

International yearbook of education

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Introduction

This XXXth volume of the International Yearbook of Education contains a brief chapter outlining the major trends in the evolution of education in 1967-1968, followed by tables of quantitative data concerning the number of pupils and teachers and financing, together with summaries of the national reports on educational developments in 96 Member States. It also contains the information furnished by the governments concerning the effect given to Recommendation No. 43 concerning the teaching of mathematics in secondary schools, adopted by the International Conference on Public Education at its nineteenth session, in 1956.

The next volume of the International Yearbook of Education will be planned on different lines. It will still include comparable data on the organization of education in each of the Member states, and statistics regarding the number of pupils and teachers and the financing of education, but the monograph on each Member State will no longer deal with the education system as a whole. Instead, it will consist an account of the main problems and trends in the field of education and of the most outstanding educational innovations and research in each state. On the basis of the information thus supplied, a chapter will be devoted to a synthesis designed to elucidate the subjects of common concern to the majority of the governments and to show in which directions their efforts in respect of education converge.

This chapter might serve as a work paper for a selective discussion on educational developments, which would be confined to a few major problems of common interest to the majority of Member States.

Some aspects of educational developments in 1967-1968

Although it is not possible to summarize in a few sentences the variety and complexity of trends revealed by an examination of the national systems, certain converging orientations can be identified: a controlled but very clear quantitative expansion, apparent mainly at secondary level and, in many cases, still more marked at higher level; an effort towards qualitative improvement and renewal affecting correlatively the structures, content and methods; a move towards diversification motivated by the necessity to make education a preparation for life but which gives the conception of general basic culture its full value as a prerequisite for specialization and as a condition for subsequent reconversion.

Structural reform and innovations in method naturally leave hesitations and gaps. But improvisation hesitates before concerted action in which administrative measures, planning and educational research are combined. And the similarity of the solutions—or at least of the subjects of concern—reflects not only the analogy of the problems but also the intensification of the exchanges between those responsible for education and specialists in different countries.

Budget

The growing importance attached to education continues to be reflected in a generally increased financial effort on the part of the authorities concerned.

Reference to the percentage of national revenue or gross national product allotted to education reveals a decrease in only three countries, according to the national reports. On the other hand, 57 governments report an increase in this percentage, of between 5% and 10% in 17 cases, and between 10% and 20% in 24 cases. In seven cases, the increase in educational expenditure in relation to the national revenue or gross national product exceeds 20%, the maximum being 48%.

Quantitative Evolution

The tendency towards stability observed last year at primary level is confirmed: six countries report a reduction of numbers in primary education and 30 others an increase of 5% or less. In secondary education, however, although five governments report a decrease and twelve others an increase of less than 5%, an increase exceeding or considerably exceeding 10% over the corresponding figure for the previous year is observed in 28 countries.

The evolution of enrolment in technical and specialized education (commercial, vocational, agricultural) is more difficult to define: increase in numbers appears to be generally slight and there is sometimes a decrease; but opposite trends may be observed which reflect structural changes involving the transfer of pupils from one type of school to another.

The same phenomenon is also apparent in general education where, for example, there have been certain shifts of numbers between actual secondary education and complementary types of education.

The rising trend is most sharply defined in higher education, since it is apparent in almost all countries and the increase in numbers in comparison with the corresponding figure for

the previous year exceeds 10%, in 30 cases, and is often considerably greater. As regards the numbers in special education, they indicate an effort which is confined to a limited number of countries but which is generally appreciable.

The patterns of numerical evolution of education are thus distributed over a very wide range and reflect several broad trends as well as a great diversity of conjunctural situations.

Teaching Staff

A considerable number of Member States continue to be affected by the shortage of teaching staff, since only eight countries state that they have no shortage. Some 15 governments report a shortage of teachers at all levels and 15 others a shortage of secondary teachers, while seven of them indicate a shortage of teachers for technical education. The shortage appears less widespread at the level of primary teachers and two countries even report a surplus at this level which may perhaps, in one case at least, be attributed to the lack of posts. At secondary level, the subjects more particularly affected by the shortage of teaching staff are modern languages, science and mathematics.

In such a situation, many countries, often in developing regions, call upon insufficiently qualified teachers or upon graduates without teacher training but, more and more frequently, steps are taken to rectify this state of affairs by organizing retraining or refresher courses.

It appears that the complementary conceptions of training and further training, and the practices followed in this respect, are more and more frequently considered from the standpoint of continuing education. In contrast with the recourse to crash courses for teachers, linked with the shortage, is the tendency, observed in some richer countries, to extend the duration of teacher training, which is more and more often placed at higher level.

Qualitative Improvement: Organization, Structures, Methods, Content of Education

From the mass of measures taken in the different countries the relationship between educational structures, syllabus content, methods and aids used seems to emerge more clearly than previously.

There is an impression, in most countries, of a more conscious effort to give the education system a structure and to determine its content in the light of the needs of society and preparation for certain specific occupations. This finality among others, however, appears in several ways. In the first place, in primary education, a tendency may be noted to give a larger place to certain disciplines which will play an important part in subsequent training, viz. mathematics and modern languages, or to give the syllabuses a practical bias (rural or community primary education, in developing countries).

At secondary level, the growing favour enjoyed by the comprehensive school is accompanied by a tendency, already observed in the previous year, to base on a common core of essential knowledge of varying scope a more highly developed and increasingly common system of streaming, also found moreover in technical and vocational education as well as in secondary and general education. There is a sharp increase in the number of new types of schools, of additional sections and of new subjects added to the curricula. In higher education, however, concomitantly with a broader range of courses offered, a reaction against undue specialization is sometimes observed in certain countries: the importance attached to a sound, general, common culture, essential for the reconversion of knowledge in constant evolution, is also akin to the idea of continuing education.

A tendency is also clearly discernible for general education, which increasingly concerns itself with practical considerations and includes elements of technology, to come closer to technical education, which is increasingly based on general knowledge in which the humanities are given their proper place.

Syllabus reform reflects structural reform and the conception of continuous revision is becoming more and more widespread; the most frequently modified syllabuses at secondary

level are those for mathematics, science and languages. The methods used call mostly for active participation by the pupil, reference to the environment, and group work.

Thirty-seven governments report greater or more widespread use of audio-visual aids, and increased use of programmed instruction is also apparent.

Educational Research

In addition to the classic means of improving education systems—reform of structures, syllabuses, methods, textbooks, teaching aids—qualitative progress seems to be increasingly expected from a relatively new factor, educational research. Thirty-two countries report important activities in this field. Certain trends are worthy of note: the linking of research with the action of organs responsible for educational policy and planning, decentralization of research at regional level, increasing recourse to teachers for the conduct of research.

The range of research subjects is also broadening: basic vocabulary, phonetics and linguistic substrata, teaching of reading and arithmetic, children's ability and acquisition of knowledge, school results, checking school learning, programmed instruction, teaching mathematics, etc. Many countries report research on the problem of early school leaving.

Out of School Education

The aim of most of the activities reported in the field of education for adults is to provide retraining and vocational training in the more developed countries, and literacy teaching in developing countries.

Youth activities, however numerous, usually seem to take the traditional forms of assistance to youth organizations and of holiday and leisure programmes rather than reflecting a youth policy or a coherent action to promote young people's participation in building their own future. There appears to be a significant gap in this respect in the majority of countries.

FINANCING EDUCATION

Expenditure for educational purposes is shown in the following comparative table of data sent by 100 countries. The increase (or decrease) expressed as a percentage in comparison with the corresponding figure for the previous year is given in brackets; the percentage increase (or decrease) given in the International Yearbook of Education 1967 is shown in square brackets. These are followed by the proportion of the state budget represented by these figures and their proportion of the gross national product.

Comparative Table

Afghanistan. Budget of the Ministry of Education for 1968-1969: 930,413,000 afghanis (+6% [+17.4%]) © 10% of state budget.

Albania. Budget of the Ministry of Education and Culture for 1968: 382,330,000 leks (+9.2%) © 9.5% of state budget.

Algeria. Education budget for 1968: 745 million Algerian dinars (+9.5%) [+7.9%] © 21.05% of state budget.

Argentina. Budget of the Secretariat of State for Culture and Education for 1967: 124,048.2 million pesos (+34.9%) [+29.8%] © 17% of state budget © 4.6% of gross national product.

Australia. Total expenditure on education in 1966-1967: \$911 million (+10.4%) [+12.1%] © 10.9% of total government expenditure © 5% of national income.

Austria. Educational expenditure in 1967: 7,147,841,711 Austrian schillings (+21.7%) [+13.9%] ⊗ 9.4% of total state budget.

Bahrain. Budget of the Department of Education for 1967-1968: 2,994,500/000 Bahrain dinars (+16.9%) ⊗ 26.3% of national income.

Belgium. Budget of the Ministry of Education and Culture for 1968: 48,041,000,000 Belgian francs (+5.9%) [+6%] ⊗ 18.6% of state budget.

Botswana. Appropriations for education in 1967: 2,411,988 rand (+20.8%) [+36.4%] ⊗ 13% of total state expenditure ⊗ 6% of gross national product.

Bulgaria. Educational expenditure for 1967: 8% of state budget.

Burundi. Educational expenditure in 1968: 422,257,000 Burundi francs (+4.8%) ⊗ 23.4% of state budget.

Cameroon. Appropriations for education in 1967-1968: 5,203,819,000 CFA francs (+5.4%) [+18.5%] ⊗ 14.2% of total expenditure of the Federal Republic ⊗ 3.5% of gross national product.

Canada. British Columbia. Education budget for 1968-1969: \$271,106,311. *Ontario.* Education budget for 1968-1969: \$876,364,000. *Nova Scotia.* Educational expenditure in 1967-1968: \$71,974,272. *Saskatchewan.* Educational expenditure in 1967-1968: \$119,000,000.

Chad. Education budget for 1967: 1,621,817,000 CFA francs (+18.6%) ⊗ 15.4% of total state budget.

China (Republic of). Education budget of the Central Government for 1966-1967 and 1967-1968: NT\$576,792,563 (+18.3%) [+7.6%].

Colombia. Budget of the Ministry of Education for 1968: 1,391,568,000 pesos (+30.2%) [+5.65%] ⊗ 13.5% of total state budget.

Congo (Republic of). Budget of the Ministry of Education for 1968: running costs: 2,244,996,649 CFA francs (+23.3%) and investments: 111,500,000 CFA francs (-70.9%) ⊗ 18.6% of total state budget.

Congo (Democratic Republic of). Education budget for 1968: 21,643,623 zaïres (+73.9%) [-4%] ⊗ 19% of national budget.

Costa Rica. Education budget for 1967: 205,068,130 colons ⊗ 27.9% of state budget ⊗ 5.4% of national income.

Cuba. Budget of the Ministry of Education for 1968: 335,906,600 pesos (+19.2%) [+9.8%].

Cyprus. Education budget for 1967-1968: £4,492,000 (+4.5%) [+7.5%] ⊗ 15% of total state budget ⊗ 2.5% of national income.

Czechoslovakia. Education budget for 1968: 12,226.2 million Czechoslovak crowns (+8.8%).

Dahomey. Education budget for 1967-1968: 1,982,384,000 CFA francs (+16%) ⊗ 24.7% of state budget.

Denmark. Budget of the Ministry of Education for 1967-1968: 3,639 million Danish crowns (14.5%) ⊗ 20% of total state budget ⊗ 4% of gross national product.

Dominican Republic. Budget of the Secretariat of State for Education, Fine Arts and Religion: \$29,794,000 (+2.8%) ⊗ 16.7% of total state budget ⊗ 3% of national income.

El Salvador. Budget of the Ministry of Education for 1967: 63,521,758 colons (+7.3%) ⊗ 25.7% of state budget.

Ethiopia. Education budget for 1967-1968: 63,451,797 Ethiopian dollars (+17.7%) ⊗ 13.6% of general state budget.

Finland. Expenditure of schools controlled by the National Board of Vocational Education: 168,393,816.86 marks (+24.8%).

France. Education budget for 1968: 16,719.5 million francs for operating expenses and 3,800 million francs for expenditure on equipment, a total of 20,519.5 million francs (+10.7%) [+11%] ⊗ 16.5% of general state expenditure ⊗ 3.6% of gross national product ⊗ 4.8% of national income.

Gabon. Budget of the Ministry of Education for 1968: 2,116,666,000 CFA francs (+8.8%) [+21.4%].

Germany (Federal Republic of). Cultural expenditure in 1967 (federal, *Länder* and local authorities): 19,291.1 million DM (+9.2%) [+9.5%].

Ghana. Educational expenditure in 1967-1968: NC74,822,000 (+80.1%) ⊙ 24.6% of total public expenditure.

Greece. Budget of the Ministry of Education and Religion for 1967: Dr.4,899,000,000 (18.9%) ⊙ 13.4% of total state budget ⊙ 2.7% of national income.

Guatemala. Budget of the Ministry of Education for 1968: 24,935,851 quetzals (+9.6%) [+5.9%]
⊙ 14% of state budget.

Guyana. Education budget for 1967-1968: G\$20,526,343 (+16%) [+20%]
⊙ 14.5% of general state expenditure ⊙ 15% of estimated government revenue.

Hungary. Education budget for 1968: 8,778 million forints (-1.2%) [+9.8%]
⊙ 6.3% of state budget ⊙ 4.2% of gross national revenue.

India. Education budget for 1967-1968: 6,630 million rupees (+21%) [+12.1%]
⊙ 20.9% of total revenues of the states.

Iran. Education budget for 1967: 17,021 million rials (+10.2%) [+16%]
⊙ 19% of total recurrent state expenditure ⊙ 3.6% of gross national product.

Iraq. Educational expenditure in 1967-1968: 48,646,956 dinars (+10.6% in comparison with 1966-1967).

Ireland. Public education budget for 1968-1969: £54,881,183 (+25%) [+13.2%]
⊙ 17.6% of total state budget ⊙ 5% of national income.

Israel. Education budget for 1967-1968: 467 million Israeli pounds (+2.4%) [+16%]
⊙ 4% of national income ⊙ 13.5% of regular government budget.

Italy. Budget of the Ministry of Education for 1967-1968: 1,653,589.2 million lire (-13.2%) [+1%].

Ivory Coast. Budget of the Ministry of Education for 1967-1968: 9,238,917,000 CFA francs (+12.8%) ⊙ 14.6% of total state budget ⊙ 3.1% of national income.

Japan. Budget of the Ministry of Education for 1967-1968: 622,961,000,000 yen (+14.8%) [+13%]
⊙ 11.8% of total state budget ⊙ 5.4% of national income.

Jordan. Education budget for 1967-1968: 5,676,195 Jordanian dinars (+18.8%) [+11.4%]
⊙ 8.2% of total state budget ⊙ 2.9% of national income.

Korea (Republic of). Central Government education budget for 1967: 31,362 million won (+22.4%) [+74.6%]
⊙ 17.7% of total government expenditure ⊙ 2.8% of national income.

Kuwait. Budget of the Ministry of Education for 1967-1968: 34,834,369 dinars (+25%) [+23%]
⊙ 8.8% of national income.

Laos. Education budget for 1967-1968: 1,653,145,000 kip (+18%) [+2.3%]
⊙ 10.2% of state budget ⊙ 1.2% of gross national product.

Lebanon. Budget of the Ministry of Education for 1968: 101,502,500 Lebanese pounds (+4.4%) [+10.1%]
⊙ 15.7% of general state expenditure ⊙ 5% of gross national product.

Liberia. Education budget for 1967: \$6,717,301 (+1.5%) [+7.3%].

Luxembourg. Education budget for 1967: 1,743.6 million francs (+8.1%) ⊙ 14.9% of total budget of state and communes ⊙ 6.2% of national income.

Madagascar. Total public expenditure for educational purposes in 1967: 6,580,574,000 Malagasy francs ⊙ 16.9% of state budget ⊙ 4.2% of gross domestic product.

Malawi. Total public expenditure for educational purposes in 1967: £3,182,878 (+28.6%) ⊙ 13.9% of state budget ⊙ 16.9% of national income.

Malaysia. Education budget for 1967: \$361,986,850 (+9%) [+7%]
⊙ 20% of total government expenditure ⊙ 20% of gross national product.

Mali. Education budget for 1967-1968: 3,760,540,000 Malian francs (−4.4%) [+54.7%]
 ⊗ 18.1% of total state budget ⊗ 2.9% of national income.

Malta. Education budget for 1967-1968: £3,226,000 (+5.7%) [+7.5%]
 ⊗ 12.7% of total state expenditure ⊗ 18% of national income.

Mexico. Budget of the Ministry of Education for 1968: 6,482,358,00 pesos (+12.2%) [+11.4%].

Monaco. Education budget for 1968: 9,343,950 francs (+1.3%) [+27.6%]
 ⊗ 6.2% of total state expenditure ⊗ 3.7% of gross national product.

Morocco. Credits for equipment placed at the disposal of the Ministry of Education and Fine Arts for 1968: 57,830,400 dirhams (+48%) [+17.3%]
 ⊗ 16.2% of general state expenditure.

Nepal. Total government expenditure on education in 1967-1968: 38.1 million rupees (+2.1%).

Netherlands. Budget of the Ministry of Education and Science for 1968: 4,762.9 million guilders (+14%) [+16%]
 ⊗ 28% of general state expenditure ⊗ 6% of national income.

New Zealand. Total expenditure in the 1967 education budget: \$NZ174,563,744 (+10.2%)
 [+7.9%]
 ⊗ 12.7% of total state budget ⊗ 5.1% of national income.

Niger. Education budget for 1968: 1,378,347,000 CFA francs (+10.6%) [+9.9%]
 ⊗ 11.3% of total state budget ⊗ 2.3% of estimated national income.

Norway. Budget of the Ministry of Education for 1968: 1,957,000,000 Norwegian crowns (+9.6%) [+12.6%]
 ⊗ 13.9% of state budget ⊗ 6.4% of gross national product.

Pakistan. Total government expenditure for education in 1967-1968: 884.5 million rupees (+19.2%) [−5.3%]
 ⊗ 5.5% of total government expenditure.

Panama. Budget of the Ministry of Education for 1967: 26,609,765 balboas (+11.5%) [+12.4%]
 ⊗ 28.2% of total national budget ⊗ 4.4% of gross national product.

Philippines. Public expenditure for education in 1966-1967: 645,907,570 pesos (+7.7%) ⊗ 25.7%
 of state budget ⊗ 3.2% of gross national product.

Poland. Budget for public and higher education for 1968: 29,073 million zlotys (+7.2%).

Qatar. Budget of the Ministry of Education for 1967-1968: 29,049,744 rupees (−7%) [−4%]
 ⊗ 11% of general state expenditure.

Romania. Education budget for 1968: 8,030,300,000 lei (+6.5%) [+4.5%]
 ⊗ 9.8% of general state expenditure.

Saudi Arabia. Expenditure by the Ministry of Education in 1967-1968: 523,961,862 rials (−2.5%)
 [+6.9%]
 ⊗ 10.6% of general state budget ⊗ 5.3% of national income.

Senegal. Educational expenditure in 1967-1968: 6,582,128,080 CFA francs (+4.4%) [+0.3%].

Sierra Leone. Total expenditure for educational purposes in 1967-1968: Le. 7,458,900 (+10%)
 [+16.9%]
 ⊗ 17.9% of total state budget ⊗ 17% of national income.

Singapore. Government expenditure on education in 1967: \$150,937,299 (+6%).

Spain. Budget of the Ministry of Education and Science for 1968: 27,030.9 million pesetas (+14.6%) [+9.6%].

Sudan. Educational expenditure in 1967-1968: 20,631,499 Sudanese pounds (+31%) [+34.6%]
 ⊗ 25.2% of total state expenditure ⊗ 4.2% of gross national product.

Sweden. Total public expenditure on education and research in 1967-1968: 6,750 million Swedish crowns (+13%) ⊗ 18.6% of total state expenditure ⊗ Approximately 7% of gross national product.

Syrian Arab Republic. Education budget for 1968: 170,172,976 Syrian pounds (+3%) [+0.02%]
 ⊗ 16.5% of state budget ⊗ 4% of national income.

Thailand. Education budget for 1967: 2,838.2 million bahts.

Togo. Education budget for 1968: 1,095,955,000 CFA francs (+5.3%) [+7.1%]
 ⊗ 2.7% of national income.

Tunisia. Budget of the Secretariat of State for Education for 1968: 31,246,150 dinars (+11.5%)
 [+13.9%]
 ⊗ 25.2% of general state expenditure.

Turkey. Budget of the Ministry of Education for 1968: 3,924,355,000 Turkish pounds (+16.8%) [+2%] @ 17.3% of state budget @ 4% of gross national product.

Ukrainian SSR. Budget for education, culture and science development for 1968: 2,470.4 million roubles (+3.8%) [+2.4%].

United Arab Republic. Budget of the Ministry of Education for 1967-1968: 89,397,000 Egyptian pounds (+4.8%) [+3%] @ 13.3% of total state budget @ 4.1% of national income.

United Kingdom. England and Wales. Educational expenditure in 1967-1968: £1,940 million (+75.1%) [+15.8%]. *Scotland.* Education authorities' expenditure in 1966-1967: £135 million (+14.4%) [+9%]. Expenditure by the Department of Education in 1967-1968: £29 million (+26%) [+19%]. *Northern Ireland.* Educational expenditure in 1967-1968: £45 million (+9.8%) [+10.8%].

United Republic of Tanzania. Educational expenditure in 1967-1968: 160,793,000 shillings @ 17.5% of total state budget.

United States. Educational expenditure in 1967-1968: approximately \$52 billion (+15.6%).

Venezuela. Budget of the Ministry of Education for 1968: 1,234,125,274 bolivars (+11.8%) [+12.6%] @ 13.7% of general state expenditure @ 3.1% of gross national product.

Yugoslavia. Educational expenditure in 1967: 4,642,549,000 new dinars (+16.9%) [+18.9%] @ 4.9% of national income.

Zambia. Half of education budget for July 1966-June 1967 + budget for July-December 1967: £21,195,374 (+36.5%) @ 17% of general state expenditure @ 7.7% of national income.

NUMBER OF PUPILS AND TEACHERS

The following table shows, by country, the number of pupils and teachers in the various types of education and the difference in comparison with the previous year, expressed as a percentage. Comparisons may thus easily be made, with due allowance for the differences in educational structure and interpretation from one country to another.

Comparative Table ¹

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Afghanistan — 1967</i>						
Primary	444,000	+10.4	(+12.3)	9,100	+15.9	(+16.6)
Middle	44,000	+22.2	(+28.6)	1,318	+19.1	(+107.7)
Secondary	10,000	+25	(+33.3)	521	+54.6	(+ 19.1)
Technical and vocational	7,000	0	(+22.8)	877	+21.5	(+ 1.7)
Teacher training	6,000	0	(+ 5.3)			
Higher	4,300	+30.3	(+10)			
<i>Albania — 1967-1968</i>						
Pre-school	19,710	+ 4.5		956	+11.7	
Primary	260,630	+ 5		8,647	+ 5.7	
General secondary						
lower	152,025	+20.1		7,090	+23.5	
upper	11,961	- 7.3		841	- 6.8	
Secondary technical and vocational	8,493	+ 1.3		455	- 7.3	
Teacher training	1,853	-36.2		115	-28.6	
Two-year teacher training	1,190	-18.1		40	-27.3	
Higher	6,951	+15.9		566	+35.7	

¹ The percentage given in the second column shows the rate of increase or decrease in the number of pupils or teachers in comparison with the previous year. The percentage in brackets shows the rate of increase or decrease given in the International Yearbook of Education, 1967.

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Algeria — 1967-1968</i>						
Primary	1,461,776	+ 7.5	(+ 2.1)	33,113	+ 8.3	(+ 1.7)
General secondary	104,034	+ 7.4	(+13.9)	4,735	+ 6.9	(+ 7.3)
Technical	37,221	+ 8.1	(+ 8.7)	2,603	- 0.6	(+31.7)
Teacher training	5,439	+34.2	(+ 8.8)	325	+27.5	(-13.7)
Higher	9,720	+ 4.8	(+15.3)	693	+ 1.6	(+20.1)
<i>Argentina — 1967</i>						
Pre-school	158,388	+ 2.4	(+15.5)	8,001	+ 1.3	(+14.9)
Primary	3,224,380	+ 1	(+ 6.1)	162,652	+ 3.1	(+ 6)
Secondary:						
general	189,754	+ 3.6	(+ 8.8)	27,379	+ 4.1	(+ 7.7)
commercial	201,937	+ 5.7		30,638	+ 4.7	
industrial	123,235	+ 4.2		20,585	+ 3.8	
agricultural	3,222	-10.6		456	+ 7.5	
vocational	99,866	- 3.9		9,833	+ 1.9	
artistic and other	25,583	-14.4		3,141	- 1	
teacher training	203,399	+ 5.2	24,357	+ 6.6		
Special	17,507	+10.8	—	—		
Higher:						
university	237,256	+ 7.3	(+ 2.1)	11,449	+ 6.2	(- 3.9)
higher schools	10,077	-20.6		5,776	+ 8.4	
teacher training	19,320	+ 7.8				
<i>Australia — 1967</i>						
Pre-school and primary	1,741,000	+ 2.2	(+ 2.2)	102,000	+ 4.1	(+ 3.9)
Secondary	848,000	+ 5.9	(+ 3.9)			
Technical	400,000	+ 4.2	(+ 4.9)			
Teacher training	28,900	+ 6.6	(+ 6.7)			
Higher	95,000	+ 3.3	(+ 8.7)			
<i>Austria — 1967-1968</i>						
<i>Public</i>						
Primary	578,420	+ 0.7	(+ 3.1)	—	—	(+ 5.2)
Upper primary	234,644	+ 8.9	(+11.8)			
Special	24,907	+ 5.3	(+ 8.5)			
Polytechnic courses	29,751	- 6				
Secondary	94,954	+ 9.1	(+ 6.8)			
Teacher training	3,367	- 5		6,561	+ 4	(+ 2.8)
Secondary technical and vocational	18,407	+ 7.4		3,848	+ 8.1	
Vocational	13,412	+ 8.4				
Higher	55,483	+ 5.9	(+ 0.5)	6,369	+13.9	(+ 6.6)
<i>Private</i>						
Primary	13,573	+ 1	(+ 3.1)	—	—	(+ 4.7)
Upper primary	10,578	+13.3	(- 0.2)			
Special	708	+ 8.3	(+ 8.3)			
Polytechnic courses	374	+98.9				
Secondary	16,767	+ 6.7	(- 1.4)			
Teacher training	2,127	- 7.8		1,232	+ 5.9	(+ 2.4)
Secondary technical and vocational	5,296	+17.9		2,695	+ 9.1	
Vocational	19,382	+12.9				
Schools for higher occupations	167	+11.3		154	+11.6	

	Number of pupils			Number of teachers					
		%	%		%	%			
<i>Bahrain — 1967-1968</i>									
Primary	35,165	+ 7.1	(+ 6.5)	1,979	+10.1	(+8.4)			
Intermediate: general	4,923	+ 0.6	(+27.5)						
technical	378	+ 7.7	(+23.6)						
Secondary: general	3,823	+39.6	(+57.8)						
teacher training	157	-53	(-29.2)						
commercial	252	- 1.2	(+29.4)						
technical	181	+11.7	(+19.1)						
Religious (all levels)	155	+ 6.2	(+10.6)						
Higher: teacher training	107	+311.5							
<i>Belgium — 1967-1968</i>									
Nursery	457,022	+ 2.6	(+ 0.5)						
Primary	1,008,288	+ 0.2	(+ 0.8)						
Intermediate (general training)	289,857	+ 1.1							
Technical	493,805	+ 3.4	(+11.9)						
Teacher training	30,264	- 5							
Artistic	61,061	+ 2.9	(+ 3)						
Technical higher	29,647	+ 9.9							
University	59,172	+10	(+10.2)						
State correspondence courses	6,153	+ 1.4							
<i>Botswana — 1968</i>									
Primary	78,963	+ 7.9		1,795	+ 6.7				
Secondary	2,299	+24	(+17.1)						
Technical and vocational	61	+38.6							
Teacher training	322	+ 3.9							
<i>Brazil — 1967</i>									
Primary	11,613,000	+ 8.6	(+ 9.8)						
Secondary	2,002,893	+10.9	(+16.2)						
Commercial	325,557	+ 6.3	(+ 6.1)						
Industrial	102,234	+11.6	(+16.3)						
Agricultural	14,191	+ 1.5	(+11.9)						
Teacher training	292,180	+10	(+20.6)						
Higher	213,741	+18.7	(+12.1)						
<i>Bulgaria — 1967-1968</i>									
Pre-school	378,770	+ 1	(+ 3.6)				17,555	+ 2.7	(+ 4.3)
General: day	1,183,123	- 1.3	(- 1.7)						
evening	26,309	-10.9	(- 8.2)						
Sanatorial schools	3,460	+ 5.4	(+11.5)						
Special	16,483	+ 4.6	(+ 8)						
Technicums: day	105,268	- 3.4	(- 2.1)						
evening	32,993	- 8.1	(- 1.3)						
Secondary vocational technical and vocational schools, and technical schools	99,793	+ 5.5	(+ 9.5)						
Secondary art	2,070	+27.1	(- 7.4)						
Semi-higher	8,253	- 0.9	(-33.9)						
Higher	85,270	- 1.7	(- 0.9)						
<i>Burundi — 1967-1968</i>									
Pre-school	954	+95.1		16	+45.5				
Primary	170,916	+11.4							
Secondary: general	3,297	+20.1							
teacher training:									
short course	1,498	+ 5.9							
long course	677	+27							
technical and vocational	1,005	+ 8.9							
Higher: university	235	- 6.4							
teacher training	59	+63.9							

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Cambodia — 1967-1968</i>						
Primary: public	890,376	+10.8	(+ 6.2)			
private	43,916	+ 3.5	(- 1)			
Secondary: public	90,068	+15	(+17.7)			
private	9,516	+ 0.8	(-24)			
Technical and vocational:						
public	3,741	+75.3				
private	2,046	-14.5				
Higher: public	8,929	+21.3				
<i>Cameroon — 1967-1968</i>						
<i>East Cameroon</i>						
Pre-school	18,850	-17.9	(+13.9)	12,807	+ 6.6	(+ 3.6)
Primary	643,449	+ 5.3	(+ 3.7)			
Secondary	33,488	+17	(+ 9.3)	1,337	+ 8.3	(+30.5)
Technical	9,685	+ 0.6	(+ 7.7)	497	-	
Teacher training	1,383	-		239	-	
<i>West Cameroon</i>						
Primary	172,000	+12.9	(+22.6)	-	-	
Secondary	3,893	+29.4	(+21.6)	-	-	
Technical	1,369	+ 2.3	(+14.1)	-	-	
Teacher training	1,844	-		-	-	
<i>Higher Education</i>						
Federal University and School of Administration	2,196	+21.7	(+39.1)	176	+39.7	(+77.5)
Students abroad	249	-61.8	(-12)	-	-	
<i>Canada — 1967</i>						
<i>Provinces</i>						
British Columbia	460,819	+ 3.5	(+ 5.2)	19,075	+ 9.3	(+ 5.5)
Saskatchewan	246,125	+ 1.7	(+ 2.7)	11,188	+ 3	(+ 6.3)
Manitoba	232,160	+ 3.4	(+ 0.7)	10,458	+ 7.8	(+ 1.8)
Ontario	1,868,788	+ 3.8	(+ 3.6)	78,182	+ 8.8	(+ 7.9)
Nova Scotia	206,768	+ 2	(+ 1.4)	8,686	+ 4.9	(+ 4.4)
Newfoundland	151,823	+ 2.3	(+ 1.6)	5,864	+ 3.9	(+ 3.6)
<i>Chad — 1967-1968</i>						
Pre-school	964	-59.8		-	-	
Primary	178,693	+19.1		2,406	- 1	
Secondary	8,223	+71.9		331	+ 7.5	
Technical and vocational	727	+42		53	+89.3	
Teacher training	666	-29.6		4	-81.8	
<i>China (Republic of) — 1967-1968</i>						
Pre-school	88,897	+ 9.1	(+ 3.3)	2,829	+10.8	(- 4.7)
Primary	2,348,218	+ 1.7	(+ 2.2)	55,684	+ 1.7	(+ 2.3)
Secondary: high schools	640,447	+ 9.7	(+ 7.5)	28,728	+ 8.9	(+ 7.8)
normal schools	1,570	-39.9	(-17.3)	179	-43	(-18.9)
vocational	143,296	+12	(+ 8.8)	9,407	+ 7	(+ 4.4)
Higher	138,613	+21.7	(+33.4)	13,340	+19.6	(+19.6)

	Number of pupils		Number of teachers	
	%	%	%	%
<i>Colombia — 1968</i>				
Pre-school	112,279		18,565	
Primary	2,733,432		100,629	
Secondary:				
general (baccalaureate)	405,778		38,600	
industrial	22,819		2,017	
commercial	69,233		7,844	
agricultural	7,930		815	
vocational	11,504		1,668	
artistic	8,681		709	
nursing	1,572		194	
teacher training	54,004		5,392	
Higher	62,844		8,918	
<i>Congo (Republic of) — 1967-1968</i>				
Pre-school	256	—	7	—
Primary	207,595	+ 6.5 (+ 4.2)	3,474	+ 6.4 (+ 5.3)
Secondary: lower	16,802	+14.5 (+24.8)	411	+16.6 (+63.1)
upper	1,451		186	
Technical: elementary	1,002	-14.4 (+13.7)	116	+ 7.3
short	932		90	
long	503		75	
Teacher training: primary	280	- 5.7 (+26.6)	25	+13.6 (+66.7)
secondary	282		25	
Higher	378	+ 1.9	31	+ 3.3
Primary	2,543,200	+16	57,850	+ 2
Secondary: guidance stage	95,300	+ 5.3		
general	23,500	+14.9		
teacher training	18,600	+31.6	7,100	+ 7.4
technical and vocational	14,450	+ 9.7		
Higher: universities	3,393	+16	346	- 5.7
higher schools	2,077	+20.3	374	+24.3
<i>Costa Rica — 1967</i>				
Pre-school	6,412	+ 5.5	246	- 1.6
Primary	315,547	+ 6.6	9,446	+ 1
Secondary	57,716	+11.8	2,460	- 4.3
Vocational	3,689	- 2.6	195	- 6.7
Teacher training	1,431	+ 8.7	72	0
Higher	7,200	+18.9	546	+ 2.4
Special	764	+ 1.6	51	+18.6
Evening courses (for adults)	5,496	-13.2	168	-10.2
<i>Cuba — 1967-1968</i>				
Primary	1,391,147	+ 2.8 (+ 2.4)	46,910	+ 9 (+ 2.7)
Secondary general	177,087	+ 4 (+14.3)	11,276	+10.6 (+ 6.4)
Secondary technical and vocational	46,732	+ 0.8 (+13.5)	3,649	- 3.2 (+11.8)
Teacher training	23,308	- 8.8 (-19)	951	-33.9 (- 2.4)
Special schools	6,901	+32.3 (+19.1)	952	+48.5 (+ 8.8)
Adult education	425,211	- 4.6 (-27.8)	23,088	-13 (-26.9)
Higher	35,046	+ 4 (- 3.3)	4,499	+ 8.4 (+40)

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Cyprus — 1967-1968</i>						
<i>Public</i>						
Pre-school	432	-10.6	(+ 3.2)	18	-	
Primary	71,313	- 0.4	(- 0.2)	2,144	+ 1.7	(+ 2.7)
Secondary: general	21,368	+ 2.5	(- 4.2)	869	+ 3.7	(+ 2.6)
technical and vocational	4,089	+ 7.4	(+16.1)	226	+11.9	(+13.5)
Teacher training	154	+67.4	(- 6.1)	11	- 8.3	(- 7.7)
<i>Private</i>						
Pre-school	1,371	+20.5	(+49.3)	67	+13.6	(+73.5)
Primary	943	+ 6		61	-	
Secondary	3,739	-21.6	(+14.1)	200	+26.6	
<i>Czechoslovakia — 1967-1968</i>						
Pre-school	378,360	+ 9.6	(+ 4.6)	27,189	+10.3	(+ 5)
Elementary	2,109,183	- 2.6	(- 2.6)	97,505	- 0.3	(+ 1.9)
General secondary	97,865	- 1.8	(- 0.8)	6,409	+ 1.4	(+ 8.6)
Special	56,447	+ 3.4	(+ 4.9)	4,806	-	
Training of skilled workers	350,128	+ 2	(+ 0.4)	-	-	
Longer technical (5 years)	3,876	-		-	-	
Vocational and vocational secondary .	189,616	- 1.2	(- 1.3)	13,796	-	
Higher	95,872	+ 3.3	(+ 1.2)	15,619	-	
<i>Dahomey — 1967-1968</i>						
Primary	139,734	+ 5.3	(+ 1.5)	3,451	+ 4.5	(+ 5.3)
Secondary	13,354	+11.6	(+ 4.9)	447	+10.6	(+ 8.9)
Technical	460	- 4.6	(+ 9.8)	69	+ 6.2	(+ 3.2)
Teacher training	129	0	(+ 1.6)	5	+25	
Higher	115	+117	(+35.9)	9	+50	(+20)
<i>Denmark — 1967-1968</i>						
Primary	523,000			36,350		
Secondary	179,500			3,290		
Technical and vocational	139,450			2,350		
Teacher training	21,560			-		
Higher	38,000			4,800		
<i>Dominican Republic — 1967-1968</i>						
Pre-school and primary	649,000	+ 7.9		12,000	+ 7	
Secondary	76,000			1,816		
Teacher training	550					
Vocational	2,475					
<i>El Salvador — 1967</i>						
Pre-school	21,296			733		
Primary	473,449			13,220		
Lower secondary	39,724			2,922		
Upper secondary	8,812					
Teacher training	3,362					
Commercial	15,710					

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Ethiopia — 1967-1968</i>						
Primary	451,000	+10.1	(+ 8.2)	9,820	+ 7.2	
Junior secondary	44,700	+22.5	(+26.4)	1,590	+25.2	
Senior secondary	26,700	+12	(+10.2)	1,160	+17.2	
Technical and vocational	5,820	+17.3	(+43.3)	500	+11.1	
Teacher training	1,810	+ 5.8	(+ 1.4)	120	+ 9.1	
Post-secondary: at home	3,750	+ 7.4	(+54.8)	550	0	
abroad	1,870	+ 3.9	(+ 8.6)			
<i>Finland — 1967</i>						
Primary	508,700	- 3.1	(- 3.3)	23,090	- 2.3	(- 0.7)
Communal lower secondary	28,803	+15.3	(+19)	-	-	
State secondary	92,800	+ 0.8	(+ 1.7)	-	-	
Private secondary	172,973	+ 3	(+ 5.5)	-	-	
Foreign language secondary	629	- 0.8	(- 2.2)	-	-	
Vocational	39,055	+ 5.3	(+ 5.6)	4,047	+ 4.3	(+ 3.7)
Technical	14,110	+ 8.5	(+11.9)	1,405	+ 6.3	(+12.4)
Commercial	18,913	+ 6.2	(+10.6)	1,025	+ 7.1	(+13.7)
Navigation schools	553	+42.9	(+19.1)	96	+52.4	(+ 3.3)
Teacher training	225	+38	(+16.4)	47	+23.7	(- 2.6)
Special	5,956	-		708	-	
<i>France — 1966-1967</i>						
Pre-school	1,884,325	+ 6	(+ 5.1)	263,113		
Elementary and special	4,993,431	0	(+ 2.2)			
Secondary and technical	3,980,762	+ 1.1	(+ 3.4)	204,095		
Teacher training	34,000	- 1.2	(+ 3)	2,063		
Higher: universities	459,470	+11	(+12.5)	20,969		
higher schools	43,000	+ 4.9	(+ 5.1)	-		
<i>Gabon — 1968</i>						
Primary	85,328	+ 5.2	(+ 2.5)	2,320	+ 0.3	(+11.1)
Complementary	2,635	+ 4.2	(+ 8.2)	62	-59.8	(+23.8)
Secondary	2,914	+ 9	(+ 9.2)	-	-	
Teacher training	133	-22.7	(-31.3)	-	-	
Technical	1,539	+ 2.3	(+ 4.4)	34	-63	(- 6.1)
<i>Germany (Federal Republic of) — 1966</i>						
<i>General (May 1966)</i>						
Primary	5,684,042	+ 1.9	+ 1.5)	254,526	+ 4.3	(+ 3)
Special	198,833	+ 9	(+ 6.9)			
Intermediate	622,134	+ 8.2	(+ 8.2)			
Secondary (longer course)	1,049,540	+ 8.4	(+ 7.7)			
<i>Vocational (November 1966)</i>						
Part-time	1,747,444	- 1.8		24,765	+ 1.7	
Extension	56,880	+ 7.3		5,211	+14.1	
Full-time	176,095	+ 5.1		8,102	+ 4.4	
Advanced	150,677	+ 3.3		6,182	-	
<i>Colleges of engineering (November 1966)</i>						
Teacher training colleges	61,761	+ 1.9	(+ 4.1)	4,779	+25.4	(+ 6.5)
<i>Teacher training colleges (November 1966)</i>						
Teacher training colleges	59,416	+17.9	(+ 7.2)	2,619	+ 5.6	

	Number of pupils		Number of teachers	
		%	%	%
<i>Ghana — 1967-1968</i>				
Primary and middle	1,402,202	+ 0.3	48,613	+ 0.2
Secondary	43,889	+ 3.9	2,619	+ 9.5
Teacher training	16,768	+ 2	1,195	+ 6.2
Technical	3,105	-54.1	293	-19.1
Higher	4,878	+ 9	—	—
<i>Greece — 1967-1968</i>				
Pre-school	52,000	+13	1,812	—
Primary	910,090	+ 3.1	27,847	—
General secondary	363,257	+ 5.3	10,789	+ 5.3
Vocational and technical	55,671	+ 0.1	5,450	+ 1.1
Teacher training	5,142	+32.2	277	+31.3
Higher	68,657	+21.4	2,100	+42.5
<i>Guatemala — 1967</i>				
Pre-school	20,204	- 1.4	646	+ 3.7
Primary	474,919	+ 6.3	13,088	+ 7.1
Intermediate	60,340	+13.6	4,919	+ 6.2
Higher (1968)	11,990	+ 7	—	—
<i>Guyana — 1966-1967 and 1967-1968</i>				
Primary (1966-1967)	167,918	+ 2.8	5,176	+ 1.4
Secondary (1966-1967)	17,734	+16.1	727	+27.1
Technical and vocational (1966-1967)	1,552	-16.6	36	+ 2.9
Teacher training (1967-1968)	415	+33.4	31	+10.7
Higher (1967-1968)	614	+19.2	65	14
<i>Hungary — 1967-1968</i>				
Pre-school	196,973	+ 2.6	10,788	+ 2.1
Primary	1,331,079	- 3.6	62,340	+ 0.2
Special	25,895	+ 5.8	2,229	+ 6.7
Secondary	129,110	- 5.2	8,170	- 1.3
Vocational secondary	60,597	+18.3	2,112	+44.5
Technical	37,962	-11.6	2,301	-10.6
Teacher training:				
pre-school	658	+14.4	83	+ 1.2
teacher training school	1,973	- 2.2	253	- 1.6
primary	4,210	+ 1.7	500	- 0.8
secondary	6,821	- 5.6	—	—
Higher:				
day section	52,407	+ 0.2	8,996	+ 1.2
evening and correspondence sections	31,531	-15.3		
<i>India — 1967-1968</i>				
Primary: lower	52,240,000		1,005,846	
upper	11,790,000		550,940	
Secondary	5,820,000		490,333	
Higher	2,000,000		102,952	

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Iran — 1967-1968</i>						
Pre-school	15,208	+ 3.6	(+ 7.1)	145	+ 5.1	
Primary	2,575,667	+ 8.3	(+ 9)	76,586	+ 7.4	
Education Corps	269,437	+ 6.6	(+15.3)	7,901	- 0.9	
Secondary	673,737	+16.2	(+17.4)	21,454	+11	
Agricultural	822	-		58	-	
Other technical and vocational schools	15,063	+12	(+ 4)	1,480	+ 3.4	
Teacher training	6,681	+17.6	(+19.9)	354	+16.1	
Higher	46,700	+27.1	(+25)	3,100	+11.8	
<i>Iraq — 1967-1968</i>						
Pre-school	16,744	+10		602	+10.1	
Primary	1,007,959	+ 1.9		51,839	+10	
Secondary	254,033	+ 4.4		8,663	+ 7.7	
Teacher training	14,738	+79.1		412	+16.7	
Technical and vocational	10,203	+18.2		967	+23.3	
Higher	34,926	+13.7		1,619	+25.4	
<i>Ireland — 1966-1967 and 1967-1968</i>						
Pre-primary and primary (1966-1967)	510,468	+ 0.8	(- 0.1)	-	-	
Secondary (1967-1968)	118,807	+14.7	(+ 5)	5,839	+ 9.9	
Technical and vocational (1966-1967):						
full-time	40,124	+ 6.9	(+ 8)	2,445	+ 4.5	(+11)
part-time	60,449	-11.4	(- 1.9)	2,276	- 0.4	(+ 8.7)
Teacher training (1967-1968)	1,893	+ 6.4	(+ 2.5)	81	-	(- 3.8)
<i>Israel — 1967-1968</i>						
Pre-school	106,100	+ 7.3	(+ 2.7)	3,400	+ 9.7	(0)
Primary	456,200	- 0.7	(+ 0.2)	23,800	+ 0.4	(+ 6.8)
Other schools	19,500	+18.2	(+ 3.8)	1,800	+12.5	(+ 6.7)
Secondary	151,000	+ 6.3	(+13.7)	12,000	+ 5.3	(+10.7)
Teacher training	7,800	+ 1.3	(+20.3)	1,300	- 7.1	(+ 7.7)
Higher	29,200	+ 9.4	(+22.5)	-	-	
Other institutions	6,100	+ 3.4	(-23.4)	-	-	
<i>Italy — 1967-1968</i>						
Pre-school	1,291,010	+ 3.1		33,604	+ 6.9	
Primary	4,646,024	+ 1.4		220,714	+ 6.6	
Secondary: lower	1,887,074	+ 3.7		157,086	+ 5.7	
Vocational	188,663	+10.3		17,231	0	
Technical	609,740	+ 1.6		46,859	+ 6.3	
Classical, scientific and teacher training	580,915	+ 5.3		39,396	+ 2.4	
Higher	456,643	+13.3		-	-	
<i>Ivory Coast — 1967-1968</i>						
Pre-school	1,157	+ 0.2	}	6,521	+10.4	
Primary	296,721	+ 7				
Secondary	28,612	+19.8				
Leadership and teacher training centres	728	0		26	+44.4	
Technical	3,892	+ 3.4		313	+12.2	
Teacher training	305	+ 6.3		30	0	
Higher	1,962	+16.9		130	+41.3	

	Number of pupils		Number of teachers			
		%	%	%		
<i>Japan — 1967-1968</i>						
Pre-school	1,314,318	+ 7.6	(+ 7.9)	59,637	+ 8	(+ 9.7)
Primary	9,452,071	- 1.4	(- 2)	353,496	+ 1.1	(+ 0.7)
Lower secondary	5,270,851	- 5.1	(- 6.7)	242,970	- 0.6	(- 1.4)
Upper secondary:						
full-time	4,301,380	- 4	(- 1.7)	201,252	0	(+ 2.3)
part-time	479,248	- 5.5	(- 1.4)	27,820	+ 0.3	(- 0.6)
Special	48,409	+ 4.5	(+ 4.5)	10,448	+ 7.8	(+ 7.8)
Higher: universities	1,160,425	+11.1	(+11.4)	101,131	+ 8.5	(+12)
junior colleges	234,748	+20.4	(+32.1)	28,740	+17.4	(+19.7)
technical colleges	33,998	+18.1	(+29.7)	3,593	+23.1	(+42)

Jordan — 1967-1968

Pre-school	18,197	+11.2	(+ 6.5)	389	+ 4	(+14)
Primary	369,789	+16.2	(+ 7.2)	9,292	+13.6	(+ 4.4)
Secondary general	126,051	+21.5	(+ 6.6)	5,485	+15.7	(+10.4)
Secondary religious	96	+23.1		5	0	
Secondary technical and vocational	4,407	+31.3	(+12.6)	267	+12.7	(+ 4.8)
Teacher training	2,103	+18.1	(+29.9)	154	+35.1	(+13.7)
Higher: university	2,292	+25.2		159	+28.2	
other schools	979	+22.7		123	+23	
Special	125	- 15		19	- 9.5	

Korea (Republic of) — 1967-1968

Pre-school	22,137	+ 1.3	(- 34.3)	1,651	+ 4.6	(+12.6)
Primary	5,382,500	+ 4.2	(+ 4.5)	89,277	+ 5.1	(+ 7.3)
Middle school	911,938	+10.9	(+ 9.4)	21,678	+ 9.5	(+ 3.8)
High school general	259,084	- 0.3	(+ 2.3)	7,948	+ 0.5	(+ 0.1)
High school vocational	182,862	+ 4.6	(+ 1.4)	7,293	+ 8.3	(+ 8.3)
Junior technical college	14,089	+33.6	(+38.3)	678	+13.6	(+36.9)
Junior college	14,734	-13.6	(+ 9.8)	333	-27.9	(+ 1.8)
Junior teachers' college	8,818	+ 9.2	(+35.1)	452	+13.9	(+30.2)
College and university	124,029	- 6.3	(+25.3)	5,985	+ 3	(+ 9.5)
Graduate school	4,880	+ 3.8	(+22.3)	60	-77.8	(+63.6)
Trade school	13,141	+24.1	(+ 0.8)	694	+32.2	(- 7.7)
Higher trade school	13,406	+ 5.5	(- 0.9)	784	+ 4.7	(+21.6)
Civic school	11,204	- 4.3	(-14.9)	332	- 9.8	(-18)
Higher civic school	64,451	+10.1	(+ 3)	2,667	+ 8.5	(- 1.8)
Special	3,121	+ 8.4	(+13.5)	280	+13.4	(+ 5.6)
Miscellaneous	4,391	+21.7	(+17.5)	337	+20.4	(- 7)

Kuwait — 1967-1968

Pre-school	11,312	+ 1.7	(+14)	564	+13	(+ 4.6)
Primary	54,028	+ 3.9	(+ 4.9)	2,425	+ 3.4	(+ 1.3)
Intermediate	33,217	+18.5	(+18.7)	1,987	+19	(+30.1)
Secondary	8,791	+26.7	(+ 18)	752	+22.9	(+22.6)
Teacher training	2,384	+36.2	(+53)	297	+32.6	(+37.4)
Religious studies	278	- 5.4	(- 4.9)	36	+ 9.1	(-15.4)
Special	624	+13.9	(+12.5)	106	- 2.8	(+ 5.8)
Technical	855	+31.7	(+ 4.7)	183	+37.6	(+11.8)
Commercial:						
secondary	85	- 9.6	(+11.9)			
ordinary course	165	+27.9	(+10.3)	45	+ 7.1	(+16.7)
evening course	202	+ 8	(-11.8)			
Higher	587	+40.4		122	+177.3	

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Laos — 1967-1968</i>						
Primary	178,122	+10.1	(+10.7)	4,782	+10.9	(+ 5.6)
Secondary	4,882	+17.2	(+15.7)	219	+11.2	(+ 8.2)
Technical	1,050	+15.5	(+ 4)	141	+ 1.4	(+58.2)
Teacher training	2,223	+ 1.5	(+31.6)	152	-17.8	(+81.4)
Higher	457	+35.2	(+158)	27	+170	(+100)
Fine arts	172	+35.4		55	+57.1	
Private	20,072	+ 6.1	(+12.8)	418	- 9.1	(+43.8)

Liberia — 1967

Pre-school and primary	108,030	- 2.4	(+33)	3,195	+ 1.8	(+19.4)
Secondary general	11,551	+ 2	(+34.7)	589	+13.1	(+37.5)
Vocational	783	-21	(+ 9.1)	72	+10.8	
Teacher training	377	+35.1	(- 9.1)	34	+13.3	(-14.3)
Higher: teacher training	174	-10.3	(+17.6)	23	- 8	(- 7.4)
other	909	+50.7	(+16)	120	+27.7	(+16)

Luxembourg — 1967-1968

Pre-school: public	5,885	+ 6.6		220	+10	
private	139	- 7.3		5	0	
Primary: public	35,173	+ 0.3		1,511	+ 2.7	
private	1,452	- 7		61	+ 3.4	
Intermediate: public	738	+52.2		69	+23.2	
private	76	+216.7		4	+ 300	
Secondary: public	6,336	+ 4.6		512	+ 9.6	
municipal	272	+13.3		18	+ 5.9	
private	1,555	+ 3.9		77	- 3.8	
Technical and vocational:						
public	5,244	+11		379	+21.1	
private	1,124	+ 1.9		79	-20.2	
Teacher training:						
Institute of Education	194	-17.8		47	+27	
Higher	190	+13.1		37	0	

Madagascar — 1967-1968

Primary	567,800	+ 7.1		6,520		
Secondary:						
general and teacher training	10,522	+25.7		410		
classical and teacher training	13,530	+ 7.6		591		
Technical: lycée	3,192	+17.5		191		
collège	2,486	+ 6.4		253		
Higher:						
Research and teacher training	175	+34.6		35		
university	3,619	+13.8		151		

Malawi — 1967

Primary	297,456	+ 4	(-15.4)	6,794	+10.5	(+17.9)
Secondary	7,964	+15.3	(-12.1)	460	+27.1	(- 5)
Technical and vocational	551	-53.2	(+ 4.3)	67	+21.8	
Primary teacher training	1,180	- 0.6	(-10)	120	+ 5.3	(- 5)
Higher	460	-		-	-	

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Malaysia — 1967</i>						
Primary	1,290,192	+ 3.3	(+ 3.8)	46,436	+ 2.8	(+ 3.3)
Secondary	409,318	+19.4	(+15.9)	17,608	+14.7	(+18.2)
Technical	1,332	+ 4.8		68	+ 1.5	
Vocational	1,000	+37.2		60	+25	
Higher:						
University of Malaya	4,560	+26.6		407	+15.6	
College of Agriculture	437	+64.3		33	+57.1	
Technical College	752	+ 7.3		68	+ 6.3	
Teacher training institutions	9,939	- 3.2		1,142	- 8.8	
<i>Mali — 1967-1968</i>						
Pre-school	967	+20.1		—	—	
Fundamental: lower	157,967	+ 4.9	(+ 6.6)	3,882	+14.7	(+10.8)
upper	29,055	+12	(+22)	1,442	+12.9	(+14.2)
Secondary	1,841	+38.9	(+31.1)	154	+ 5.5	(+92.1)
Teacher training	2,061	+69.4	(+62.7)	—	—	
Technical	2,228	+11.5	(+35.7)	304	+ 1.7	(+63.4)
Higher	345	+48.1	(+39.2)	82	+18.8	(+19)
<i>Malta — 1967-1968</i>						
Primary	44,000	- 2.2	(- 4.3)	2,000	- 0.6	(- 0.2)
Secondary	8,090	+ 5.5	(+ 6.1)	585	+15.2	(+ 8.5)
Technical and vocational	1,668	- 1.4	(+18.3)	154	+35.1	(- 5)
Higher	1,148	+18.4	(+45)	54	- 5.3	(- 3.4)
Teacher training	392	+ 1.3	(0)	23	0	(0)
<i>Mexico — 1968</i>						
Pre-school	383,166	+ 5.6	(+ 0.6)	10,435	+ 4.5	(+ 5.5)
Primary	8,159,403	+ 5	(+ 5.1)	174,585	+ 6.3	(+ 0.8)
Lower secondary	801,473	+ 9.3	(+ 5)	55,399	+ 7.6	(+ 8.4)
Technical, industrial and commercial	110,272	+ 0.7		6,289	-14.3	
Vocational	43,845	+21.6		5,723	+20.5	
Upper secondary	189,014	+13.4	(+22.3)	16,182	+ 6.8	(+ 0.9)
Teacher training	44,532	+ 6.7	- 0.3)	5,012	+ 2.5	(+ 5)
Higher	178,188	+15.5	(+ 9.7)	19,218	+ 8.6	(+ 0.7)
<i>Monaco — 1967-1968</i>						
Pre-school	360	+14.3		12	+ 9.1	(0)
Primary	1,178	+ 0.9	(+ 1.7)	52	+ 4	(0)
Secondary	1,404	+ 0.3	(+ 6.5)	86	+ 1.2	(+23.2)
Technical	204	+14.6	(+76.2)	12	+20	(+100)
Social promotion	62	-11.4	(+40)	1	0	(0)
Higher work promotion	41	-31.7	(-14.3)	3	-40	-16.7)
<i>Morocco — 1967-1968</i>						
Primary	1,031,588	+ 1.8	(- 3)	29,229	+ 2.8	
Secondary: general	222,166	+12.3	(+18.4)	9,267	+ 7.9	
technical	14,449	+11	(+ 4.5)	959	- 4.8	
Higher	10,128	+36.2	(-10.8)	498	+ 7.8	
<i>Nepal — 1966</i>						
Primary	394,700	+ 2.2		13,960	+ 4.2	
Secondary	69,100	+20.3		3,500	+19.5	
Higher	10,230	+26.3		—	—	

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Netherlands — 1966-1967</i>						
Pre-school	469,032	+ 2.6	(+ 2.3)	13,884	+ 2.4	(+ 3.5)
Primary	1,418,665	+ 0.7	(+ 0.8)	45,634	+ 1.4	(+ 3.2)
Secondary	533,219	+ 1.7	(+ 1.9)	27,773	+ 2.9	(+ 4.1)
Technical and vocational	594,944	+ 0.5	(+ 2.1)	—	—	
Teacher training	65,021	+ 6.7	(+ 7.2)	—	—	
Higher	70,840	+10.2	(+10.2)	—	—	
Special	64,876	+ 3.3	(+ 3.3)	4,868	+ 3.4	(+ 0.8)
<i>New Zealand — 1967</i>						
Pre-school	20,886	+ 4.6	(+ 6)	510	+ 3	
Primary	500,898	+ 2.9	(+ 2.8)	17,983	+ 2.4	(+ 3.6)
Secondary	168,534	+ 3.9	(+ 2.9)	8,356	+ 4.7	(+ 2.9)
Technical	87,374	+ 1.2	(+ 8.1)	633	+ 9.5	(+17.7)
Teacher training	6,155	+ 2.4	(+ 3.6)	—	—	
Higher	26,331	+ 8.2	(+ 9.8)	1,605	+10.5	(+16.1)
<i>Niger — 1968</i>						
Primary: public	72,416	+ 9.6	(+13.5)	1,692	+ 9.2	(+ 9.8)
private	4,845	+ 6.3	(+23)			
Secondary: public	4,070	+19.8	(+18.7)	260	+36.8	(+10.5)
private	290	+36.2	(+82.1)			
Technical: public	156	+ 6.8	(+ 5)	19	+26.7	(0)
Higher	167	+14.4		—	—	
<i>Norway — 1967-1968</i>						
Primary and comprehensive	484,752	+ 2.4	(+ 3.2)	28,138	+ 5.8	(+ 5.2)
Continuation	22,721	-13	(-15.3)			
Secondary	98,300	- 4.7	(- 3.5)	7,447	- 2.6	(- 0.6)
Folk high school	6,119	+ 1.6	(+ 1.3)	935	+ 1.3	(- 0.8)
Teacher training	7,977	+ 1	(+ 1.6)	871	- 4.4	(+ 4)
Agricultural	2,600	- 8.2	(- 3.6)	513	- 3.4	(- 1.1)
Technical and vocational	31,908	+ 4.7	(+ 7.3)	4,125	+ 5.3	(+ 7.3)
Navigation	4,034	- 5.5	(+ 0.5)	851	+11.4	(+ 1.5)
Commercial	18,007	- 2.3	(- 1.2)	1,357	- 0.5	(+ 2.1)
Social work	4,646	+ 4	(+ 7.1)	2,335	+ 9.9	(+ 7.3)
Home economics	2,181	+ 2.2	(+ 2.5)	673	- 1.8	(+ 1.6)
Special	2,945	+ 7.2	(+ 0.7)	—	—	(+ 8)
Universities and higher education	22,748	+ 6.3	(+ 7.5)	—	—	
<i>Pakistan — 1966-1967</i>						
Primary	7,050,741	+ 3.5	(+ 6.4)	172,953	+ 1.4	(+ 5.6)
Secondary	2,585,986	+ 7.5	(+ 9.6)	94,511	+ 6.3	(+ 9.6)
Secondary vocational	19,070	+ 8.8	(+14.3)	1,170	+15.7	(+ 3.2)
General arts and science colleges:						
Intermediate (higher secondary)	46,069	+ 7.2	(+17.6)	2,117	+ 2.3	(+19)
Degree	233,601	+ 7.7	(+11.8)	7,802	+ 9.9	(+11.7)
Professional colleges	24,550	+11.8	(+ 4.1)	1,705	+ 5.1	(+ 7.5)
Medicine	6,952	+ 8.9		694	+ 1.3	
Teacher training:						
Teacher training units (attached to high schools)	367	0	(0)	—	—	
Teacher training schools	14,705	+ 5.4	(+26)	1,027	+ 0.8	(0)
Teacher training colleges	2,914	+ 9	(+13.5)	226	+ 9.7	(+29)
Technical teacher training colleges	180	+48.8	(0)	24	+26.3	(0)
University institutes of education	805	+ 5.8	(- 4.3)	86	+26.5	(-18.1)
Institute of Physical Education	290	+ 3.9	(-21.6)	28	0	(-22.6)
Higher	24,409	+ 6.8	(+14.3)	2,199	+14.1	(+11.6)
Other general schools	664,653	+14.3	(+14.8)	21,027	+ 6.1	(+ 0.3)
Special	5,689	+ 2.9		416	+ 5.1	

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Panama — 1967</i>						
<i>Public</i>						
Pre-school	2,198	+ 4.9	(+ 7.5)	6,371	+ 6.7	
Primary	204,678	+ 2.6	(+ 3.4)			
Secondary technical and vocational	37,007	+ 6.4	(+ 10.3)			
Complementary	1,300	+ 2	(+ 1.8)			
Special	600	+13.6				
Higher	8,946	+16.9	(+11.6)			
<i>Private</i>						
Pre-school	3,300	+ 7.2	(+ 7)			
Primary	11,100	+ 0.5	(+ 6.3)			
Secondary technical and vocational	25,300	+ 7	(+ 1.7)			
Complementary	800	- 5.4	(- 34.9)			
Special	50	+13.6				
Higher	387	+23.2	(+64.4)			
<i>Philippines — 1967-1968</i>						
Primary: public	6,396,170			217,349		
private	286,111			7,553		
vocational	220					
Secondary: public	469,582			15,631		
private	812,906			24,441		
vocational	87,600					
Higher: public	2,084			323		
private	539,314			21,453		
vocational	9,070					
<i>Poland — 1967-1968</i>						
Pre-school	656,662	+ 6.9	(+ 1.8)	27,792	+ 5.5	(+15.1)
Primary	5,706,300	+ 3.2	(+ 6.8)	201,370	+ 6.4	(+ 10.1)
General secondary	306,135	- 5.1	(- 24.4)	15,044	- 1.4	(- 3.7)
Vocational	1,500,473	- 7.9	(- 2.5)	-	-	(+ 7.2)
Higher	288,788	+ 5.2	(+ 9)	25,565	+ 6.9	(+ 4.2)
Special	88,614	+ 8		-	-	
<i>Qatar — 1967-1968</i>						
Primary	11,871	+ 1.1	(+ 4.9)	692	+ 7.6	(+ 4.9)
Preparatory	1,501	+22.8	(+27.2)	96	+15.7	(+ 3.8)
General secondary	477	+41.1	(+22.9)	40	+ 8.1	(+23.3)
Religious studies	128	+10.3	(+26.1)	17	0	(- 10.5)
Technical	201	- 2.9	(- 22.5)	33	+10	(+ 7.1)
Teacher training	103	+80.7	(+32.6)	12	+20	(+ 100)
Commercial	55	+111.5		9	+125	
<i>Romania — 1967-1968</i>						
Pre-school	391,051	+ 9.7	(+ 0.8)	15,672	+11.2	
General education:						
Compulsory general	2,927,737	- 1	(- 0.8)	145,255	+ 0.7	
Secondary day	340,970	- 8.2	(- 0.8)			
Art schools	20,800	+ 0.8	(+ 1.2)	2,521	+ 3.7	
Special schools for handicapped children	8,994	+ 5.7		1,191	+12.6	
Teacher training:						
Secondary schools	13,792	+33.4	(+11.4)	-	-	
Institutes	3,088	+28.6	(- 59.5)	-	-	
Vocational and technical:						
Vocational schools	219,401	+ 6.9		11,924	+ 2.7	
Technical schools	40,763	-12.9		3,270	-19.7	
Technical schools for foremen	16,317	+12.5	(+ 6.2)			
Specialized secondary schools	47,636	+88.3		2,836	+83.6	
Higher	141,589	+ 3.4	(+ 4.8)	13,792	+ 2.9	

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Saudi Arabia — 1967-1968</i>						
Kindergarten	605	-11		36	+16.1	
Primary	235,225	+10.6	(+15)	10,846	+ 9.6	
Intermediate	29,556	+38.8	(+13)	1,675	+30.2	
Secondary	5,834	+27.6		643	+19.7	
Teacher training	3,261	-27.5	(-18.7)	247	-15.1	
Industrial	543	-41.7		232	-24.7	
Commercial	207	-44.1	(-45.3)	26	-23.5	
Agricultural	127	-57.4	(-41.1)	14	-46.2	
Special	990	+31.1		163	+34.7	
Popular	34,824	- 7.6		—	—	
Private	14,050	+33		596	+ 7.2	
Evening schools	6,085	+ 4.8		—	—	
<i>Senegal — 1967-1968</i>						
Primary	243,000	+ 5.2	(+ 5.6)	—	—	
Secondary	31,103	+22.4	(+22.5)	—	—	
Technical	8,585	+39.4	(-10.3)	706	+97.8	(- 7)
<i>Sierra Leone — 1967-1968</i>						
Pre-school	682	+10	(+16.3)	48	+ 9.1	(+12.8)
Primary	142,396	+ 5	(+10.4)	5,033	+ 5.8	(+11.9)
Secondary	22,199	+ 4.1	(+26.1)	1,107	+25.2	(+ 3.2)
Technical and vocational	1,053	-39.2	(-11.1)	97	0	
Teacher training	798	- 2.4	(-12.7)	103	+ 8.4	(- 9.4)
Higher	782	+ 5	(+29.5)	247	+ 5.1	(+54.9)
<i>Singapore — 1967</i>						
Primary and secondary:						
Public	332,792	+ 6.1		12,654	+ 7.1	
Grant-aided	176,446	- 1.4		5,972	- 0.1	
Private	8,647	-18		390	-15	
<i>Spain — 1966-1967</i>						
Primary	3,971,803	+ 0.8	(+ 4.8)	114,810	+ 1.1	(+ 5.5)
Secondary:						
General baccalaureate	913,637	+13.7	(+ 7.8)	6,874	+16.7	(- 1.5)
Workers' baccalaureate	57,711	+19.1	(+17.6)	2,167	-52.7	(+ 4)
Vocational training	127,448	+ 6.9	(+ 8)	9,940	+208.7	(+ 3.9)
Commercial schools	15,824	-20.7	(+ 3.4)	938	+ 5.4	(+ 0.6)
Teacher training schools	66,340	+26.8	(+11.7)	1,027	+ 0.5	(- 6.5)
Technical (secondary)	72,207	+ 6.3	(+ 0.3)	3,606	+ 1.8	(+ 8.1)
Artistic	40,616	+ 7.7	(- 7.1)	1,558	-14.3	(+ 2.5)
Higher	141,149	+16.8	(+10.8)	9,509	+34.7	(+28.2)
<i>Sudan — 1967-1968</i>						
Pre-school: private	3,500	+42	(+ 7.1)	75	+33.9	(+ 3.7)
Primary: public	480,961	+ 2.6	(-27.2)	9,607	+ 0.9	(-10)
private	37,300	+111.2	(+71.5)	1,005	+100.2	(+56.9)
Secondary: public	71,607	+12.1	(+ 5.3)	3,736	+ 2.4	(+10.8)
private	62,800	+52.1	(+ 8.3)	2,600	+50	(+ 5.7)
Teacher training: public	2,165	+ 0.2	(- 7.7)	263	+ 1.5	(- 2.6)
Higher: public	4,738	+ 4.1	(+10.9)	585	+11	(- 6.2)
private	3,986	+14.6	(+18.6)	104	+11.8	(+12)

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Sweden — 1967</i>						
Comprehensive school	906,900	+ 1		57,200		
Lower secondary	47,700	-20.8		2,400		
<i>Gymnasium</i> (academic, commercial and technical)	111,700	+ 1.2		8,200		
Continuation	22,400	+33.3		1,900		
Vocational	70,700	+ 1.3		8,100		
Teacher training	8,000	+ 9.6		—		
Higher education	97,600	+22.6		—		
Folk high school	14,800	+18.4		1,000		
<i>Switzerland — 1967-1968</i>						
Pre-school	140,000					
Elementary	465,575					
Secondary: lower	219,838					
upper:						
general	29,740					
vocational	152,798					
Higher	38,360					
<i>Syrian Arab Republic — 1967-1968</i>						
<i>Public</i>						
Primary	705,379	+ 5.4	(+ 5.6)	18,709	+ 6.9	(+ 7.2)
Intermediate	101,607	+ 9.6	(+16.5)	5,848	+12.4	(+12.5)
Secondary	36,449	+18.9	(+ 3.1)			
Teacher training	6,276	-15.9	(+ 6.1)	522	+ 3.6	(-11.9)
Intermediate industrial	80	-83.8		410	-13.7	(-15.5)
Secondary industrial and girls	3,932	+24.7	(+ 2.5)			
Secondary commercial	1,581	+27.9	(- 2.8)	147	+11.4	(+48.3)
Islamic Canon Law	1,683	+17.8	(+ 0.4)	242	+21	(- 7)
Secondary agricultural	29	-56.1	(-73.2)	3	0	(-91.9)
University of Damascus	26,434	- 3.3	(- 0.5)	321	- 2.7	(- 4.2)
University of Aleppo	4,578	+ 5.6	(- 1.8)	101	-52.4	(+ 7.6)
<i>Private</i>						
Pre-school	31,500	+ 7.6	(- 0.2)	313	—	
Primary	42,297	-21.4	(- 0.7)	1,954	-25.4	(- 3.2)
Intermediate	44,187	+ 6	(-17.9)	5,070	+118.8	(-14.2)
Secondary	25,170	+19.6	(+23.3)			
Intermediate and secondary industrial	171	-27.5	(-61)	24	-22.6	(-26.2)
<i>Thailand — 1966</i>						
Pre-school	16,457	+10.6	(+ 8.8)	752	+12.7	(- 0.3)
Primary	4,155,001	+ 2.9	(+ 2.9)	114,101	+ 4	(+ 4.1)
Secondary	162,114	+ 1.9	(0)	10,040	+ 0.7	(+ 9.2)
Vocational	52,753	+ 6.9	(+10.5)	5,670	+ 3.4	(+ 4.9)
Teacher training	23,403	+ 7.4	(+ 0.7)	2,108	+14.8	(+ 4.4)
Higher	31,501	+11.1	(- 9.8)	3,634	+52.6	(+16)
Private (all levels)	892,951	+11.3	(+ 4)	38,234	+10.1	(+ 1)
<i>Togo — 1967-1968</i>						
Pre-school: public	2,563	+ 5.5		48	+11.6	
Primary: public	114,601	+11	(+ 9.9)	1,999	+ 7.1	(+12.4)
private	56,735	+ 3.6	(-10.1)	1,291	+ 8	(- 0.1)
Secondary: public	7,601	+17.4	(+25.8)	233	+14.8	(+18.7)
private	6,077	- 0.6	(- 1.1)	304	+ 5.9	(-10.6)
Technical: public	567	+14.8	(-24.6)	55	+31	
private	985	+21.8	(-29.1)	25	-58.3	
Vocational: public	216	+34.2		—	—	
Teacher training: public	50	+66.7		—	—	
Higher: public	109	+28.2	(+16.4)	9	+12.5	(+14.3)

	Number of pupils			Number of teachers		
		%	%		%	%
<i>Tunisia — 1967-1968</i>						
Primary	810,795	+ 4.3	(+ 8.4)	15,188	+ 7.4	(+ 9.9)
Secondary	80,905	+13.8	(+23.4)	3,278	+17.1	(+14.1)
Secondary vocational	34,181	+14.3		—	—	
Teacher training	6,103	+10.9	(+38.6)	—	—	
Higher	7,828	+14.6	(+ 9.6)	304	+20.6	(+12)
<i>Turkey — 1967-1968</i>						
Primary	4,526,000	+ 5.6	(+ 6.4)	103,977	+10.8	(+ 6.9)
Secondary	715,766	+15.9	(+20.1)	16,276	+14	(+21.2)
Technical and vocational	153,484	- 0.2	(+18)	7,310	+ 5.1	(+ 2.2)
Teacher training	57,846	+ 5.9	(+13.6)	2,049	+13.2	(+11.3)
Higher	68,337	+10.8	(+ 1.6)	4,738	+16.3	(+12.3)
Religious	30,159	+47.1	(+41.1)	1,049	+67.3	(+36)
Private	98,279	+14	(+12.8)	6,309	- 7	(+15.2)
<i>USSR — 1967-1968</i>						
General	48,901,000	+ 1.5	(- 0.2)			
Higher	4,310,900	+ 4.6	(+ 6.8)			
Specialized secondary	4,166,600	+ 4.3	(+ 8.7)			
<i>United Arab Republic — 1967-1968</i>						
Primary	3,513,568	+ 0.6	(- 0.2)	88,510	+ 1.9	(- 0.5)
Preparatory general	757,604	+ 8.1	(+14.5)	26,761	+10.7	(+11.4)
Preparatory technical	9,008	-48.8	(-36.2)	764	-38	(-38)
Secondary general	275,091	+ 6.4	(+12.1)	13,163	+ 8.4	(+ 8.5)
Secondary technical	153,648	+27.4	(+18.3)	10,035	+13.2	(+11.4)
Primary teacher training	34,894	-18	(-14)	3,584	-12.5	(- 9.6)
Higher	171,126	- 3.1	(+ 2)	4,162	+ 1.8	(+ 4.9)
<i>United Kingdom — 1967</i>						
<i>England and Wales</i>						
Primary and secondary (public)	7,328,110	+ 2	+ 1.3)			
<i>Scotland</i>						
Primary and secondary (public and grant-aided)	924,580	+ 1	(+ 0.5)	42,271	- 0.1	(+ 2.3)
Primary and secondary (private)	18,500	+ 0.2				
Special	11,641	+ 3.3	(+ 3)			
<i>Great Britain</i>						
Higher (university)	200,000	+ 8.7				
<i>United States — 1967</i>						
Kindergarten through grade 8:						
Public	31,640,000	+ 1.6	(+ 2.4)	1,040,000	+ 3.5	(+ 4.1)
Private	5,200,000	0	(+ 1.9)	163,000	+ 3.8	(+ 3.3)
Other	200,000	0	(0)	14,000	0	(0)
Secondary schools grades 9 through 12:						
Public	12,247,000	+ 2.9	(+ 1.3)	815,000	+ 4.1	(+ 5)
Private	1,400,000	+ 7.7	(0)	80,000	+ 8.1	(0)
Other	100,000	0	(0)	7,000	0	(0)
Higher education (universities, colleges, junior colleges, teacher training schools)	6,500,000	+ 9.3	(+ 9.6)	495,000	+ 8.3	(+ 8.6)

	Number of pupils		Number of teachers	
		%	%	%
<i>Venezuela — 1967-1968</i>				
Pre-school	33,858	+ 9.7	870	+ 4.1
Primary	1,550,633	+ 2.7	45,700	+ 3.8
Secondary	230,371	+ 9.8	10,624	+ 6.4
Technical	108,466	+ 3.5	5,916	+10.1
Teacher training	11,147	+ 1.2	1,314	- 3.9
Higher:				
institutes of education	3,559	+12.7	387	+11.5
universities	55,272	+16.4	6,058	+13.3
<i>Vietnam (Republic of) — 1967-1968</i>				
Primary: public	1,609,589	+15.8	26,016	+ 8.6
private	359,405	- 1.3	6,406	+ 0.3
Secondary: public	162,776	+11.1	3,232	+13.2
private	308,149	+13.5	8,296	+12.7
Technical and vocational	8,527	+10	529	-11.4
Agricultural, forestry and veterinary	2,231	+ 8.2	60	+20
Teacher training	4,536	+ 2.3	191	+39.4
Higher	31,272	+ 3.2	789	- 4.2
<i>Yugoslavia — 1967-1968</i>				
Primary	2,936,486	- 0.7	107,752	+ 4.4
Secondary:				
Higher schools	189,067	+ 2.5	9,318	+ 4.1
Teacher training	26,469	- 3.7	1,371	+ 4.2
Technical and vocational	201,392	- 2.1	9,114	- 0.3
School for skilled workers	226,831	+11.8	5,377	+ 5.5
Other vocational schools	1,708	-31.4	163	- 1.2
Art schools	5,164	+ 1.8	1,114	+22.4
Special schools for handicapped children	19,067	+ 8.6	2,009	+10.9
Adult education	48,386	- 4.3	2,602	- 5.7
Complementary training	27,304	+ 2.9	1,202	- 6.2
Higher schools	82,570	+ 9.6	3,986	+ 1.7
Faculties, academies and advanced schools	128,240	+ 6.8	11,964	+ 1.4

The teaching of mathematics in secondary schools

Steps taken to implement

RECOMMENDATION No. 43

TO THE MINISTRIES OF EDUCATION

adopted by the International Conference on Public Education
at its XIXth session (1956)

In 1950, the International Conference on Public Education, convened jointly by Unesco and the IBE, adopted a recommendation (No. 31) on the introduction to mathematics in primary schools. As a logical follow-up to this recommendation and to the inquiry which had preceded it, and in view of the growing importance attached to the teaching of mathematics, the International Conference on Public Education in 1956 placed on its agenda the teaching of mathematics in secondary schools, which had also been the subject of a prior inquiry among the ministries of education. Recommendation No. 43, then adopted by the Conference, already gave some idea of the main trends which have with time become more marked and led to a thorough upheaval in traditional mathematics teaching. While "modern mathematics" is still in many cases in its early stages, mathematics can be said to have taken on a far more dynamic character than in the past, so that it can no longer be considered as a static and purely deductive science.

Of the 96 countries whose reports appear in this Yearbook, 53 sent information, in various forms, on the development of mathematics teaching. Some comment on each article of Recommendation No. 43, some simply state that the recommendation has been implemented as a whole, others present a detailed report on the evolution of mathematics teaching in recent years, not only with reference to the recommendation by the International Conference on Public Education, but also in the light of various international or regional colloquiums, seminars and congresses which have been organized since then, in particular by Unesco and the OECD. Still others include such information in their reports on educational developments.

The reader of Recommendation No. 43 is struck by its up-to-date character and even progressive statements. They open the way to any possible evolution, foreseeable or not, which contributes to the improvement of mathematics teaching. Even more, they situate mathematics among the set of essential values which contribute to the human being's training and education. By way of example, mention may be made of the chapter on the aim of mathematics teaching, to which several replies refer:

1. Throughout both general and vocational secondary education every possible endeavour should be made to achieve the aims of mathematics teaching bearing on intellectual capacity and the formation of character. These aims lead to the logical process in action (thinking, analyzing, abstracting, schematizing, reasoning deductively, generalizing, specializing, applying, criticizing, etc.), to the qualities of rational thought and its expression (order, precision, clarity, concision, etc.), to observation, the concepts of space and number, intuition and imagination in the abstract field, attention and the power to concentrate, perseverance and the habit of ordered effort, and finally to the formation of the scientific outlook (objectivity, intellectual honesty, interest in research, etc.).

2. The operations of a practical order, the adaptation to the natural environment, and the need to understand the problems raised by technical, economic and social activities,

make it more and more necessary to understand current mathematical processes (computation, fundamental geometry, geometrical representation, equations, formulas, functions, tables and graphs). These fundamental ideas and means also play a part in an increasing number of professions.

3. Mathematics and the appropriate process of thought should be regarded as an essential part of the education of a modern person, even if his work is not of a scientific or technical nature. The teaching of mathematics, closely co-ordinated with that of other subjects, should lead pupils to understand the part played by mathematics in the scientific and philosophical conceptions of the modern world.

4. One of the main aims of the advanced course of mathematics in upper secondary classes should be preparation for scientific or technical studies at higher level, whose mathematical basis is steadily increasing.

Although all the countries state that they are in agreement with the aims and methods advocated in the recommendation and that they are in favour of introducing modern mathematics, several of them make it quite clear that there are still obstacles in the way of a radical reform of mathematics teaching. The main difficulty is the need not only for further training, but also for retraining of teaching staff as well as the lack of resources with which to obtain the necessary material. Unesco has already examined the problem on several occasions and investigations in this field are not yet exhausted. It is interesting to note that projects for reform are often of an inter-regional character, which enables several countries in similar situations to combine their efforts. Mention may be made, for example, of the Entebbe system for African countries, the common syllabuses proposed for the Scandinavian countries, the Latin American congresses, the Unesco project for the Arab countries.

Generally speaking, mathematics is found to be increasingly considered as a whole—arithmetic, algebra, geometry constituting a single unit instead of being compartmented into distinct disciplines. Mathematics is also considered in its relationship with other subjects, both arts and sciences.

As regards the details of the new syllabuses, described in several replies, specialists will draw their own comparative conclusions.

Argentina. In the teaching of secondary-level mathematics account has been taken not only of Recommendation No. 43 but also of the findings of the first Inter-American Conference on Mathematical Education (Bogota, December 1961), of the International Congress on Mathematics (Stockholm, July 1962) and of the second Inter-American Conference on Mathematical Education (Lima, December 1966).

Under the terms of ministerial resolution No. 1166 of 15 December 1964, a national committee on the teaching of mathematics was set up to implement the recommendations of the first Inter-American Conference on Mathematical Education. This committee was formed in July 1965 within the framework of the Under-Secretariat for Education as part of the General Directorate of Secondary, Teacher, Special and Higher Education. Its members are mathematicians, teachers and high-ranking officials. It gave its opinion on the characteristics of present mathematics teaching and proposed a series of measures which have affected the evolution of the reform.

Aims of mathematics teaching

Account has been taken of the educational aims of mathematics teaching with regard to intellectual and character training. Mathematics and the type of thinking connected with it were considered as an essential element of general culture which brings pupils to understand their important place in the scientific and philosophical conception of the world to-day. The new way of teaching this discipline helps the pupil to acquire knowledge he has worked out for himself instead of resorting to repetition of other people's reasonings.

Place given to mathematics

Mathematics is a compulsory subject in all streams of both stages—basic and upper—of secondary education.

The "common" secondary syllabuses include, for each of the first four years, a section devoted to geometry and another devoted to arithmetic and algebra. The fifth-year syllabus includes trigono-

metry and cosmography. Five periods per week are devoted to this subject in the first and second years and four in the third, fourth and fifth years.

In 1965, in view of the good results obtained with the experimental syllabuses, it was decided to include in the "common" syllabuses some aspects of mathematics which are now considered essential to general training, *viz.*, knowledge of the theory of sets, binary operations, inequalities, vectors, statistics and probability.

Syllabuses

Mathematics syllabuses are based on the general aims of teaching this subject and on the particular aims of various types of secondary education.

The syllabuses previously in use dated back to the 1926 reform which, at that time, represented a considerable advance. In 1962, it was decided to draw up mathematics syllabuses for the secondary level in accordance with the requirements of scientific progress and the recommendations of the above-mentioned international conferences. A group of professors of the mathematics department of the Faculty of Exact and Natural Sciences of the University of Buenos Aires carried out the reform. The syllabuses cover the usual six years of study in secondary schools controlled by the universities, although secondary education in Argentina normally lasts five years.

The experimental syllabuses give less room to geometry and trigonometry and more to algebra. These syllabuses have been used on a small scale in official schools since 1963. The teaching staff was carefully selected from among scholarship holders who had attended intensive courses on the modernization of mathematics. These teachers met periodically to clarify the content, methodology and school organization required by the reform.

Concomitantly with the introduction of the first-year course a seminar was examining the subjects for the second-year course. This progressive system was applied year by year up to the fifth-year syllabus which came into force in 1967.

Encouraged by the satisfactory results obtained, the education authorities decided to broaden the experiment, which now covers 10 schools of different types scattered throughout the country, *viz.*, seven teacher training schools, two national secondary schools and one commercial school.

The reports issued are generally encouraging; none of the teachers who have taken part in the experiment would wish to return to the traditional syllabuses. As regards the pupils, they have adapted themselves remarkably well to this experiment. They are now convinced that mathematics is as attractive and accessible as any other subject. Some difficulties have arisen, however, the main one probably due to the fact that the number of periods available during the five years of secondary school does not allow the new syllabuses to be used. It seems necessary to increase the number of periods per week allotted to this discipline while at the same time reforming the curricula within the framework of the general educational policy now being adopted. A strong tendency in favour of intensifying and renewing the teaching of all basic sciences will certainly foster the development of the new mathematics syllabuses.

The teaching department of the National Secondary, Teacher, Special and Higher Education Service feels that it would be wise to wait for the findings of the national symposium on science teaching, to be held in Córdoba in October, before presenting the modified syllabuses.

Methods

Every endeavour has been made to gear the difficulty and content of the syllabus for each year to the pupils' average mental age, interests and needs. Active learning has been stimulated and encouraged by the pupils' personal participation, through which they discover for themselves ideas, mathematical relations and properties and organize operational schemes instead of having them imposed from outside. Observations and demonstrations designed to exercise a critical mind and powers of reasoning are added to the intuitive concepts acquired in the primary school.

The axiomatic method is only used in algebra courses in the upper years, where the pupils' mental maturity makes this possible. In the final year there is a return to the intuitive geometry studied during the first year, but on the basis of a critical discussion of the premises involved.

Teaching materials

The evolution of mathematical methodology has necessitated the adoption of new textbooks.

At the beginning of the experiment, teachers in the experimental classes drew attention to the difficulty arising out of the lack of adequate textbooks in Spanish. Texts were therefore published, some of them written by teachers participating in the experiment; reports and handbooks were also issued. Nevertheless there are still not enough works of reference and popular books, nor enough specialist journals, despite the dissemination of information in official circulars, educational and specialist journals and press articles. A start has been made with preparing and using audio-visual aids in teaching mathematics.

Teaching staff

The new syllabuses require suitably qualified staff. In the 500 official secondary schools in Argentina there were 2,800 mathematics teachers, of whom 1,700 (60%) held a teaching diploma in the

speciality, 550 (20%) a diploma with which they could teach this subject (engineers, etc.), 440 (16%) a "supplementary" diploma (primary teachers), while 110 (4%) had either no diploma or one that was not recognized. The teaching staff was thus not in a position to meet the requirements of the new approach to mathematics teaching. Intensive summer courses were therefore held on the initiative of the National Council of Scientific and Technical Research. Similar courses have since been sponsored regularly by this council and the Ministry of Education and Justice—now Secretariat of State for Culture and Education—both in the capital and in the interior of the country.

In addition to the summer courses, many courses are held during the school year, not to mention the short courses, lectures, seminars and demonstration classes, so that over half the teachers in secondary education, both official (2,800) and private (2,200) have been introduced to new mathematics and all the mathematics teachers in the country are aware of a new trend and are more or less acquainted with its features.

The National Institute of Further Training for Science Teachers (INEC) was recently added to the organizations offering specialist courses.

Not enough attention is paid yet to teachers' training in education, educational psychology and sociology, which constitutes an essential addition to their mathematical training. Additional training is necessary in this respect.

International collaboration

International bodies have facilitated the exchange of ideas, work and research, and Argentina has derived benefit from study trips, scholarships, meetings, publications, etc. in connection with the new orientations of mathematics teaching.

Australia is particularly interested in the new secondary mathematics course. This interest has been stimulated by one of the main activities organized since the adoption of Recommendation No. 43, namely the Australian seminar on mathematics in the secondary school, organized in conjunction with Unesco.

Organization and aims of the seminar

This Seminar was organized by the New South Wales Department of Education for the Australian National Advisory Committee for Unesco. It was held in Basser College, University of New South Wales, from 11 to 16 January, 1965.

The aim of the seminar was to bring together lecturers in tertiary institutions, teachers of secondary mathematics, administrators concerned with secondary mathematics and research workers and to enable them to review Australian mathematics teaching and compare it with modern developments in mathematics teaching in America and the United Kingdom.

Consultants and participation

Consultants from the United Kingdom and the United States contributed information on the teaching of mathematics at the secondary level in their respective countries. Participation was limited to approximately 100 residential members from all Australian states, from the Australian Territory of Papua and New Guinea, and from New Zealand. Participants were drawn from universities, teachers' colleges and the inspectorates, and included secondary teachers in public and non-governmental schools in each Australian state.

Topics of study

Main topics of study were as follows: (a) modern syllabuses in mathematics for secondary schools; (b) teaching the modern syllabus; (c) writing texts for modern syllabuses; (d) developments in mathematics teaching in England and the School Mathematics Project at Southampton; (e) the School Mathematics Study Group and the philosophy of mathematics curriculum development; (f) an appraisal of existing Australian mathematics syllabuses.

Exhibition

A display of textbooks and teaching aids was arranged to accompany the seminar.

Review and outcome of the seminar

A review of the achievements of the various sessions showed that the seminar had been successful. As a direct outcome of the comparative study of the teaching of secondary mathematics, Australian educationists are now following closely the latest changes both in the content of mathematics at secondary level and in the techniques for developing mathematical concepts and skills. They are also more keenly aware of the increasing importance of mathematics in the community, as instanced by the rapidly developing acceptance of computer technology.

Belgium. After many experiments in modernizing the teaching of mathematics, the *ad hoc* committee has drawn up a detailed first-year intermediate-level syllabus.

Botswana. Consideration is being given to the introduction of modern mathematics in primary and secondary schools and experiments have been conducted for this purpose in a few schools.

Brazil. A very detailed report on the situation of mathematics teaching was received from Brazil. It begins by pointing out that, since the first Inter-American Conference on Mathematical Education (Bogota, 1961), remarkable progress has been made in the field of mathematics teaching in many countries in the western hemisphere, as witness the introduction of secondary teachers to modern mathematics, the restructuring of secondary school syllabuses to articulate them with primary education on the one hand, and with higher education on the other, the production of textbooks in accordance with the new conception of mathematics, etc.

Regarding the teaching of mathematics in Brazilian secondary schools, the changes which have occurred—more or less important according to the provinces—are due to the new tendency advocated by the universities, the institutes of mathematics, the study groups and the official education authorities (Ministry of Education and Culture and its directorate of secondary education for the federal region, secretariats for education in the provinces), so that it was possible to unify the efforts towards reform made by mathematics teachers throughout the country.

In this respect there is increasing collaboration between university mathematicians and secondary school teachers. Study groups linked with the universities (*GEEM*) have been set up to seek ways and means of modernizing mathematics teaching, mainly in the secondary schools.

The following figures give some idea of the increased importance attached to mathematics in recent years:

	1962	1965
Schools of philosophy, arts and sciences with mathematics departments	13	46
Institutes of mathematical research	1	13
Training centres for science teachers and study groups on mathematics teaching	2	8
Secondary school teachers attending courses on the improvement of mathematics	578	7,250
Percentage of secondary mathematics teachers with university training	22%	47%

Teaching staff

In the Province of San Pablo, concerning which the fullest information is available, the number of university graduates in mathematics has doubled since 1962, but these 265 mathematics and physics graduates are not enough to meet the demand for new teachers of mathematics in the province's secondary schools. A further 400 are still needed.

The shortage of mathematics teachers continues to affect not only the Provinces of San Pablo, but also other provinces. In order to remedy it, the Ministry of Education and Culture pays special attention, in the campaign it launched three years ago to improve and extend secondary education (*CADES*), to training candidates who intend to teach mathematics in secondary schools. In a large number of provinces courses of introduction to modern mathematics are given (theory of sets, mathematical logic and modern practice), as well as refresher courses on mathematics (modern algebra, applied mathematics, deductive techniques).

Great importance is also attached to university mathematicians' participating in courses designed to bring future secondary teachers of mathematics into close contact with the progress of modern mathematics. Brazilian mathematicians themselves are kept informed by the mathematical research institutes, the oldest and most important of which is the Institute of Pure and Applied Mathematics (*IMPA*) set up in Guanabara in 1952 by the National Research Council.

Colloquiums and Congresses

The Brazilian colloquiums on mathematics sponsored by *IMPA* every other year since 1957 provide those engaged in mathematical research in Brazil with an opportunity to exchange ideas and results. They have also included advanced courses on mathematics given by Brazilian and foreign teachers. At the 1961 and 1963 colloquiums, study groups paid particular attention to the secondary school mathematics course and its articulation with higher education.

The Brazilian congresses on mathematics teaching, started in 1955, have helped to build closer relations between university mathematicians and secondary school mathematics teachers. At the fourth congress, in 1962, the San Pablo *GEEM* published the first results of the application of modern mathematics in the secondary school, in eight study sessions including demonstration classes with pupils. Although at that time opinions were fairly divided in Brazil regarding mathematic teaching at secondary level, the congress undoubtedly served to stimulate and encourage some teachers who were ready for the reform but hesitated to go forward with it.

The fifth congress, from 10 to 15 January 1966 at São José dos Campos (San Pablo Province), was attended by 350 participants from all over the country. It was also attended for the first time by eminent foreign teachers, mathematicians and experts. Its main theme was "modern mathematics in the secondary school". This fifth congress had immediate results: the Ministry of Educa-

tion and Culture, through the *CADES* and in response to requests from various provinces, sponsored courses on the improvement of mathematics. In July, 25 courses on the improvement of mathematics were organized by the Science Teachers' Training Centre for secondary school teachers throughout the country. These courses, known as "120-hour courses", were attended by about 600 teachers. Furthermore, in agreement with the schools of philosophy, arts and sciences of several provinces, the *CADES* organized courses lasting 120 days at the rate of 5 hours per day, consisting of general knowledge and pedagogy together with modern mathematics. It is felt that in addition to his mathematical knowledge, the teacher should be fully conversant with the language and culture of his country.

Finally, the San Pablo *GEEM* organized in 1966, in collaboration with the University and institutes of mathematics, various courses on the improvement of mathematics (first, second and third levels), which were attended by 800 teachers. These courses cover the following subjects: mathematical logic, modern algebra, linear programming, topology, probability, statistics.

The Brazilian Society for the Progress of Science (*SBPC*) organizes annual meetings in different parts of the country for university professors specializing in scientific subjects. For the last three years, this society has organized one-week sessions in July on modern mathematics. These sessions have had repercussions throughout the country. Similarly, the Brazilian Institute of Education, Science and Culture (*IBECC-UNESCO*), São Paulo section, the oldest scientific centre attached to secondary schools, has a mathematics section which organizes courses and issues publications for secondary school teachers.

A course on modernization of mathematics was organized last September and October for parents by the state vocational school in São Paulo in conjunction with the *GEEM*. It was attended by about 200 parents.

Mathematics syllabuses used in Brazilian secondary schools

To date, about 70% of Brazilian secondary schools, 40% of them opened in 1963, have adopted the following mathematics syllabus:

Pupils aged 11 to 12 years: theory of sets and relations; operations with whole numbers; structural properties, intuitive geometry; easy constructions and problems of the bisection of figures.

Pupils aged 13 to 14 years: operations on the set "R"; algebraic calculations; functions; linear function; quadratic function; figures in plane geometry; simple closed curves, convex polygon; circle.

Pupils aged 15 to 17 years: exponential, logarithmic and trigonometric functions; progressions; combinatory analysis, matrixes and determinants; linear equation systems; operations with complex numbers; introduction to infinitesimal calculus; polynomials and algebraic equations, analytical study of the line, circle and cones; space geometry; axiomatic treatment.

In some provinces, there are experimental classes applying more advanced syllabuses under the supervision of teachers who are members of study groups.

Publications and textbooks

Various publications have appeared on the subject, such as the Mathematical Society's latest bulletins on modern mathematics in secondary education. The São Paulo *GEEM* publishes an information bulletin on the main developments of mathematics teaching, as well as a series of booklets for teachers: "Modern Mathematics for Secondary Education", "A Modern Mathematics Syllabus for Secondary Education", "Elements of the Theory of Sets", "Mathematical Logic for the Upper Secondary School", "Combinations and Probabilities".

The new mathematics textbooks for secondary schools are based on modern conceptions, gradually introducing certain basic concepts and placing technical operations in their proper place. Some textbooks are accompanied by a teachers' guide.

Competitions

Competitions organized recently by the *IBECC* under the title "Scientists of Tomorrow" have produced work by hundreds of students from all parts of Brazil in the fields of physics, chemistry, natural history and mathematics. The first prizes have been awarded during the last few years for work on modern mathematics submitted by pupils from secondary schools in São Paulo and Santos, breaking a long tradition that mathematics never received a prize! At the science exhibition which has aroused young people's enthusiasm in the last two years, the stands devoted to modern mathematics were among the main centres of attraction.

On 31 October 1967, at Mackenzie University in São Paulo, the first decisions were taken regarding an olympiad in modern mathematics for secondary school pupils.

Use of television

In January 1964, in conjunction with the television section of the São Paulo Secretariat for Education, the *GEEM* arranged the first television course on modern mathematics for secondary school teachers. The course was given over a two-week period by university professors, with study sessions on the theory of sets, mathematical logic and modern practice.

Burundi. The reform of secondary school syllabuses, now in its final stages, has completely revised the mathematics syllabus. This reform corresponds exactly to Recommendation No. 43 on the teaching of mathematics in secondary schools since it is designed to produce the best possible output and a higher level of training.

Byelorussian SSR. In 1967-1968, work continued on the considerable task of bringing general secondary education up to a level compatible with present achievements in the field of science, technology and culture. This work led to the issuing of new syllabuses, based on the following principles: development of the ability to generalize and of rational logic, acquisition of theoretical foundations; 40% of the timetable is to be devoted to human sciences, instead of 37% as stipulated in the 1959 curricula, and 36.6% instead of 30% to natural sciences and mathematics.

Congo (Republic of) Recommendation No. 43 is already implemented.

Costa Rica. The following comments are given with reference to Recommendation No. 43, the figures referring to the articles of the recommendation:

Place given to mathematics

5. Out of the weekly total of 40 periods in the three-year lower secondary stage, five 40-minute periods are devoted to mathematics in the first year and four in both the second and third years.

6. In the two-year upper stage, divided into arts, science and vocational streams, the most time is devoted to mathematics in the science stream, which has six mathematics periods per week.

7. No official steps have been taken to provide pupils showing special aptitudes for the study of science with the opportunity of following a more advanced syllabus.

8. In the arts stream, there are three compulsory mathematics periods per week but pupils are not obliged to take a mathematics examination to obtain their baccalaureate.

9. Through its specialist advisers, the Ministry of Education has stressed in its circulars or on the occasion of visits to secondary schools, the importance that must be given to mathematics according to the field of study.

Syllabuses

10. The science, arts and vocational syllabuses are drawn up by the committee concerned, with reference not only to the general aim of teaching mathematics but also to the particular needs of each stream.

11. The Ministry of Education has set up a committee to undertake a first revision of the reformed syllabuses at the end of the lower stage; it is planned that the upper-stage syllabuses shall include chapters on functions, vector algebra, infinitesimal calculus and analytical geometry.

12. Teachers throughout the country are of the opinion that the growing interest in mathematics is due to the reformed system which has made it possible to improve the quality of teaching. The number of science and arts baccalaureate classes thus increased by 2,090 in 1967, although the pass mark had been raised to 50%.

13. Syllabuses are arranged concentrically, starting from the general idea in order to arrive at the details.

15. Teachers are free to enlarge on the prescribed syllabuses whenever they consider this to be necessary.

Methods

16 to 25. The aim of the reform of secondary education is to modernize not only syllabus content but also methods. In the years prior to the official implementation of the reform, the Ministry of Education, through its advisers and inspectors, endeavoured to ensure that teachers and parents understood the new type of teaching that was proposed. While the reform was being carried out, the Ministry stressed the new teaching methods advocated in Recommendation No. 43. It has met with opposition from some teachers who sought to retain doctrinaire methods, but the number of such teachers is on the decline and there is now twofold progress: greater interest in the sciences and better general promotion.

In its circulars and at meetings, the Ministry of Education has emphasized the important role of the teacher. Good syllabuses and excellent publications are not sufficient to ensure good teaching they are not combined with the teacher's creative activity.

Teaching materials

The country does not yet possess good mathematics textbooks for the lower secondary stage. The Council of Education recently designated a committee to examine the quality of existing textbooks, some of which may even be eliminated. For the last two years low-cost textbooks have

been imported through the agency of the Ministry and steps are taken to ensure that most teachers build up a basic library.

Teaching staff

The unaccustomed increase in the school population has made it necessary to employ mathematics teachers not holding the normal qualifications. As the reform was implemented, the Ministry organized courses, seminars, etc. in order to improve their training. Furthermore, a mathematics department was set up in the University in 1958 for the sole purpose of training teachers and the Teacher Training College, opened in 1968, will overcome the shortage of qualified teachers. There is a conviction that the teacher's knowledge must be far greater than what he actually teaches.

The lack of any economic incentive and the rigour of the actual subject have so far failed to attract any large number of candidates to teach this subject. With the same amount of effort, young people embark on careers offering greater financial advantages.

International Collaboration

The United States Peace Corps volunteers assisted by providing two mathematics teachers who both collaborated in courses, seminars, conferences, etc., for one year.

Finally, thanks are due to the Unesco mission for its important collaboration in establishing the Teacher Training College.

Cuba. Before the 1959 revolution, mathematics teaching, like education as a whole, was underdeveloped as a consequence of the economic and social conditions then prevailing. Since that time, despite the restrictions caused by the lack of senior staff, a certain number of steps have gradually been adopted in order to effect a complete transformation of mathematics teaching and particularly important changes are about to be introduced in the syllabuses in respect of modern mathematics.

Aim of mathematics teaching

In accordance with the measures adopted in 1967-1968 concerning the new syllabus for general education, the prime objective of mathematics teaching is to develop the powers of reasoning, clarity of thought and precise judgement; to exercise the imagination and the ability to generalize; to create mental habits which bring pupils to adopt a scientific attitude towards any problem and to use a scientific vocabulary; to enable them to take an interest in natural and social facts and phenomena and to participate in transforming the latter for the benefit of the progress and welfare of human society. Another objective of mathematics teaching is of an instrumental nature, *i.e.* it offers pupils the techniques and means of successfully carrying out the tasks which arise in any socialist society; it creates conditions in which they can embark on the study of other sciences in technical and vocational institutions, including higher education; it gives them the basic knowledge with which they can meet fully the demands of production in building up socialism; it helps them in their polytechnical training which links production to education, theory to practice, the school to life, etc.

Finally, the teaching of mathematics has an objective which is of great practical value in that it enables pupils to interpret problems of everyday life by means of different mathematical calculations, drawings, plans, graphs, etc.; it teaches them to make simple objects in the workshop or at home; helps them to appreciate the rhythm and beauty of music and the arts in general; develops their leisure activities by means of games, hobbies and sports.

Place given to mathematics

Mathematics is given priority in general education syllabuses as well as in those for technical and vocational education. In the curriculum for general education it is allocated six periods per week from the 7th to the 12th school year (5 hours in the 8th year). In technical and vocational education and in schools for training skilled workers, there is a total of 196 mathematics periods, while in institutes training middle-grade technicians, there is a total of 480 mathematics periods.

Mathematics will occupy an even larger place in the curricula and syllabuses which are to come into force next year.

In the pre-university examination, mathematics represents 30%, Spanish, physics and chemistry 20% each and biology 10%. In the examination taken at the end of the 9th school year (end of the intermediate secondary school), mathematics also represents 30%, Spanish 25%, physics, chemistry, biology and history 10% each and English 5%.

Syllabuses

The modern conception of mathematics based on the theory of sets is now being introduced on an experimental basis. In seminars organized and run by Ministry of Education teams, guidance on the teaching of new mathematics and on the content and method of the textbook which is being prepared for next year is being given by teachers and consultants. The new conception of mathematics

corresponds to a large extent to the present tendencies of the scientific and technical revolution which is gaining momentum in the country.

The following suggestions may be offered in the light of experiments conducted by study groups in different countries and in Cuba:

- Pupils are generally capable of learning much more than is thought.
- The transition from one stage of education to another can be speeded up by better designed syllabuses and better teaching techniques.
- Early introduction of the concepts of mathematical structures speeds up learning by simplifying and unifying their content.
- Even at primary level, the parallel and integral development of algebra and geometry may be practised.
- The pupil has not only to acquire the technique of operations, but also to understand the very foundations of mathematics.
- Each subject must first be presented intuitively in the lower classes and various ways of presenting the problems must be used in order to study them from different angles.
- Experiments conducted by means of solid objects must be able to lead to the abstract notion.
- Individual pupils who wish to broaden their knowledge and make a more thorough study of certain subjects should be given sufficient time to use additional material.
- The recreational aspects of mathematics should be used especially in the lower classes. Mathematics includes rhythmic elements comparable to those in music and the arts, which can give as much satisfaction as a beautiful melody.

The new syllabus has been tried out in a number of schools and, with the adjustments needed to effect the transition, will be introduced next year.

In secondary education, the new syllabuses are to be introduced gradually and will only be applied completely in class 7 (first year of secondary education). The same will apply to first-year classes in primary education. Finally, in the experimental programme which will be introduced throughout the country in September 1968, all the suggestions of Recommendation No. 43 will be taken into account.

Methods

Since the reforms were introduced in 1959, instructions have been issued regarding the method to be used.

The basic aspects of the method recommended may be summarized as follows: pupils will play an active part in acquiring new concepts; teachers will make them think by giving them problems and experiments to analyze and from which to draw their own general conclusions; pupils will often be invited to ask questions, to find and correct their mistakes, to suggest new solutions or demonstrations and to express the concepts in their own words. They will be encouraged to work independently, to go more deeply into certain subjects and to formulate situations and problems on their own initiative. They may be given certain research or individual tasks to carry out from which they will draw their own conclusions. Additional reading matter, reference works, leaflets and magazines must be available to them. It is very important that the teacher should be able to stimulate his pupils and that he should always be open to new ideas.

Teaching materials

The need for new materials, particularly for textbooks, linked with the expansion of mathematics teaching is a serious difficulty, which has been partly solved by resorting to foreign textbooks. Next year the textbooks necessary for the first primary and secondary years will be available.

Pupils in all levels of education are supplied with free textbooks. The recently created department of audio-visual aids is preparing material suitable for teaching this subject, on which there are also daily television and radio programmes.

Teaching staff

After the revolution, the university institutes of education started special courses for intending mathematics teachers in the intermediate secondary school (7th, 8th and 9th school years) or in pre-university education (10th, 11th and 12th years). The courses last five years and place considerable emphasis on practical work.

Large-scale educational expansion has entailed the appointment of unqualified staff, such as graduates from other professions, primary teachers, etc. but they have always been given prior training and subsequent further training. This further training is also given to teacher training college graduates.

International collaboration

Cuba has received assistance from international bodies, particularly from Unesco. The socialist countries and other friendly countries have offered collaboration, particularly in training senior

staff. Also, technicians and specialists from all parts of the world, in particular from Latin America, have rendered and still are rendering inestimable service to the country.

Cuba participated in the most important international events in the field of mathematics teaching and derived the greatest benefit therefrom.

Cyprus. Mathematics is taught in the three lower classes of the *gymnasium* and the three higher classes of the classical section for four periods per week and in the three classes of the science section for six periods per week.

In the three lower classes modern mathematics is taught, including the theory of probability, elements of statistics and vector calculus. In the classical *gymnasium*, algebra, with elements of infinitesimal calculus, geometry, and trigonometry are taught at GCE ordinary level.

In the three classes of the science section, algebra and elements of infinitesimal calculus, geometry, analytical geometry, descriptive geometry, drawing and trigonometry are taught at GCE advanced level.

Mathematics teachers are all holders of university degrees in mathematics, and teaching stresses initiative, investigation and individual activity of students with the help of the teacher.

Denmark. The 1958 law on upper secondary education contains special provisions concerning its curriculum and places mathematics teaching at a higher level than previously, generally corresponding to the terms of Recommendation N° 43.

The introduction of new subjects, such as the concepts of the theory of sets and of algebra and the calculation of probability, met with some initial difficulties but these now seem to have been overcome and it will be possible to attain the aims of mathematics teaching, meeting the requirements of the syllabus and the timetable.

The shortage of teaching staff caused a slight reduction in the number of mathematics periods. By slight adjustments to the syllabus, however, it was possible to avoid lowering the standard of knowledge. While the number of periods was reduced, emphasis was placed on the fact that collaboration between teacher and pupil was even more important in mathematics than in any other subject. This observation was underlined in the recommendations made to teachers.

Teachers in upper secondary schools are either specialists or else teachers who have specialized in one or two subjects in order to obtain their degree. Before taking up teaching, they still have to attend a course on education and teach for a certain time under the supervision of an experienced teacher.

It is felt, however, that there would be some advantage in giving teachers the opportunity of devoting more time to teaching pupils individually. The difficulties are due largely to the fact that the Danish education system places great emphasis on the rigorous and carefully graded introduction of mathematical problems, so that the subjects are dealt with in a mathematically correct manner at every level and taught in their proper context. It is also recommended that teaching at the lower level should be based on precise postulates which can be grasped immediately.

Dominican Republic. The Secretariat of State for Education, Fine Arts and Religion is launching a large-scale programme of in-service training for teachers. It is also examining teacher training school syllabuses and undertaking a reform of them. In these activities, Recommendation No. 43 of the International Conference on Public Education is taken into consideration.

Furthermore, consideration is being given to the reform of secondary education. Three secondary schools offering a diversified curriculum have been brought into operation on an experimental basis. Their mathematics teachers have been prepared for their task in accordance with Recommendation No. 43.

Ethiopia. Following a three-year pilot project, modern mathematics was introduced in all grades 9 (first year of senior secondary school) in September 1967. Throughout the year a teacher assistance project was in operation, run by the Education Development Centre in order to facilitate the implementation of the programme by extending to as many primary and secondary teachers as possible in-service training on the teaching of modern mathematics, in accordance with the African Programme based on textbooks and material drawn up at Entebbe.

Specific comments on the articles of Recommendation No. 43 are as follows:

Aims of mathematics teaching

1. The African Mathematics Programme is consistent with the aims listed in Recommendation No. 43. The programme lays emphasis on basic understanding and the discovery method.
2. Textbooks are being adapted in Ethiopia, using metric units and problems which have a direct bearing on the Ethiopian situation.
3. The programme aims to link subjects together, especially rural science and social studies.
4. In the upper levels, particular attention is paid to preparing advanced courses for university and vocational education.

Place given to mathematics

5. The secondary school curriculum devotes six periods per week to mathematics.
6. In upper classes, this number of periods may be increased for students who intend to specialize in mathematics or science.
7. It is difficult to allot more periods than this but selected students may be given assignments to work by themselves.
8. Mathematics is compulsory up to grade 12.
9. Mathematics has always been regarded as a key subject both for class promotion purposes and for the award of the final certificate.

Syllabuses

At present, all pupils follow a common course but a separate syllabus for vocational education and for the best academic pupils is envisaged. In the light of experience, it is expected that the more advanced topics, such as analytical geometry, calculus, probability, functions and vectors will be reserved for the more gifted pupils.

13. It is therefore intended that the majority of pupils will confine their studies to the basic topics, not including those mentioned above.

Methods

16. In the teacher training institutes and in-service courses on different class syllabuses, special attention is given to methods which encourage teachers to relate their teaching to the practical needs of the pupils in their community.

17. It is hoped that the very nature of modern mathematics will develop more active pupil participation.

18. An effort is made to awaken the pupils' interest, encourage him to find his own ways of arriving at solutions and develop to the full his own capacities.

19. When the new syllabus begins in elementary schools in September 1969, much emphasis will be placed on the Entebbe series whereby the child develops through his own discoveries an active participation.

20 to 25. The very nature of the materials, methods and basic ideas behind the Entebbe series should go far in achieving what is considered essential in the development of the child's abilities in mathematics.

Teaching materials

26. The books are being adapted to the Ethiopian environment and will be revised from time to time. Under the IDA expansion scheme for secondary schools, a selection of modern mathematics reference books has been ordered for all secondary schools. The Ministry of Education ensures the dissemination and exchange of ideas through the journal *Teaching News* produced by the Curriculum Division.

27. The educational television service produced during the 1967-1968 school year a series of television broadcasts on modern mathematics for grade 9. As part of its in-service training programme for teachers, the Curriculum Division is developing a series of teaching aids and teachers are given every encouragement to make and use simple and inexpensive teaching aids. Some experimentation may be carried out by the schools radio programme in conjunction with the Curriculum Division as from September 1968.

Teaching staff

28. The training of future secondary school mathematics teachers is at present the responsibility of the Faculty of Education of Haile Selassie I University. Mathematical training is given by the mathematics department, working in close relation with the Ministry of Education.

29. Future mathematics teachers will therefore have studied mathematics well beyond the level at which they will have to teach it. Moreover, during their training, they will be directed towards methods of teaching consistent with the demands of the modern mathematics syllabus.

30. Only careful selection and training can ensure that pupils are taught by competent teachers but naturally the aim is to give all teachers the best possible qualifications.

31. Both in teacher training institutes and in the Faculty of Education, future teachers make an appropriate study of the child and educational psychology.

32. Every teacher in service is given the opportunity of keeping abreast of modern methods by attending in-service courses.

33. The Teacher Assistance Project includes demonstration lessons given by the more gifted and modern-minded teachers.

34. It is hoped to raise the status of mathematics teachers, and indeed of all teachers, by organizing a Teaching Service.

Gabon. The book prepared by Unesco on the teaching of mathematics was very well received in Gabon. Teachers of this subject who have examined the publication are of the opinion that this project can be used in the near future in connexion with a possible reform of secondary school syllabuses in general.

Ghana. The curricula give emphasis to the teaching of science and mathematics both in the elementary and in the secondary schools.

Greece. In keeping with the spirit of Recommendation No. 43, an important place is given to mathematics in secondary education. Thus, the number of periods has been increased and appropriate teaching materials are used where available. Analytical syllabuses are being compiled in accordance with the provisions of organic law 129/67. They provide for an increase in the number of periods and for the addition of new subjects (relative to the theory of sets, symbolic logic, analytical geometry, vector calculus, infinitesimal calculus, statistics and the theory of probability), a better selection of syllabus content, the use of audio-visual aids and the improvement of teaching methods.

Guyana. The Ministry of Education has endeavoured to implement the major part, if not all, of Recommendation No. 43.

Aim of mathematics teaching

Articles 1 to 4 have been adopted.

Place given to mathematics

5 to 9. These articles were taken into consideration when the timetables and work plans were drawn up.

Syllabuses

10 to 15. Effect has been given to most of the ideas expressed in this chapter through the recourse to modern mathematics: pilot projects have been started in six schools. Teachers in service are also being given instruction in modern mathematics.

Methods

16 to 25. The various measures advocated in this chapter have been taken into consideration and teachers are encouraged to use methods which give mathematics a role in preparing pupils for life in modern society.

Teaching materials

26 and 27. Financial considerations have restricted any increase in the use of audio-visual apparatus and aids. An effort is made, however, to follow modern trends by supplying teachers, especially those in secondary schools, with new textbooks adapted to the country's needs. Seminars have also been organized to show teachers how to use local materials to produce mathematical teaching aids.

Teaching staff

28 to 35. Mathematics, in the same way as general science, physical education, domestic economy and handicrafts, was considered sufficiently important for a special official to be designated to supervise and assist teachers of the subject.

In secondary schools there is a shortage of fully qualified mathematics teachers but, while Guyanese teachers are being trained, the gap is being partially filled by the recruitment of teachers from other countries through, for example, the United States Peace Corps, the United Kingdom Voluntary Service Overseas and the Canadian University Service Overseas.

Hungary. The Ministry of Cultural Affairs, the National Institute of Education, the János Bolyai Mathematical Society and the Institute of Mathematical Research and, generally speaking, all persons holding posts of responsibility in education or conducting research in this field are entirely in agreement with the provisions of Recommendation No. 43. The International Colloquium on Mathematics Teaching, organized in Hungary in 1962, helped to consolidate and broaden its principles still further.

The recommendation can only be implemented slowly, however. While many points may be considered as having been adopted already, some very important parts have not yet come into force as they would involve serious practical problems. Before they come into force generally, they must be subjected to a series of experimental tests, both as regards the subject and as regards the teaching method. Teachers now in service have to be persuaded and even, to a certain extent, retrained, the number of periods necessary for teaching new mathematics has to be obtained, syllabus

buses established, textbooks written, pupils' working tools chosen or even created. Finally, the funds have to be found for these innovations. Despite all these obstacles, which cannot be overcome for many years, appreciable results have already been achieved.

Some of these results are summarized below under the relevant chapter headings of the recommendation:

Aim of mathematics teaching

Official aims corresponding to those in the recommendation are gradually replacing the former system which stressed memorization and knowledge by means of mechanical and stereotype exercises. Pupils' reflection is now encouraged by allowing them to work independently and developing behavioural qualities useful to society. This tendency is apparent in both the primary and the secondary school and seeks to give a sound basis for further studies at higher level.

Place given to mathematics

Mathematics is compulsory in all types of school and is one of the main subjects for which the pupil must obtain a mark every year. It is also a compulsory subject in the school leaving examination, which includes written and oral mathematics tests. The number of mathematics periods per week is also indicative of the importance attached to this subject. In grammar schools, for example, the highest number of periods is devoted to mathematics: 18 per week for four years, whereas only 16 per week are devoted to Hungarian language and literature.

Syllabuses

The new secondary school syllabus was issued in 1965. It is to be followed shortly by the secondary vocational school syllabus. The grammar school mathematics syllabus now includes vector analysis in trigonometry and in analytical geometry, infinitesimal calculus and the theory of probability and combination. Elements of the descriptive geometry method are taught as part of mathematics.

Special classes have been started for pupils who are particularly gifted in mathematics. Their main subject is mathematics, occupying 10 periods per week. Their syllabus includes number theory, numerical methods, mathematical statistics, the theory of probability, vector algebra, complex numbers, higher algebra, the theory of sets, mathematical logic, programming, computers, etc., in addition to the normal curricular subjects.

Although the 1965 syllabus for ordinary grammar school classes represents an important step towards modernization of the subject taught, it is felt that this modernization is by no means complete. Experiments have been conducted over the last five years in order to draw up a thoroughly new syllabus from the first year of schooling up to the school leaving examination, but it will be some ten years before this syllabus can be brought into general use.

The secondary schools do not teach pupils the mathematical knowledge necessary for various occupations. It is by learning to reflect that pupils are prepared to cope with the mathematical tasks awaiting them in their particular occupation. Only in the special mathematics classes can pupils receive training which qualifies them for employment as technicians in various fields, such as computer programming, mathematical programming, mathematical statistics.

Teachers enjoy a certain degree of freedom to undertake experiments which are not exactly in line with the syllabus, with the permission and under the supervision of the Ministry.

Methods

The methods suggested in the recommendation are taken as a basis for observations and experiments on the one hand and for courses of in-service training for teachers on the other. The "Mathematics Teaching Journal", issued six times a year, enables teachers to publish the results of their research and helps to familiarize them with the new syllabus.

A characteristic tendency of the modern methods is the replacement of passive attention by pupils' active participation in the lessons. Subsequently, inductive reflection leads systematically to deductive reflection.

Teaching materials

The secondary schools' mathematical journal for gifted pupils wishing to learn on their own has been in existence for about 70 years.

Textbook publishers are making available to pupils and teachers a series of publications dealing with the various fields related to mathematics at the level of secondary education. This series is contributing considerably to increasing interest in mathematics. Generally speaking, every effort is made to popularize mathematics by means of all kinds of publications.

School radio and television broadcasts are also devoted to mathematics. At present, however, they are intended only for children between the ages of 10 and 14 years.

Manufacturers of teaching aids are gradually progressing from the production of demonstration objects to that of instruments or apparatus suitable for class use.

There is a considerable development of mathematical contests for schoolchildren throughout the country. The best pupils take part in international mathematical olympiads and competitions, are organized within the country through the secondary schools' mathematical journal.

Teaching staff

Teachers in the lower primary school (first four years of schooling) undergo three years' training in teacher training schools, whose mathematics syllabuses are at present undergoing revision. The same applies to the four-year teacher training schools which train future teachers for the upper primary school (5th to 8th years). Teachers in the secondary school (9th to 12th years) qualify at the university after five years' study.

Teachers in service may attend courses of further training on their special subject and on teaching methods. Such courses are not compulsory. The reform of teachers' further training is in progress.

India. Recommendation No. 43 has been addressed to the governments of each of the states and also to mathematics teachers in secondary schools.

Preliminary work

In 1962, the first concrete step towards the improvement of school mathematics was taken by the National Council for Educational Research and Training (NCERT). A panel of distinguished mathematicians of the country was constituted to prepare a suitable syllabus and new textbooks and teachers' guides. This panel was replaced in 1965 by an editorial board, which has now completed the preparation of four textbooks, on algebra, trigonometry, probability and statistics.

In 1963-1964 a Unesco study group suggested methods of improving the teaching of mathematics and science in schools. The main recommendations made were as follows:

- teaching of arithmetic should be completed in primary classes I-V and negative numbers introduced as early as class V;
- all studies in algebra and trigonometry should be based on functions;
- in geometry, greatest stress should be laid on variation and symmetry;
- school mathematics should include modern algebra, logic, statistics, probability, topology and number theory;
- trials should be conducted in classes VI-XI with an experimental syllabus and instructional material developed by a group of Indian and Unesco experts.

Syllabus

The NCERT prepared a syllabus for general mathematics as a compulsory subject for all classes up to class X, to conform to the pattern of education recommended by the Education Commission (1964-1966). This syllabus includes new concepts such as the study of mathematical logic, probability, statistics, etc. Six study groups, four in universities, one in a college and one in an institute of technology, have been set up to prepare curriculum guides and textbooks to cover this syllabus.

Teaching materials

Instructional materials have been produced in connexion with the above-mentioned experiments, in final or in experimental form. For example, the NCERT published textbooks on modern algebra in two parts for secondary schools in Delhi. Again, under the Unesco project, textbooks with teachers' guides and curriculum guides on arithmetic-algebra and geometry for class VI have been published in their final form after preliminary trials. The same material for class VII is in the press, and material is being prepared for trying out in class VIII. These books are at present in use in all Delhi secondary schools and in all the central schools run by the Union Ministry of Education, and are gradually being adopted in other states.

Teaching staff

A number of short-term training programmes have been organized for teachers, while the new materials were tried out in selected schools. To help the Delhi Education Authorities in changing to modern mathematics, which was introduced in 1966, the NCERT collaborated in conducting these training courses. Under the programme of summer institutes, about 3,000 mathematics teachers will complete their 45-day training by the end of July 1968.

Research

The NCERT conducted two programmes of research on school mathematics, one for the purpose of analyzing current syllabuses, teaching and learning processes and general mathematics textbooks, and the other for preparing achievement tests in mathematics for all school stages.

Search for mathematical talent is also carried on throughout the country at the end of the secondary stage, as part of the science talent search programme.

Ireland. In 1963, in-service training courses for teachers of mathematics were organized to enable them to teach the new syllabuses adopted in 1964 for the secondary school leaving certificate. These courses now include summer courses, week-end and evening courses, organized by the Department of Education or the Irish Mathematics Teachers' Association, as well as occasional courses on specific topics organized by the universities. The courses are given by university pro-

fessors, the Department's inspectors and selected secondary school teachers. Courses on methods of teaching new mathematics are conducted by specialists from abroad.

The Department has been generous in providing grants for the courses, and, in recent years, whenever a fair-sized group of teachers sought a course at any local centre the course was established, with competent staff. As a consequence of these measures, practically all teachers of mathematics in secondary schools have attended at least one course and most of them have attended more than one course. Initially each teacher met his own travel and accommodation expenses; in recent years, however, full travelling expenses and partial accommodation expenses have been refunded by the Department.

Appointment of teachers

The minimum desirable qualifications for a teacher of mathematics are a first university degree with mathematics as a main subject, together with a higher diploma in education from a recognized university. Where it is not possible to recruit a teacher with these qualifications, a graduate teacher with the higher diploma in education who has taken mathematics during part of his university course may be accepted.

Involvement of teachers

In recent years teachers both collectively and individually are being given responsibilities in new sectors. They now act as assistant advising examiners—and even, on occasion, as advising examiners—in mathematics at the public examinations. Through their recognized school bodies and through the Mathematics Teachers' Association, they are involved in the drawing up of the examination syllabuses. Selected secondary school teachers are also employed as lecturers at in-service training courses.

Syllabuses

Modern syllabuses are now in operation at all levels in secondary schools. Tentative modern syllabuses (pass and honours) were introduced at the leaving certificate level four years ago; these syllabuses are now being revised and the new syllabuses will be in operation in the schools in 1969. New syllabuses for higher and lower levels have been in operation at intermediate certificate level for the past two years. Both girls and boys have equal opportunities with regard to choice of syllabus. Syllabus committee members for the leaving certificate are composed of representatives from the universities, from the Department of Education, from the school organizations and from the teachers' associations. The intermediate certificate syllabuses were drawn up by a similar committee, except that the universities were not represented.

Television and other audio-visual aids

Programmes in mathematics for junior pupils have been available on television in recent years; uses of other teaching aids are being actively investigated.

Textbooks

It is difficult to keep textbook production abreast with syllabus changes. This matter is being attended to, especially at lower level, and the situation is expected to improve significantly in a relatively short period.

Ivory Coast. In February 1968 the Ministry of Education published a summary report on mathematics teaching, advocating that it should be reorganized at all levels on the basis of observations, conclusions and recommendations expressed in many topical articles, official publications, reports issued by various educational services, in particular the French National Institute of Education, and international organizations, in particular the OECD and Unesco. The ideas expressed also correspond to Recommendation No. 43.

The conclusion of the report includes the following remarks: "... It appears opportune that the problem of teaching this subject which conditions the scientific and technical development of any country and, in particular, of our African countries, should be placed on the agenda of the next Conference of Ministers of Education of French-speaking African and Malagasy states, in the same way as it has several times been placed before other international bodies, such as the OECD and Unesco... The possibility of effecting certain stages of the reform no doubt depends on factors which differ from one country to another (teacher training, tradition as regards syllabus or teaching system, greater or lesser availability of means, even the distances to be covered and the transport difficulties involved); these differences must be measured and the possibility of applying one country's experience to another assessed. Ultimately, however, behind these differences lie objectives and research which are essentially comparable: to ensure the optimum scientific development of the country, its mathematical potential must be improved.

This growth means improving both the mathematical ability of the masses and the qualifications of the mathematically gifted. Traditional teaching has often made people allergic to mathematics

and failed to achieve the output desired, both in quantity and in quality. We have seen the effectiveness of new mathematics, the clarity and essential simplicity of which make it more intelligible and easier to grasp for a greater number of people, while its organization and resources provide an incomparable and invaluable tool for action in every field. But we have also emphasized that there can be no promotion of mathematics teaching without a new pedagogical approach as highly developed as the actual mathematics. And the possibility of carefully worked out changes rests initially with the *teachers*: the action of any state must therefore be concerned in the first place with teachers' training and further training on the one hand, and with the investigation, in the light of experiments, of new teaching methods for the different levels; finally, the number of qualified teachers must be sufficient to allow for classes of a reasonable size which can work efficiently.

Teachers, parents and the state must be aware of the importance of the effort required. Although less spectacular than other undertakings, the true reform of mathematics teaching is nonetheless a fundamental need in the fight against scientific underdevelopment, the technical and socio-economic dependence which today threatens any country faced with the explosion of scientific knowledge and the technological revolutions changing the economic and cultural life of the whole world."

Information and training for teachers are considered particularly important and many meetings have already been organized for common reflection on the problems of the reform. There is not a single secondary school in the Ivory Coast which has not been reached by direct information, independently of that given in documents issued by the Education Service.

At Abidjan Teacher Training College, the essential renewal has been effected for the first and second sections training teachers for the second and first stages of secondary education. It remains to be carried out for the third section, which trains inspectors of primary education.

Japan. Measures taken since 1956 to implement Recommendation No. 43:

I. *Mathematics in lower secondary schools.* Mathematics in lower secondary schools is now taught in accordance with the syllabus which was revised in 1958 and put into effect in 1961.

To improve pupils' basic knowledge and skills and to strengthen scientific and technical education, the minimum number of mathematics periods per week was increased slightly and the content of instruction was made more systematic. As in the past, mathematics is compulsory in the three classes of the lower secondary school but an elective course in mathematics was introduced in the third years to ensure that all pupils receive instruction in accordance with their abilities. Emphasis was placed on the development of basic skills and understanding of fundamental principles and laws as well as on practice in mathematical thinking.

Methods of proofs concerning plane figures were added in the second year (class 8). In the third year (class 9) the main additions to the syllabus were: quadratic equations and functions, theorem of the angle of circumference, correlative table and diagram. The introduction of these items raised the level of instructional content in these two classes by at least one year. For example, some of the teaching content previously allotted to the third year was introduced in the second year. The third-year elective course is intended to allow some pupils the opportunity to study the subject matter of the compulsory course more thoroughly.

II. *Mathematics in upper secondary schools.* Mathematics in upper secondary schools has since 1962 been taught in accordance with the syllabus which was revised in 1960. In order to improve pupils' basic knowledge and skills and to keep abreast of the progress of modern science and technology, and of the considerable development of mathematics teaching, stress was laid on the learning of basic mathematical concepts.

In order to cater for differences in abilities, aptitudes and prospects among pupils, mathematics II was divided into two subjects, mathematics IIA (general study) and mathematics IIB (advanced study). The following subjects are thus offered: mathematics I, mathematics IIA, mathematics IIB, mathematics III, applied mathematics. The number of compulsory subjects has been increased from one to two, *i.e.* mathematics I is compulsory for all pupils, while for his second compulsory subject the pupil may opt for mathematics IIA, mathematics IIB or applied mathematics. Mathematics III is provided for those pupils who have mastered mathematics IIB.

The number of credits allotted to each subject is as follows:

After the revision		Before the revision	
Mathematics I	5	Mathematics I	6 or 9
Mathematics IIA	4	Mathematics II	3
Mathematics IIB	5	Mathematics III	3 or 5
Mathematics III	5	Applied mathematics	3 or 5
Applied mathematics	6		

Syllabuses were modernized by the inclusion of the theory of sets, vectors, normal distribution, etc.; many upper secondary school pupils also study infinitesimal calculus, probability and elementary statistics.

Syllabus for mathematics I: fundamentals of algebra and geometry, such as algebraic expressions and their computation, equations and inequalities, functions and graphs, plane figures and expressions, solid figures, mathematics as a deductive system.

Syllabus for mathematics IIA: computation methods, probability and statistics, sequences of numbers and their limit, differentiation and their integration.

Syllabus for mathematics IIB: permutation and combination, sequences and progression, trigonometric function and vector, figures and co-ordinates, differentiation and integration.

Syllabus for mathematics III: differentiation and integration and their applications, probability and statistics, simple integration by parts, integrals of logarithmic functions, normal distribution.

Syllabus for applied mathematics: trigonometric functions, computation, figures and equations, sequence of numbers and series, differentiation, integration, probability and statistics.

III. *Anticipated revision of current secondary school mathematics syllabuses.* Further improvements are proposed in the lower and upper secondary school syllabuses. The new syllabuses will be published in 1969 and 1970 respectively and will come into force in the 1972-1973 school year.

In June 1968 the basic principles for the revision of the lower secondary school mathematics syllabus were laid down. The aims of the revision are to modernize mathematics teaching and to improve syllabus content by introducing new concepts such as the theory of sets, probability, inequalities, etc.

In respect of the revision of upper secondary school mathematics syllabus, diversified syllabuses have to be drafted in order to cater for pupils' differing abilities and to modernize the teaching content.

Jordan. The aims of mathematics teaching mentioned in Recommendation No. 43 are known to the teachers and are also stated in detail in the School Curriculum Handbook. These aims are only partially fulfilled, however, because of the volume of the syllabus and inadequate training of the teachers.

Place given to mathematics

Mathematics is given considerable weight in the secondary school curriculum and leaving examinations.

More periods are allotted to mathematics in the science section, where pupils have the option of taking more mathematics, physics, chemistry or biology according to their interest and ability.

Mathematics with a cultural bias is given in the arts section.

Syllabuses

The mathematics syllabus has been continuously revised and developed but still retains a traditional character. A national group has been formed to improve the mathematics syllabus and teaching.

Methods

Teaching techniques prescribed in the recommendation are not fully adopted in secondary schools because of the shortage of qualified teachers, examination system and certificate requirements. A new section in the Ministry of Education is working on the improvement of testing and evaluation techniques.

Teaching materials

Teaching materials are limited and rarely used. There are no teaching materials for secondary school mathematics teaching. The textbooks do not emphasize the intrinsic unity of mathematics. It is hoped that the national group working on the improvement of mathematics teaching will also ensure the production of good textbooks and teaching aids for secondary school mathematics.

Teaching staff

Although secondary school teachers are legally required to hold a university degree and to have taken one year's teacher training, only 46% of the secondary school teachers are university graduates.

Korea (Republic of). The mathematics syllabus was completely revised in 1963 by the Ministry of Education, which took account of Recommendation No. 43.

Teaching of mathematics in middle schools

Mathematics is a compulsory subject. Its objective is to help pupils to understand basic concepts, principles and laws of mathematics through life experiences; to develop their ability to think logically and to solve problems efficiently; to enable them to judge issues independently and correctly and to examine them rationally on the basis of knowledge and skills acquired in the study of mathematics.

Revision was mainly concerned with the introduction of the theory of sets; inclusion in 7th grade mathematics of most of the geometry syllabus previously taught from the 7th to the 9th grade (projective geometry, however, remains in the 9th grade syllabus); introduction in the 8th grade of the

following concepts: inequality, simultaneous equation, elementary function, frequency distribution, mean value, similarity and congruence of triangles and other basic aspects of plane geometry; introduction in the 9th grade of perfect squares and the formula of root in the solution of quadratic equations and intuitive treatment of statistical inference.

There are six areas of study in the middle school mathematics syllabus: number system, algebraic equation, ratio and proportion, measurement, statistics, geometry.

The number of periods allotted to mathematics in the 7th, 8th and 9th grades is 3 to 4 periods per week out of a total of 30 to 33 class periods.

Teaching of mathematics in secondary schools

Secondary schools comprise four sections: humanities, natural science, vocational, fine arts.

Before the revision, secondary school mathematics was organized in three separate courses: first-year mathematics, analysis, geometry. The first was taught as a compulsory subject in the first year of secondary school and the other two were optional subjects.

Secondary school mathematics has been reorganized into three courses: general mathematics, mathematics I and mathematics II. General mathematics is compulsory for all first-year pupils, mathematics I is compulsory for pupils in the humanities, vocational and fine arts sections and mathematics II for pupils in the natural science section. Pupils in the vocational section are required to follow for certain branches, supplementary mathematics courses in addition to mathematics I.

The objective of the general mathematics course is to help pupils to acquire the fundamentals of mathematical thinking by an understanding of the basic concepts and rules of mathematics which at the same time facilitate the study of other disciplines or of advanced mathematics. The syllabus covers the following subjects: number system and mathematical statements, approximate value, functions and graphs, equation and inequality, equation of curve, plane figures.

Mathematics I should help pupils to acquire higher mathematical abilities by further developing the concepts and skills studied in general mathematics. The syllabus covers the following subjects: logarithmic calculations, number series and progression, probability and statistics, infinitesimal and integral calculus, solid geometry.

Mathematics II should help pupils in the natural science section to acquire advanced mathematical abilities by further developing the concepts and skills of general mathematics and should provide them with the foundation for work in science and technology. The syllabus covers the following subjects: equation and inequality, exponential function and logarithms, trigonometrical function and vector, number series and progression, probability and statistics, co-ordinate geometry, infinitesimal and integral calculus.

Secondary schools have adopted a credit system under which 8 credits in general mathematics are required for all sections, 12 credits in mathematics I for the fine arts, humanities and vocational sections and 26 credits in mathematics II for the natural science section.

Teaching methods

There are some differences in teaching methods among schools and teachers, but the fundamental direction is to guide the pupils to identify the problems and to find solutions inductively and then to prove them logically with deductive methods.

Teaching materials

In general, reference books, textbooks, models and other visual aids are used extensively.

Teaching staff

Only those who have specialized in mathematics or mathematics education in colleges and universities and have obtained the teaching certificate delivered by the Ministry of Education are authorized to teach in secondary schools.

Further training programmes for mathematics teachers include seminars, vacation courses, workshops and lectures. The Korean Society for the Study of Mathematics Education issues publications, but there are no periodicals.

Kuwait. Teachers are developing their methods and approaches to mathematics teaching in order to achieve a better understanding of basic ideas, arouse pupils' interest in the subject and enable them to adopt a mathematical attitude in the solution of practical problems. The new approaches aim at providing insights into mathematical principles and at bringing the pupil to appreciate, observe and analyze, awakening in him an interest in scientific discovery and research. The teaching of solid geometry in the 3rd and 4th secondary school years (scientific section) incites the pupil to make solid models for each theory and exercise and thus develops his spirit of observation and his imagination. This also serves as a preparation for the study of descriptive geometry at university level.

Emphasis is laid on the teaching of current mathematical subjects such as equations, functions, statistical and geometrical graphs, in view of their importance for the study of economic and social problems.

Teachers relate not only the teaching of mathematics to that of other exact sciences but also the different branches of mathematics among themselves. The advantage of this method is seen in applied mathematics which covers all branches of the subject: geometry, arithmetic, algebra and differentiation. It shows the major role which mathematics holds in the scientific and industrial concepts of modern life.

The timetable for the scientific section devotes eight periods per week in the 3rd and 4th-year classes to the teaching of mathematics. In the 3rd year, the syllabus includes algebra, analytical geometry, statistics, plane and solid geometry, trigonometry and mechanics; in the 4th year, more advanced algebra, analytical geometry, differentiation, integration, solid geometry and trigonometry with the solution of oblique triangles and physics.

Mathematics is taught in the 3rd year of the literary section. It is applied primarily to subjects of a cultural nature, such as investment, statistics and astronomy. The Ministry is contemplating the introduction of a special course in the 3rd and 4th years of the literary section. The pass mark for mathematics in this section is 30% of the maximum.

Mathematics is considered as a fundamental discipline from the beginning of the primary stage. The pupil is not promoted from one grade to another if he fails in mathematics.

Mathematics textbooks take account of the most recent developments in this subject, analytical geometry, differentiation and integration, statistics and applied mathematics being taught in conformity with the Unesco project for the improvement of mathematics teaching. The teaching of vectors and applied mathematics is provided in secondary schools.

The textbooks in current use are adapted to each age group and meet the pupils' needs. It is proposed to establish special schools with higher standards for gifted pupils, one for girls and the other for boys. These two schools are expected to open within the next two years.

Directives concerning teaching methods are given as suggestions; each teacher is free to make use of his own experience and to choose his mode of teaching. New teachers receive precise instructions, the principal aim of the method being to raise the educational standard.

A special effort is made to direct pupils towards mathematics, particularly in the first two years of secondary schooling. This effort is aimed at increasing the number of pupils in the scientific section, which starts in the 3rd secondary school year and offers the opportunity to specialize in the study of mathematics.

The most common errors made by pupils are studied thoroughly and are dealt with separately according to their nature. Teachers help the pupils to find their errors and to correct them by themselves; some of the errors give rise to a general discussion which leads to the right answers.

Teachers encourage the pupils to find individual expressions, to compare them with those of their classmates and to select those which appear to be the best. This aims at improving the method by the choice of more accurate expressions. They also encourage pupils to find different solutions to the same question.

Mathematics, at the secondary and intermediate stages, is taught as a complete unit. School textbooks are written in such a way as to show that all branches of mathematics are connected, and that the latter are related to the other physical sciences.

A special department of the Ministry of Education attends to the local production and the importation of audio-visual aids. There is no doubt that these aids help pupils to understand the abstract meanings of mathematical terms more readily.

The most qualified and able teachers are selected to teach in the first stages in order to arouse the pupils' interest in the subject from the very beginning and to improve the performance of weak pupils.

Highly qualified teachers may be divided into two groups: those who teach mathematics and education and those who teach mathematics only. Both groups are continually directed and supervised by specialists (inspectors) in science and education. This is necessary in view of the lack of practical experience in the first group and the lack of practical experience and pedagogical knowledge in the second group.

The Ministry attracts a sufficient number of candidates to the teaching profession by offering a good monthly allowance when they enrol in teacher training schools.

Laos. The secondary school mathematics syllabus was revised two years ago in accordance with Recommendation No. 43.

Lebanon. The committees entrusted with the preparation of new syllabuses have given particular attention to scientific subjects. Although these syllabuses aim on the whole at providing a sound humanist culture based on the training of the mind and the development of a critical judgment, the exact sciences and mathematics play an essential part. As regards mathematics, the content has been reorganized and better adjusted to the various stages of the development of the child's mentality. At secondary level, a part of descriptive geometry and solid geometry with no relation to university studies has been dropped. Conversely, other aspects have been developed or added, such as analytical geometry, analysis and modern algebra.

Liberia. Mathematics has always formed an important part of the curriculum in Liberian schools at both the primary and secondary levels. Up to 1962, the traditional textbooks bought from American book publishers served as guides for all schools.

In 1962, Liberia was invited by Educational Services Inc. to participate in the Entebbe modern mathematics workshops with a view to improving instruction in mathematics in African schools. Subsequently, experimental classes in modern mathematics were begun in 3 of the 9 counties. Over the past six years, as teachers were introduced to the new methods and materials were developed, classes in modern mathematics have been expanded. At present, in some schools the programme has ceased to be experimental and is a part of the regular curriculum; in other schools the experiment is being continued.

In accordance with modern trends, mathematics is required throughout the primary school and in the junior and senior stages of secondary school. Those pupils who pursue studies leading to college entrance follow courses in advanced mathematics, while the others may choose vocational or other courses.

The general aim of mathematics instruction is to impart notions of both a cultural and a utilitarian interest. For this reason, adaptation of materials produced at the Entebbe workshops is more effective than textbooks written for European countries. At each level, the instructional materials should be related directly to the pupil's age and intellectual capacity.

The syllabus is constantly under review and committees include teachers at the three levels of education—primary, secondary and higher—as well as experts in the Ministry of Education.

The syllabus is so conceived as to allow teachers freedom to extend its scope by the addition of optional sections. A plan is distributed to teachers in primary and secondary schools, accompanied by charts, tables and guides which set forth in detail suggested activities and resource materials.

Although many teachers still use the theoretical methods prescribed in traditional textbooks, some are fully aware of the need to teach pupils that mathematical theories have their origin in the real world. Liberian teachers have far to go in improving methods of teaching mathematics and in placing greater emphasis on concrete experiences before proceeding to the abstract. It is hoped that by introducing a practical approach to mathematics teaching at the primary level teachers will be able to help pupils to discover basic mathematical principles and ideas which will be further developed in secondary school and at the university.

Due to a lack of funds, it has not been possible for the Government to provide secondary schools with adequate instructional materials in mathematics; textbooks have therefore been the main basis and source of instruction.

Realizing the importance of the teacher in mathematics instruction, the Department of Education, with assistance from the Educational Development Centre (EDC), has conducted special courses in mathematics during the annual vacation period. Furthermore, particular attention is given to the training of mathematics teachers. The shortage of Liberian teachers in this field has been partly relieved by the employment of foreign teachers to serve until Liberians can fill these posts. Scholarships are granted to students who go abroad to be trained as secondary school mathematics teachers.

Luxembourg. The general aims of mathematics teaching and secondary school syllabuses are in line with the general criteria set out in Recommendation No. 43.

Since 1960, Luxembourg has been following closely the efforts made in many countries to adapt mathematics teaching to university requirements and to the technical and economic life of today. This reform of the content and methods of teaching is being carried out at all stages of secondary education; it draws heavily on foreign experiments, particularly those conducted in OECD countries.

Over the last decade the Ministry of Education has made considerable efforts to give teachers a more thorough grounding in the methods of modern mathematics. Mathematics teaching is now in the process of continuous evolution which is taking place in many foreign countries on an academic scale.

Malawi. The implementation of Recommendation No. 43 is on the following pattern, according to the order of the chapters:

Aims of mathematics teaching

Malawi endorses the aims set out in this chapter.

Place given to mathematics teaching

Mathematics is a compulsory subject for the first two years of secondary education and children are urged to continue this subject in the final two years. In the 1968 'O' level examination 68% of all candidates will sit for mathematics.

The minimum timetable allocation for mathematics throughout the school is four periods per week.

Instruction is of a cultural rather than technical nature, except in the 6th form, where applied mathematics is an additional subject.

Consideration is being given to the introduction of a commerce-biased syllabus as an option in the second half of the secondary course, preceded by two compulsory years of general study.

Methods

In Malawi schools there are four distinct types of mathematics teaching:

- (a) Approximately 5% of the schools use the methods of euclidian geometry, manipulative algebra, etc. This small minority is gradually disappearing as a result of government policy and general trends. This course has been discontinued in the first two years of the secondary school.
- (b) Approximately 85% of the schools employ methods which encourage a more practical approach, proceeding from the concrete to the abstract, producing deductive argument drawn as much from algebra as from geometry and giving preference to thought and reasoning rather than to mechanical drill and rote learning. These methods are designed to emphasize the unity of mathematics and to show the links between mathematics and everyday life.
- (c) Approximately 5% of the schools add to method (b) the methods of analytical geometry and elementary calculus for specially gifted pupils.
- (d) The remaining 5% of the schools at present employ in forms 1 and 2 the methods considered officially to be the most advanced.

These schools are taking part in the Schools Mathematics Project of East Africa. Experimentation, concrete activity, development of operations, discovery of mathematical relations, etc. characterize this approach. This is a fast growing reform and it is to be hoped that this method will supplant the others in the near future.

Teaching materials

Schools Mathematics Project textbooks are recommended for the last mentioned group of schools. Each school has a library of reference books. Supplementary material in the form of circulars and pamphlets is issued by the Government. Pupils are encouraged to construct mathematical figures on their own.

Teaching staff

Teachers are kept abreast of modern developments by in-service training courses. In 1967, 30 teachers attended a ten-day course run by two British lecturers recruited and financed by CREDO (Curriculum Renewal and Education Development Overseas).

In 1968, 55 teachers attended a similar course and further courses are planned for 1969 and 1970.

Special courses are supplemented by seminars, lectures and publications. An Association of Mathematics Teachers is being formed.

International co-operation

The Malawi Government is in close touch with other Commonwealth countries and has derived much benefit from the assistance of CREDO and the British Council.

This co-operation will be extended through the mathematics conference which is to be sponsored by the Commonwealth Secretariat in September 1968.

Malaysia. Recommendation No. 43 on the teaching of mathematics has received attention. The importance of mathematics is stressed in the curricula. There is a growing trend towards the revision of the secondary school mathematics syllabus to include such modern aspects as the theory of sets, statistics, etc. It is hoped that this revision will extend into primary education on the one hand and into higher education on the other.

Malta. The various articles of Recommendation No. 43 have been put into effect as follows:

Aims of mathematics teaching

1 to 4. The teaching of mathematics is compulsory in the primary schools as well as throughout secondary schools of all types: grammar, secondary, technical and vocational. Special stress is laid on mathematics and science in technical and vocational education but the same aims of mathematics teaching also apply to arts students. The Conference on the Teaching of Mathematics in Secondary Schools, held in 1967, confirms the points made in the recommendation.

Place given to mathematics

5 to 9. A pass in arithmetic has for many years been a requirement for admission to the secondary school. Apart from English, mathematics is allotted the highest number of periods per week in all secondary school timetables (usually five or six 45-minute periods per week). In the science stream of the 6th form there are sometimes nine periods per week of pure mathematics and six to nine of applied mathematics. A pass in mathematics is required for admission to the 6th-form science stream and consequently for higher studies in the field of science and technology.

Syllabuses

10 and 11. Intensive work has been carried out in the discussion and study of mathematics syllabuses by school staffs, usually meeting with the chief inspector and heads of schools. The recent redrafting of the Oxford GCE syllabuses for 1970 has been reflected in the secondary school syllabuses in Malta. Attempts are being made to break the uniformity of one mathematics syllabus for all. Teachers are exploring the feasibility of schemes of work for pupils' different abilities and needs. There is still room for further progress in this direction.

Methods

16 to 23. Generally speaking, totally new and revolutionary ideas are being introduced in the teaching of mathematics. The prime aim is to lead the pupil towards the formation of mathematical concepts on his own initiative and through the method of personal discovery and to apply the relevant concept to any situation involving a mathematical calculation. The method based on the learning of theorems by heart or the working out of a set exercise "to get the answer" is dying out, although there are still some teachers who seem to prefer the old techniques.

The 1967 Conference focused attention on the new trends and offered practical suggestions in this connexion. It also stressed the necessity of adjusting the syllabus more closely to the pupil's needs and future activities. A standing committee on the teaching of mathematics in schools completed its work on a new syllabus for infant classes in 1968 and is now dealing with the primary school syllabus, after which it will go on to the secondary school syllabus. The aim is to achieve a continuous process of mathematics teaching based on the new approach. In the lower secondary classes in particular, practical and experimental work is emphasized on a basis of individual effort by the pupils with guidance from the teacher. Theoretical work is naturally retained and is carried out in the light of the ideas stated above.

24 and 25. The GCE 'O' level examination regulations for 1970 prescribe the "all in one" mathematics syllabus, and the secondary school syllabuses have been geared to that end. (In the case of secondary technical schools for boys this scheme has been in operation for about 12 years.) Following the suggestions put forward by the 1967 Conference, efforts are being made to bring out the historical aspect of mathematics development in correlation with other subjects and with life. Much remains to be done in this connexion, however, including a study of the results of experimentation and research which need to be conducted in the schools themselves.

Teaching materials

26 and 27. Teachers are given every encouragement to construct teaching tools and material and some financial assistance is also given for this purpose. Financial resources are still not sufficient, however, for the purchase of all the necessary materials.

Teaching staff

28 to 30. The problem of the shortage of qualified teachers of mathematics and science and also of teachers of technical subjects affects Malta just as it does other member countries of the Council of Europe and of the Commonwealth. The Government is doing its best to provide more university scholarships for 6th-form pupils intending to take up teaching and for serving teachers wishing to obtain higher qualifications in mathematics and science. The Commonwealth also grants scholarships. Refresher courses are held locally.

31 to 35. Plans are in hand to provide teacher training for secondary school teachers, which will of course include mathematics. It is hoped that the plans will be put into effect in the near future.

Graduates teaching in secondary schools receive special allowances for a good degree and are placed on a higher salary scale than non-graduates. Four new posts of inspectors of secondary schools have been created, one of which is for mathematics and science.

International collaboration

36. It is desirable that direct access should be given to efficient and proficient teachers of mathematics to teach in other countries, where the supply warrants such schemes. Salary differences, terms of employment (e.g. service counted for superannuation) and living conditions raise problems which have yet to be solved, however. Malta has experimented with recruitment of teaching staff from the United Kingdom and also from the graduate voluntary service overseas. Results have been satisfactory.

Mexico. Following the reform of secondary school curricula and syllabuses carried out in 1960, the Ministry of Education put Recommendation No. 43 into effect, adapting it to the three classes of secondary education.

General aims of mathematics teaching in secondary schools

These aims are similar to those formulated in the recommendation.

Syllabuses

Following the reform begun in 1960, the teaching of mathematics in three-class secondary schools is distributed as follows: four periods per week in the first two classes and three periods in the third class.

The syllabuses cover, in the 1st class, arithmetic and elementary algebra and geometry; in the 2nd class, algebra and the introduction to descriptive geometry; in the 3rd class, algebra, descriptive geometry and elementary trigonometry.

These syllabuses are experimental in character, subject to continual review in the light of scientific and technical progress. They were last reviewed in 1968. The purpose of this review was to emphasize fundamental aspects of mathematical structure. The respective syllabuses are arranged in subject units covering the following points: general aims, specific aims of the unit, basic themes and their respective activities, relationships with other subjects on the curriculum, teaching materials, teaching periods for each unit, teaching guidelines and bibliography for pupil and teacher.

Methods

By means of meetings, centres for pedagogical co-operation, pamphlets and bulletins, the Ministry of Education facilitates the dissemination among mathematics teachers of the active methods considered the most appropriate for the teaching-learning process.

These methods are designed to encourage the pupil's individual experiments in contact with reality and to maintain the necessary cohesion. Teacher, pupil, subject and environment should form a whole.

The most appropriate method of teaching mathematics is the heuristic method whereby questions are put in such a way that the pupil acquires a mental attitude which compels him to think, associate transfer and put into practice.

Teaching materials

Through the general directorates concerned, the Ministry of Education recommends the acquisition and use of the most appropriate teaching materials such as filmstrips and films (produced by the Latin-American Institute of Educational Films and by commercial firms) in addition to the common materials produced by the pupils under the guidance of their teachers.

As regards textbooks and workbooks, it is the Ministry of Education, working through the Advisory Committee on Textbook Revision, which lays down the requirements which these books must meet in order to be accepted as official mathematics textbooks in the secondary schools.

Teaching staff

Secondary school mathematics teachers are drawn from the teacher training colleges and from faculties and schools of mathematics.

Teachers' in-service training is a subject of constant concern to the Ministry of Education and is carried out by means of continuing seminars, academy meetings, centres for pedagogical co-operation, congresses, round tables, scholarships for study abroad, publications and exhibitions.

Modern mathematics teaching experiment

In 1965 the Academy of Scientific Research sponsored a round table in Mexico on "the problems of mathematics teaching in our country". The conclusions of this round table brought out the urgent need for experiments at the various levels of the educational system, with syllabuses drawn up according to new centres of interest of mathematics and education.

For this purpose, the General Directorate of Secondary Education established in 1967 a plan to experiment, first in pilot groups, and from 1967-1968 onwards in pilot schools, with mathematics courses based on syllabuses geared to the modern structures of mathematics and the corresponding teaching approach: elementary concepts of sets, relationships, function, elementary number structures, concept of change and constants.

The scheme of work for the experiment consists of the following phases:

- (a) All the teachers conduct a pilot test to find out the pupils' errors and the differences existing between them, which gives them a real basis on which to work.
- (b) Teachers conducting experiments meet twice monthly for an exchange of views on the progress of the work, on the teaching recommendations needed for each chapter of the syllabuses, and on the type of exercises and problems given to pupils.
- (c) Towards the end of the second semester of each year, pupils in experimental groups are given a standard test to see if they really obtain better results.

From this experiment it was clear that pupils in experimental groups were able to solve mechanical problems even though this aspect of the work was not stressed in the teaching. The pupils' continuous practice in reasoning enabled 90% of the reactives of the conceptual type to be solved. The rate

of learning in the second semester of the first year increases in relation to the first, as a result of the teaching method used. For the first time in the history of mathematics teaching in Mexico, pupils in the second class are able to understand "what elementary algebra is", sets of numbers, their calculations and respective properties; they begin the study of the concept of function and apply the laws and properties to geometrical problems of general interest and to other subjects on the curriculum.

Monaco. Recommendation No. 43 on the teaching of mathematics in secondary schools led the government authorities to organize a series of lectures on education for the retraining of competent teachers in order to introduce modern mathematics into the official curricula in the near or more distant future.

New Zealand. The number of schools in the pilot scheme in modern mathematics showed further increase in 1967. A systematic programme of in-service training courses under the direction of regional inspectorates is in operation to prepare the way for the eventual adoption of modern mathematics in all schools.

Norway. The mathematics syllabus for the new nine-year comprehensive school represents an attempt to set forth in concrete programmes the ideas expressed in Recommendation No. 43.

This syllabus has been tried out as an experiment over a period of eight years. At present it is under revision in the light of experience gained, and with a view to adapting it to the latest progress in the field of mathematics teaching.

Pakistan. Following the International Conference on Public Education in 1956, the education system was reviewed and a report of the Commission on National Education was published in 1959. The syllabuses for all subjects were reoriented and modified by the Curriculum Committee set up on the recommendation of the commission and since then the modified syllabuses have been introduced from primary level to the higher stages. In drawing up the new syllabuses, due consideration was given to Recommendation No. 43 on the teaching of mathematics in secondary schools.

Aims of mathematics teaching

Mathematics syllabuses of general and vocational secondary schools have been reoriented in the light of the aims advocated in the recommendation.

Syllabuses

Mathematics is a compulsory subject in all classes of the primary and middle school (first eight years of schooling) and is part of the core curriculum. In view of the differences of aptitudes and interests of pupils, however, the syllabus for classes 9 and 10 has been differentiated: science pupils have to pass an examination in special mathematics, whereas arts pupils take a less advanced examination in mathematics.

Methods

Instruction is given by properly qualified teachers who have specialized in the teaching of mathematics. Modern methods of teaching are employed to arouse and sustain pupils' interest. All teaching is related to real life situations. Individual differences and mental growth are kept in view. The pupils are led from the concrete to the abstract, the teacher proceeds from the easy to the difficult, from the particular to the general, in order to minimize abstraction. The pupils are also led to arrive at results and formulae on their own, and they actively participate in the lesson. They are helped to work out rules through the discovery method and they learn how to approximate where exact results cannot be found. Cramming is discouraged and geometry is taught mainly by the analytical method, pupils arriving at results on the bases of certain hypotheses. After this they are helped to organize the matter in a logical order. Talented pupils are encouraged to read relevant books, most of which are available in the school libraries.

Teaching materials

A new set of books for various classes has been prepared by the Textbook Board on the basis of the new syllabuses. Particular attention is given to selecting authors, reviewers and editors for preparing such books. These books are of better quality and cheaper than those used in the past. Reference books, supplementary materials and popular handbooks are available to school libraries. In addition, audio-visual education centres produce mathematical models, charts and graphs. Teachers and pupils take part in the preparation of this material.

Teaching staff

In mathematics the role of the teacher is of prime importance. In order to refresh teachers' knowledge of the subject, and to acquaint them with up-to-date mathematical development in the country

and abroad, in-service training is given from time to time in the education extension centres. These courses cover not only theoretical mathematics but also applied mathematics. They also deal with the history of mathematical thought and the methodology of mathematical science. In addition, lectures, vocational courses, seminars, workshops, practical courses, etc. are arranged occasionally for teachers in service.

Philippines. The mathematics project launched in 1962 by the Bureau of Public Schools with the co-operation of the United States Peace Corps, the National Science Development Board and the University of the Philippines aims primarily at improving the teaching of mathematics in secondary schools.

The project involves raising teachers' standards of qualification on the one hand, and bringing mathematics syllabuses into line with the latest developments in this subject on the other.

In September 1962, Peace Corps volunteers with degrees in mathematics and with training in specific mathematics programmes were assigned to 11 selected pilot high schools to serve as consultants and assistants to Pilipino mathematics teachers. In the summer of 1963 the 11 Pilipino mathematics teachers and their consultants came together at the University of the Philippines to take courses on modern mathematics and to develop some teaching units for the first year of the secondary school.

During the 1963-1964 school year new materials and teaching approaches in mathematics were tried out. Furthermore, some Pilipino teachers were formally prepared in the newer mathematics programmes and in the task of developing a secondary mathematics curriculum by attending a course at the University of the Philippines during the second semester. At the close of the training period they produced a suggested outline for a high school first year mathematics course.

During the summer of 1964, six of the teachers trained in the second semester of the 1963-1964 school year and six Peace Corps volunteers who had tried out the new materials and teaching approaches in the pilot high schools were called to a writing session in Baguia. Taking the above-mentioned suggested outline as a starting point, this group developed the Experimental Curriculum Guide in Mathematics I.

During the 1964-1965 school year this guide was tried out in 23 high schools throughout the country. In this trial period, notes, observations, suggestions and recommendations were made by the teachers and Peace Corps volunteers using the guide and were reported periodically to the Bureau of Public Schools which took them into consideration in the revision of the Guide.

In the summer of 1965 a curriculum workshop was conducted to revise the curriculum guide in mathematics I and to develop a curriculum guide in mathematics II. These guides were tried out in selected schools during the 1965-1966 school year and the results of this trial used in revising the guides the following summer.

A guide in mathematics III was developed in the summer of 1966.

Each school division is now making an appraisal of modern mathematics instruction at secondary level. Their findings will be taken as a basis for a five-year plan for introducing modern mathematics in all classes. This plan will include a long-range programme covering in-service training for mathematics teachers, the issue of teachers' guides and the development of teachers' mathematics education.

Romania. Everybody is entitled to mathematical training. The schools accept the psychological principle that every boy or girl is capable of some mathematical activity. The following comments refer to the chapters of Recommendation No. 43:

Aims of mathematics teaching

Mathematics as taught in the secondary schools makes an important contribution to pupils' general training, bearing in mind modern demands and cultural progress, based on a materialist-dialectical world outlook. Pupils in the science stream also acquire some basic knowledge with a view to their subsequent specialized studies in faculties of natural science or other specialized advanced schools.

In teaching mathematics, the teachers have very important aims in view: to develop their pupils' reasoning powers, to bring them to understand the meaning of new ideas, enabling them to assimilate them correctly and practise applying them. They also seek to teach their pupils quick and rational calculation, developing space representation and care for correct reasoning.

At the same time the syllabuses contain provision for the development of qualities with which mathematics teachers are more especially concerned: order, precision, quality, concise expression, power of abstracting, development of attention, power of concentration, perseverance, etc.

Place given to mathematics

In the timetables for classes 5 to 8 of the general schools (corresponding to the lower secondary schools) four periods per week are allotted to mathematics. For classes 9 to 12 (corresponding to the upper secondary schools) twenty periods per week are allotted in the science stream and twelve in the humanities stream.

Special mathematics classes have been started for pupils showing special ability in this subject. Their syllabus includes certain additional aspects such as the fundamentals of geometry, algebraic structures, introduction to the theory of number and to mathematical logic, computers and programming.

Syllabuses

Secondary school mathematics syllabuses were drawn up after careful consultation and discussion within various committees of teachers in higher institutes and secondary schools.

Many articles have appeared in various journals on the problems of modernizing mathematics teaching, both as regards the modern approach to various classical chapters and as regards the necessity for introducing new themes into the syllabuses.

Mathematics syllabuses and textbooks have been brought into line with the present stage of development in science and technology, bearing in mind that pupils need an initial period in which to become familiar with the whole of the knowledge from which the new ideas are developing. During this period the mental patterns corresponding to the mathematical structures must be defined so that they may be used as a broad outline for the pupils' mathematical training.

In accordance with these requirements, the secondary school mathematics syllabus covers the following themes:

- themes needed to understand the modern content of certain notions and their use in presenting the entire mathematics course, e.g. multitude, function, algebraic structure, etc.;
- themes needed for the use of algebraic apparatus, such as determinants, standards, vectors;
- themes needed for the application of mathematics to a wide variety of fields: notions of probabilities and mathematical statistics, analytical geometry, differential and integral calculus, differential equations, notions of theoretical mechanics, linear algebra.

Methods

The Institute of Education and a number of teachers have undertaken research and experiments on suitable methods of ensuring efficiency in modern mathematics teaching. Their findings have been published and have provided helpful suggestions for mathematic teachers. Pupils are encouraged to play an active part in lessons.

Their interest in mathematics is further stimulated by mathematics circles, collaboration in the "Mathematics Gazette" in which they submit solutions or propose problems, the publication of "Notes on Mathematics", etc.; in this way they start on individual research. Pupils' interest in mathematics is also sustained by the competitions in which large numbers of them take part.

Mathematics teaching proceeds from the concrete to the abstract, drawing on pupils' own experience in order to provide a clear grasp of certain notions or demonstrations. The pupils are shown that mathematical notions start from practice and have practical applications.

Whereas the emphasis in the lower classes is on the inductive method, pupils learn, as they advance in the study of mathematics, to use deductive reasoning in constructing a mathematical theory on the basis of axioms, definitions and theorems.

Pupils are urged to attach great importance to mathematical reasoning and to limit the role of memory to fundamentals, to avoid routine and mechanical learning. They are trained to achieve a concise, clear and rigorous expression of their thoughts.

In the upper secondary classes stress is laid on the unity of mathematics.

Teaching materials

Pupils are issued with free textbooks in all schools and also have at their disposal many books of problems, works on mathematics and a journal, the "Mathematics Gazette", started over seventy-five years ago. These publications are obtainable at a low price and are to be found in all school libraries.

Schools have sets of geometrical figures, models and wall charts, slides and film strips which are intuitive aids to an understanding of the abstract notions of mathematics.

Teaching staff

In view of the important role of mathematics teachers, special attention is given to their training and further training.

Mathematics teachers for secondary schools are trained in the universities. They receive their specialist training at courses given in further training institutes, through practical exercises organized by the school inspectorates and through individual study for their higher degrees.

Teachers are kept informed of the evolution of mathematical sciences and of progress in the field of teaching through many publications and specialized articles. They also receive advice from specialist inspectors. Mathematics teachers, like all other teachers, enjoy the esteem to which their scientific training and their task as educators entitles them.

International Collaboration

The Socialist Republic of Romania initiated the international mathematics olympiads. The first two were held in Romania, after which they have been held each year in various countries, the number of countries participating rising from five to thirteen.

Delegates of the Ministry of Education have visited various countries to exchange experiences regarding the teaching of mathematics.

A European colloquium on the problems of modernizing mathematics teaching in secondary schools and higher education is to be held in Bucharest under the auspices of Unesco.

Saudi Arabia. The Ministry of Education, in its efforts to review mathematics teaching methods and syllabuses has taken account of the evolution of this discipline and of Recommendation No. 43. In particular, the following steps have been taken:

Syllabuses

The primary school syllabus has been revised and is to be put into effect next year. A revision at lower secondary level is planned for the main purpose of unifying the different parts of mathematics and linking this subject closely with the other sciences. There is a similar plan for the upper secondary level, including in particular the development of the teaching of analytical geometry, the introduction of certain aspects of geometry and mechanics, the rudiments of descriptive geometry, trigonometry. Mathematics is to be introduced in the arts stream, where pupils will study algebra and geometry and also trigonometry and astronomy. Technical syllabuses have been drawn up in a similar vein for modern intermediate schools (for pupils with a technical bent).

In the science stream, mathematics and science occupy the first place in the new curriculum which came into effect this year. The weekly timetable allocation for this discipline at upper secondary level is 21 periods. Its importance is also recognized in the new examinations, in conformity with article 9 of Recommendation No. 43.

During the previous school year a transitional syllabus between the former and the new ones was used in order to find out whether pupils would be able to assimilate the new syllabus.

Teaching methods and materials

The advice given by Ministry experts to educational advisers, and the latter's recommendations to teachers during their visits and inspections correspond closely to Recommendation No. 43. Particular emphasis is laid on scientific knowledge and on means of expression conducive to educational activity. The Ministry intends to provide schools with material and instruments in order to make mathematics teaching more effective. It also intends to use television as an aid to this instruction.

Teaching staff

At upper secondary level most mathematics teachers are specialists in this subject. The others have great experience in this field.

At lower secondary level there are non-specialist teachers and this situation is to be remedied.

In primary education there are two types of teachers of mathematics: certificated teachers and those who attend courses of further training for two years. In order to meet the shortage of mathematics teachers, qualified teachers from other Arab countries are appointed under contract.

The mathematics teacher enjoys high esteem and receives a specialist allowance (article 34 of Recommendation No. 43).

Special Education

The Ministry is particularly concerned with deaf-mute and blind boys and girls. The schools for them are sufficient in number and modern in design. Mathematics is taught in them at primary and lower secondary levels, account being taken of these pupils' particular difficulties. Mathematics textbooks have been produced for the primary level of schools for the blind.

Sierra Leone. There is continuing emphasis on improving the teaching of mathematics in primary and secondary schools. A pilot experimental programme has been in operation since 1963. An increasing number of primary schools are participating in the programme and teachers attend in-service courses regularly run by mathematics specialists from the university and training colleges during the Easter and long vacations. This programme is sponsored jointly by the Education Development Center (USA) and the Ministry of Education. In addition, mathematics has been one of the subjects in regular courses run by the inspectorate.

Courses in modern mathematics are now available as an alternative to traditional mathematics in primary and secondary schools and provision has been made for alternative papers at public examinations for secondary schools.

The newly established Institute of Education is to be responsible for curriculum development as one of its functions and there are plans to continue the current emphasis on modern mathematics.

Singapore. As far as financial resources and availability of personnel permit, the ideas set out in Recommendation No. 43 have been implemented in Singapore.

Somalia. Recommendation No. 43 was adopted before Somalia was independent and as a result no particular, coherent action was taken regarding the teaching of mathematics in secondary schools.

Sudan. In order to keep mathematics syllabuses abreast of scientific progress and technical activities linked with modern life, and with a view to raising the standard of secondary school syllabuses, modern mathematics has been introduced in the curriculum of the Higher Teacher Training Institute which trains secondary school teachers.

Sweden. In the autumn of 1963 the National Board of Education began an investigation in order to compare the effects of individualized instruction in mathematics with conventional class instruction in the 7th and 8th grades of the comprehensive school. The experience gained during the first year of the investigation justified a follow-up study. The Board therefore started the Individualized Mathematics Instruction Project (IMI) in the autumn of 1964, which was conducted by the Institute of Educational Psychology of Malmö School of Education.

The aims of the project are:

- to construct and test material for self-instruction in mathematics,
- to develop suitable instructional methods to use with this material,
- to study how pupils should be grouped and teachers employed to attain the maximum effectiveness when using this material,
- to measure, with the help of the material constructed, the effects of completely individualized instruction (possibly by comparison with conventional class instruction).

The pilot study was made on a sample of 700 pupils distributed among 32 classes. Half of the pupils were given traditional class instruction (control classes), while the other half of the pupils worked independently (experimental classes) and a comparison was then made of the results obtained in the two types of class.

This pilot study, which ended in the autumn of 1965, showed that it seemed possible to give rather highly individualized instruction in mathematics without increasing the teachers' burden of work. The pupils' workload can be reduced without restricting their knowledge of mathematics in relation to traditional class instruction. Pupils' achievements seem to be at least as good when they work alone as when they work in class. The pupils appreciate being able to work on their own. The self-instruction material given to the pupils should be tested and adapted to several levels of ability.

Accounts of the pilot study are to be found in, *inter alia*:

- *Individualized mathematics instruction. Report of current research. Educational-psychological problems No. 8, December 1964, Malmö School of Education.*
- *Individualized mathematics. Kommunal Skoltidning No. 5, 1965.*
- *Experiments with individualized mathematics instruction, Educational reports, No. 9, 1965.*

The material is described in the booklet published in English under the title: *Some facts about IMU - A system of teaching mathematics in classes 7-9 developed by the Swedish Board of Education.* It includes modules designed for both general and special courses. Grades 7, 8 and 9 courses are covered by nine such modules, each of which occupies about one-third of a school year and comprises ten parts (components).

All the pupils will study the A component. On the basis of the diagnostic test and experience of a pupil's previous achievements, the teacher furnishes the pupil with the B component suited to his ability. All the B components cover about the same material. It is the form of instruction and the number of supplementary problems that vary. The same is true of the C component. The D components contain material for "special" work, *i.e.* more independent tasks. Apart from the comprehensive diagnostic tests, there are also shorter diagnostic tests, to be corrected by the pupils, included in the A-D components. The answer book contains complete solutions and comments on all the problems in the A, B and C components.

The teacher must decide fairly frequently (9 or 10 times per school year) what material is suited to his pupils' ability; it is hoped that this will give better co-ordination between the degree of difficulty of the material and the level of the pupil's ability.

Three experimental versions of the material are planned. They will be tried out on successively larger groups of pupils and the final experiment is expected to be made on 100 classes.

The material is expected to be ready for use for grade 7 in the autumn of 1969, for grade 8 in 1970 and for grade 9 in 1971. The study of effects will be finished by the summer of 1971 and the final report on the whole project will appear a year later.

The experiments were conducted with flexible grouping and teaching teams. There was no division of pupils according to the course chosen. Several classes (usually three) were combined to make

large groups. These large groups are taught by teams of two teachers and an assistant. Reports on the first year's experiments will be found in *Educational Reports*, No. 3, 1966.

Pilot study in gymnasium and continuation school

The study is concerned with 21 *gymnasium* classes and an equal number of continuation school classes. Some of these have been combined to make large groups (five large groups).

The pupils work at their own rate with the help of self-instruction material. The purpose is to ascertain whether the programme designed for the upper department of the comprehensive school can also be used in the *gymnasium* and continuation school. The intention is also to elucidate the effects of such instruction and how self-instruction material for the *gymnasium* and continuation school should be constructed.

Pilot study in the middle department

This study covers 22 classes in grade 4. The classes will be followed through grades 5 and 6. The pupils will be transferred, with the help of diagnostic tests, one at a time from class instruction to independent work. Textbooks from the Nordic Committee for the Modernization of Mathematics Teaching are used in the experimental classes and are supplemented by solutions, diagnostic tests, glossaries, etc. Material has also been constructed to train reading ability.

Collaboration among Nordic countries in the field of mathematics teaching

The Nordic Committee for the Modernization of Mathematics Teaching presented its final report in the autumn of 1967. Having regard to the most urgent requirements when it started its work in 1960, this committee devoted its main interest to classes 7 to 12, particularly to questions relating to the aims and syllabus for this subject. To some extent it dealt also with methodological questions and with the introductory teaching of mathematics in classes 1 to 6. As regards the latter classes, however, further thorough investigations are necessary. Experience of the trials that have been made shows that many new ideas can be used but that extensive field tests must be made before appropriate forms can be found for the teaching. Other countries' experience may also be drawn upon to some extent, e.g. the United States, the United Kingdom, France and Hungary, but in most countries, children start school at the age of 6 or earlier, while in the Nordic countries they start at 7.

For these reasons, among others, it is desirable that the co-operation in the field of mathematics teaching that has started among Nordic countries should continue. Through the use of their joint financial and staff resources, and by drawing on experience from projects in countries in other parts of the world, it should be possible within a comparatively short time to achieve results of great value for the introductory teaching of mathematics. The Nordic cultural commission therefore appointed in 1968 a committee to study the question of the teaching of mathematics in classes 1 to 6. The setting up of this committee is a step towards courses in mathematics common to the Nordic countries.

The Nordic Committee for the Modernization of Mathematics Teaching intends to investigate in greater detail the pre-requisite conditions and the methodological form for the introductory teaching of mathematics on the lines recommended by the committee. A point of special importance is the emphasis to be laid on psychological-pedagogical and methodological aspects. For this purpose study material for pupils and guides for teachers are to be prepared. Consideration will be given primarily to the following fields: introduction of positive integers, the position system, decimal and rational numbers, algorithms, rough calculations, measurements and units, systems of co-ordinates and statistics, geometry.

The material is to be tried out in experimental classes, special attention being paid to the use of concrete structural material. After the trials the material will be revised and retested. The project is expected to last about five years.

The following questions in particular will be studied: choice and use of concrete structural material; teaching aids suitable for individual learning; co-ordination between mathematics and other subjects; approach to logical concepts and problems; understanding the concept of sets and certain structures and use of sets, groups, relations ("arrow diagrams"); testing pupils' understanding and knowledge of mathematics.

The work is being supervised by a committee consisting of one member from each country. Experts are also being appointed to work on the production of the pupils' and teachers' material. These persons will themselves supervise and take part in the trials. In the first year the trials will be conducted in each country so as to enable the experts to participate in the lessons.

In each country the first year will be centred on one or more [of the fields to be studied. The experience gained will be communicated to the committee and to the experts from the other countries, after which the material will be revised and tested during the second year in more than one country. During the third year the work will be further expanded and the material will be published in the form of official documents. The committee will then issue a final report on its findings.

The chairman of the committee is Swedish and there is a member for each of the other Nordic countries (Denmark, Finland and Norway). A secretariat has been established at the Educational Research Centre in Stockholm.

The committee started its work in the autumn of 1968 with concentrated trials in some 40 classes in the four countries. The committee arranged for the purchase of a large supply of structural

material such as Cuisenaire rods, logical blocks, multibase arithmetic blocks, Dienes' algebra and geometry material, pegboards, etc. This material is being tried out in all four countries. Denmark is also working with vectors in classes 4 to 6 and with the use of the group concept and similar structures. Finland is experimenting with the introduction of negative numbers in class 4 and of the concepts of sets and relations. The teaching of the position system and of fractions is also being studied. Norway—apart from the use of the structural material—is experimenting with courses for pre-school teachers. Sweden is working in class 1 with a television series on mathematics, weighing and measuring and "arrow diagrams". In co-operation with the SIFON project at the Educational Research Centre trials are being made in individualization and in flexible sizes of classes and groups. In class 4 trials are being conducted with the co-ordination of mathematics and other subjects, and with the use of calculating machines.

Syrian Arab Republic. In accordance with Recommendation No. 43, new syllabuses for mathematics were issued in 1967 for all levels of education. These syllabuses have already been put into effect in the first and second years of the primary and preparatory levels and will be brought into use in the third preparatory year at the beginning of the 1968-1969 school year. Certain themes closely linked with everyday life and conducive to the development of a scientific mind have been included in the preparatory-level syllabuses, in particular the principles of triangles and their application in surveying, the principles of analytical geometry and their application in graphic charts, and the principles of solid geometry.

The following subjects have been added to the secondary-level syllabuses: principles of modern algebra, curvilinear and oscillatory movements, logarithmic and exponential functions.

Modern symbols are used in the new textbooks. It is planned to use them in the study of circumference in the third preparatory year.

The Syrian Arab Republic is participating in the pilot project for the improvement of mathematics syllabuses and teaching methods in the Arab countries organized by the Department for the Advancement of Science of Unesco.

Place given to mathematics

At the beginning of the 1966-1967 school year, one period of mathematics was introduced in the second year of the secondary arts stream.

It is proposed to introduce an additional weekly period of mathematics in the third year at preparatory level and in the first and second years of the secondary-level science stream.

Teaching staff

A course of further training for mathematics teachers is to be held during the summer of 1968 in order to keep them informed of the evolution of theoretical mathematics and of the application and progress of teaching methods in their subject.

Thailand. The teaching of mathematics in secondary schools has aims identical with those advocated in Recommendation No. 43.

Place of mathematics in the curriculum (1960)

Mathematics is taught as a compulsory subject throughout the three-year lower secondary school and the two-year upper secondary school. The timetable allocation in the lower secondary school is five periods per week (three of arithmetic and algebra and two of geometry) in the general stream and three periods per week in the vocational stream (arithmetic and algebra), out of a total weekly timetable of thirty periods. In the upper secondary school two periods per week are allocated for mathematics A and four for mathematics B, out of a total weekly timetable of 30 periods.

The upper secondary school has three streams: science, language, and general. The science stream takes both mathematics A and B. The language and general streams take only mathematics A, except for students of the language stream who choose mathematics instead of a second foreign language, in which case they take both mathematics A and B.

Syllabuses

The lower secondary syllabus covers the following subjects:

Arithmetic and algebra: fractions, decimals, percent, ratio, proportion, symbols and substitution, signed numbers, variables and constants, simple equations, profit and loss, simple and compound interest, graph of statistics and linear graphs, slope, factorization, simultaneous linear equations, problems on loans, income taxes, commission and insurance, square roots and cube roots, approximate calculations, lowest common multiple and highest common factor in problems of distance, time and labour, algebraic expressions, quadratic equations, parabola, numerical trigonometry, surface area and volume of geometrical figures, congruent and similar figures.

Geometry: axioms, definitions, theorems and constructions of straight lines, angles, triangles, parallel lines, polygons, circles, areas of rectangles, triangles and polygons.

The upper secondary syllabus includes, according to the streams, mathematics A or B.

Mathematics A covers the following subjects:

Arithmetic and algebra: equations with one, two or three unknowns, the theory of indices, surds, logarithms, variation.

Trigonometry: circular functions, easy identities, use of trigonometric tables, graphs of trigonometric functions, problems on heights and distances.

Statistics: frequency distribution, graphical presentation of frequency distribution, percentiles, elementary measures of central tendency and measures of dispersion.

Mathematics B covers the following subjects:

Algebra: theory of quadratic equations and functions, solution by factorization, by discriminant, and by graphical method, circles with centres at the origin, principle of undetermined coefficients, the remainder theorem, the progressions and some allied series.

Trigonometry: measurement of angles in various systems, proofs and applications of trigonometric formulae, trigonometric equations, inverse functions, solution of triangles, compound angles, logarithms of trigonometric functions, problems on heights and distances in one and more than one plane.

Geometry: theorems on the orthocentre of a triangle, theorems involving the squares on the sides of a triangle, proportions, theorems on similar triangle, theorems on rectangles associated with circles.

Construction problems: division of a line-segment, similar figures, circles passing through some given points and touching some given straight lines.

In 1967 twenty secondary schools were selected for conversion to comprehensive schools and nine of them have already started the programme.

Students entering such schools have had seven years of compulsory mathematics. In their first year in the comprehensive schools they have six compulsory 50-minute periods per week of mathematics and in the second year three. Elective mathematics courses are available in the second and third years.

Major changes in the mathematics syllabus include modernization of syllabus content and improvements in the teaching approach, more emphasis being given to mathematical reasoning and structure. Some new topics have been added and less important ones omitted.

It is hoped that the new syllabuses in mathematics will be used in secondary schools throughout the country if the experiment in the comprehensive schools proves successful.

Students showing particular ability in mathematics will have the opportunity of taking analytical geometry and elementary calculus before they leave the secondary school.

Methods

Suggestions have been officially issued concerning the methods to be used in teaching mathematics in secondary schools during the in-service training programmes for teachers.

Students' active participation in the development of mathematical concepts is encouraged. They are led to formulate ideas and discover mathematical relations and properties for themselves.

Few materials or aids are available for mathematics teaching in the lower secondary school.

School textbooks are prescribed by the central education authorities.

Teaching staff

The minimum qualification required of secondary teachers of mathematics is a higher certificate in education (major in mathematics) which requires two years' training after completion of the upper secondary school. Preference is given, however, to university graduates for teaching mathematics in secondary schools.

Tunisia. With the modest means at its disposal, Tunisia has not hesitated to make mathematics teaching one of its main educational concerns. At primary level, educationists have been experimenting since 1952 with new methods such as Dienes' logical and multibase blocks and especially the Cuisenaire rods. The teachers entrusted with these experiments attended seminars in Tunisia and abroad.

At secondary level—apart from the annual revision, correction and adjustment of mathematics syllabuses to the demands of the evolution of this subject—elements of modern mathematics have been introduced in the first year under the reform of secondary education started in October 1967, in order to familiarize pupils with such notions as sets, inclusion, graphs, bijection, etc.

Place given to mathematics

The timetable allocation for mathematics, which was already large, was increased with effect from October 1967. Mathematics is taught in all streams, including the arts streams. It may also be noted that there is a pure mathematics stream at secondary level. The timetable allocation is eleven periods per week in the sixth year. The science stream, which is experimental in character, also gives an important place to mathematics in view of the interdependence of this subject and all scientific and technical subjects.

Syllabuses, methods and textbooks

Specialist committees have the task of preparing textbooks in the light of the general evolution of mathematics and of specifically Tunisian syllabuses. The audio-visual aids used enable the pupils to grasp mathematical abstractions.

The syllabuses are kept constantly up to date, revised and adjusted to scientific and technical progress. The theory of sets, analytical geometry, infinitesimal calculus, statistics and probability, the study of functions and vectors are increasingly superseding obsolete questions.

Teaching methods are continually advancing. The pupil is constantly called upon to use his inventiveness and powers of reasoning, and applications of mathematics are introduced which open the way to abstraction. Having acquired the basic principles of mathematics, the pupil is gradually introduced to deductive reasoning and investigation.

Teaching staff

Tunisia is also concerned to train teachers whose methods draw on the most recent principles and knowledge. For this purpose teachers are continually receiving further training so that their knowledge does not lag behind the evolution of their subject.

Periodical meetings are organized by regions, for purposes both of retraining and of information. Through their advice and suggestions, inspectors and educational advisers make an effective contribution to teachers' further training and to the development of mathematics.

International collaboration

Contact is maintained with foreign countries so that the exchange of ideas and work, research and results may continue and benefit be derived from the experience and progress of teachers in all the countries. This is the spirit in which the seminars are organized for Tunisian and foreign teachers, and in which Tunisian secondary school inspectors take part in international colloquiums and meetings of teachers from all countries.

Turkey. In 1963 a science teaching development project was developed with the financial help of the Ford Foundation. The main aim of this project was to set up a scientific secondary school for children showing special talent in this field and so increase the number of scientists. The syllabus and staff of the scientific secondary school were also to contribute to the renewal of textbooks, laboratory guides and teaching material for secondary education. Publications were to be prepared and courses organized to give teachers the training necessary to enable them to apply the new syllabus and teaching methods.

In the spring of 1963, nine teachers of mathematics, seven of biology, seven of chemistry and seven of physics were selected following a competition which was open to all science teachers in the country. They were to study from eight to ten hours per week in Ankara schools and also followed a special programme under the guidance of eight university professors.

In the summer of 1964 these 30 science teachers and eight university professors prepared the textbooks which were to be used in the 1st grade of the scientific secondary school when it opened in September 1964. Studies were carried out in Florida State University in the United States with the participation of American experts.

Geometry textbooks were prepared by adapting those of the School Mathematics Study Group (SMSG) which were revised following trials with a large number of pupils. For basic mathematics American and European textbooks were used as sources in preparing the textbook for the 1st grade of the scientific secondary school although the greater part of this textbook may be considered as the work of Turkish professors and teachers. It begins by giving the pupil a logical understanding of the matter through notions and concepts easily within his grasp and range of interest. Next comes the theory of sets, followed by the concepts of relation and function, the group system, etc. All these ideas are given in broad outline only. Examples are given from modular arithmetic. The number system is given in an axiomatic way, and is followed by polynomials, rational algebraic functions, analytical planes, linear equations and inequalities.

The textbooks prepared in the 1964-1965 school year were used in the 1st grade of the scientific secondary school with 100 children of high intelligence. The results were very satisfactory.

In the summer of 1965, the 1st-grade textbooks were revised in the light of this experience. The 2nd-grade textbooks for the scientific secondary school were written by the same commission but with the participation of some professors from Turkish and American universities. The geometry textbook for the 2nd grade was, again, an adaptation of the textbook prepared by the SMSG for the same level.

The basic mathematics textbook for the 2nd grade was written the same year by a group of professors and teachers but was not a translation or adaptation. It covers the following subjects: mathematical induction, combinatory analysis, probability, polynomial equations and inequalities, various vectors, trigonometry, analytical geometry, logarithms, sequences and series.

Courses were organized the same summer for science teachers from various secondary schools in order to acquaint them with the characteristics of the new syllabus.

A conference on mathematics was held in Ankara from 13 to 17 June 1968 with the participation of mathematics professors from the United States, Belgium and Switzerland as well as of 24 teachers from various secondary and teacher training schools, 18 officials from the Ministry and 43 professors and instructors. The delegates reaffirmed that a revision and an improvement in the teaching of mathematics in secondary schools were a necessity. In the summer of 1966 the 2nd-grade textbooks were revised and 3rd-grade textbooks prepared, together with three guides for the use of the more talented pupils.

The programme was tried out in some of the first grades of the Bahçelievler experimental secondary school by teachers participating in the intensive training courses. In the light of experience, the programme was revised in 1967 by the teachers of the scientific secondary school and the university professors concerned. It was planned that the programme should be applied in eight secondary schools and some teacher training institutes in various parts of the country. An intensive five-week training course was organized for the science and mathematics teachers of the schools concerned.

Finally, the Science Teaching Project was superseded by the more comprehensive Scientific Commission for the Development of Science Teaching in Turkey, headed by the President of the Board of Education and consisting of three science professors. Sub-commissions were appointed to carry out research. A centre for research, guidance and publications attached to the commission was established at the scientific secondary school. Teachers in secondary schools and teacher training institutes applying the programme were given as much help as possible by this centre during the 1967-1968 school year.

A symposium was held in February 1968 on science teaching in secondary education, by the Scientific and Technical Research Council of Turkey. Professors from abroad were also invited. The old and new syllabuses were reviewed. A majority decision was taken that the syllabuses should be urgently revised in order to meet the present-day needs of science. Science teachers in secondary schools and teacher training institutes using the new syllabuses will meet at the scientific secondary school this summer to assess results and make recommendations. Meanwhile, a further group of secondary school teachers will take a course of training and in this way the new syllabuses will gradually be introduced in secondary schools throughout the country over the next few years; studies are also being conducted with a view to introducing the syllabuses in the lower classes.

It is clear from the foregoing notes that Recommendation No. 43 has really been put into effect. The Ministry of Education will soon achieve its aim of introducing the syllabus at all levels of secondary education.

USSR. One of the first places on the curriculum is occupied by mathematics and related subjects which exercise a strong educational and formative influence on pupils. The scientific level of these disciplines has now been considerably raised as a result of changes in their content. The new syllabus for mathematics in classes IV and V includes arithmetic as well as the rudiments of algebra and geometry in preparation for the systematic courses which start in class VI. The teaching of arithmetic rests on the theory of sets. The introduction to algebra and geometry and the linking of the elements of these subjects with arithmetic give the pupils' knowledge a much more scientific character. In classes IX and X the characteristic limit processes for higher mathematics are studied. The algebra and elementary analysis course includes differential coefficients, the integral and the bases of the theory of probability. In the upper classes, pupils are given an idea of the axiomatic method in geometry by means of a broad application of co-ordinates and space vectors, including the scalar product of vectors.

Venezuela. During the year 1960-1961, an evaluation of the teaching of mathematics in official secondary schools was undertaken. This study gave rise to the following short-term and long-term proposals:

- Mathematics syllabuses of the department of mathematics and physics of the Institute of Education should be brought up to date so that specialist teachers of this subject may be prepared to adopt, assimilate and carry out the reforms needed in the teaching of mathematics.
- New trends in mathematics teaching should be disseminated by means of lectures, talks, round tables, television broadcasts, etc.
- Publications for mathematics teachers attending courses of further training: algebra, analysis, geometry, logic.
- Courses of further training for mathematics teachers in service, designed to acquaint them with the latest developments in this field, from the point of view both of content and of method. (Seven such courses were organized with 250 participants, 150 of whom obtained their diploma between 1962 and 1967.)
- Seminar to inform professors of the Institute of Education of the most recent knowledge in this field.
- Advice to EDUPLAN (1966-1967) in preparing mathematics syllabuses.
- Advice to secondary education on bringing mathematics syllabuses up to date.

Vietnam. Since 1956 the authorities concerned have taken a number of steps to improve the quality of mathematics teaching in secondary schools.

Syllabuses

A syllabus reform carried out in 1958 prescribed an introduction to mathematics in the first year of lower secondary education (11 to 14 year age group). The syllabus is the same for all pupils. There are 3 periods per week of mathematics in classes 6 and 5 and $3\frac{1}{2}$ in classes 4 and 3.

At upper secondary level (15 to 17 year age group), the mathematics timetable is as follows: arts streams (classical and modern), one period per week in each class (2, 1 and final); experimental science stream, four periods per week in each class; mathematics-science stream, six periods per week in classes 2 and 1, eight in the final class.

A new syllabus for mathematics is at present being tried out in Thu Duc pilot secondary school under the guidance of professors of Saigon Faculty of Education. It is hoped that this experiment will be completed within the next two years, so that teaching at secondary level may be based on modern mathematics.

Teaching staff

Important changes have been made in the training of secondary school mathematics teachers since the College of Education became the Faculty of Education of Saigon.

The mathematics syllabus taught at the Faculty is based on that of Düsseldorf, first level for training teachers for lower secondary education, first and second levels for training teachers for the upper level. The standard of knowledge is thus considerably higher than under the previous syllabus.

Practical and theoretical teacher training has been made more intensive and now occupies about a third of the syllabus.

Courses of further training and seminars for secondary school teachers are held every summer. Teachers are thus kept informed of recent progress in mathematical thought and teaching.

**Educational Developments
in 96 Countries**

National Reports

Malta

The Maltese Islands, known as Malta, form a unified constitutional monarchy within the British Commonwealth of Nations. Malta became a sovereign and independent state on 21 September 1964. The Maltese Islands have a total area of 122 square miles and a population of 319,000 inhabitants, i.e. a population density of approximately 2,700 per square mile.

The Department of Education, within the Ministry of Education, Culture and Tourism, is the state authority responsible for all types of education, excluding nursery and University. The latter institution is autonomous, but maintains the closest possible collaboration with the Department of Education, especially in the case of the Junior College, which is a sixth-form course of two years preparatory to matriculation.

Education is compulsory for all children between the ages of 6 and 14 years, but where school accommodation is available (which is the case in most towns and villages) younger children are accepted for admission, and older children are allowed to continue their schooling, in primary schools, beyond the age of 14. The normal duration of primary education is eight years and that of secondary education five years, after which students may continue their studies in the two-year sixth-form course. The duration of vocational and technical education depends on the subject. The teacher training course is still one of two years' duration.

The school year begins on 15 September for primary schools and ends on 15 July; for the secondary schools and higher institution it begins on 1 October and ends between 1 and 15 July.

EDUCATIONAL DEVELOPMENTS IN 1967-1968 ¹

ADMINISTRATION

Planning

The Government and the education authorities are studying the report of an expert sent by Unesco in 1967 to study the educational structure and to make recommendations for the necessary changes in the field of educational planning, especially for the introduction of secondary education for all.

Inspection

Four new posts for specialist inspectors have been created this year. Their main field of work will be in the secondary schools.

Budget

The total education budget for the financial year 1967-1968 was £3,226,000 (composed of £2,786,000 for recurrent expenditure and £440,000 for capital expenditure), showing an increase of £175,002 over the previous year's budget (+5.73%). Educational expenditure represented 12.65% of the total state expenditure, 1.8% less than in the previous year.

Expenditure on education represents 18% of the total national revenue.

School Building

There is no shortage of primary school accommodation. Three new schools built recently were constructed to provide more suitable accommodation rather than to overcome any

¹ From the report presented at the XXXIst session of the International Conference on Public Education by Mr. Saviour J. GATT, Delegate of the Government of Malta.

shortage; they were built under the second five-year development plan (1964-1969) and contain 58 classrooms.

There is still, however, a shortage of secondary school premises, mostly due to the expansion of secondary education. In accordance with the above-mentioned development plan, a grammar school for girls, and two technical institutes are under construction, as well as a second school for extended courses.

Under the third five-year development plan (1969-1974) plans have been submitted for building two secondary technical schools for girls, seven schools for extended courses, one grammar school for boys, and two special schools for handicapped children.

QUANTITATIVE DEVELOPMENT

Number of Pupils and Teachers

The following table shows the number of pupils and teachers in the various types of education and the difference in comparison with the corresponding figures for the previous year:

	Pupils			Teachers		
	1967-1968	Difference		1967-1968	Difference	
Primary	44,000	-1,000	- 2.2%	2,000	-12	- 0.6%
Secondary	8,090	+ 424	+ 5.5%	585	+77	+15.2%
Technical and vocational .	1,688	- 4	- 1.4%	154	+40	+35.1%
Higher	1,148	+ 178	+18.4%	54 ¹	- 3	- 5.3%
Teacher training	392	+ 5	+ 1.3%	23 ²	0	—

¹ plus 28 visiting lecturers

² plus 17 part-time lecturers

STRUCTURE AND ORGANIZATION

Primary and Secondary Education

The introduction of extended course changes to some extent the structure of the upper primary school. These courses are geared to the needs of primary schoolchildren who wish to continue their schooling after the primary school course proper, but who have failed to secure a place in a secondary school.

Special Education

A new centre for handicapped children is being built, and a centre for maladjusted children was opened a few months ago. Teachers for these centres are trained either locally or in the United Kingdom.

Higher Education

The following new courses have been introduced at the College of Arts, Science and Technology: shipbuilding technicians, building quantity surveyors and clerks of works, hygiene, housekeeping, control clerk and larder work, Maltese income tax, Maltese law, business training, shop stewards and office organization.

Private Education

Private schools, run by religious or secular bodies, make a considerable contribution to the civic, moral and spiritual aspects of education on the Island.

The 58 private primary and 21 private secondary schools cater for the education of some 18,000 children at nursery, primary and secondary levels. The term "private" as applied to these schools does not mean that they are selective in their admission as to the wealth, social status, or even creed of the pupils' parents. It merely denotes that they are not state schools but are run by private persons or corporations, mostly religious bodies. These schools are not under the direct control of the Department of Education, but the Government has the right to see that they reach the same standard of education as in state schools, especially those accepting students who have been awarded government scholarships.

CURRICULA, SYLLABUSES AND METHODS

Curricula and Syllabuses

While no important curricular changes have been made during the year, teachers' meetings have been held at primary and secondary levels to discuss the introduction, in due course, of new mathematics.

Audio-visual Aids

Weekly lessons on English language and literature and on science for secondary schools are broadcast experimentally on local television.

An experimental Audio-visual Aids Centre has been set up in both the training colleges and can be visited by all teachers.

Textbooks

New class-readers in Maltese are being planned for use in the primary schools.

TEACHING STAFF

Recruitment

There is no actual shortage of teachers in either primary or secondary schools, but there is a serious lack of professionally trained teachers, especially in secondary schools and technical institutes. To meet this shortage, numerous scholarships are being offered under various schemes and it is hoped that the Training College will be able, within a few years, to start teacher training courses for university graduates wishing to enter the profession. The training college output of 200 a year is also helping to eliminate gradually the need to employ untrained teachers in secondary schools.

Training

Training colleges' entry requirements have been raised, and consideration is being given to the possibility of extending the training course from two to three years and providing post-graduate courses for prospective secondary school teachers.

Status

Recently teachers' salaries were raised considerably and better qualified young people are consequently applying for admission to the Training College and for employment as teachers in secondary schools.

AUXILIARY SERVICES

Health and Hygiene

Schoolchildren's health and hygiene is looked after by the school medical and dental service.

Physical education and sports masters ensure that children adopt a healthy attitude towards sports and games in general.

Nutrition

Free milk and medicines are regularly supplied by the Child Welfare Section. Hot meals are served at very low cost by the local Save the Children Fund Committee. Many new primary schools have gardens which the children are encouraged to look after. Canteens have been set up at the College of Arts, Science and Technology and in two secondary schools.

School Psychologists and Vocational Guidance

A few teachers have been awarded scholarships to train in pupil and vocational guidance in Great Britain. The Council of Europe has been asked to send experts in pupil and vocational guidance to help set up a guidance section in the Department of Education. Vocational guidance has this year been introduced at the College of Arts, Science and Technology, and pupil guidance in one of the secondary technical schools.

Cultural and Artistic Activities

A number of evening classes, both of a literary and of a technical nature, have been opened this year for secondary school pupils who wish to improve their knowledge of the subjects taught at school or to learn extra subjects, and for young people who wish to train in various skills. Altogether 308 such courses have been set up in 45 different centres.

OUT OF SCHOOL EDUCATION

Youth Activities

The Youth Service Organization of the Department of Education has this year been organized by a fully trained and qualified youth organizer. This organization is helping to train leaders for the various youth clubs by arranging seminars, residential week-end courses and two summer camps. It also organizes annually summer camps for children from primary schools and private orphanages. This year there will be short courses for primary school leavers; they will consist of film shows, lectures and discussions. Through the Council of Europe, contacts have been established with various organizations overseas. It is hoped that, through the good offices of the Council of Europe, an expert on youth leadership will shortly be sent to Malta.

INTERNATIONAL RELATIONS

Under the terms of the cultural and scientific treaty recently concluded with the Italian Government, numerous scholarships to be held in Italy and aid in the form of teachers and experts have been offered; exchange of students is also envisaged.

The Catholic Church, by the various pronouncements and teachings emanating from the Holy See on character building, contributes in no small measure to civic education.