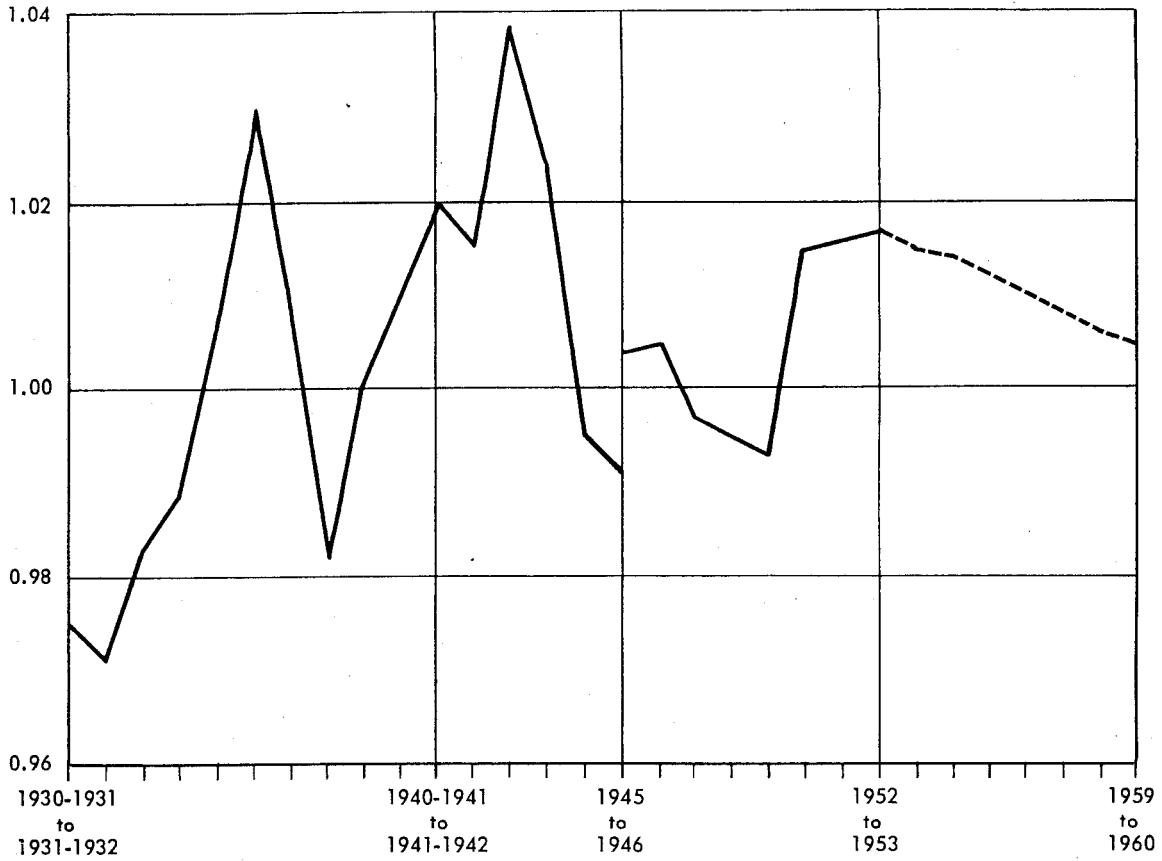
Source: California: State Department of Finance. Projections of public school enrolment in California to 1960 and 1965.

Chart VII-2. California: Grade progression ratios (grades 2 to 8) in public schools, for selected years



Source: California. State Department of Finance. Projections of public school enrolment in California to 1960 and 1965.

Chart VII - 3. California : Grade-progression ratios, grade 4 to grade 5, by school years, 1930/1931 to 1946/1947 ; as of 31 October 1945 to 1960



Source : California, State Department of Finance. Projections of public school enrolment in California to 1960 and 1965.

3. SCHOOL ENROLMENT PROJECTIONS FOR NEW ZEALAND ¹

Projections of school enrolment in New Zealand have been made since 1948 and periodically revised. The first projection, published in 1948, covered a period of only four years. A more elaborate set of "school population estimates" was published in 1950, covering a ten-year period from 1950 to 1960. These related to school enrolment at the first and second levels (primary and post-primary) in public and private schools. Another publication in 1957 contained projections of university enrolment up to 1975.²

These various projections have been superseded by the most recent report entitled, *School enrolment projections for the years 1959-1972*, which will be the subject of our examination in this chapter.³

Table VII-22, reproduced from the above-mentioned report, gives the latest estimates of total school enrolment in primary and post-primary schools, separately for the public and private schools, for each year from 1959 to 1972. Projections of primary school enrolment for all years after 1967 are shown in a

range of highest and lowest estimates, resulting from three alternative series based on different assumptions on the trend of birth rates after 1962. For post-primary school enrolment, two alternative series are shown for each year throughout the projection period.

1. We are indebted to Mr. E. G. Jacoby, Research Officer, New Zealand Department of Education, for supplying the documentation and basic information utilized in this section. The reader is also referred to an earlier publication of Unesco, containing much illustrative data from New Zealand. See: *Unesco Educational studies and documents*, No. 32, "Methods of school enrolment projection", by E. G. Jacoby (Paris, 1959).
2. New Zealand. Education Department. *Annual report of the Minister of Education for the year ended 31 December 1947* (Wellington, 1948); *School population estimates for the years 1950-1960* (document J-5; Wellington, Government Printer, 1950); *New Zealand University enrolment projections to 1975* (Wellington, Government Printer, 1957).
3. New Zealand. *School enrolment projections for the years 1959-1972* (document E.2; Wellington, Government Printer, 1959).

Table VII-22 New Zealand: *Total school enrolment projections, 1959-1972*

Year ¹	Primary school rolls ²		Post-primary school rolls			
	Public	Private	Series A		Series B	
			Public	Private	Public	Private
1959	366 250	49 000	89 500	18 150	89 750	18 250
1960	370 850	49 600	99 150	20 000	99 650	20 100
1961	375 550	50 200	109 350	21 900	110 100	22 000
1962	381 900	50 850	115 700	22 850	116 700	23 050
1963	389 500	51 850	119 900	23 350	121 000	23 500
1964	398 950	52 850	122 500	23 700	123 750	23 900
1965	407 400	53 950	124 900	23 750	126 300	24 050
1966	417 200	55 000	127 500	24 000	129 400	24 350
1967	427 200	56 300	130 600	24 400	132 900	24 850
1968	437 000 - 436 800	57 400 - 57 300	134 400	24 800	137 200	25 300
1969	446 800 - 445 300	58 600 - 58 400	138 750	25 350	142 200	25 950
1970	457 100 - 453 600	59 700 - 59 250	143 100	25 800	147 250	26 600
1971	468 000 - 461 300	61 100 - 60 250	147 600	26 300	152 500	27 200
1972	480 000 - 469 000	62 400 - 61 000	152 400	26 900	158 400	27 950

1. Enrolment as of 1 July.

2. Range of figures for 1968-1972 resulting from alternative projections of expected births.

Source: New Zealand. *School enrolment projections for the years 1959-1972*.

Range estimates of university enrolment, over the same period 1959-1972, are reproduced in table VII-23.

Table VII-23 New Zealand: *University enrolment projections, 1959-1972*

Year	Enrolment expected to fall between		
1959	13 700	—	13 000
1960	15 150	—	14 350
1961	16 100	—	15 250
1962	17 150	—	16 150
1963	18 100	—	17 000
1964	19 600	—	18 400
1965	21 700	—	20 250
1966	23 700	—	22 000
1967	25 500	—	23 600
1968	26 800	—	24 700
1969	27 500	—	25 100
1970	28 250	—	25 500
1971	29 400	—	26 200
1972	30 750	—	26 900

Source: see table VII-22.

The methods used in arriving at these projections, as explained in detail elsewhere,¹ consisted essentially of the following operations:

(1) *Estimating the school-age population, by single years of age*

In a country like New Zealand, where compulsory schooling is enforced for all children between the ages of 7 and 15 (in fact, most children begin school at the age of 5), it is easy to see that the principal factor determining future school enrolment is the estimated size of the school-age population. The latter is in turn dependent on the annual number of births, adjusted for survival to a specified age; to which must be added the cumulative net gains in external migration.

(2) *Estimating the enrolment ratio, specific for age*

For New Zealand, this operation has particular significance in respect of children below the age of 7, for it can be shown that children below the minimum age for compulsory schooling are currently enrolled in school in increasing proportion. Another age group requiring special attention are the children between the ages of 13 and 15, some of whom will be attending primary school while others will be at secondary school.

(3) *Estimating the total school enrolment by age of pupil*

From the basic factors of school-age population and enrolment ratio at each age, the total number of children expected to be enrolled in school can be derived. They will then be separated by level of school (primary or secondary) and by public or private school, age by age.

(4) *Estimating "school survival" ratios through the secondary school course*

Starting with actual enrolment data for a number of years, "survival ratios" are worked out between Form II (the last primary class) and each of the succeeding forms. Progression in New Zealand schools from Form III to IV, and from Form IV to V, is normally year by year. Repetition occurs only in Forms V and VI, depending upon the pupils passing certain examinations having to do with school certificates and university entrance. These survival ratios, like the enrolment ratios under step (2), are projected into the future.

(5) *Estimating secondary school enrolment from projected survival ratios*

From the actual and projected enrolment in Form II (the last primary class), and by means of the projected survival ratios, estimates of future enrolment can be obtained for each of the forms through the secondary course, year by year, for the desired number of years.

(6) *Linking of survival ratio with enrolment ratio projections*

The next step in this procedure is to link together the two sets of projections, independently obtained, by means of a cross-tabulation, such as an age-grade classification of pupils normally produced in school statistics. In such a cross-tabulation, the total enrolment by age (obtained by the enrolment ratio method) is set up in one column, say the last column, and the total enrolment by grade or form is set up in one row, say the last row. The grand total of projected enrolment for a given year should obviously be the same, whether by addition of the column or of the row.

(7) *Adjustment of projected ratios to obtain identical totals*

A final step consists in making suitable adjustments in the projected ratios (by age or by grade) so that the grand total of projections by age - using the

1. See: Unesco. *Methods of school enrolment projection*; especially chapters III and IV.

enrolment ratio method - becomes identical with the grand total of projections by grade - using the survival ratio method.

We presume that this is the general procedure followed by the New Zealand Education Department in arriving at the estimated classification of pupils in primary and post-primary schools, as shown in tables VII-24 and VII-25. Additionally, estimates are presented of the annual number of children entering primary and post-primary schools, as in table VII-26; and of the annual number of pupils leaving school, by the highest class reached, as reproduced in part in table VII-27.

The proportion of pupils enrolled in public schools in 1958 was 88.1 per cent at the primary school level and 83.0 per cent at the post-primary level. It was assumed that these proportions would rise gradually to 88.5 for primary schools and 85.0 for post-primary schools by 1972.

For projections of school enrolment by districts, it was simply assumed that each district would share in the future enrolment increases of the whole country in the same proportion as it did in the enrolment increases recorded for the period 1953-1958.

The resulting district enrolment projections, for a shorter period than the national projections, are illustrated in table VII-28.

Finally, we shall take a look at the enrolment projections published in 1950 and in 1959, comparing them with actual enrolment recorded for the years 1950-1958, and 1959-1962. We note at once, from table VII-29; that the projections published in 1950 on primary school enrolment for the years 1950-1958 were generally not too far off from actual enrolment, the percentage of error ranging from 0.1 to 4.6; but the projections for post-primary school enrolment were below the actual enrolment by margins of error ranging from 3.2 to 24.0 per cent. For the years 1959-1962, according to table VII-30, the new projections made in 1959, as far as private primary schools are concerned, were in error by larger margins than before, although there was a marked improvement in the accuracy of projections at the post-primary level. It would be interesting, in another five or ten years, to test if this improved accuracy of projection would hold for the later years covered by these projections.

Table VII-24 New Zealand: *Estimated classification of primary pupils (public and private schools combined) by grade, 1959-1972*

(In thousands)

Year ¹	Primers ²	Standards				Forms	
		1	2	3	4	I	II
1959	118.3	50.45	49.6	50.15	49.3	50.05	47.4
1960	121.15	50.75	49.7	50.45	49.4	49.65	49.35
1961	124.75	51.95	50.45	50.45	50.0	49.35	48.8
1962	127.7	53.15	51.65	51.15	50.3	49.95	48.85
1963	130.7	54.6	53.0	52.6	50.95	50.0	49.5
1964	134.8	55.8	54.7	53.9	52.35	50.6	49.65
1965	137.2	57.4	55.85	55.2	53.45	51.9	50.35
1966	138.8	59.6	57.45	56.4	54.85	53.2	51.9
1967	141.55	60.1	59.5	57.95	56.1	54.85	53.45
1968 ³	144.9	60.9	60.15	59.85	57.7	56.0	54.9
1969 ³	148.25	62.5	60.95	60.55	59.55	57.6	56.0
1970 ³	151.75	63.95	62.45	61.15	60.4	59.5	57.6
1971 ³	156.25	65.3	64.0	62.7	61.3	60.05	59.5
1972 ³	162.0	67.1	65.4	63.8	62.9	61.1	60.1

1. As of 1 July.

2. A child normally spends 1-1/2 - 2-1/2 years in these classes.

3. Corresponding to the highest alternative projection of births.

Source: see table VII-22.

Table VII-25 New Zealand: *Estimated classification of post-primary pupils (public and private schools combined) by grade, 1959-1972*¹

Year ²	Form III	Form IV	Form V	Form VI
1959	40 100	33 850	24 350	9 700
1960	46 450	36 900	26 500	9 900
1961	48 350	43 550	29 350	10 850
1962	48 100	45 850	33 650	12 150
1963	48 150	46 250	36 200	13 900
1964	48 800	46 750	36 850	15 250
1965	48 900	47 650	38 000	15 800
1966	49 600	48 550	39 400	16 200
1967	51 150	49 350	40 550	16 700
1968	52 700	50 800	42 100	16 900
1969	54 100	52 600	43 750	17 700
1970	55 200	53 900	45 750	19 000
1971	56 750	55 150	47 600	20 200
1972	58 700	56 700	49 450	21 500

1. Based on Series (B) projections.

2. As of 1 July.

Source: see table VII-22.

Table VII-26 New Zealand: *Estimated number of children entering school, 1959-1960 - 1971-1972*

Year	Pupils entering primary schools ¹			Pupils entering post-primary schools ²
	Series (a)	Series (b)	Series (c)	
1959-1960	53 050	(Same as Series (a))		46 450
1960-1961	55 250	"	"	48 350
1961-1962	55 850	"	"	48 100
1962-1963	57 700	"	"	48 150
1963-1964	59 950	"	"	48 800
1964-1965	59 550	"	"	48 900
1965-1966	60 850	"	"	49 600
1966-1967	62 800	"	"	51 150
1967-1968	63 850	63 800	63 350	52 700
1968-1969	65 500	65 000	64 100	54 100
1969-1970	67 100	66 250	64 850	55 200
1970-1971	69 450	68 100	65 850	56 750
1971-1972	72 400	69 450	67 550	58 700

1. All five-year-olds as of 1 July and those six- and seven-year olds at the same date who were not enrolled on 1 July of the previous year.

2. Pupils on the rolls in Form III (1st year post-primary) as of 1 July; they enter at the beginning of the school year.

Source: see table VII-22.

Table VII-27 New Zealand: *Estimated number of pupils leaving school, by class reached, 1959-1960 - 1971-1972*¹

Year	Pupils leaving school after completing				
	Primary school ²	Form III	Form IV	Form V ³	Form VI ³
1959-1960	1 100	3 200	7 350	14 450	9 700
1960-1961	1 250	2 900	7 550	15 650	9 900
1961-1962	1 000	2 500	9 900	17 200	10 850
1962-1963	950	1 850	9 650	19 750	12 150
1963-1964	900	1 400	9 400	20 950	13 900
1964-1965	1 050	1 150	8 750	21 050	15 250
1965-1966	700	350	8 250	21 800	15 800
1966-1967	350	250	8 000	22 700	16 200
1967-1968	250	350	7 250	23 650	16 700
1968-1969	300	100	7 050	24 400	16 900
1969-1970	450	200	6 850	24 750	17 700
1970-1971	350	50	6 300	25 550	19 000
1971-1972	250	50	5 700	26 100	20 200

1. Corresponding to series (B) projections of post-primary rolls.
2. It is assumed that in future almost all primary school leavers will go on to post-primary school.
3. Disregarding small changes in number of pupils who stay in Form V or Form VI for more than one year.

Source: see table VII-22.

Table VII-28 New Zealand: *Projections of public primary and post-primary enrolments, by district, 1959-1965*¹

District	1959	1960	1961	1962	1963	1964	1965
<i>Public primary school enrolment</i>							
Auckland	80 850	81 975	83 100	84 650	86 475	88 750	90 800
South Auckland	57 800	58 875	60 000	61 500	63 275	65 500	67 475
Taranaki	15 950	16 100	16 275	16 500	16 750	17 100	17 400
Wanganui	23 850	24 150	24 475	24 875	25 400	26 000	26 550
Hawke's Bay	25 425	25 800	26 175	26 700	27 325	28 125	28 775
Wellington	45 400	45 925	46 450	47 150	48 000	49 050	50 000
Nelson	10 175	10 300	10 400	10 525	10 700	10 875	11 075
Canterbury	51 650	52 250	52 850	53 700	54 700	55 925	57 025
Otago	25 650	25 900	26 175	26 550	26 975	27 525	28 000
Southland	15 000	15 175	15 350	15 600	15 900	16 250	16 600
<i>Public post-primary school enrolment²</i>							
Auckland	21 925	24 550	27 300	29 025	30 150	30 875	31 550
Hamilton	14 050	15 925	17 900	19 150	19 975	20 500	20 975
Central	30 900	33 975	37 250	39 300	40 650	41 500	42 300
Southern	22 875	25 200	27 650	29 225	30 225	30 875	31 475

1. Excluding Maori schools, and special schools controlled by the Department of Education.
2. Corresponding to series (B) projections.

Source: see table VI I-22.

Table VII-29 New Zealand: *Comparison of projected and actual enrolment, primary and post-primary, public and private schools, 1950-1958*

Year	Public or Private	Primary		Per cent Error of Projection	Post-primary		Per cent Error of Projection
		Actual	Projected		Actual	Projected	
1950	Public	256 661	255 805	-0.3	48 535	46 970	- 3.2
	Private	35 775	35 135	-1.8	10 511	10 160	- 3.3
1951	Public	267 202	266 915	-0.1	50 961	48 390	- 5.0
	Private	37 109	36 685	-1.1	11 045	10 420	- 5.7
1952	Public	284 546	282 900	-0.6	54 373	50 315	- 7.5
	Private	39 342	38 825	-1.3	11 622	10 800	- 7.1
1953	Public	300 299	296 850	-1.1	59 838	52 855	-11.7
	Private	41 208	40 650	-1.4	12 476	11 340	- 9.1
1954	Public	313 272	308 170	-1.6	66 638	56 750	-14.8
	Private	42 753	42 130	-1.5	13 627	12 120	-11.1
1955	Public	321 982	317 845	-1.3	72 439	60 965	-15.8
	Private	44 086	43 420	-1.5	14 970	12 910	-13.8
1956	Public	333 349	326 210	-2.1	75 772	62 255	-17.8
	Private	46 261	44 715	-3.3	15 823	13 295	-16.0
1957	Public	346 247	334 335	-3.4	79 172	62 020	-21.7
	Private	47 953	45 970	-4.1	16 259	13 490	-17.0
1958	Public	357 335	340 960	-4.6	83 139	63 185	-24.0
	Private	48 418	46 995	-2.9	16 984	13 725	-19.2

Source: Projected enrolment as published in New Zealand. *School population estimates for the years 1950-1960*; actual enrolment data supplied by the New Zealand Department of Education (Research Officer) in June 1963.

Table VII-30 New Zealand: *Comparison of projected and actual enrolment, primary and post-primary, public and private schools, 1959-1962*

Year	Public or Private	Primary		Post-primary		
		Actual enrolment	Per cent Error of Projection	Actual enrolment	Per cent Error of Projection	
					(A)	(B)
1959	Public	366 939	-0.2	89 987	-0.5	-0.3
	Private	51 549	-4.9	17 663	+2.8	+3.3
1960	Public	372 953	-0.6	99 913	+0.8	-0.3
	Private	52 887	-6.2	19 293	+3.7	+4.2
1961	Public	377 514	-0.5	110 163	-0.7	-0.1
	Private	54 079	-7.2	20 752	+5.5	+6.0
1962	Public	385 359	-0.9	119 028	-2.8	-2.0
	Private	55 293	-8.0	22 290	+2.5	+3.4

Source: Projected enrolment as in table VII-22; actual enrolment data supplied by the New Zealand Department of Education (Research Officer) in June 1963.

Table VII-31 France: *School enrolment, by age groups, 1950-1965*
(In thousands)

School year	Pupils at first and second levels of education ¹							
	Under 6 years	6-13 years	14 years and over	14	15	16	17	18 and over
<i>Estimated:</i>								
1950-1951	1 204	4 385	813	291	208	166	89	59
1951-1952	1 388	4 408	834	297	214	172	90	61
1952-1953	1 451	4 632	864	306	222	179	95	62
1953-1954	1 396	4 886	938	342	241	189	101	65
1954-1955	1 421	5 193	972	336	254	202	109	71
1955-1956	1 434	5 532	973	326	248	208	115	76
<i>Projected:²</i>								
1956-1957	1 450	5 809	(A) 1 017	366	245	207	120	79
			(B) 1 023	372	245	207	120	79
1957-1958	1 450	6 005	(A) 1 082	401	275	204	119	83
			(B) 1 099	414	279	204	119	83
1958-1959	1 450	6 212	(A) 1 137	407	301	229	118	82
			(B) 1 169	426	310	233	118	82
1959-1960	1 450	6 380	(A) 1 195	426	305	251	132	81
			(B) 1 247	452	320	259	135	81
1960-1961	1 450	6 362	(A) 1 384	575	319	254	145	91
			(B) 1 467	619	339	266	150	93
1961-1962	1 450	6 313	(A) 1 548	603	432	266	147	100
			(B) 1 662	657	465	282	154	104
1962-1963	1 450	6 247	(A) 1 684	615	453	361	154	101
			(B) 1 827	678	493	387	163	106
1963-1964	1 450	6 170	(A) 1 778	626	461	377	208	106
			(B) 1 954	699	509	410	224	112
1964-1965	1 450	6 093	(A) 1 843	628	470	384	218	143
			(B) 2 152	812	525	423	237	155
1965-1966	1 450	6 045	(A) 1 842	606	471	392	223	150
			(B) 2 432	774	812	437	245	164

1. Excluding apprentice centres ("centres d'apprentissage").

2. For age group 14 years and over, series (A) assumes continuation of trends; series (B) assumes the application of school reform measures beginning in 1964-1965.

Source: France. Institut national d'études démographiques. *Population*, 13^e année, n° 2 (avril-juin, 1958).

4. SCHOOL ENROLMENT PROJECTIONS FOR FRANCE

Our example from France is taken from two articles which appeared in *Population*, the quarterly journal of the French National Institute of Demographic Studies.¹ One of these articles gives a summary of projections of school and university enrolment for the ten-year period, 1956 to 1965, which had been adopted by the National Planning Commission (*Commissariat général au Plan*) as basis for action by the government.² The other article, which contains two series of projections, covering the first and second levels of education on a longer-term basis, also goes into more detail concerning the methods used in arriving at these projections.³

Essentially the methods used in these studies consisted of: (1) estimating the future population by age groups; (2) estimating future school enrolment ratios for each group, separately for first level (primary) and second level (secondary) education; (3) estimating the distribution of future enrolment between public and private schools; (4) estimating the distribution of second level enrolment between general secondary and vocational schools; and (5) estimating the proportion of secondary school graduates entering university faculties.

One of the complications involved in these projections was due to the uncertainties connected with a proposal to prolong the period of compulsory education by two years (that is, from 6 to 15 instead of 6 to 13 years of age), and to reform the school system accordingly. Therefore the projections are given in two alternative series: one of which assumes the continuation of trends without the prolongation of compulsory education, and the other takes into account the immediate and future effects of the prolongation of compulsory education.

Table VII-31, extracted from the report submitted to the National Planning Commission, contains projections of school enrolment by age groups for each of the ten years 1956 to 1965, with estimates derived from school statistics for the years 1950 to 1955. It may be noted that the projections for the age group under 6 years (not under compulsory education) are held to a constant number, which may in fact vary according to the size of the group and the voluntary schooling chosen by the parents. The age group 6 to 13 years inclusive, which comes under compulsory education in any case, is estimated to be nearly 100 per cent enrolled in school. The variation in numbers, reaching a maximum about 1959-1960 and receding after that date, is in accordance with changes in the birth rate, actual or anticipated. For the age groups 14 years and over, two series of projections are given: series (A) based on anticipated continuation of trends, while series (B) assumes certain immediate and later effects

resulting from the possible application of school reform measures beginning in 1964, notably the prolongation of compulsory education by two years.

At the first level of education, assuming an increasing share of the enrolment coming under public instruction, reaching about 86 or 87 per cent by 1964, the respective enrolments in public and private schools, pre-primary and primary, are shown in table VII-32. These figures are not directly comparable with those shown in table VII-31, which are based on enrolment projections by age and not by level of education. For example, some of the children under 6 may be found in the primary grades of public and private schools, while a considerable number of the children aged 6-13 years will be enrolled in continuation classes (*cours complémentaires*) which are included in the projections for the second level of education. Pupils enrolled in primary classes within secondary schools are excluded from table VII-32; they are apparently also excluded from table VII-33, which deals with projections of school enrolment at the second level.⁴

Table VII-33 gives the estimated and projected enrolments at the second level of education, 1950-1965, as related to the estimated population 11-17 years of age. It may be noted that the ratio of enrolment at the second level, as defined, was expected to rise from about 28 per cent in 1955 to 40 per cent in 1965, without taking into consideration the effects of the proposed school reform mentioned above. Thus the number of pupils enrolled in public and private schools at the second level, excluding the private apprentice centres (*centres d'apprentissage*) was expected to double between 1955 and 1965.

As between public and private schools at the second level, the number of pupils in public schools was expected to more than double between 1955 and 1965, while the increase in private schools was anticipated to be somewhat less than double. However, the percentage of total second-level enrolment attributed to private schools was expected to fall from nearly 30 per cent in 1950 to about 25 per cent in 1965. (See table VII-34.)

1. We are indebted to M. Jean Bourgeois-Pichat, Director of the Institute, for permission to make use of these articles for illustrative purposes in the present Manual.
2. Fourastié, Jean, "Les travaux de la Commission de l'équipement scolaire du Commissariat général au Plan", *Population* (Revue trimestrielle de l'Institut national d'études démographiques), 13e année, no. 2, avril-juin 1958.
3. Pressat, Roland, "Croissance des effectifs scolaires et besoins en maîtres", *Population*, 13e année, nos. 1-2, janvier-mars et avril-juin 1958.
4. In the school year 1960-1961, for example, there were some 233,000 pupils reported enrolled in primary classes within public and private secondary schools (see *Annuaire statistique de la France*, 1962, page 50, table XXI).

Table VII-32 France: *Distribution of pupils at the first level of education, 1950-1964*
(In thousands)

School year	Public schools		Private schools		Total ¹	
	Pre-primary	Primary	Pre-primary	Primary	Pre-primary	Primary
1950-1951	896	3 218	213	629	1 109	3 857
1952-1953	999	3 473	226	678	1 225	4 151
1954-1955	1 056	3 927	215	720	1 271	4 647
<i>Projected:</i>						
1956-1957	1 073	4 408	210	783	1 283	5 191
1957-1958	1 074	4 511	206	790	1 280	5 301
1958-1959	1 087	4 614	203	789	1 290	5 403
1959-1960	1 099	4 678	199	787	1 298	5 465
1960-1961	1 104	4 665	193	766	1 297	5 431
1961-1962	1 105	4 627	189	741	1 274	5 368
1962-1963	1 109	4 572	183	719	1 292	5 291
1963-1964	1 108	4 512	178	698	1 286	5 210
1964-1965	1 111	4 458	172	672	1 283	5 130

1. Excluding primary classes in secondary schools.

Source: see table VII-31.

A further distribution of enrolment in public schools at the second level between three types of instruction - general secondary, continuation classes, and vocational (*enseignement technique*), as estimated for 1950-1955 and projected to 1965, is shown in table VII-35. Here it may be seen that the proportion of total enrolment in general secondary schools was assumed to decrease gradually to the 1950 level, and the proportion in vocational schools to increase correspondingly, while the proportion in continuation classes was assumed to remain constant at the 1950 level.

So much for the first two levels of education. At the level of higher education, leaving out all non-university institutions (*les grandes écoles*) and excluding foreign students in the universities, the projections implied an increase on the order of 120 per cent between 1955 and 1965, somewhat higher

than the rate of increase in total enrolment at the second level, projected over the same period. It may be of interest to note that the projections imply a much higher rate of growth for the science faculty, a relatively lower rate of growth for the faculties of medicine and pharmacy, and the lowest rates of growth for the faculties of law (*droit*) and arts (*lettres*). (See table VII-36).

Of particular interest from the viewpoint of methodology is the second article mentioned above, which is based essentially on projections of enrolment ratios for the crucial age groups 14, 15, 16 and 17, according to two hypotheses: (a) that they would continue previous trends of voluntary schooling at those ages; and (b) that they would be affected by the possible prolongation of compulsory education by two years, beginning in 1964 or 1965.

Table VII-33 France: *Enrolment at the second level of education, 1950-1965*
(Thousands of pupils)

School year	Population 11-17 years of age ¹	Enrolment at second level ²		Pupils in public apprentice centres	Total enrolment at second level ³
		Number	(b) as % of (a)		
	(a)	(b)		(c)	(b) + (c)
<i>Estimated:</i>					
1950-1951	4 471	880	19.7	...	...
1951-1952	4 354	906	20.8	...	...
1952-1953	4 189	949	22.6	153	1 102
1953-1954	4 119	1 007	24.4	159	1 166
1954-1955	4 100	1 073	26.2	164	1 237
1955-1956	4 111	1 147	27.9	168	1 315
<i>Projected:</i>					
1956-1957	4 152	1 229	29.6	172	1 401
1957-1958	4 379	1 366	31.2	185	1 551
1958-1959	4 684	1 531	32.7	203	1 734
1959-1960	5 038	1 718	34.1	218	1 936
1960-1961	5 336	1 888	35.4	235	2 123
1961-1962	5 583	2 043	36.6	250	2 293
1962-1963	5 777	2 172	37.6	268	2 440
1963-1964	5 939	2 286	38.5	285	2 571
1964-1965	5 895	2 316	39.3	300	2 616
1965-1966	5 836	2 334	40.0	305	2 639

1. As of 1 January during the school year.

2. Excluding preparatory classes in higher education institutes (16,000 in 1956), and primary classes in secondary schools.

3. Including public apprentice centres, but excluding private apprentice centres.

Source: see table VII-31.

Table VII-34 France: *Distribution of pupils at the second level of education, 1950-1965*

(In thousands)

School year	Public schools		Private schools	
	Including apprentice centres	Excluding apprentice centres	Excluding apprentice centres	As per cent of total excluding apprentice centres %
<i>Estimated:</i>				
1950	...	619	260	29.5
1951	...	646	260	28.7
1952	836	683	266	28.2
1953	886	727	280	28.0
1954	941	777	296	27.6
1955	998	830	317	27.6
<i>Projected:</i>				
1956	1 065	893	336	27.3
1957	1 183	998	368	27.0
1958	1 327	1 124	407	26.6
1959	1 483	1 265	453	26.3
1960	1 633	1 398	490	26.0
1961	1 768	1 518	525	25.7
1962	1 885	1 617	555	25.5
1963	1 989	1 704	582	25.4
1964	2 027	1 727	589	25.4
1965	2 044	1 739	595	25.4

Source: see table VII-31.

Table VII-35 France: *Distribution of public school pupils at the second level of education, by type, 1950-1965*

(Number in thousands)

School year	Total : second level ¹	General secondary ²		Continuation classes ³		Vocational ⁴	
		Number	Per cent	Number	Per cent	Number	Per cent
<i>Estimated</i>							
1950-1951	619	320	51.6	176	28.5	123	19.9
1951-1952	646	336	52.0	186	28.8	124	19.2
1952-1953	683	359	52.6	196	28.7	128	18.7
1953-1954	727	381	52.5	208	28.6	137	18.9
1954-1955	777	412	53.0	220	28.3	146	18.7
1955-1956	830	443	53.3	238	28.7	149	18.0
<i>Projected:</i>							
1956-1957	893	478	53.5	255	28.5	160	18.0
1957-1958	998	534	53.5	284	28.5	180	18.0
1958-1959	1 124	600	53.4	320	28.5	204	18.1
1959-1960	1 265	674	53.3	360	28.5	231	18.2
1960-1961	1 398	743	53.1	398	28.5	257	18.4
1961-1962	1 518	803	52.9	432	28.5	283	18.6
1962-1963	1 617	850	52.6	461	28.5	306	18.9
1963-1964	1 704	891	52.3	485	28.5	328	19.2
1964-1965	1 727	896	51.9	492	28.5	339	19.6
1965-1966	1 739	895	51.5	496	28.5	348	20.0

1. Excluding apprentice centres.

2. Excluding preparatory classes of higher education institutions, and primary classes in secondary schools.

3. Excluding vocational sections of continuation classes.

4. Including vocational schools, vocational sections of secondary schools and of continuation classes; excluding apprentice centres.

Source: see table VII-31.

Table VII-36 France: *Distribution of students in university faculties: 1948-1965*

(In thousands)

Academic year	Total number of students ¹	Number of students by faculty				
		Law	Science	Arts	Medicine	Pharmacy
<i>Estimated:</i>						
1948-1949	116.6	34.8	21.4	29.7	23.9	6.7
1950-1951	123.4	35.2	24.3	31.2	26.1	6.7
1952-1953	130.4	36.6	28.1	33.5	25.7	6.6
1954-1955	140.9	37.2	33.9	36.4	26.2	7.3
1955-1956	143.9	34.0	37.2	38.9	26.4	7.4
<i>Projected:</i>						
1956-1957	151.0	34.7	40.2	41.1	27.4	7.7
1957-1958	159.8	35.3	44.5	44.0	27.7	8.2
1958-1959	173.3	39.5	49.2	46.3	29.5	8.8
1959-1960	188.5	41.8	55.3	49.7	32.1	9.5
1960-1961	206.1	45.7	62.1	53.5	34.2	10.6
1961-1962	226.5	49.9	69.4	58.1	37.5	11.7
1962-1963	246.4	53.8	76.1	62.1	41.8	12.6
1963-1964	266.4	57.3	84.5	64.7	46.0	13.9
1964-1965	292.3	62.5	94.4	68.7	51.3	15.3
1965-1966	316.4	66.7	102.9	74.1	56.3	16.5

1. French students only (excluding foreign students) in university faculties (not including other institutions of higher education).

Source: see table VII-31.

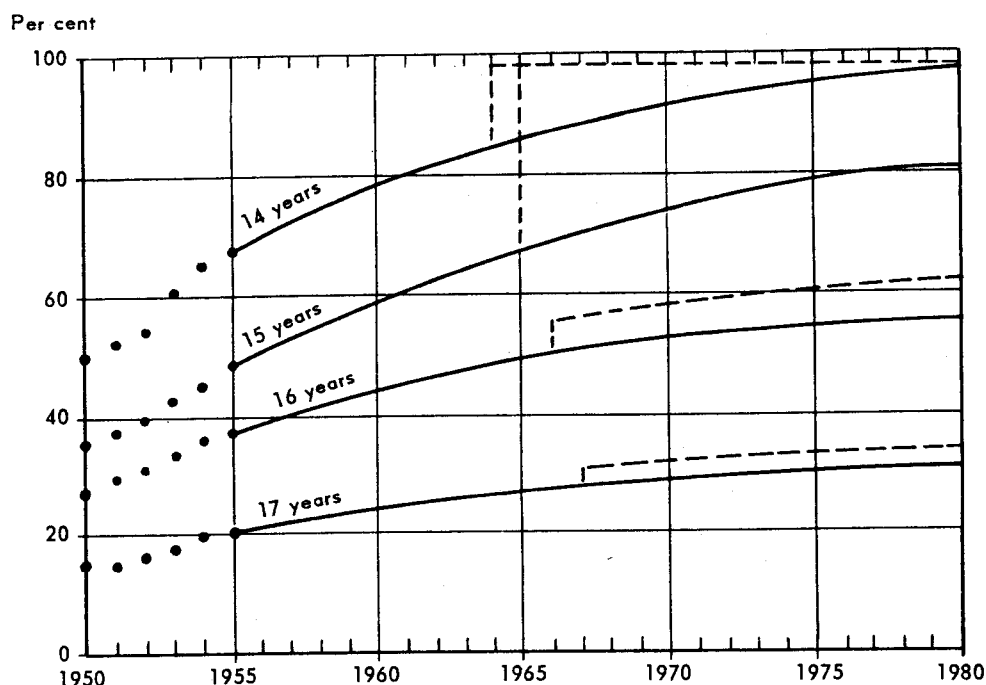
Starting with observed enrolment ratios for these age groups for the years 1950-1955, as estimated from official population and school statistics,¹ the author made approximate estimates of these ratios for the school year 1957-1958. These estimated ratios are given as follows:

School year	Estimated school enrolment ratio, by age			
	14-year olds	15-year olds	16-year olds	17-year olds
1950-1951	49.9	35.5	27.2	14.7
1951-1952	52.1	36.9	29.4	14.7
1952-1953	54.1	38.9	30.7	16.2
1953-1954	60.7	42.6	33.0	17.4
1954-1955	65.5	45.1	35.7	19.1
1955-1956	67.4	48.4	36.9	20.3
1957-1958 (approx.)	72	53	40	22

These estimated enrolment ratios are plotted and projected to 1980, as reproduced in chart VII-4. The solid lines in this chart represent projections of the enrolment ratio for each of the age groups 14 to 17. This is according to the first hypothesis. Now, under the second hypothesis, assuming that school reform measures would be applied beginning in 1964, and 1965, involving the prolongation of compulsory education by two years, it was anticipated that the enrolment ratios for the 14 and 15-year olds would rise immediately to a level of 98.5 per cent, and that the ratios for the 16 and 17-year olds would then be raised as a consequence. These increased ratios are shown by the broken lines in chart VII-4.

1. These estimates, as quoted by the author of the article, were prepared by M. Löbel of the National Institute of Statistics and Economic Studies (INSEE), in January 1957, for the use of the Planning Commission.

Chart VII - 4. France: Projection of school enrolment ratios for the population 14, 15, 16 and 17 years of age, according to two hypotheses



Source: France. Institut national d'études démographiques. Population, 13^e année, n° 1, janvier-mars 1958.

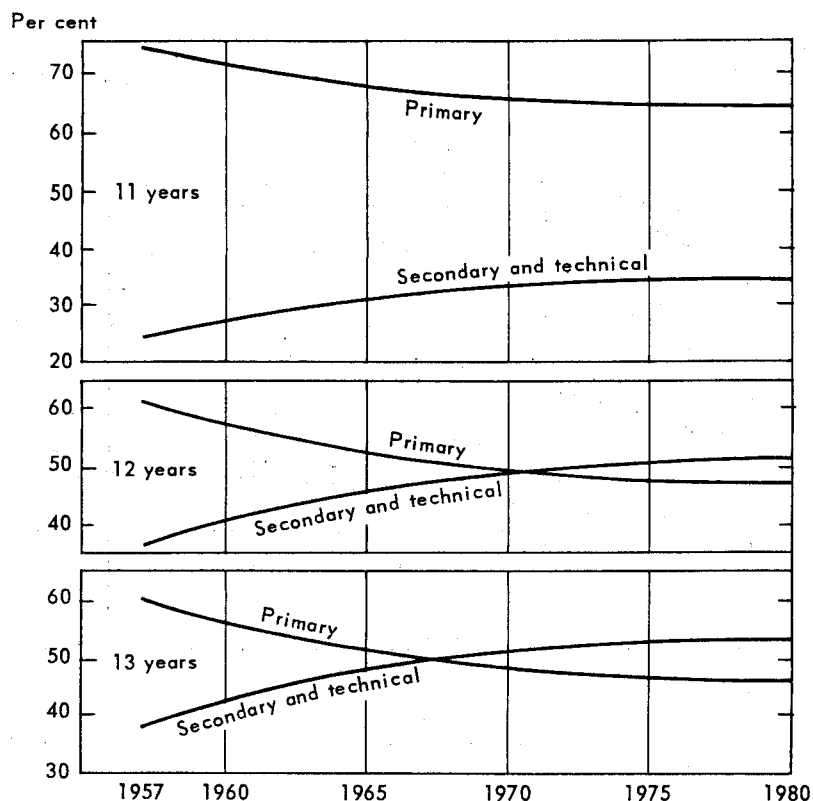
The next step in the procedure, as explained in the article, was to estimate enrolment ratios by level of education for each age group from 6 to 17 years. These ratios, estimated for 1957, were as follows:

Age group	Estimated school enrolment ratio, by level		
	First level	Second level	Both levels
6-year olds	98.5	—	98.5
7-year olds	98.5	—	98.5
8-year olds	98.5	—	98.5
9-year olds	97.1	1.4	98.5
10-year olds	90.3	8.2	98.5
11-year olds	73.8	24.7	98.5
12-year olds	61.5	37.0	98.5
13-year olds	60.2	38.3	98.5
14-year olds	15.0	57.5	72.5
15-year olds	2.5	50.5	53.0
16-year olds	1.0	39.0	40.0
17-year olds	0.3	21.7	22.0

Now, under the hypothesis of no change in the period of compulsory education, the enrolment ratio of the 11, 12 and 13-year olds may be split between the first and second levels and each portion projected forward to 1980, making sure that any increase in the second-level ratio must be accompanied by a corresponding reduction in the first-level ratio (since the children could not be enrolled in primary and secondary schools at the same time). Projections of these respective enrolment ratios for the age groups 11, 12 and 13, from 1957 to 1980, are shown in chart VII-5.

Similarly, the school enrolment ratios projected for the 14 to 17 age groups must be reduced by the percentage of pupils at those ages still found in primary grades, in order to obtain second-level enrolment ratios projected to 1980. Only here a modification must be introduced under the second hypothesis, namely, that the period of compulsory education might be prolonged till the child reaches the age of 16. Some assumptions will have to be made as to the distribution of the 14 and 15-year olds between the two levels of education.

Chart VII-5. France: Projection of school enrolment ratios for the population 11, 12 and 13 years of age, by level of education, 1957-1980



Source: See chart VII-4.

Without following in detail the arguments put forth by the author, we shall merely mention that he assumed a slight reduction in the proportion of the 14-year olds allocated to the second level of education (under the assumption that they would be subject to compulsory education), while the proportion of 15-year olds in second-level education would be slightly increased.

The school enrolment ratio of children under 6 (that is, 3, 4, and 5-year olds) was found to be approximately 60 per cent. An assumption was made that this ratio might rise to 65 and remain constant at that level. Allowance was made, on an over-all

basis, for those aged 18 years and over still enrolled in schools at the second level.

With further assumptions as to the distribution of second-level enrolment between public and private schools, and among the three major types of second-level education in public schools, the author presented two tables containing his projections of school enrolment at the first level as far as 1980 and at the second level as far as 1986. These are reproduced as tables VII-37 and VII-38. Compared with tables VII-31 to VII-35, they are roughly consistent though different in certain details.

Table VII-37 France: *Projected enrolment at first and second levels of education, without prolongation of compulsory education*

(Thousands of pupils)

School year	First level (primary; public and private) ¹	Second level education					
		Public and private	Private	Public			Total public
				Continu- ation courses	Lycées and collèges	Vocational	
1957	5 315	1 698	475	330	544	349	1 223
1958	5 411	1 873	515	365	603	390	1 358
1959	5 459	2 073	562	405	669	437	1 511
1960	5 428	2 309	617	452	748	492	1 692
1961	5 366	2 518	662	494	818	544	1 856
1962	5 312	2 680	691	527	875	587	1 989
1963	5 260	2 790	709	549	914	618	2 081
1964	5 202	2 873	727	564	940	642	2 146
1965	5 154	2 903	735	568	947	653	2 168
1966	5 088	2 932	739	572	956	665	2 193
1967	5 034	2 946	742	573	959	672	2 204
1968	4 970	2 967	745	578	966	678	2 222
1969	4 903	2 988	750	582	974	682	2 238
1970	4 840	3 009	755	586	981	687	2 254
1971	4 784	3 021	755	589	986	691	2 266
1972	4 744	3 029	757	591	988	693	2 272
1973	4 716	3 022	756	589	986	691	2 266
1974	4 714	3 014	753	588	983	690	2 261
1975	4 737	2 988	747	583	975	683	2 241
1976	4 773	2 978	745	581	971	681	2 233
1977	4 829	2 970	742	579	969	680	2 228
1978	4 896	2 971	743	579	969	680	2 228
1979	4 972	2 986	747	582	974	683	2 239
1980	5 051	3 013	753	588	983	689	2 260
1981	...	3 052	763	595	996	698	2 289
1982	...	3 103	776	605	1 012	710	2 327
1983	...	3 160	790	616	1 031	723	2 370
1984	...	3 223	806	629	1 051	737	2 417
1985	...	3 288	822	641	1 073	752	2 466
1986	...	3 353	838	654	1 094	767	2 515

1. No estimates of primary school enrolment are made after 1980 since estimates of future births are available only up to 1975.

Source: France. Institut national d'études démographiques. *Population*, 13e année, n° 1, janvier - mars, 1958.

Table VII-38 France: *Projected enrolment at first and second levels of education, with prolongation of compulsory education by 2 years in 1964 and 1965*

(Thousands of pupils)

School year	First level (primary: public and private) ¹	Second level education					
		Public and private	Private	Public			Total public
				Continu- ation courses	Lycées and collèges	Vocational	
1965	5 450	2 952	747	578	963	664	2 205
1966	5 360	3 017	760	589	984	684	2 257
1967	5 289	3 050	769	593	992	696	2 281
1968	5 206	3 084	774	600	1 005	705	2 310
1969	5 129	3 102	779	604	1 010	709	2 323
1970	5 052	3 127	785	609	1 019	714	2 342
1971	4 985	3 142	786	612	1 025	719	2 356
1972	4 934	3 143	786	613	1 025	719	2 357
1973	4 898	3 130	783	610	1 021	716	2 347
1974	4 882	3 115	779	607	1 016	713	2 336
1975	4 896	3 090	772	603	1 008	707	2 318
1976	4 926	3 072	768	599	1 002	703	2 304
1977	4 976	3 059	765	596	998	700	2 294
1978	5 039	3 059	765	596	998	700	2 294
1979	5 110	3 071	768	599	1 002	702	2 303
1980	5 187	3 098	775	604	1 010	709	2 323
1981	...	3 137	784	612	1 024	717	2 353
1982	...	3 188	797	622	1 040	729	2 391
1983	...	3 245	811	633	1 059	742	2 434
1984	...	3 308	827	645	1 079	757	2 481
1985	...	3 373	843	658	1 100	772	2 530
1986	...	3 439	860	670	1 122	787	2 579

1. No estimates of primary school enrolment are made after 1980 since estimates of future births are available only up to 1975.

Source: see table VII-37.

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